RAYALASEEMA UNIVERSITY

(UGC 2 (f) & 12B, accredited by NAAC with 'B' Grade)

KURNOOL

Prof. R.Sanjeeva Rao, Dean
Academic Affairs

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No:RU/Academic Affairs/Engg. College/BoS-Meeting/2020-21/2 Date:20-02-2021

Sir / Madam,

Greetings from Rayalaseema University, Kurnool!!!

I am by direction of the Hon'ble Vice Chancellor of **Rayalaseema University, Kurnool** to inform you that the Virtual **Board of Studies (BoS) meeting through ONLINE mode** has been scheduled on **24-February-2021 (Wednesday)** from **10:30 AM** onwards.

In this regard, all the Chairpersons and Members of different Boards of Studies are hereby invited and requested to attend the meeting.

Agenda of the meeting:

To discuss and approve the following in respect of B.Tech II Year courses in **Civil Engineering**, **Computer Science & Engineering**, **Electronics & Communication Engineering** and **Mechanical Engineering.**

1) Academic Regulations RU19
2) Course Structure
3) Detailed Syllabi

An online meeting link for the Common Boards of Studies meeting will be shared to you at least one hour before commencement of meeting on 24-02-21.

Individual Chairpersons are requested to create a meeting link for their respective Boards and share the same well in advance to the members concerned to convene the virtual meeting for their respective board.

Also, the chairpersons are requested to coordinate with their respective members to have informal discussion at least a day before the meeting.

However, the common BoS meeting will commence at 10:30 AM. Soon after the completion of the common Boards of Studies meeting, the individual Boards of Studies may proceed for virtual meeting of their respective boards through the links already created & shared by them.

Thanking you,

DEAN (Acad. Affairs)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
Course Structure for Four Year Regular B.Tech. Degree Program
(Effective for the batches admitted from 2019-20 onwards)

ELECTRONICS & COMMUNICATION ENGINEERING

INDUCTION PROGRAM (3 weeks duration)

- Physical activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas
- Familiarization to Dept./Branch & Innovations

B. Tech – I Semester (Theory – 4, Lab – 4)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9901	Mathematics – I	3	1	0	4	30	70	100
2	BS	19ABS9902	Engineering Physics	3	0	0	3	30	70	100
3	ES	19AES0201	Basic Electrical and Electronics Engineering	3	0	0	3	30	70	100
4	MC	19AMC9902	Environmental Sciences	3	0	0	0	30	-	30
PRACTICAL										
5	ES	19AES0301	Engineering Drawing Lab	1	0	4	3	30	70	100
6	BS	19ABS9903	Engineering Physics Lab	0	0	3	1.5	30	70	100
7	LC	19ALC0301	Engineering & IT Workshop Lab	0	0	3	1.5	30	70	100
8	ES	19AES0202	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5	30	70	100
			TOTAL:	**13**	**01**	**13**	**17.5**	**240**	**490**	**730**

B. Tech – II Semester (Theory – 5, Lab – 3)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9906	Mathematics – II	3	1	0	4	30	70	100
2	BS	19ABS9904	Engineering Chemistry	3	0	0	3	30	70	100
3	ES	19AES0501	C Programming	3	1	0	4	30	70	100
4	HS	19AHS9901	Communicative English	2	0	0	2	30	70	100
5	MC	19AMC9901	Human Values & Professional Ethics	3	0	0	0	30	-	30
PRACTICAL										
6	BS	19ABS9905	Engineering Chemistry Lab	0	0	3	1.5	30	70	100
7	ES	19AES0502	C Programming Lab	0	0	3	1.5	30	70	100
8	HS	19AHS9902	Communicative English Lab	0	0	3	1.5	30	70	100
			TOTAL:	**14**	**02**	**09**	**17.5**	**240**	**490**	**730**

B. Tech – III Semester (Theory – 7, Lab – 4)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9907	Complex Variables and Transforms	3	0	0	3	30	70	100
2	ES	19AES0203T	Electrical Technology	2	0	0	2	30	70	100
3	ES	19AES0503T	Data Structures	2	0	0	2	30	70	100
4	PC	19APC0401	Network Theory	3	0	0	3	30	70	100
5	PC	19APC0402	Signals & Systems	3	0	0	3	30	70	100
6	PC	19APC0403T	Electronic Devices and Circuits	2	0	0	3	30	70	100
7	PC	19APC0404	Digital Electronics and Logic Design	3	0	0	3	30	70	100
PRACTICAL										
8	ES	19AES0203P	Electrical Technology Lab	0	0	3	1.5	30	70	100
9	ES	19AES0503P	Data Structures Lab	0	0	2	1	30	70	100
10	PC	19APC0403P	Electronic Devices and Circuits Lab	0	0	3	1.5	30	70	100
11	PC	19APC0405	Basic Simulation Lab	0	0	2	1	30	70	100
			TOTAL:	**19**	**0**	**10**	**24**	**300**	**700**	**1000**

B. Tech – IV Semester (Theory – 8, Lab – 3)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9911	Probability Theory and Stochastic Processes	3	0	0	3	30	70	100
2	ES	19AES0505T	Python Programming for Engineers	3	0	0	3	30	70	100
3	HS	19AHS9905	Managerial Economics and Financial Analysis	3	0	0	3	30	70	100
4	PC	19APC0406	Computer Architecture and Organization	3	0	0	3	30	70	100
5	PC	19APC0407	Control Systems	3	0	0	3	30	70	100
6	PC	19APC0408	Electromagnetic Waves and Transmission lines	3	0	0	3	30	70	100
7	PC	19APC0409T	Electronic Circuits – Analysis and Design	3	0	0	3	30	70	100
8	MC	19AMC9903	Biology for Engineers	3	0	0	0	30	0	30
PRACTICAL										
9	ES	19AES0505P	Python Programming for Engineers Lab	0	0	2	1	30	70	100
10	PC	19APC0409P	Electronic Circuits – Analysis and Design Lab	0	0	3	1.5	30	70	100
11	HS	19AHS9906	Advanced English Language Communication Skills Lab	0	0	3	1.5	30	70	100
			TOTAL:	**24**	**00**	**08**	**25**	**330**	**700**	**1030**

DETAILED SYLLABUS

B. TECH – I SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CSE, ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19ABS9901	3	1	0	4	CIA	30 M
Course Title	:	MATHEMATICS – I					SEE	70 M

COURSE OBJECTIVES:

1. To enlighten the learners in the concept of differential equations, matrices and multivariable calculus.
2. To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

COURSE OUTCOMES:

After the completion of this course, the students will be able to:

1. Understand the effective mathematical tools for the solutions of differential equations that model physical processes.
2. Identify the essential characteristics of linear differential equations with constant coefficients and solve the linear differential equations with constant coefficients by appropriate method.
3. Solving systems of linear equations, using technology to facilitate row reduction determine the rank, Eigen values and Eigen vectors, diagonal form and different factorizations of a matrix.
4. Translate the given function as series of Taylor's and McLaren's with remainders and analyze the behavior of functions by using mean value theorems.
5. Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies and acquire the Knowledge maxima and minima of functions of several variables.

Unit I

Ordinary Differential Equations of First Order: Formation of the ordinary differential equations (ODEs) – Solution of an ordinary differential equation – Equations of the First Order and First Degree – Linear Differential Equation – Bernoulli's Equation – Exact Differential Equations – Equations Reducible to exact equations-Orthogonal Trajectories.

Ordinary Differential Equations of First Order but not First Degree: Equations solvable for p – Equations solvable for x – Equations solvable for y – Equations do not contain x(or y) – Clairaut's Equations.

Unit II

Ordinary Differential Equations of Higher Orders: Solutions of Linear Ordinary Differential Equations with Constant Coefficients – Rules for finding the Complimentary Functions – Rules for finding the particular integral – Method of variation of parameters – Cauchy's linear equation – Legendre's Linear Equation.

Unit III

Matrices: Inverse and rank of a matrix – System of linear equations; Symmetric, skew – symmetric and orthogonal matrices – Eigen values and Eigen vectors and their properties, Cayley – Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley – Hamilton theorem, diagonalization of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation.

Unit IV

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), indeterminate forms and Hospital's rule; Maxima and minima.

Unit V

Multivariable Calculus: Limit, continuity and partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd.
2. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
3. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19ABS9902	3	0	0	3	CIA	30 M
Course Title	:	ENGINEERING PHYSICS					SEE	70 M

COURSE OBJECTIVES:

1. To disseminate knowledge in basic concepts of mechanics and to understand the basic ideas of damping and resonance.
2. To interpret the significant concepts of magnetic materials which leads to potential applications and basics of electromagnetic waves.
3. To identify the importance of the optical phenomenon i.e., interference, diffraction andpolarization related to its Engineering applications.
4. To teach the concepts related to laser, fiber optics and superconductivity which lead to their fascinating applications.
5. To familiarize the concept of Quantum mechanics and semiconductors relevant to engineering branches.

UNIT I

MECHANICS AND OSCILLATIONS: Basic laws of vectors and scalars-rotational frames – conservative forces; F = – grad V, torque andangular momentum - Newton's laws in inertial and linear accelerating non-inertial frames ofreference.

Simple Harmonic motion –Characteristics of SHM; Damped harmonic motion – over-damped, critically damped and lightly damped oscillators; Forced oscillations and resonance.

UNIT II

ELECTROMAGNETISM AND MAGNETIC PROPERTIES OF MATERIALS: Divergence of Electric and Magnetic Fields – Gauss theorem for divergence – Curl of Electric and Magnetic Fields – Stokes theorem for curl – Maxwell's Equations – Electromagnetic wave propagation (conducting and non-conducting media) – Poynting's Theorem.

Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Classification of Magnetic materials – Domain Concepts of ferromagnetism – Hysteresis – soft and hard magnetic materials – Magnetic device applications.

UNIT III

WAVE OPTICS: Interference: Principle of superposition – Young's Experiment – Coherence – Interference in thin films, Wedge shaped film, Newton's Rings – Determination of wavelength.

Diffraction: Diffraction, differences between interference and diffraction, Fraunhofer diffraction due to Single slit

Polarization: Polarization by double refraction – Plane polarized light by Nicol's Prism – Half wave and Quarter wave plate – Engineering applications of Polarization.

UNIT IV

LASERS AND FIBER OPTICS: Introduction, spontaneous and stimulated emissions, population inversions, pumping, Ruby laser, Gas laser (He-Ne Laser), Semiconductor laser, Applications of lasers.

Optical Fiber and Total Internal Reflection, Acceptance Angle and cone of a fiber, Numerical aperture, Fiber optics in communications, Types of Optical Fibers, Applications of optical fibers.

SUPERCONDUCTIVITY: Super conductivity, Meissner Effect, Basics of BSC theory, Types of Superconductors and Applications of Superconductors.

UNITV

QUANTUM MECHANICS: Introduction, Photoelectric Effect, de – Broglie's hypothesis, Wave – particle duality Heisenberg's Uncertainty principle, Schrodinger's time independent wave equation, Particle in one dimensional box.

SEMICONDUCTOR PHYSICS: Energy bands in solids, Types of electronic materials: metals, semiconductors, and insulators**.** Intrinsic and Extrinsic semiconductors, Direct and Indirect band gap semiconductors Hall effect – Applications of Hall effect – Drift and Diffusion currents – Continuity equation– Applications of Semiconductors.

COURSE OUTCOMES:

After the completion of this course, the student will be able to:

1. ExtendNewton's second law for inertial and non – Inertial frame of reference and analyze the concept of resonance.
2. Applythe Gauss' theorem for divergence and Stokes' theorem for curl andclassifythe magnetic materials based on susceptibility
3. Interpret the differences between interference and diffraction, illustrate the concept of polarization of light and its applications and classify ordinary polarized light and extraordinary polarized light.
4. Applyelectromagnetic wave propagation in different Optical Fibers, the lasers concepts in various applicationsand explainMeissner's effect, BCS theory.
5. Interpretthe direct and indirect band gap in semiconductors and identify the type of semiconductor using Hall Effect.
   Analyze the behavior of particles at very microscopic level by using wave nature of particles.

TEXT BOOKS:

1. Gaur R.K. and Gupta S.L., "Engineering Physics"-Dhanpat Rai publishers, 2012
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Krshisagar - S. Chand publications, 11th Edition 2019.
3. Fundamentals of Physics by David Halliday and Robert Resnick – Part I and Part II - Wiley.
4. H.K. Malik & A.K. Singh "Engineering Physics" - McGraw Hill Publishing Company Ltd.
5. "Engineering Physics", K.Thyagarajan - McGraw Hill Publishing Company Ltd., 2015.
6. D.Kleppner and Robert Kolenkow "An introduction to Mechanics"- II - Cambridge University Press, 2015.

REFERENCE TEXT BOOKS:

1. M K Varma "Introduction to Mechanics"-Universities Press-2015.
2. I. G. Main, "Vibrations and waves in physics", 3rdEdn., Cambridge University Press
3. D.K. Bhattacharya and A. Bhaskaran, "Engineering Physics"- Oxford Publications-2015
4. David J. Griffiths, "Introduction to Electrodynamics"- 4/e, Pearson Education, 2014
5. P.K. Palaniswamy, "Engineering Physics" Scitech Publications
6. Shatendra Sharma, Jyotsna Sharma, "Engineering Physics" Pearson Education, 2018

7. D.Kleppner and Robert Kolenkow "An introduction to Mechanics" – II – Cambridge University Press, 2015.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, ME and ECE & II Semester CSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0201	3	0	0	3	CIA	30 M
Course Title	:	BASIC ELECTRICAL AND ELECTRONICS ENGG.					SEE	70 M

COURSE OBJECTIVES: -

1. To introduce basics of simple electric circuits.
2. To impart knowledge on measuring devices for voltages and currents.
3. To provide comprehensive idea about working principle, operation and applications of PN junction diode & knowledge about semiconductors
4. To teach applications of electronic principles which are used in Engineering
5. To give knowledge about Special purpose diodes and applications

COURSE OUTCOMES: -

1. Able to recall Simple electrical connections.
2. Knowledge about the Measuring Instruments
3. Learning operation and properties of semiconductors
4. Useful knowledge on PN diode and simple applications.
5. Working and construction of Analog Electronic devices.

UNIT I

ELECTRICAL CIRCUITS: Basic Electrical Circuit elements – (R-L-C) – Ohms Law – Kirchhoff's Law –Introduction to AC Circuits – and DC Circuits – Series connection – parallel connections, Analysis of single – phase ac circuits consisting of RL – RC – RLC series circuits – Nodal Analysis-Mesh Analysis.

UNIT II

MEASURING INSTRUMENTS: Moving coil and moving iron instruments (Ammeter and voltmeter) –Cathode ray oscilloscope – cathode ray tube – Regulated power supply – Digital Multi Meter (DMM) – MeggerInstrument-Introduction to Electric and magnetic fields – Thermistor – Linear Mode power supply.

UNIT III

SEMICONDUCTORS: Classification of semiconductors – Intrinsic semiconductors – Extrinsic semiconductors – conductivity of Intrinsic and Extrinsic semiconductors – P-type semiconductor – N-type semiconductor – Qualitative theory of P-N junction – V-I characteristics of PN junction diode – and simple applications – Light Emitting Diode (LED).

UNIT IV

RECTIFIERS AND FILTERS: Introduction to Rectifiers – Half Wave Rectifiers – Full Wave Rectifiers –Bridge rectifier – Advantages of Bridge rectifier – Comparison of Rectifiers – Harmonic components in a Rectifier circuit – Introduction to Filters – Inductor Filter – capacitor Filter – LC or L-section Filter – Types of Voltage regulators – series voltage regulator – shunt voltage regulator – Clippers and Clampers.

UNIT V

ANALOG ELECTRONICS: Zener diode, Applications of diode as switch and rectifier, Zener diode as regulator, Breakdown mechanism – Avalanche Zener Breakdown – special purpose diodes: Schottky diode, tunnel diode, varactor diode, photodiode, phototransistor, Introduction to Bipolar Junction Transistor – BJT construction, operation, configurations – CB, CE, CC. – Introduction to Basic Logic Gates.

Text Books: -

1. D.P. Kothari, I.J.Nagrath, Basic Electrical and Electronics Engineering, 2^{nd} Edition, McGraw Hill Education (India) Private Limited.
2. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, 2nd edition, Pearson India Private Limited.

Reference Books: -

1. Principles of Electrical Engineering and Electronics, V.K. Mehta & Rohit Mehta, S.Chand publications.
2. Electronic Devices and Circuit Theory by Robert L.Boylestad and Louis Nashelsky., Pearson.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AMC9902	3	0	0	0	CIA	30 M
Course Title	:	ENVIRONMENTAL SCIENCES					SEE	--

COURSE OBJECTIVES: -

1. Creating basic awareness on environment
2. Understanding the importance of ecological balance for sustainable development.
3. Creating awareness on biodiversity and its conservation
4. Understanding the impacts of developmental activities and mitigation measures.
5. Understanding the environmental policies and regulations.

COURSE OUTCOMES:

Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which in – turn helps in sustainable development.

UNIT I

Ecosystems: Definition, Scope and Importance ecosystem. Classification, Structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Energy flow in the ecosystem, Biogeochemical cycles, Bioaccumulation, ecosystem value, derives and carrying capacity, Field visits.

UNIT II

Natural Resources: Classification of Resources: Living and Non – Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable energy source, and case studies.

UNIT III

Biodiversity and its Conservation: Introduction – Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India – Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; Conservation of biodiversity: In-situ and Ex-situ conservation. National Biodiversity Act.

UNIT IV

Environmental Pollution and Control Technologies: Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary Tertiary.

Overview of air pollution control technology, Concept of bioremediation. Global Environmental Problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montreal Protocol.

UNIT V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio – economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl Human Health, Environmental Ethics, Concept of Green Building, Ecological foot print, Life Cycle Assessment(LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCES:

1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt Ltd.
4. Environmental Science by Daniel B. Botkin & Edwards A. Keller, Wiley INDIA edition.
5. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AES0301	1	0	4	3	CIA	30 M
Course Title	:	ENGINEERING DRAWING LAB					SEE	70 M

COURSE OBJECTIVES:

1. To gain and understanding of the basics of geometrical constructions of various planes and solids, understanding system of graphical representation of various objects and various views to draft and read the products to be designed and eventually for manufacturing applications.
2. To learn about various projections, to understand complete dimensions and details of object.
3. Ultimately student must get imaginary skill to put an idea of object, circuit, assembly of parts in black & white, to design a product and to understand the composition, which can be understood universally.

COURSE OUTCOMES:

1. Drawing 2D and 3D diagrams of various objects.
2. Learning conventions of Drawing, which is a Universal Language of Engineers.
3. Drafting projections of points, planes and solids.

UNIT I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance – Conventions in Drawing – Lettering – BIS Conventions.

Curves used in Engineering Practice: (a) Conic Sections including the Rectangular Hyperbola – General method only, (b) Cycloid, Epi-cycloid and Hypocycloid, (c) Involutes.

UNIT II

Scales: Plain, Diagonal and Vernier.

Projection of Points: Principles of orthographic projection – Convention – First angle projections, projections of points.

UNIT III

Projections of Lines: Lines inclined to one or both planes, Problems on projections, Finding True lengths.

Projections of Planes: Projections of regular plane surfaces- plane surfaces inclined to both planes.

UNIT IV

Projections of Solids: Projections of Regular Solids with axis inclined to both planes.

Developments of Solids: Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid, Cone.

UNIT V

Isometric and Orthographic Projections: Principles of isometric projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of lines, Planes, Simple solids (cube, cylinder and cone). Isometric projections of spherical parts. Conversion of isometric Views to Orthographic Views.

Text Books:

1. Engineering Drawing, N.D. Bhatt, Charter Publishers
2. Engineering Drawing, K.L. Narayana& P. Kannaih, SciTech Publishers, Chennai

References:

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers
2. Engineering Drawing, Shah and Rana,2/e, Pearson Education
3. Engineering Drawing and Graphics, Venugopal /New age Publishers
4. Engineering Graphics, K.C. John, PHI,2013
5. Engineering Drawing, B.V.R. Gupta, J.K. Publishers

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19ABS9903	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING PHYSICS LAB					SEE	70 M

COURSE OBJECTIVES:

1. To understand the phenomenon of interference and diffraction using Travelling Microscope and spectrometer.
2. To analyze the interaction of electromagnetic fields.
3. To understand the concept of polarization and classify polarized and unpolarized lights.
4. To realize the laws of resistance by using Carey Foster's bridge.
5. To analyze the frequencies of electrically maintained tuning fork by Melde's apparatus.

COURSE OUTCOMES:

After completion of this course, the students will be able to:

1. Apply the knowledge of optics to calculate geometrical parameters of thickness of thin object and radius of curvature of a lens.
2. Plot the intensity of the magnetic field of circular coil carrying current with varying distance.
3. Evaluate the Planck's constant value practically and analyze the characteristics of photo electric cell and Cauchy's constants.
4. Determine coefficient of thermal Conductivity of a Bad Conductor.

LIST OF EXPERIMENTS:

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.
2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying Circular Coil.
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer.
5. Determination of Refractive Index of Ordinary ray μ_o and extraordinary$\mu_e$ray.
6. Determination of Thickness Given Paper Strip by Wedgeshape Method.
7. Calibration of LowRange Voltmeter.
8. Calibration of LowRange Ammeter.
9. Determination of Magnetic Moment and Horizontal Component of Earth's Magnetic Field.
10. Lees Method – Coefficient of thermal Conductivity of a Bad Conductor.
11. Carey Foster's Bridge – Verification of laws of Resistance and Determination of Specific Resistance.
12. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
13. Photoelectric cell – Characteristics.
14. Planks Constants.
15. Determination of Wavelength of Mono chromatic source using LASERdiffraction

Reference Books:

1. S.Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics" – S.Chand Publishers, 2017.
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Laboratory Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19ALC0301	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING & IT WORKSHOP LAB					SEE	70 M

ENGINEERING WORKSHOP LAB

COURSE OBJECTIVES:

4. The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially, he should know the labor involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

COURSE OUTCOMES:

1. Acquires basic knowledge of various tools and their uses in different sections of manufacturing.
2. Apply wood working skills in real world applications.
3. Design and model various basic prototypes in the trade of fitting.
4. Able to perform various basic House Wiring techniques.

TRADES FOR EXERCISES:

(a) Carpentry: Bench Work, tools used in carpentry.
Jobs for Class work: (i) Half lap joint (ii) Mortise and Tenon joint
(iii) Bridle joint (iv) Corner dovetail joint

(b) Fitting: Tools used in fitting work, Different files, chisels, hammers and bench vice.
Jobs for class work: (i) Vee Fit (ii) Square Fit
(iii) Dovetail Fit (iv) Half Round Fit

(c) House Wiring: Tools used in house wiring work.
Jobs for class work: (i) Series / Parallel Connection with three bulbs
(ii) Tube Light Connections (iii) Stair Case Connections
(iv) Measurement of Earth Resistance / Godown Wiring

Note: At least two exercises to be done from each trade.

TRADES FOR DEMONSTRATION:

a) Plumbing
b) Machine Shop

REFERENCE BOOKS:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P.Kannaiah/ K. L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

IT WORKSHOP LAB

COURSE OBJECTIVES:

1) Understand the basic components and peripherals of a computer.
2) To become familiar in configuring a system.
3) Learn the usage of productivity tools.
4) Acquire knowledge about the netiquette and cyber hygiene.
5) Get hands on experience in trouble shooting a system

COURSE OUTCOMES:

At the end of the course the students can able to

1) Assemble and disassemble the systems
2) Use the Microsoft Office Tools
3) Install various software
4) Know about various search engines
5) Trouble shoots various Hardware and Software problems.

LIST OF EXERCISES

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. Operating System Installation – Install Operating Systems like Windows, Linux along with necessary Device Drivers. The system should be configured as dual boot with both windows and Linux.
3. MS – Office / Open Office
   a) Word – All Toolbars, Page Setup, Page Background, Font, Para Graph, Page Borders, Headers & Footers, Mail Merge, Tables, Symbols, Equations, Saving, and Reviewing.
   b) Excel / Spread Sheet – All Toolbars, Cell Formatting, Grid Lines, Font, Page Setup, Organize data, Functions, Formulae, Headers & Footers, Tables, Graphs and Charts.
   c) Power Point Presentation – Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets, Numbering, Slide Show, Animations, Hyperlinks, Inserting – Images, Clip Art, Shapes, Objects, Tables and Charts, Audio, and Video files.
   d) Access - creation of database, validate data.
4. Network Configuration & Software Installation – Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. Internet and World Wide Web Search Engines, Types of search engines, netiquette, cyber hygiene.
6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.

Reference Books:

1. Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, K.L. James, Eastern Economy Edition.
2. Microsoft Office 2007: Introductory Concepts and Techniques, Windows XP Edition by Gary B. Shelly, Misty E. Vermaat and Thomas J. Cashman (2007, Paperback).
3. Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, Rudra Prathap, Oxford University Press, 2002.
4. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008.

5. The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dreamtech.
6. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
7. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AES0202	0	0	3	1.5	CIA	30 M
Course Title	:	BASIC ELECTRICAL & ELECTRONICS ENGG. LAB					SEE	70 M

COURSE OBJECTIVES:

1. Get exposure to common electronic components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand usage of common electrical measuring instruments.
4. Determine performance characteristics of PN Junction diodes and applications.
5. Understanding simple Network connections Like series circuits

COURSE OUTCOMES:

1. To learn about the simple Logic gates functions.
2. Understanding the simple configurations of the Transistor.
3. Useful for the simple applications of PN diode.
4. To give knowledge about PN diode characteristics.
5. Knowledge about simple Network Analysis

BASIC ELECTRICAL ENGINEERING LAB

List of Experiments:

1. Verification of Ohms Law
2. Verification of KCL and KVL Laws
3. MESH analysis
4. NODAL analysis
5. Verification of RC and RL Parallel Resonance
6. Verification of R-L-C Series Resonance

BASIC ELECTRONICS ENGINEERING LAB

List of Experiments:

1. V-I Characteristics of PN DIODE
2. Half Wave Rectifier
3. Full Wave Rectifier
4. BJT Configuration of CB, CE, CC
5. ZENER Diode Characteristics
6. Basic LOGIC gates

B.TECH – II SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to II Semester CSE, ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19ABS9906	3	1	0	4	CIA	30 M
Course Title	:	MATHEMATICS – II					SEE	70 M

COURSE OBJECTIVES:

1. To familiarize the prospective engineers with techniques in multivariate integration and partial differential equations.
2. To equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

COURSE OUTCOMES:

After the completion of this course, the students will be able to:

1. Understand beta and gamma functions and its relations and conclude the use of special function in evaluating definite integrals.
2. Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and apply double integration techniques in evaluating areas bounded by region.
3. Apply Del to Scalar and vector point functions and illustrate the physical interpretation of Gradient, Divergence and Curl.
4. Find the work done in moving a particle along the path over a force field and evaluate the rates of fluid flow along and across curves.
5. Apply a range of techniques to find solutions of standard PDEs and outline the basic properties of standard PDEs.

Unit I

Sequences and Series: Convergence of sequence and series, tests for convergence;
Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit II

Special Functions: Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions, evaluation of improper integrals.

Unit III

Multiple Integrals: Double integrals, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves, Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates.

Unit IV

Vector Calculus: Scalar and vector point functions, vector operator del, del applies to scalar point functions Gradient, del applied to vector point functions – Divergence and Curl, vector identities.

Line integral – circulation – work done, surface integral – flux, green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Unit V

Partial Differential Equations: First order partial differential equations, solutions of first order linear and non – linear PDEs. Solutions to homogenous and non – homogenous higher order linear partial differential equations.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd.
2. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
3. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19ABS9904	3	0	0	3	CIA	30 M
Course Title	:	ENGINEERING CHEMISTRY					SEE	70 M

COURSE OBJECTIVES:

- To familiarize engineering chemistry and its applications
- To impart the concept of soft and hard waters, softening methods of hard water
- To train the students on the principles and applications of electrochemistry, polymers, surface chemistry, and cement.

COURSE OUTCOMES:
At the end of the course the students will be able to:
1. To impart the concept of soft and hard waters, softening methods of hard water.
2. Explain the importance of polymers in our daily life and mechanism of conduction in the conducting polymers.
3. To analyze the fuel and methods for preparation of synthetic fuels.
4. To understand the basics of electrochemistry, conductometry and batteries.
5. To familiarizes the Engineering materials.

Unit I
Water Technology: Sources of Water, Impurities and their Influence on Living Systems, Soft Water and Hardness of Water, Estimation of Hardness by EDTA Method, Boiler Troubles – Scale and Sludge, Industrial Water Treatment Internal Treatment Methods(Phosphate Conditioning, Calgon Conditioning), Water softening Methods (Zeolite and Ion-Exchange Processes), Specifications for Drinking Water, Bureau of Indian Standards(BIS) and World Health Organization(WHO), Municipal Water Treatment, Desalination of Brackish Water, Reverse Osmosis (RO) and Electrodialysis.

Unit II
Polymer Chemistry: Introduction to Polymers, Types of Polymerizations (Addition & Condensation), Mechanism of Addition Polymerization (Ionic and Radical).
Plastics: Thermoplastics and Thermosetting. Preparation, Properties and Applications of Bakelite, Nylon – 66.
Elastomers: Buna-S, Buna – N–Preparation, Properties and Applications.
Conducting Polymers: Polyacetylene, Polyaniline, Mechanism of Conduction and Applications.

Unit III

Fuel Technology: Fuels –Classification of fuels.

Solid Fuels: Wood and Coal, Ranking of Coal-Analysis (Proximate and Ultimate), Coke Manufacture Otto Hoffman Process.

Liquid Fuels: Petroleum Origin, Extraction, and Refining. Motor Fuels Petrol, Diesel Oil, Knocking Octane Number and Cetane Number; Synthetic petrol – Fischer – Tropsch's& Bergius process.

Gaseous Fuels: Composition and Uses of Natural Gas, LPG, and CNG. Flue gas analysis and its significance.

Unit IV

Electrochemistry: Introduction to Electrochemistry (Conductors, Semi-Conductors, Insulators, Conductance). Electrodes, Reference Electrodes, Electrochemical Cell, Nernst Equation, Cell Potential and its Calculations, Numerical Problems. Principle and Applications of Potentiometry, Conductometry.

Batteries: Primary Batteries – Zinc – Air Battery.
Secondary Batteries –Lithium-Ion Batteries – Working of the Batteries including Cell Reactions.
Fuel Cell – Hydrogen – Oxygen.

Unit V

Materials of Engineering Chemistry:

Building materials: Portland cement, Constituents, Phases and Reactivity of Clinker, Setting and Hardening of Cement.

Refractories: Classification, Properties, Factors affecting the Refractory Materials and Applications.

Lubricants: Classification of Lubricants with examples. Definition and Significance of the following Characteristics of a Good Lubricating Oil – Viscosity, Viscosity Index, Flash & Fire Point, Acid Number, Saponification Value, Pour Point and Cloud Point.

Text books:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Shashi Chawla, A Reading of Engineering Chemistry, 3rd Edition, Dhanpat Rai and Co., New Delhi, 2011,3rd edition.
3. Puri, Sharma and Pathania "Principles of Physical Chemistry". Vishal Publishing Co., Jalandhar.1991, 31^{st} edition
4. Gowariker*et al.*, Polymer Science and Technology, Prentice Hall of India Pvt. Ltd., New Delhi, 2004, 10^{th} reprint.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AES0501	3	1	0	4	CIA	30 M
Course Title	:	C PROGRAMMING					SEE	70 M

COURSE OBJECTIVES:

1. Introduce the internal parts of a computer, and peripherals.
2. Introduce the Concept of Algorithm and use it to solve computational problems
3. Identify the computational and non – computational problems
4. Teach the syntax and semantics of a C Programming language
5. Demonstrate the use of Control structures of C Programming language

COURSE OUTCOMES:

1. Illustrate the working of a computer and apply algorithmic approach for solving a problem.
2. Recognize the importance of programming language independent constructs
3. Select the control structure to solve computational problems
4. Design and implement programs to analyze the array applications.
5. Structure the individual data elements to simplify the solutions.

Unit I

Introduction to Computer Programming Languages: Evolution of Computer Programming languages – Machine, Symbolic and high – level languages. Fundamentals of Algorithms (Pseudo Codes) and Flowcharts, Compiler, Interpreter, Loader, and Linker.
Creating and Running Programs: Writing, Editing, Compiling, Linking and Executing.
Program Control Structures: Sequence, Selection and Iteration. Software Development Method.

Unit II

Introduction to C Language: Background,Basic Structure of a C Program – Steps to execute a C Program – Character Set of C Language – Basic I/O Statements – Basic Data Types and Sizes – C – Tokens: Identifiers, Keywords, Constants, and Variables. Sample Programs.
Input and output: standard input and output, formatted output – printf, formatted input – scanf.

Unit III

Operators: Arithmetic, Relational, Logical, Increment and decrement, Conditional, Assignment, Bitwise – Operator Precedence – Expressions – Type Conversions, Conditional Expressions – Precedence and Order of Evaluation. Sample Programs.
Control Flow / Control Statements: Selection & Making Decisions – Logical Data and Operators – Two-way Selection, Multi-way selection – Standard Statements and blocks – Non-iterative Statements: (if, if-else, null else, nested if-else, if-else ladder, else-if, switch) – Repetitive / Iterative Statements: Concept of loop – Pre-test and post-test loops – While loop, do-while loop, and for loops, initialization and updating, event and counter controlled loops. Branching: break, continue, and Goto. – Sample programs on applications.

Unit IV

Arrays in C language: Concept – Definition – Declaration – Types of arrays – One Dimensional, two dimensional, multidimensional – initialization of arrays – Storing and assessing elements – Array applications.

Strings: Definition, Declaration, Initialization – Basic operations – String manipulations – String handling functions – Arrays using strings

Unit V

Pointers and arrays: Concept –Definition, Declaration, Initialization, pointer to pointer, functions and pointers, arrays and pointers, pointer as function arguments (call-by-reference), pointers and strings.

Functions: Concept –Definition, Declaration, Types of functions – parameter passing – passing arrays to functions, passing pointers to functions, Recursion – returning non-integers, external variables, scope variables, header variables, register variables, block structure. User defined functions – Standard Library Functions.

Structures: Definition –Declaration – Initialization - Accessing the structure elements – arrays of structures, Array with in structures, pointers to structures, Passing Structure to functions – nested structures, self-referential structures, unions, typedef.

Text Books:

1. Pradip Dey, and Manas Ghosh, “Programming in C”, 2018, Oxford University Press.
2. R.G. Dromey, “How to Solve it by Computer”. 2014, Pearson.
3. Brian W. Kernighan, and Dennis M. Ritchie, “The C Programming Language”, 2ndEdition, Pearson.

Reference Books:

1. RS Bichkar “Programming with C”, 2012, Universities Press.
2. Pelin Aksoy, and Laura Denardis, “Information Technology in Theory”, 2017, Cengage Learning.
3. Byron Gottfried and Jitender Kumar Chhabra, “Programming with C”, 4th Edition, 2019, McGraw Hill Education.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AHS9901	2	0	0	2	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH					SEE	70 M

COURSE OBJECTIVES:

Reading Skills
- Addressing explicit and implicit meanings of a text on current topics.
- Understanding the context.
- Learning new words and phrases.
- Using words and phrases in different contexts.

Writing Skills
- Using the basic structure of a sentence.
- Applying relevant writing formats to create paragraphs, essays, letters, emails, reports and presentations.
- Retaining a logical flow while writing.
- Planning and executing an assignment creatively.

Interactive Skills
- Analyzing a topic of discussion and relating to it.
- Participating in discussions and influencing them.
- Communicating ideas effectively.
- Presenting ideas coherently within a stipulated time.

Life Skills
- Examining self-attributes and identifying areas that require improvement: self-diagnosis and self-motivation.
- Adapting to a given situation and developing a functional approach to finding solutions: adaptability and problem solving.
- Understanding the importance of helping others: community services and enthusiasm.

COURSE OUTCOMES:
1. The student will acquire basic proficiency in English using all LSRW skills.
2. Read and explore for enrichment of works from various genres (Poems, essays etc.)
3. Make correct usage of grammar and Vocabulary in writing and speaking.
4. To make them develop Linguistic competence.
5. To make them understand the concept of redundancies in writing skills.

UNIT I

Reading : *On the conduct of life:* William Hazlitt
Grammar : Prepositions
Vocabulary : Word Formation I: Introduction to Word Formation
Writing : Clauses and Sentences
Life skills : **Values and Ethics**
If: Rudyard Kipling

UNIT II

Reading : *The Brook:* Alfred Tennyson
Grammar : Articles
Vocabulary : Word Formation II: Root Words from other Languages
Writing : Punctuation
Life skills : **Self – Improvement**
How I Became a Public Speaker: George Bernard Shaw

UNIT III

Reading : *The Death Trap*: Saki
Grammar : Noun-Pronoun Agreement
Subject- Verb Agreement
Vocabulary : Word Formation III: Prefixes and Suffixes
Writing : Principles of Good Writing
Life skills : **Time Management**
On saving Time: Seneca

UNIT IV

Reading : *ChinduYellama*
Grammar : Misplaced Modifiers
Vocabulary : Synonyms; Antonyms
Writing : Essay Writing
Life skills : **Innovation**
Muhammad Yunus

UNIT V

Reading : *Politics and the English Language*: George Orwell
Grammar : Clichés; Redundancies
Vocabulary : Common Abbreviations
Writing : Writing a Summary
Life skills : **Motivation**
The Dancer with a White Parasol: Ranjana Dave

Prescribed Textbook: *Language and Life: A Skills Approach* Board of Editors, Orient Black Swan Publishers, India. 2018.

Suggested Readings

- Practical English Usage. Michael Swan. OUP. 1995.
- Remedial English Grammar. F.T. Wood. Macmillan.2007
- On Writing Well. William Zinsser. Harper Resource Book. 2001
- Study Writing. Liz Hamp – Lyons and Ben Heasly. Cambridge University Press. 2006.
- Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
- Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AMC9901	3	0	0	0	CIA	30 M
Course Title	:	HUMAN VALUES AND PROFESSIONAL ETHICS					SEE	--

COURSE OBJECTIVES: -This introductory course input is intended.

1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

UNIT I

Course Introduction –Need, basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self-Exploration – what is it? – its content and process; 'Natural Acceptance' and Experiential Validation – as the mechanism for self-exploration. Continuous Happiness and Prosperity – A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities – The basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT II

Understanding Harmony in the Human Being – Harmony in Myself! Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' – Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT III

Understanding Harmony in the Family and Society – Harmony in Human – Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human – human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay – tripti;

Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society – Undivided Society (Akhand Samaj), Universal Order (SarvabhaumVyawastha) – from family to world family!

UNIT IV

Understanding Harmony in the nature and Existence – Whole existence as Co – existence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature – recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astiva) of mutually interacting units in all – pervasive space. Holistic perception of harmony at all levels of existence.

UNIT V

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order,
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order.

a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
b. At the level of society: as mutually enriching institutions and organizations.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIIich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer& Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan& V. S Senthil kumar, Engineering Ethics (includingHumna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. AI Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19ABS9905	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING CHEMISTRY LAB					SEE	70 M

COURSE OBJECTIVES:

1. To Verify the fundamental concepts with experiments

COURSE OUTCOMES: At the end of the course, the students will be able to

1. **Prepare** of various Solutions
2. **Determine** the hardness of water
3. **Analysis** of water
4. **Calculate the** cell constant and conductance of solutions
5. **Determine** the physical properties like viscosity, acid number, saponification number
6. **Estimate** the Iron and Calcium in cement

LIST OF EXPERIMENTS:

1. Preparation of Primary Standard (sodium carbonate) Solution.
2. Estimation of Hardness of Water by EDTA method.
3. Estimation of Dissolved Oxygen by Winkler's method.
4. Estimation of Available Chlorine in Bleaching Powder.
5. Estimation of Ferrous ion in the given Mohr Salt by using KMnO4 Solution
6. Determination of Strength of an Acid in Pb – Acid Battery.
7. Preparation of Polymer (Bakelite).
8. Determination of Cell Constant and Conductance of Solutions
9. Determination of Strength of Acid by Conductometric Titrations.
10. Estimation of Calcium in Port land Cement.
11. Determination of Iron in Cement Sample by Colorimeter.
12. Determination of Viscosity of Lubricating Oil using Ostwald Viscometer.
13. Determination of Average Molecular Mass of given Polymer (Polyvinyl Alcohol) by Using Ostwald Viscometer.
14. Determination of acid number of given lubricating oil.
15. Determination of Saponification number of given lubricating oil.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AES0502	0	0	3	1.5	CIA	30 M
Course Title	:	C PROGRAMMING LAB					SEE	70 M

COURSE OBJECTIVES:

1. To learn about the computer systems, computing environments, developing a computer program and structure of C.
2. To gain Knowledge of the operators, control statements in C.
3. To learn about the design concepts of arrays, strings and their usage.
4. To assimilate about pointers and dynamic memory allocation.

COURSE OUTCOMES:

1. Acquire skills to write, compile and debug programs in c language.
2. Be able to use different operators, data types and write programs
3. Acquire knowledge to select the best loop construct for a given problem.
4. Design and implement programs to analyze the array applications.
5. Design and implement C programs with Functions.

Exercise: 1

a) Write a C program to print a given statement.
b) Write a C program for exchanging (interchanging) values of two variables.
c) Write a C program to find the reverses of a given Number.

Exercise: 2

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program to find the second maximum number among the given list of numbers.
c) Write a C program to find the k^{th}smallest number among the given list of numbers.

Exercise: 3

a) Write a C program to demonstrate various operators (Arithmetic operator, increment & decrement operator, Relational operator, and Assignment operator).
b) Write a C Program, to counts number of positive and negative numbers separately and also compute the sum ofthem.

Exercise: 4

a) Write a C program to generate the first ‘n’ terms in the sequence of Fibonacci series.

Exercise: 5

a) Write a C program to generate all the prime numbers between 1 and n, where ‘n’ is the value given by the user.
b) Write a program which Prints the following patterns.

```
ABCDEFGFEDCBA          0
ABCDEF FEDCBA         111
ABCDE   EDCBA        22222
ABCD     DCBA       3333333
ABC       CBA      444444444
AB         BA
A           A
```

c) Write a C program to generate Pascal’s triangle.
d) Write a C program to construct a pyramid of numbers.

Exercise: 6

a) Write a C program, for the arithmetic operators using switch case (which takes two integer operands and one operator from the user, performs the specified operation and then prints the result. (Consider the operators +,- ,*, /, % and use Switch Statement)
b) Write a program to find G.C.D (Greatest Common Divisor) of two numbers using recursion and non-recursion.
c) Write a program to find factorial of a number using recursion and non-recursion.

Exercise: 7

a) Write a C program to calculate distance between two points.
b) Write a program to find Roots of quadratic equation.

Exercise: 8

a) Write a C program to perform Matrix Addition
b) Write a C program to perform Matrix Multiplication
c) Write a C program to perform inverse of a Matrix.
d) Write a C program to find the transpose of a given matrix.

Exercise: 9

a) Write a C program for any numerical method.
b) Write a C program to make a simple calculator.

Exercise: 10

a) Write a C program to solve Towers of Hanoi problem by using recursive function.
b) Write a C program to know if the given string is a palindrome or non-palindrome.
c) Write a C program to find whether the given year is a leap year or not.

Exercise: 11

a) Write a C program to insert a sub-string in to the given main string.
b) Write a C program to demonstrate the parameter passing mechanism using: call-by-value, call-by-reference.

Exercise: 12

a) Implement the sorting algorithm: Insertion sort and Selection sort.
b) Write a C program to access elements of an array using pointers
c) Write a C program to find the sum of numbers with arrays and pointers.

Exercise: 13

a) Implementation of string using operations.
   i) Copy
   ii) Concatenate
   iii) Length
   iv) Compare

Exercise: 14

a) Write a C program to find the position of a substring.
b) Write a C program to represent complex numbers using structure.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AHS9902	0	0	3	1.5	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH LAB					SEE	70 M

COURSE OBJECTIVES:

1. Students will be exposed to a variety of self-instructional, learner friendly modes of language learning
2. Students will cultivate the habit of reading passages from the computer monitor. Thus, providing them with the required facility to face computer based competitive exams like GRE, TOEFL, and GMAT etc.
3. Students will learn better pronunciation through stress, intonation and rhythm
4. Students will be trained to use language effectively to face interviews, group discussions, public speaking
5. Students will be initiated into greater use of the computer in resume preparation, report writing, format making etc

COURSE OUTCOMES:

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

Unit I

1. Phonetics for listening comprehension of various accents
2. Reading comprehension
3. Describing objects/places/persons

Learning Outcomes: At the end of the module, the learners will be able to

- understand different accents spoken by native speakers of English
- employ suitable strategies for skimming and scanning on monitor to get the general idea of a text and locate specific information
- learn different professional registers and specific vocabulary to describe different persons, places and objects

Unit II

1. JAM
2. Small talks on general topics
3. Debates

Learning Outcomes: At the end of the module, the learners will be able to

- Produce a structured talk extemporarily
- Comprehend and produce short talks on general topics
- Participate in debates and speak clearly on a specific topic using suitable discourse markers

Unit III

1. Situational dialogues – Greeting and Introduction
2. Summarizing and note making
3. Vocabulary Building

Learning Outcomes: At the end of the module, the learners will be able to

- Learn different ways of greeting and introducing oneself/others
- Summarize the content with clarity and precision and take notes while listening to a talk/lecture and make use of them to answer questions
- Replenish vocabulary with one-word substitutes, homonyms, homophones, homographs to reduce errors in speech and writing

Unit IV

1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

Learning Outcomes: At the end of the module, the learners will be able to

- Learn different ways of asking information and giving directions
- Able to transfer information effectively
- Understand non-verbal features of communication

Unit V

1. Oral Presentations
2. Précis Writing and Paraphrasing
3. Reading Comprehension and spotting errors

Learning Outcomes: At the end of the module, the learners will be able to

- Make formal oral presentations using effective strategies
- Learn different techniques of précis writing and paraphrasing strategies
- Comprehend while reading different texts and edit short texts by correcting common errors.

B.TECH – III SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to III Semester CE, ECE & ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19ABS9907	2	1	0	3	CIA	30 M
Course Title	:	COMPLEX VARIABLES AND TRANSFORMS					SEE	70 M

COURSE OBJECTIVES: -

- This course aims at providing the student to acquire the knowledge on the calculus of functions of complex variables. The student develops the idea of using continuous/discrete transforms.

Unit I: Complex Variable – Differentiation

Introduction to functions of complex variable – concept of Limit & continuity – Differentiation, Cauchy –Riemann equations, analytic functions (exponential, trigonometric, logarithm), harmonic functions, finding harmonic conjugate – construction of analytic function by Milne Thomson method – Conformal mappings – standard and special transformations (sin z, e^z, cos z, z^2) Mobius transformations (bilinear) and their properties.

Learning Outcomes: Students will be able to:

- Understand functions of Complex variable and its properties.
- Find derivatives of complex functions.
- Understand the analyticity of complex functions.
- Understand the conformal mappings of complex functions.

Unit II: Complex Variable – Integration

Line integral – Contour integration, Cauchy's integral theorem, Cauchy Integral formula, Liouville's theorem (without proof) and Maximum – Modulus theorem (without proof);power series expansions: Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals (around unit circle, semi-circle with f(z) not having poles on real axis).

Learning Outcomes: Students will be able to

- Understand the integration of complex functions.
- Apply Cauchy's integral theorem and Cauchy's integral formula.
- Understand singularities of complex functions.
- Evaluate improper integrals of complex functions using Residue theorem.

Unit III: Laplace Transforms

Definition-Laplace transform of standard functions-existence of Laplace Transform – Inverse transform – First shifting Theorem, transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function. Differentiation and integration of transform – solving Initial value problems to ordinary differential equations with constant coefficients using Laplace transforms.

Learning Outcomes: Students will be able to

- Understand the concept of Laplace transforms and find the Laplace transforms of elementary functions.
- Find the Laplace transforms of general functions using its properties.
- Understand Laplace transforms of special functions (Unit step function, Unit Impulse & Periodic).

- Apply Laplace transforms to solve Differential Equations.

Unit IV: Fourier series
Determination of Fourier coefficients (Euler's) – Dirichlet conditions for the existence of Fourier series – functions having discontinuity – Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Half-range Fourier sine and cosine expansions – typical wave forms – Parseval's formula – Complex form of Fourier series.

Learning Outcomes: Students will be able to
- Understand finding Fourier series expression of the given function.
- Determine Fourier coefficients (Euler's) and identify existence of Fourier series of the given function.
- Expand the given function in Fourier series given in half range interval.
- Apply Fourier series to establish Identities among Euler coefficients.
- Find Fourier series of wave forms.

Unit V: Fourier transforms& Z Transforms:
Fourier integral theorem (without proof) – Fourier sine and cosine integrals-complex form of Fourier integral. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – convolution theorem.
Z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

Learning Outcomes: Students will be able to
- Find Fourier Sine and cosine integrals.
- Understand Fourier transforms.
- Apply properties of Fourier transforms.
- Understand Z transforms.
- Apply properties of Z transforms.
- Apply Z transforms to solve difference equations.

TEXT BOOKS:
1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
3. Advanced Engineering Mathematics, by R.K.Jain and S.R.K.Iyengar, Alpha Science International Ltd. Pangboume England.

REFERENCE BOOKS:
1. Higher Engineering Mathematics, by B.V.Ramana, McGraw Hill publishers.
2. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

COURSE OUTCOMES:
After the completion of course, students will be able to
1. Understand the analyticity of complex functions and conformal mappings.
2. Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.
3. Understand the usage of Laplace Transforms, Fourier Transforms and Z transforms.
4. Evaluate the Fourier series expansion of periodic functions.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester ECE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AES0203T	2	0	0	2	CIA	30 M
Course Title	:	ELECTRICAL TECHNOLOGY					SEE	70 M

COURSE OBJECTIVES: -

- The constructional features of DC machines, different types of DC machines and their characteristic.
- The constructional details of single-phase transformer and their performance characteristics by conducting suitable tests.
- The analysis of three phase balanced and unbalanced circuits, three phase induction motors and their characteristics.
- The constructional feature and operation of synchronous machines.

Unit I: D.C. Generators
D.C. Generators – Principle of Operation – Constructional Features – E. M.F Equation– Numerical Problems – Methods of Excitation – Separately Excited and Self Excited Generators – Build-Up of E.M.F – Critical Field Resistance and Critical Speed – Load Characteristics of Shunt, Series and Compound Generators – Applications

Learning Outcomes: After completing this unit, the student will be able to:

- To know about principle of operation of a DC machine working as a generator
- To distinguish between self and separately excited generators and classification
- To know how EMF is developed
- To distinguish between critical field resistance and critical speed
- To know about various characteristics of different types of generators

Unit II: D.C. Motors
D.C Motors – Principle of Operation – Back E.M.F.–Torque Equation – Characteristics and Application of Shunt, Series and Compound Motors-Speed Control of D.C. Motors: Armature Voltage and Field Flux Control Methods. Three Point Starter-Losses – Constant & Variable Losses – Calculation of Efficiency – Swinburne's Test.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand the concept of network reduction techniques and Network Theorems. (L1)
- Solve various circuits using Network theorems and network reduction techniques. (L2)
- To know about principle of operation of DC machine working as a motor
- To know about torque developed
- To know about how to control speed of DC shunt motor
- To know about necessity of starter
- To know about various load characteristics of various types of DC motors

Unit III: Single Phase Transformers & Three Phase A.C. Circuits

Introduction – Single Phase Transformers – Constructional Details– EMF Equation – Operation on No Load and on Load – Phasor Diagrams – Equivalent Circuit – Losses and Efficiency – Regulation – OC and SC Tests – Predetermination of Efficiency and Regulation. Analysis of Balanced Three Phase Circuits – Phase Sequence – Star and Delta Connection – Relation between Line and Phase Voltages and Currents in Balanced Systems – Measurement of Active and Reactive Power in Balanced and Unbalanced Three Phase Systems.

Learning Outcomes: After completing this unit, the student will be able to:

- To understand the principle of operation of 1-ϕ transformer
- To understand computation and predetermination of regulation of a 1-ϕ transformer
- To know about basics of three phase circuits
- To distinguish between phase voltages, currents, line values and phase values
- To distinguish between balanced and unbalanced three phase circuits and power measurement

Unit IV: 3-Phase Induction Motors
Poly-phase Induction Motors – Construction Details of Cage and Wound Rotor Machines – Principle of Operation – Slip – Rotor EMF and Rotor Frequency – Torque Equation – Torque Slip Characteristics – Losses and efficiency.

Learning Outcomes: After completing this unit, the student will be able to:

- To know about principle of operation of three phase induction motor
- To distinguish between squirrel cage and slip ring induction motors
- To know about various losses and computation of efficiency of induction motor
- To know about the torque developed by the induction motor
- To understand various characteristics of induction motor

Unit V:Synchronous Machines
Principle and Constructional Features of Salient Pole and Round Rotor Machines – E.M.F Equation – Voltage Regulation by Synchronous Impedance Method – Theory of Operation of Synchronous Motor.

Learning Outcomes: After completing this unit, the student will be able to:

- To know about principle of working of alternator
- To distinguish between salient pole and cylindrical rotor machines
- To know about EMF equation
- To know about predetermination of regulation of alternator by synchronous impedance method
- To know about principle of operation of synchronous motor

TEXT BOOKS:

1. I.J.Nagrath & D.P.Kothari,"Electric Machines",7th Edition,Tata Mc Graw Hill, 2005
2. T.K.Nagsarkar and M. S. Sukhija, "Basic Electrical Engineering", 3rd Edition, Oxford
    a. University Press 2017.

REFERENCE BOOKS:

1. B. R. Gupta & Vandana Singhal, “Fundamentals of Electric Machines”, 3rd Edition, New age International Publishers, 2005.
2. S. Kamakashiah, “Electromechanics – III”, overseas publishers Pvt. Ltd.
3. V.K. Mehta and Rohit Mehta, “Principles of Electrical Engineering”, S.Chand Publications, 2005.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

- CO1: Able to calculate the EMF generated on DC Generator also able to control speed of different DC motors.
- CO2: Able to conduct open circuit and short circuit tests on single phase transformer for knowing their characteristics.
- CO3: Able to analyse three phase circuits, three induction motor operating principle and know their torque slip characteristics.
- CO4: Able to have knowledge on synchronous machine with which he/she can able to apply the above conceptual things to real – world problems and applications.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to III Semester CE, CSE & ME)
(For III Semester ECE weekly 02 hrs. with 02 Credits only)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AES0503T	3	0	0	3	CIA	30 M
Course Title	:	DATA STRUCTURES					SEE	70 M

COURSE OBJECTIVES: -

- To teach the representation of solution to the problem using algorithm
- To explain the approach to algorithm analysis
- To introduce different data structures for solving the problems
- To demonstrate modeling of the given problem as a graph
- To elucidate the existing hashing techniques

Unit I: Introduction

Algorithm Specification, Performance analysis, Performance Measurement. Arrays: Arrays, Dynamically Allocated Arrays. Structures and Unions. Sorting: Motivation, Insertion sort, Quick sort, how fast can we sort, Merge sort, Heap sort.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Analyze the given algorithm to find the time and space complexities. (L4)
- Select appropriate sorting algorithm (L4)
- Design a sorting algorithm (L6)

Unit II: Stack, Queue and Linked lists

Stacks, Stacks using Dynamic Arrays, Queues, Circular Queues Using Dynamic Arrays, Evaluation of Expressions, Multiple Stacks and Queues. Linked lists: Singly Linked Lists and Chains, Representing Chains in C, Linked Stacks and Queues, Additional List Operations, Doubly Linked Lists.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Evaluate expressions (L5)
- Develop the applications using stacks and queues (L3)
- Construct the linked lists for various applications (L6)

Unit III: Trees

Introduction, Binary Trees, Binary Tree Traversals, Additional Binary Tree Operations, Binary Search Trees, Counting Binary Trees, Optimal Binary search Trees, AVL Trees. B-Trees: B-Trees, B + Trees.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain the concept of a tree (L2)
- Compare different tree structures (L4)
- Apply trees for indexing (L3)

Unit IV: Graphs and Hashing

The Graph Abstract Data Type, Elementary Graph Operations, Minimum Cost Spanning Trees, Shortest Paths and Transitive Closure.
Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Recognize the importance of Graphs in solving real world problems (L2)
- Apply various graph traversal methods to applications (L3)
- Design a minimum cost solution for a problem using spanning trees (L6)
- Select the appropriate hashing technique for a given application (L5)
- Design a hashing technique (L6)

Unit V: Files and Advanced sorting

File Organization: Sequential File Organization, Direct File Organization, Indexed Sequential File Organization.

Advanced sorting: Sorting on Several keys, List and Table sorts, Summary of Internal sorting, External sorting.

Learning Outcomes: Students will be able to

- Organize files (L3)
- Design the algorithms which sort the elements which doesn't fit in main memory (L6)

TEXT BOOKS:

1. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Data Structures in C", 2nd Edition, Galgotia Book Source, Pvt. Ltd., 2004.
2. ALAN L. THARP, "File Organization and Processing", Wiley and Sons, 1988.

REFERENCE BOOKS:

1. D. Samantha, "Classic Data Structures", 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012.
2. Peter Bras, "Advanced Data Structures", Cambridge University Press, 2016
3. Richard F.Gilberg, Behrouz A.Forouzan," Data Structures A Pseudo Code Approach with C", Second Edition, Cengage Learning 2005.

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Select Appropriate Data Structure for solving a real-world problem. (L4)
2. Select appropriate file organization technique depending on the processing to be done. (L4)
3. Construct Indexes for Databases. (L6)
4. Analyze the Algorithms.(L4).
5. Develop Algorithm for Sorting large files of data.(L3).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester ECE)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19APC0401	3	0	0	3	CIA	30 M
Course Title	:	NETWORK THEORY					SEE	70 M

COURSE OBJECTIVES: -
- To study about basic laws that govern flow of current, different sources of voltage and currents
- To understand basic concepts on basic RLC circuits and analyze.
- To study and apply circuit theorems
- To know the behavior of the steady states and transients' states in RLC circuits and analyze them.
- To study the basic Laplace Transforms techniques and principles of coupling
- To understand the two port network parameters & network functions

Unit I: Basic Circuit Analysis
Review of Kirchhoff's laws, Nodal and Mesh Analysis. Network Topology: Graph of a network, Concept of tree and co – tree, incidence matrix, f – circuit matrix and f – cutset matrix, Tie set and Cut – set Matrices for planar networks.

Learning Outcomes: After completing this unit, the student will be able to:
- Understand Nodal and Mesh Analyses and various Network topologies. (L1)
- Solve network problems using Nodal and Mesh Analyses. (L2)

Unit II: Network reduction techniques & Theorems
Series, parallel, series-parallel, star-to-delta, delta-to-star transformation, source transformation. Network Theorems such as Thevenin's, Norton's, Superposition, Maximum Power Transfer, Reciprocity, Milliman, Miller and Tellegan's Theorems.

Learning Outcomes: After completing this unit, the student will be able to:
- Understand the concept of network reduction techniques and Network Theorems. (L1)
- Solve various circuits using Network theorems and network reduction techniques. (L2)

Unit III: Transient Analysis
Transient analysis of RC, RL and RLC Circuits, Circuits with switches, step response, 2nd order series and parallel RLC Circuits. Analysis of transient circuits with Laplace Transform technique for step, impulse and exponential excitations.

Learning Outcomes: After completing this unit, the student will be able to:
- Understand basic characteristics of passive elements and associated circuits in transient analysis. (L1)
- Problem solving ability using conventional and Laplace Transform techniques in the transient analysis of RLC circuits. (L2)

Unit IV: Single Phase AC Circuits
Review of AC circuit fundamentals, R-L-C circuits, Impedance, Average & RMS values of an ac signal, Real and Apparent Powers, Coupled Circuits: Magnetic Circuits, Self and Mutual inductances, dot convention, impedance, reactance concept, Impedance

transformation and coupled circuits, co-efficient of coupling, equivalent T for Magnetically coupled circuits, Ideal Transformer. Series and Parallel Resonance Circuits – Concept of resonance, Q-factor, bandwidth, voltage amplifier, current amplifier, different combinations of R L C circuits.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand the fundamentals of AC circuits and calculate the different parameters of the signal. (L1)
- Derive resonant frequency and bandwidth of series and parallel RLC circuits. (L3)

Unit V:Two Port Networks

Two port network parameters, Z, Y, ABCD, h and g parameters, Relationship between parameter sets, Interconnection of two port networks. Characteristic impedance, Image transfer constant, image and iterative impedance. Network functions: Driving point and transfer functions – using transformed (S) variables, Poles and Zeros.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand the concept of two port networks and determine network parameters for given two port networks. (L1)
- Analyze the transfer functions for a given network. (L3)

TEXT BOOKS:

1. Engineering circuit analysis – by William Hayt and Jack E. Kemmerly, 6^{th} Edition, McGraw Hill Company.
2. M E Van Valkenburg, “Network Analysis”, Prentice – Hall of India Pvt. Ltd, New Delhi.

REFERENCE BOOKS:

1. Millek P. Groover, “Fundamentals of Modern Manufacturing”: “Materials, Processes and Systems”, 4^{th} edition, John Wiley and Sons Inc, 2010.
2. Sharma P.C., “A Text book of Production Technology”, 8^{th} edition, S Chand Publishing, 2014.
3. Linear circuit analysis (time domain phasor and Laplace transform approaches) – 2^{nd} Edition by Raymond A. De-Carlo and Pen-Min-Lin, Oxford University Press-2004.
4. Network Theory by N.C. Jagan& C. Lakshmi Narayana, B.S. Publications.
5. Network Theory by Sudhakar, Shyam Mohan Palli, TM

COURSE OUTCOMES: After successful completion of the course, the students will be able to

CO1: Understand the characteristics of passive elements (R, L, C) for both DC and AC excitations, basic concepts of Network Topologies, Theorems, Nodal and Mesh Analyses,

CO2: Apply different network theorems, and Kirchhoff’s Laws to electrical circuits for solving problems

CO3: Analyze the RLC circuits for different excitations (both DC, and AC), two port networks with their equivalent representations using two port parameters.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester ECE)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19APC0402	3	0	0	3	CIA	30 M
Course Title	:	SIGNALS AND SYSTEMS					SEE	70 M

COURSE OBJECTIVES: -

- To introduce students to the basic idea of signal and system analysis and its characterization in time and frequency domains.
- To present Fourier tools through the analogy between vectors and signals.
- To teach concept of sampling and reconstruction of signals.
- To analyze characteristics of linear systems in time and frequency domains.
- To understand Laplace and z-transforms as mathematical tool to analyze continuous and discrete-time signals and systems.

Unit I: Signals & Systems
Basic definitions and classification of Signals and Systems (Continuous time and discrete time), operations on signals, Concepts of Convolution and Correlation of signals, Analogy between vectors and signals-Orthogonality, mean square error, Fourier series: Trigonometric & Exponential, Properties of Fourier series, concept of discrete spectrum, Illustrative Problems.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand different types of signals and systems. (L1)
- State principles of vector spaces and concept of Orthogonality. (L2)
- Describe continuous time signal and discrete time signal. (L2)
- Analyze the periodic signals by applying Fourier series. (L3)

Unit II: Continuous Time Fourier Transform
Definition, Computation and properties of Fourier transform for different types of signals and systems, Inverse Fourier transform. Statement and proof of sampling theorem of low pass signals, Illustrative Problems.

Learning Outcomes: After completing this unit, the student will be able to:

- Identify system properties based on impulse response and Fourier analysis. (L1)
- Analyze the spectral characteristics of signals. (L3)
- Illustrate signal sampling and its reconstruction. (L2)
- Apply Fourier transform to solve problems. (L2)

Unit III: Discrete Time Fourier Transform
Definition, Computation and properties of Discrete Time Fourier transform for different types of signals and systems, Illustrative Problems.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand the properties of the discrete-time Fourier transform. (L1)
- Analyze the spectral characteristics of signals using Fourier transform. (L3)
- Evaluate the Fourier transform of Discrete-time signals. (L2)

Unit IV: Signal Transmission Through Linear Systems

Linear system, impulse response, Response of a linear system for different input signals, linear time-invariant (LTI) system, linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between bandwidth and rise time, Energy and Power spectral densities, Illustrative Problems.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand the impulse response, transfer characteristics of LTI system and various filters. (L1)
- Analyze filter characteristics and physical realization of LTI system. (L3)
- Apply the relation between bandwidth and rise time & energy and power spectral densities in various applications. (L2)

Unit V: Laplace Transforms and Z - Transforms

Laplace Transform: Definition, ROC, Properties, Inverse Laplace transforms, the S-plane and BIBO stability, Transfer functions, System Response to standard signals, Solution of differential equations with initial conditions.

Z–Transform: Definition, ROC, Properties, Poles and Zeros in Z-plane, The inverse Z-Transform, System analysis, Transfer function, BIBO stability, System Response to standard signals, Solution of difference equations with initial conditions, Illustrative Problems.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand the limitations of Fourier transform and need for Laplace transform and develop. (L1)
- Apply transform techniques to analyze discrete-time signals and systems. (L2)
- Evaluate response of linear systems to known inputs by using Laplace transforms. (L2)
- Analyze the continuous-time and discrete-time signals and systems using Laplace and Z- transforms. (L3)

TEXT BOOKS:

1. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, “Signals and Systems”, 2nd Edition, PHI, 2009.
2. Simon Haykin and Van Veen, “Signals & Systems”, 2nd Edition, Wiley, 2005.

REFERENCE BOOKS:

1. BP Lathi, “Principles of Linear Systems and Signals”, 2nd Edition, Oxford University Press, 015.
2. Matthew Sadiku and Warsame H. Ali, “Signals and Systems A primer with MATLAB”, CRC Press, 2016.
3. Hwei Hsu, “Schaum's Outline of Signals and Systems”, 4thEdition, TMH, 2019.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

- **CO1:** Understand the mathematical description and representation of continuous-time and discrete-time signals and systems. Also understand the concepts of various transform techniques. (L1)
- **CO2:** Apply sampling theorem to convert continuous-time signals to discrete-time signals and reconstruct back, different transform techniques to solve signals and system related problems. (L2)
- **CO3:** Analyze the frequency spectra of various continuous-time and discrete-time signals using different transform methods. (L3)
- **CO4:** Classify the systems based on their properties and determine the response of them. (L4)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester ECE)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19APC0403T	3	0	0	3	CIA	30 M
Course Title	:	ELECTRONIC DEVICES AND CIRCUITS					SEE	70 M

PREREQUISITES: Semiconductor Physics

Emphasis on this terminology: Energy band diagram of Insulators, Semiconductors and Metals, Mobility and Conductivity, Electrons and Holes in Intrinsic semiconductor, Donor and Acceptor impurities, drift and diffusion currents, charge densities and semiconductor. Fermi – Dirac function, Carrier concentrations, Fermi level in an intrinsic semiconductor, Fermi level in a semiconductor having impurities.

COURSE OBJECTIVES: -

- To introduce different types of semiconductor devices, viz., diodes and special diodes,
- To explain application of diodes as rectifiers, clippers, clampers and regulators
- To describe operation and characteristics of Bipolar Junction Transistor& Field Effect Transistor.
- To educate the procedure to design amplifier circuits using BJTs & FETs.

Unit I: Semiconductor Devices

Review of semiconductors - construction, characteristics, and operation of PN junction diodes, Principle of operation and characteristics of Tunnel diode with the help of Energy band diagram, Photo diode, LED, PIN diode and Varactor diode, Silicon Controlled Rectifier (SCR) and its V-I characteristics, DIAC, TRIAC, Schottky Barrier diode, solar cell, Uni – Junction Transistor (UJT) and its V-I Characteristics, Problem solving.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand the working principle of various solid state semiconductor devices. (L1)
- To solve simple problems based on the concepts related to all the active devices. (L2)
- Study the characteristics and operation of p-n junction diodes(L1)
- Analyze performance of rectifiers with and without filters (L3)
- Design half wave and full wave rectifier circuits, clippers, clampers (L4)
- Understand the characteristics & applications of Zener diode, and other special devices (L1)

Unit II: Diode Applications

Diode as switch, Rectifier – Half wave and Full wave rectifier, Bridge rectifier, Ripple factor, PIV, Filters – Inductor and Capacitor Filter, L-section filter, pi-Filter, Zener as voltage regulator, Clipping and Clamping circuits, Detector, Voltage doubler, Problem solving related to diode applications.

Learning Outcomes: After completing this unit, the student will be able to:

- Analyze performance of rectifiers with and without filters (L3)
- Design half wave and full wave rectifier circuits, clippers, clampers (L4)
- Understand the characteristics and applications of Zener diode (L1)

Unit III: Bipolar Junction Transistor (BJT)

Review of BJT basic characteristics in different configurations (PNP and NPN transistors) – Active mode of operation, Transistor equations, Transistor as an amplifier, DC analyses of Common Base, Common Emitter and Common collector circuits.

BJT Biasing: Load line and modes of operations, operating point, Bias stability, fixed bias, self-bias, stabilization against variations in I_{co}, V_{BE}, β, Bias compensation, Thermal runaway, condition for Thermal stability, Problem solving.
Applications: As a switch, as an amplifier.

Learning Outcomes: After completing this unit, the student will be able to:

- Explain principle, operation & applications of Bipolar Junction Transistor (L1)
- Describe input and output Characteristics of Bipolar Junction Transistor (L1)
- Apply BJT as a Switch and Amplifier (L2)
- Analyze the different circuits CB, CC, CE (L3)

Unit IV: FIELD – EFFECT TRANSISTORS

Metal Oxide Semiconductor Field-effect Transistor (MOSFET) - structures and V-I characteristics of n-channel Enhancement mode MOSFET, p-channel Enhancement mode MOSFET, n-channel depletion mode MOSFET, p-channel depletion mode MOSFET, symbols and conventions, Complementary MOSFETs (CMOSFETs) – structure, V-I characteristics, symbols and conventions, structure and V-I characteristics of n-channel and p-channel Junction Field Effect Transistors (JFET), Problem solving.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand construction and principle of operation all MOSFET transistors (L1)
- Finding important parameters of MOSFETs from the characteristics (L2)

Unit V:Biasing Circuits using MOSFETs and JFETs

Different configurations using MOSFETs and JFET, load line and modes of operation, different biasing circuits (self-bias, bias with source resistance, voltage divider bias) using MOSFETs and JFETs, DC Analysis of n-channel and p-channel MOSFETs (both Enhancement and Depletion modes), DC analysis of n-channel and p-channel JFETs,
Applications: MOSFETs, JFET as switch and small signal amplifier, CMOS as a switch.

Learning Outcomes: After completing this unit, the student will be able to:

- Explain principle, operation&application of Field Effect Transistor(L1)
- Describe input and output Characteristics of Field Effect Transistor(L1)
- Apply FET as amplifier and Switch(L2)

TEXT BOOKS:

1. Adel S. Sedra and Kenneth C. Smith, “Micro Electronic Circuits”, Oxford University Press International, 6^{th} Edition (2013).
2. Donald A Neamen, “Electronic Circuits – analysis and design”, 3^{rd}Edition, McGraw Hill (India), 2019.
3. J. Milliman and C Halkias, “Integrated electronics”, 2^{nd} Edition, Tata McGraw Hill, 1991.

REFERENCE BOOKS:

1. Behzad Razavi, “Microelectronics”, Second edition, Wiley, 2013.
2. R.L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuits,” 9th Edition, Pearson, 2006.

3. Jimmie J Cathey, “Electronic Devices and Circuits,” Schaum’s outlines series, 3rd edition, McGraw-Hill (India), 2010.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

CO1: Describe basic operation and characteristics of various semiconductor devices.
CO2: Analyze diode circuits for different applications such as rectifiers, clippers and clampers also analyze low frequency and high frequency models of BJT and FET.
CO3: Understand principle, operation, characteristics and applications of Bipolar Junction Transistor and Field Effect Transistor.
CO4: Design BJT and FET amplifier circuits.
CO5: Determine performance parameters of BJT & FET amplifiers.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester ECE)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19APC0404	3	0	0	3	CIA	30 M
Course Title	:	DIGITAL ELECTRONICS AND LOGIC DESIGN					SEE	70 M

COURSE OBJECTIVES: -

- To teach significance of number systems, conversions, binary codes and functionality of logic gates.
- To discuss different simplification methods for minimizing Boolean functions.
- To impart knowledge on operation, characteristics and various configurations of TTL and CMOS logic families.
- To outline procedures for the analysis and design of combinational and sequential logic circuits.
- To introduce programmable logic devices.

Unit I:

Number Systems and Codes: Decimal, Binary, Octal, and Hexa – decimal number systems and their conversions, ASCII code, Excess -3 codes, gray code.
Binary codes Classification, Error detection and correction – Parity generators and checkers – Fixed point and floating – point arithmetic.

Boolean Algebra& Logic Gates: Boolean operations, Boolean functions, Algebraic manipulations, Min-terms and Max-terms, Sum-of-products and Product-of-sum representations, Two-input logic gates, NAND /NOR implementations.

Minimization of Boolean Functions: Karnaugh map, Don't-care conditions, Prime implicants, Minimization of functions using Quine – McCluskey method.

Learning Outcomes: After completing this unit, the student will be able to:

- Summarize advantages of using different number systems. (L2)
- Explain usefulness of different coding schemes and functionality of logic gates. (L2)
- Apply basic laws and De Morgan's theorems to simplify Boolean expressions. (L3)
- Compare K- Map and Q-M methods of minimizing logic functions. (L5)

Unit II:

Combinational Circuits: Introduction, Analysis of combinational circuits, Design Procedure–Binary Adder-Subtractor, Decimal Adder, Multiplier, Comparator, Code Converters, Encoders, Decoders, Multiplexers, Demultiplexers, Illustrative examples.

Sequential Circuits-1: Introduction, Latches –RS latch and JK latch, Flip-flops-RS, JK, T and D flip flops, Master-slave flip flops, Edge-triggered flip-flops, and Flip-flop conversions.

Learning Outcomes: After completing this unit, the student will be able to:

- Apply Boolean algebra for describing combinational digital circuits. (L2)
- Analyze standard combinational circuits such as adders, subtractors, multipliers, comparators etc. (L4)
- Design various Combinational logic circuits. (L4)
- Implement logic functions with decoders and multiplexers. (L5)

Unit III:

Sequential Circuits – 2: Analysis and Design of Synchronous Sequential Circuits: Moore and Mealy machine models, State Equations, State Table, State diagram, State reduction & assignment, Synthesis using flip flops, Elements of Design style, Top–down design, Algorithmic state Machines (ASM), ASM chart notations.

Registers and Counters: Registers, shift registers, Ripple counters, Synchronous counters, Modulus-n Counter, Ring counter, Johnson counter, Up-Down counter.

Learning Outcomes: After completing this unit, the student will be able to:

- Describe behavior of Flip-Flops and Latches. (L2)
- Compare Moore and Mealy machine models. (L5)
- Design synchronous sequential circuits using flip flops and construct digital systems using components such as registers and counters (L4)
- Utilize concepts of state and state transition for analysis and design of sequential circuits (L3)

Unit IV: Memory and Programmable Logic

RAM, Types of Memories, Memory decoding, ROM, Types of ROM, Programmable Logic Devices (PLDs): Basic concepts, PROM as PLD, Programmable Array Logic (PAL) and Programmable Logic Array (PLA), Design of combinational and sequential circuits using PLDs.

Learning Outcomes: After completing this unit, the student will be able to:

- Define RAM, ROM, PROM, EPROM and PLDs. (L1)
- Describe functional differences between different types of RAM & ROM. (L2)
- Compare different types of Programmable Logic Devices. (L5)
- Design simple digital systems using PLDs. (L4)

Unit V:

Digital Logic Families: Unipolar and Bipolar Logic Families, Transistor-Transistor Logic (TTL): Operation of TTL, Current sink logic, TTL with active pull up, TTL with open collector output, Shockley TTL, TTL characteristics, I^2L, ECL logic Families.

CMOS: CMOS Inverter, CMOS characteristics, CMOS configurations - Wired Logic, Open drain outputs, Interfacing: TTL to CMOS and CMOS to TTL, Tristate Logic, Characteristics of Digital ICs: Speed, power dissipation, figure of merit, fan-out, Current and voltage parameters, Noise immunity, operating temperature range, power supply requirements.

Learning Outcomes: After completing this unit, the student will be able to:

- Summarize significance of various TTL, I^2L, ECL and CMOS subfamilies. (L2)
- Examine Interface aspects of TTL & CMOS logic families. (L5)
- Explain characteristics of digital ICs such as speed, power dissipation, figure of merit, fan-out, noise immunity etc. (L2)
- Compare bipolar and MOS logic families. (L5)

TEXT BOOKS:

1. M. Morris Mano and Michael D. Ciletti, “Digital Design", 4th Edition,Pearson Education, 2013.
2. Z. Kohavi and N. K. Jha, “Switching and Finite Automata Theory”, 3rdEdition, Tata McGraw Hill, 2010.
3. R. P. Jain, "Modern Digital Electronics", 4th edition, McGraw Hill Education (India Private Limited), 2012.

REFERENCE BOOKS:

1. Wakerly J.F., "Digital Design: Principles and Practices", 4^{th} Edition, Pearson India, 2008.
2. Charles H Roth (Jr), Larry L. Kinney, "Fundamentals of Logic Design", 5^{th}Edition, Cengage Learning India Edition, 2010.
3. John.M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

CO1: Understand various number systems, error detecting, correcting binary codes, logic families, combinational and sequential circuits.

CO2: Apply Boolean laws, k-map and Q-M methods to minimize switching functions. Also describe the various performance metrics for logic families.

CO3: Compare different types of Programmable logic devices and logic families.

CO4: Design combinational and sequential logic circuits.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester ECE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AES0203P	0	0	3	1.5	CIA	30 M
Course Title	:	ELECTRICAL TECHNOLOGY LAB					SEE	70 M

COURSE OBJECTIVES: -

- To do experiments on DC generators
- To do experiments on DC motors
- To do experiments on 1-ϕ transformer
- To do power measurements in 3-ϕ balanced and unbalanced circuits
- To do tests on 3-ϕ Induction motors
- To do experiment on Alternator
- To do experiment on Synchronous motor

Note: Student has to perform at least 10 experiments

List of Experiments:

1. OCC of a separately excited DC generator
2. Load characteristics of DC shunt generator
3. Load characteristics of DC shunt motor
4. Swinburne's test
5. Speed control of DC shunt motor
6. OC & SC tests on a 1-ϕ transformer
7. Measurement of Active and reactive powers in a 3-ϕ balanced circuit
8. Measurement of 3-ϕ power using two wattmeter method in unbalanced circuit
9. Load test on Squirrel cage Induction motor
10. Load test on Slip ring Induction motor
11. Predetermination of regulation of alternator by Synchronous impedance method
12. V and Inverted V curves of Synchronous motor

COURSE OUTCOMES:

CO1: Understand various characteristics of DC generators and DC motors, and Transformers

CO2: Experiment on the Electrical Machines and verify the results

CO3: Analyze the DC generators, Transformers and DC motors and verify the efficiency of them

CO4: Compare the experimental results with the analytical values.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to III Semester CE, CSE & ME)
(For III Semester ECE weekly 02 hrs. with 01 Credits only)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AES0503P	0	0	3	1.5	CIA	30 M
Course Title	:	DATA STRUCTURES LAB					SEE	70 M

COURSE OBJECTIVES: -

- To introduce to the different data structures
- To elucidate how the data structure selection influences the algorithm complexity
- To explain the different operations that can be performed on different data structures
- To introduce the different search and sorting algorithms.

LIST OF EXPERIMENTS:

1. String operations using array of pointers
2. Searching Algorithms (With the Number of Key Comparisons) Sequential, Binary and Fibonacci Search Algorithms.
3. Sorting Algorithms: Insertion Sort, Selection Sort, Shell Sort, Bubble Sort, Quick Sort, Heap Sort, Merge Sort, and Radix Sort. Using the system clock, compute the time taken for sorting of elements. The time for other operations like I/O etc should not be considered while computing time.
4. Implementation of Singly Linked List, Doubly Linked List, Circular Linked List
5. Stack implementation using arrays
6. Stack implementation using linked lists
7. Queue implementation using arrays. Implement different forms of queue. While implementing you should be able to store elements equal to the size of the queue. No positions should be left blank.
8. Queue implementation using linked lists
9. Creation of binary search tree, performing operations insertion, deletion, and traversal.
10. Breadth first search
11. Depth first search
12. Travelling sales man problem
13. File operations
14. Indexing of a file

OPTIONAL:

15. Reversing the links (not just displaying) of a linked list.
16. Consider a linked list consisting of name of a person and gender as a node. Arrange the linked list using ‘Ladies first’ principle. You may create new linked lists if necessary.
17. An expression can be represented in three ways: infix, prefix and postfix. All the forms are necessary in different contexts. Write modules to convert from one form to another form.
18. A table can be defined as a collection of rows and columns. Each row and column may have a label. Different values are stored in the cells of the table. The values can be of different data types. Numerical operations like summation, average etc can be performed on rows/columns which contain numerical data. Such operations are to be prevented on data which is not numeric. User may like to insert row/columns in the already existing table. User may like to remove row/column. Create table data type and support different operations on it.

COURSE OUTCOMES: After successful completion of this Lab, the students will be able to:

1) Select the data structure appropriate for solving the problem (L5)
2) Implement searching and sorting algorithms (L3)
3) Design new data types (L6)
4) Illustrate the working of stack and queue (L4)
5) Organize the data in the form of files (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester ECE)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19APC0403P	0	0	3	1.5	CIA	30 M
Course Title	:	ELECTRONIC DEVICES AND CIRCUITS LAB					SEE	70 M

COURSE OBJECTIVES: -

- To verify the theoretical concepts practically from all the experiments.
- To analyze the characteristics of diodes, UJT, BJT, FET, SCR.
- To Model the electronic circuits using tools such as PSPICE/Multisim.

Note: All the experiments shall be implemented using both Hardware and Software. **Student has to perform all experiments.**

LIST OF EXPERIMENTS:

1. Verify the Volt Ampere characteristics of SCR experimentally and **determine holding current and break over voltage** from the graph.
2. Study and draw the Volt Ampere characteristics of UJT and determine **η, I_P, I_v,V_P, &V_v** from the experiment.
3. Design a full wave rectifier for the given specifications with and without filters, and verify the given specifications experimentally. Vary the load and find ripple factor. Draw suitable graphs.
4. Verify various clipping and clamper circuits using PN junction diode and draw the suitable graphs.
5. Design a Zener diode-based**voltage regulator** against variations of supply and load. Verify the same from the experiment.
6. Study and draw the **output** and **transfer** characteristics of MOSFET (Enhance mode) in Common Source Configuration experimentally. Find **Threshold voltage (V_T), g_m, & K** from the graphs.
7. Study and draw the **output** and **transfer** characteristics of MOSFET (Depletion mode) or JFET in Common Source Configuration experimentally. Find **I_{DSS}, g_m, & V_P** from the graphs.
8. Verification of the input and output characteristics of BJT in **Common Emitter** configuration experimentally and find required **h – parameters** from the graphs.
9. Study and draw the input and output characteristics of BJT in **Common Base** configuration experimentally, and determine required **h – parameters** from the graphs.
10. Design and analysis of voltage- divider bias/self-bias circuit using BJT.
11. Design and analysis of voltage- divider bias/self-bias circuit using JFET.
12. Design and analysis of self-bias circuit using MOSFET.

Tools / Equipment Required: Software Tool like Multisim / Pspice or Equivalent, DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices

COURSE OUTCOMES:

CO1: Understand the basic characteristics and applications of basic electronic devices. (L1)
CO2: Observe the characteristics of electronic devices by plotting graphs. (L2)
CO3: Analyze the Characteristics of UJT, BJT, FET, and SCR. (L3)

CO3: Design FET based amplifier circuits/BJT based amplifiers for the given specifications. (L4)

CO4: Simulate all circuits in PSPICE /Multisim. (L5).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester ECE)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19APC0405	0	0	2	1	CIA	30 M
Course Title	:	BASIC SIMULATION LAB					SEE	70 M

COURSE OBJECTIVES: -

- To provide practical exposure with generation and simulation of basic signals using standardized tools.
- To teach analyzing signals and sequences using Fourier, Laplace and Z-transforms.
- To enable to write programs for signal processing applications.

Note: All the experiments are to be simulated using MATLAB or equivalent software.

LIST OF EXPERIMENTS:

1. Write a program to generate various Signals and Sequences: Periodic and Aperiodic, Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc function.
2. Perform operations on Signals and Sequences: Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
3. Write a program to find the trigonometric & exponential Fourier series coefficients of a rectangular periodic signal. Reconstruct the signal by combining the Fourier series coefficients with appropriate weightings- Plot the discrete spectrum of the signal.
4. Write a program to find Fourier transform of a given signal. Plot its amplitude and phase spectrum.
5. Write a program to convolve two discrete time sequences. Plot all the sequences.
6. Write a program to find autocorrelation and cross correlation of given sequences.
7. Write a program to verify Linearity and Time Invariance properties of a given Continuous/Discrete System.
8. Write a program to generate discrete time sequence by sampling a continuous time signal. Show that with sampling rates less than Nyquist rate, aliasing occurs while reconstructing the signal.
9. Write a program to find magnitude and phase response of first order low pass and high pass filter. Plot the responses in logarithmic scale.
10. Write a program to find response of a low pass filter and high pass filter, when a speech signal is passed through these filters.
11. Write a program to generate Complex Gaussian noise and find its mean, variance, Probability Density Function (PDF) and Power Spectral Density (PSD).
12. Generate a Random data (with bipolar) for a given data rate (say 10kbps). Plot the same for a time period of 0.2 sec.
13. To plot pole-zero diagram in S-plane/Z-plane of given signal/sequence and verify its stability.

COURSE OUTCOMES:

CO1: Understand the basic concepts of programming in MATLAB and explain use of built-in functions to perform assigned task.

CO2: Generate signals and sequences, Input signals to the systems to perform various operations

CO3: Analyze signals using Fourier, Laplace and Z-transforms.

CO4: Compute Fourier Transform of a given signal and plot its magnitude and phase spectrum.

CO5: Verify Sampling theorem, Determine Convolution and Correlation between signals and sequences.

B.TECH – IV SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(IV Semester ECE)

Course Category	:	Basic Sciences Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19ABS9911	3	0	0	3	CIA	30 M
Course Title	:	PROBABILITY THEORY AND STOCHASTIC PROCESSES					SEE	70 M

COURSE OBJECTIVES: -

- To gain the knowledge of the basic probability concepts and acquire skills in handling situations involving more than one random variable and functions of random variables.
- To understand the principles of random signals and random processes.
- To be acquainted with systems involving random signals.
- To gain knowledge of standard distributions that can describe real life phenomena.

Unit I: PROBABILITY INTRODUCED THROUGH SETS AND RELATIVE FREQUENCY

Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events, Problem Solving.

Definition of a **Random Variable**, Conditions for a Function to be a Random Variable, Discrete, Continuous, Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Conditional Distribution, Methods of defining Conditioning Event, Conditional Density, Properties, Problem Solving.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Understand the fundamental concepts of probability theory, random variables and conditional probability (L1).
- Study the different probability distribution and density functions (L1).

Unit II:

OPERATIONS ON SINGLE RANDOM VARIABLE: Introduction, Expectation of a random variable, Moments - Moments about the origin, Central moments, Variance and Skew, Chebyshev's inequality, Moment generating function, Characteristic function, Transformations of random variable.

MULTIPLE RANDOM VARIABLES: Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected), Unequal Distribution, Equal Distributions.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Apply the knowledge to the sum of random variables, central limit theorem in communication system (L2).
- Evaluate the single and multiple random variable concepts to expectation, variance, and moments (L4).

Unit III: OPERATIONS ON MULTIPLE RANDOM VARIABLES

Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Joint Gaussian Random Variables – Two Random Variables case, N Random Variable case, Properties of Gaussian random variables, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

Learning Outcomes: After successful completion of this unit, the student will be able to:
- Apply the different operations to multiple random variables (L2).
- Understand the concepts of linear transformation of Gaussian random variables (L1).

Unit IV:

RANDOM PROCESSES-TEMPORAL CHARACTERISTICS: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence, First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, N-Order and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process.

RANDOM PROCESSES-SPECTRAL CHARACTERISTICS: The Power Density Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum and its Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

Learning Outcomes: After successful completion of this unit, the student will be able to:
- Understand and analyze continuous and discrete-time random processes (L1).
- Analyze the concepts and its properties of auto correlation, cross correlation functions and power spectral density (L3).

Unit V:

RANDOM SIGNAL RESPONSE OF LINEAR SYSTEMS: System Response – Convolution, Mean and Mean squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output, Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output, Band pass, Band-limited and Narrowband Processes, Properties.

NOISE DEFINITIONS: White Noise, colored noise and their statistical characteristics, Ideal low pass filtered white noise, RC filtered white noise.

Learning Outcomes: After successful completion of this unit, the student will be able to:
- Describe the theory of stochastic processes to analyze linear systems (L2).
- Apply the knowledge to linear systems; low pass and band pass noise models for random processes (L2).

TEXT BOOKS:

1. Peyton Z. Peebles, “Probability, Random Variables & Random Signal Principles”, TMH, 4thEdition, 2002.
2. Athanasios Papoulis and S. Unnikrishna Pillai, “Probability, Random Variables and Stochastic Processes”, PHI, 4th Edition, 2002.

REFERENCE BOOKS:

1. Simon Haykin, "Communication Systems", Wiley, 3rd Edition, 2010.
2. Henry Stark and John W.Woods, "Probability and Random Processes with Application to Signal Processing," Pearson Education, 3rd Edition.
3. George R. Cooper, & Clave D. Mc. Gillem, "Probability Methods of Signal and System Analysis," Oxford, 3rd Edition, 1999.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

CO1: Understand the concepts of Probability, Random Variables, Random Processes and their characteristics learn how to deal with multiple random variables, conditional probability, joint distribution and statistical independence.

CO2: Formulate and solve the engineering problems involving random variables and random processes.

CO3: Analyze various probability density functions of random variables.

CO4: Derive the response of linear system for Gaussian noise and random signals as inputs.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to III Semester ME & IV Semester CE and ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AES0505T	3	0	0	3	CIA	30 M
Course Title	:	PYTHON PROGRAMMING FOR ENGINEERS					SEE	70 M

COURSE OBJECTIVES: -

- To teach the fundamentals of Python
- To elucidate problem-solving using a Python programming language
- To introduce a function-oriented programming paradigm through python
- To develop the skill of designing Graphical user Interfaces in Python
- To learn how to use lists, tuples, and dictionaries in Python programs.

Unit I:
Introduction: What is a program, running python, Arithmetic operators, Value and Types?

Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments.

Functions: Function calls, Math functions, Composition, adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Learning Outcomes: After successful completion of this unit, the students will be able to

- List the basic constructs of Python (L1)
- Solve the problems by applying modularity principle (L3)

Unit II:
Conditionals and Recursion: Floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input.

Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, more recursion, Leap of Faith, Checking types

Iteration: Reassignment, Updating variables, The while statement, Break, Square roots, Algorithms.

Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, The in operator, String comparison.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Apply the conditional execution of the program (L3)
- Apply the principle of recursion to solve the problems (L3)

Unit III:

Case Study: Reading word lists, Search, Looping with indices.

Lists: List is a sequence, Lists are mutable, traversing a list, List operations, List slices, List methods, Map filter and reduce, deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.

Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables.

Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Use the data structures Lists, Dictionaries, and Tuples (L3)
- Design programs for manipulating strings (L6)

Unit IV:

Files: Persistence, Reading and writing, Format operator, Filename and paths, catching exceptions, Databases, Pickling, Pipes, Writing modules.

Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying.

Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning

Classes and Methods: Object oriented features, Printing objects, The INIT method, The STR method, Operator overloading, Type-based Dispatch, Polymorphism, Interface and Implementation

Inheritance: Card objects, Class attributes, comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Apply object orientation concepts (L3)
- Organize data in the form of files (L6)

Unit V: Overview of Packages for Scientific and Data Processing

Introduction to Machine Learning-History and Evolution, Artificial intelligence Evolution, Different Forms, Machine learning categories, Machine learning Python packages, Data Analysis packages, Machine learning core libraries.

Learning Outcomes: Students will be able to

- Understand Machine learning fundamentals (L2)
- Apply python packages for solving machine learning and data analysis problems (L3)

TEXT BOOKS:

1. Allen B. Downey, “Think Python”, 2nd edition, SPD/O’Reilly, 2016.
2. Manohar Swamynathan, “Mastering Machine learning with Python in Six steps”, Apress.

REFERENCE BOOKS:

1. Martin C.Brown, “The Complete Reference: Python”, McGraw-Hill, 2018.
2. Kenneth A. Lambert, B.L. Juneja, “Fundamentals of Python”, CENGAGE, 2015.
3. R. Nageswara Rao, “Core Python Programming”, 2nd edition, Dreamtech Press, 2019

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Explain the features of Python language (L2)
2. Select appropriate data structure of Python for solving a problem (L4)
3. Design object-oriented programs for solving real-world problems (L6)
4. Use Python packages (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to IV Semester CSE & ECE)

Course Category	:	Humanities Sciences Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19ABS9905	3	0	0	3	CIA	30 M
Course Title	:	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS					SEE	70 M

COURSE OBJECTIVES: -

- To inculcate the basic knowledge of micro economics and financial accounting analysis
- To understand fundamentals of Production & Cost Concepts to take certain business decisions in the processes of optimum utilization of resources.
- To know various types of Market Structures & pricing methods and its strategies, and Trade Blocks.
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements & analysis for effective business decisions.

Unit I: INTRODUCTION TO MANAGERIAL ECONOMICS & DEMAND

Managerial Economics – Definition – Nature & Scope – Contemporary importance of Managerial Economics – Demand Analysis –Concept of Demand –Demand Function – Law of Demand – Elasticity of Demand – Significance – Types of Elasticity -Measurement of Elasticity of Demand - Demand Forecasting – Factors governing Demand Forecasting – Methods of Demand Forecasting – Relationship of Managerial Economics with Financial Accounting and Management.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the nature and scope of Managerial Economics and its importance
- Understand the concept of demand and its determinants
- Analyze the Elasticity and degree of elasticity
- Evaluate Demand forecasting methods
- Design the process of demand estimation for different types of demand

Unit II: THEORY OF PRODUCTION AND COST ANALYSIS

Production Function– Least-cost combination – Short-run and Long-run Production Function – Isoquants and Isocosts, MRTS – Cobb-Douglas Production Function - Laws of Returns – Internal and External Economies of scale – **Cost &Break-Even Analysis**– Cost concepts and Cost behavior – Break-Even Analysis (BEA) – Determination of Break-Even Point (Simple Problems) – Managerial significance and limitations of Break-Even Analysis.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the production function, Input-Output relationship and different cost concepts
- Apply the least-cost combination of inputs
- Analyze the behavior of various cost concepts
- Evaluate BEA for real time business decisions
- Develop profit appropriation for different levels of business activity

Unit III: INTRODUCTION MARKETS AND NEW ECONOMIC ENVIRONMENT

Market structures: Types of Markets – Perfect and Imperfect Competition – Features of Perfect Competition – Monopoly – Monopolistic Competition – Oligopoly – Price – Output Determination - Pricing Methods and Strategies

Forms of Business Organizations– Sole Proprietorship – Partnership – Joint Stock Companies – Public Sector Enterprises – New Economic Environment – Economic Liberalization – Privatization – Globalization – Trade Blocks (SAARC, EU, NAFTA, BRICS) – EXIM Policy – International Economic Environment.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the structure of markets, features of different markets and forms of business organizations
- Apply the price output relationship in different markets
- Analyze the optimum output levels to maximize profit in different markets
- Evaluate price-output relationship to optimize cost, revenue and profit
- Interpret Pricing Methods and Strategies

Unit IV: CAPITAL AND CAPITAL BUDGETING

Concept of Capital – Significance –Types of Capital –Components of Working Capital - Sources of Short-term and Long-term Capital – Estimating Working capital requirements – Cash Budget –**Capital Budgeting** – Features of Capital Budgeting Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the concept of capital budgeting and its importance in business
- Contrast and compare different investment appraisal methods
- Analyze the process of selection of investment alternatives using different appraisal methods
- Evaluate methods of capital budgeting for investment decision making and for maximizing returns
- Design different investment appraisals and make wise investments

Unit V:INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Accounting Concepts and Conventions – Introduction to Double – Entry Book Keeping, Journal, Ledger, Trial Balance – Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis–Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios – Du Pont Chart.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the concept, convention and significance of accounting
- Apply the fundamental knowledge of accounting while posting the journal entries
- Analyze the process and preparation of final accounts and financial ratios
- Evaluate the financial performance of an enterprise by using financial statements

Data Books Required: Present Value Factors table

TEXT BOOKS:

1. Varshney &Maheshwari: “Managerial Economics”, Sultan Chand, 2013.
2. Arya Sri: “Business Economics and Financial Analysis”, 4th edition, MGH, 2019

REFERENCE BOOKS:

1. Ahuja Hl "Managerial economics" 3rd edition, Schand, ,2013
2. S.A. Siddiqui and A.S. Siddiqui: "Managerial Economics and Financial Analysis", New Age International, 2013.
3. Joseph G. Nellis and David Parker: "Principles of Business Economics", 2nd edition, Pearson, New Delhi.
4. Domnick Salvatore: "Managerial Economics in a Global Economy", Cengage, 2013.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

1. Analyze the fundamentals of Economics viz., Demand, Elasticity, forecasting, Production, cost, revenue and markets (L4)
2. Apply concepts of production, cost and revenues for effective business decisions (L3)
3. Identify the influence of various markets, the forms of business organization and its International Economic Environment (L1)
4. Analyze how to invest adequate amount of capital in order to get maximum return from selected business activity (L4)
5. Prepare and analyze accounting statements like income & expenditure statement, balance sheet apart from the fundamental knowledge, to understand financial performance of the business and to initiate the appropriate decisions to run the business profitably (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(IV Semester ECE)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19APC0406	3	0	0	3	CIA	30 M
Course Title	:	COMPUTER ARCHITECTURE AND ORGANIZATION					SEE	70 M

COURSE OBJECTIVES: -

- To discuss organization and design of a digital computer.
- To explain how to use RTL to represent memory and Arithmetic/ Logic/ Shift operations
- To introduce computer languages, machine, symbolic and assembly levels
- To present organization of central processing unit and concepts of micro-programmed control
- To explain how input-output devices communicate with the other components and methods of data transfer
- To teach different types of addressing modes and memory organization.

Unit I:

Data Representation: Data Types, Complements, Fixed-Point Representation, Conversion of Fractions, Floating-Point Representation, Other Binary Codes
Register Transfer and Micro-operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic Shift Unit

Learning Outcomes: After completing this unit, the student will be able to:

- Represent various data types found in digital computers in binary form (L2)
- Emphasize representation of numbers employed in arithmetic operations and on binary coding of symbols used in data processing (L5)
- Express micro-operations in symbolic form by using register transfer language (L2)
- Develop composite arithmetic logic shift unit to show hardware design of micro-operations (L3)

Unit II:

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete Computer Description, Design and Accumulator Logic.
Programming the Basic Computer: Machine Language, Assembly Language, the Assembler, Program Loops, programming arithmetic and logic operations

Learning Outcomes: After completing this unit, the student will be able to:

- Describe organization and design of a basic digital computer (L2)
- Illustrate techniques used in assembly language programming (L2)
- Show translation from symbolic code to an equivalent binary program using basic operations of an assembler (L2)

Unit III:

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

Learning Outcomes: After completing this unit, the student will be able to:

- Develop execution unit to show general register organization of a typical CPU (L3)
- Explain operation of a memory stack (L2)
- Illustrate various instruction formats together with a variety of addressing modes (L2)
- Discuss characteristics and advantages of reduced instruction set computer (RISC) (L6)

Unit IV:

Micro-programmed Control: Control Memory, Address Sequencing, Micro-program example, Design of Control Unit.
Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations

Learning Outcomes: After completing this unit, the student will be able to:

- Develop specific micro-programmed control unit to show how to write microcode for a typical set of instructions (L3)
- Design control unit including the hardware for the micro-program sequencer (L6)
- Show procedures for implementing arithmetic algorithms for addition, subtraction, multiplication and division with digital hardware (L2)
- Discuss algorithms to specify the sequence of micro-operations and control decisions required for implementation (L6)

Unit V:

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP), Serial Communication.
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Learning Outcomes: After completing this unit, the student will be able to:

- Explain how processor interacts with external peripherals through Interface units (L2)
- Compare different modes of data transfer (L4)
- Illustrate procedures for serial data transmission (L2)
- Describe concept of memory hierarchy composed of cache memory, main memory, and auxiliary memory (L2)
- Explain organization and operation of associative memories (L2)

TEXT BOOKS:

1. M. Morris Mano, “Computer System Architecture”, 3rdedition, Pearson Education,2017.

REFERENCE BOOKS:

2. Carl Hamacher, ZvonkoVranesic and SafwatZaky, “Computer Organization”, 5th Edition McGraw Hill,
3. John D. Carpinelli, “Computer Systems Organization and Architecture”, 15threprint Pearson Education, 2018,
4. William Stallings, “Computer Organization and Architecture: Designing for Performance”, 8th Edition, Pearson

COURSE OUTCOMES: After successful completion of the course, the students will be able to

CO1: Conceptualize basics of organizational and architectural issues of a digital computer

CO2: Emphasize representation of data types, numbers employed in arithmetic operations and binary coding of symbols used in data processing

CO3: Analyze various issues related to memory hierarchy, and evaluate various modes of data transfer between CPU and I/O devices

CO4: Design basic computer system using the major components

CO5: Develop low-level programs to perform different basic instructions

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester ECE)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19APC0407	3	0	0	3	CIA	30 M
Course Title	:	CONTROL SYSTEMS					SEE	70 M

COURSE OBJECTIVES: -

- Merits and demerits of open loop and closed loop systems; the effect of feedback
- The use of block diagram algebra and Mason's gain formula to find the overall transfer function
- Transient and steady state response, time domain specifications and the concept of Root loci
- Frequency domain specifications, Bode diagrams and Nyquist plots
- State space modeling of Control system

Unit I: CONTROL SYSTEMS CONCEPTS

Open loop and closed loop control systems and their differences- Examples of control systems – Classification of control systems, Feedback characteristics, Effects of positive and negative feedback, Mathematical models – Differential equations of translational and rotational mechanical systems and electrical systems, Analogous Systems, Block diagram reduction methods – Signal flow graphs – Reduction using Mason's gain formula, Principle of operation of DC and AC Servo motor, Transfer function of DC servo motor – AC servo motor, Synchro's.

Learning Outcomes: After completing this unit, the student will be able to:

- Write the differential equations for mechanical and electrical systems
- Obtain the transfer function from block diagrams, servo motors and signal flow graphs

Unit II: TIME RESPONSE ANALYSIS

Step Response – Impulse Response – Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems – Time domain specifications – Steady state response – Steady state errors and error constants, P, PI, PID Controllers.

Learning Outcomes: After completing this unit, the student will be able to:

- Analyze the time domain specifications
- Calculate the steady state errors
- Understand about Proportional, Integral and Derivative controllers along with combinations

Unit III: STABILITY ANALYSIS IN TIME DOMAIN

The concept of stability – Routh's stability criterion, Stability and conditional stability, limitations of Routh's stability, The Root locus concept – construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

Learning Outcomes: After completing this unit, the student will be able to:

- Analyze the concept of stability in time domain
- Apply the concept of Routh's stability and Root locus in time domain

Unit IV: FREQUENCY RESPONSE ANALYSIS

Introduction, Frequency domain specifications – Bode diagrams – Determination of Frequency domain specifications and transfer function from the Bode Diagram – Stability Analysis from Bode Plots, Polar Plots – Nyquist Plots – Phase margin and Gain margin – Stability Analysis.

Compensation techniques – Lag, Lead and Lag-Lead Compensator design in frequency domain.

Learning Outcomes: After completing this unit, the student will be able to:

- Evaluate the frequency domain specifications from Bode, Polar and Nyquist plots
- Design Compensators for various systems
- Deducing transfer functions from Bode Plots
- Understand difference between Phase and Gain margins

Unit V:STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

Concepts of state, state variables and state model, state models - differential equations & Transfer function models – Block diagrams, Diagonalization, Transfer function from state model, solving the Time invariant state Equations – State Transition Matrix and it's Properties, System response through State Space models, The concepts of controllability and observability, Duality between controllability and observability.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand the concept of state space, controllability and observability
- Obtain the transfer function from sate space and vice versa
- Understand the state transition method of solving time invariant state equations

TEXT BOOKS:

1. Katsuhiko Ogata, "Modern Control Engineering",5thedition, Prentice Hall of India Pvt. Ltd., 2010.
2. I.J. Nagrath and M. Gopal, "Control Systems Engineering", 5th edition, New Age International (P) Limited Publishers, 2007.

REFERENCE BOOKS:

1. M. Gopal, "Control Systems Principles & Design", 4th Edition, Mc Graw Hill Education, 2012.
2. B. C. Kuo and FaridGolnaraghi, "Automatic Control Systems",8th edition, John wiley and sons, 2003.
3. Joseph J Distefano III, Allen R Stubberud& Ivan J Williams, "Feedback and Control Systems", 2nd Edition, Schaum's outlines, Mc Graw Hill Education, 2013.
4. Graham C. Goodwin, Stefan F. Graebe and Mario E. Salgado, "Control System Design" Pearson, 2000.
5. Gene F. Franklin, J.D. Powell and Abbas Emami-Naeini, Feedback "Control of Dynamic Systems", 6th Edition, Pearson, 2010.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

CO1: Understand the concepts of control systems classification, feedback effect, mathematical modelling, time response and frequency response characteristics, state space analysis

CO2: Apply the concepts of Block diagram reduction, Signal flow graph method and state space formulation for obtaining mathematical and Root locus, Bode, Nyquist, Polar plots for stability calculations, controllability and observability and demonstrate the use of these techniques.

CO3: Analyse time response analysis, error constants, and stability characteristics of a given mathematical model using different methods.

CO4: Design and develop different compensators, controllers and their performance evaluation for various conditions. Implement them in solving various engineering applications.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(IV Semester ECE)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19APC0408	3	0	0	3	CIA	30 M
Course Title	:	ELECTROMAGNETIC WAVES AND TRANSMISSION LINES					SEE	70 M

COURSE OBJECTIVES: -

- To introduce fundamentals of static and time varying electromagnetic fields.
- To teach problem solving in Electromagnetic fields using vector calculus.
- To demonstrate wave concept with the help of Maxwell's equations.
- To introduce concepts of polarization and fundamental theory of electromagnetic waves in transmission lines and their practical applications.
- To analyze reflection and refraction of electromagnetic waves propagated in normal and oblique incidences.

Unit I:
Vector Analysis: Coordinate systems and transformation-Cartesian, Cylindrical and Spherical coordinates
Vector Calculus: Differential length area and volume, line surface and volume integrals, Del operator, gradient, divergent and curl operations.
Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Divergence Theorem, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations, Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Illustrative Problems.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand basic laws of static electric field. (L1)
- Derive the Maxwell's equations for electrostatic fields. (L3)
- Solve problems applying laws of electrostatics. (L3)

Unit II:
Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magneto static Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Magnetic dipole, Ampere's Force Law, Inductances and Magnetic Energy, Illustrative Problems.
Faraday's Law and Transformer e.m.f, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's equations for time varying fields, Maxwell's Equations in Different Final Forms and Word Statements, Illustrative Problems

Learning Outcomes: After completing this unit, the student will be able to:

- Understand basic laws of static magnetic field. (L1)
- Derive the Maxwell's equations for magnetic fields. (L3)
- Solve problems applying laws of magneto statics. (L3)
- Derive the Maxwell's equations for electromagnetic fields. (L3)
- Apply the boundary conditions of electromagnetic fields at the interface of different media. (L2)

Unit III:

Boundary Conditions of Electromagnetic fields: Dielectric-Dielectric and Dielectric-Conductor Interfaces, Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization, Illustrative Problems.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand concept of wave propagation through the Maxwell's equations. (L1)
- Derive wave equations for different media. (L3)
- Explain concept of polarization of electromagnetic wave. (L2)

Unit IV:

Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector, and Poynting Theorem – Applications, Power Loss in a Plane Conductor, Illustrative Problems.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand principles of reflections and refraction for different incidences. (L1)
- State concept of power flow using Poynting vector. (L2)
- Calculate Brewster angle, power flow and surface impedance. (L3)

Unit V:

Transmission Lines: Introduction, Transmission line parameters, Transmission line equivalent circuit, Transmission line equations and their solutions in their phasor form, input impedance, standing wave ratio, Transmission of finite length- half wave, quarter wave transmission line, Smith chart, graphical analysis of transmission lines using Smith chart, stub matching- single and double stub matching, Illustrative Problems.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand the principles of transmission lines and concept of smith chart. (L1)
- Derive the input impedance of transmission line. (L3)
- Finding the line parameters through problem solving. (l4)
- Study the applications of different lengths of transmission lines. (L2)

TEXT BOOKS:

1. Matthew N.O. Sadiku, "Elements of Electromagnetics", 4th edition. Oxford Univ. Press, 2008.
2. William H. Hayt Jr., and John A. Buck, "Engineering Electromagnetics", 7th edition. TMH, 2006.

REFERENCE BOOKS:

1. E.C. Jordan and K.G. Balmain, "Electromagnetic Waves and Radiating Systems", 2nd Edition, PHI, 2000.
2. John D. Krauss, "Electromagnetics", 4th Edition, McGraw- Hill publication, 1999.
3. Electromagnetics, Schaum's outline series, 2nd Edition, Tata McGraw-Hill publications, 2006.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

CO1: Explain basic laws of electromagnetic fields and know the wave concept. Describes the transmission lines with equivalent circuit and explain their characteristic with various lengths.

CO2: Solve problems related to electromagnetic fields in free space, guided EM waves. Also solve the problems related to Transmission lines at Radio Frequencies.

CO3: Analyze electric and magnetic fields at the interface of different media.

CO4: Derive Maxwell's equations for static and time varying fields and give the analogy between electric and magnetic fields.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(IV Semester ECE)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19APC0409T	3	0	0	3	CIA	30 M
Course Title	:	ELECTRONIC CIRCUITS – ANALYSIS AND DESIGN					SEE	70 M

COURSE OBJECTIVES: -

- To design and analyze single and multi-stage amplifiers using BJT & FET at low and high frequencies.
- To discuss cascading of single stage amplifiers.
- To explain effect of negative feedback on amplifier characteristics.
- To teach basic principles for analyzing RC & LC oscillator circuits.
- To introduce different types of large signal amplifiers and tuned amplifiers.

Unit I: Small Signal Amplifier Analysis

Small Signal Amplifiers Using MOSFETS: Graphical analysis, Load line and small signal parameters, small signal equivalent circuit, small signal analysis of Common Source, Common Drain, Common Gate amplifiers, Comparison of the three basic amplifier configurations, Design the small signal amplifier circuits for the given specifications.

BJT Small Signal Models: Bipolar linear amplifier, Graphical and ac equivalent circuit, small signal hybrid-π equivalent circuit, Hybrid-π equivalent circuit including the early effect, other small signal parameters and equivalent circuits-h-parameters.

Small Signal Analysis: Basic CE amplifier circuit, Circuit with Emitter resistance, ac load line analysis, maximum symmetrical swing, small signal analysis-input and output impedances, Voltage gain, Current gain of CB, CC amplifiers, Design the small signal amplifier circuits for the given specifications.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand the concepts and equivalent circuit models of small signal amplifiers. (L1)
- Analyze low frequency and high frequency models of BJT and FET. (L3)
- Design BJT and FET amplifiercircuits. (L4)
- Determine performance parameters of BJT and FET amplifiers. (L2)

Unit II:

Frequency Response: Amplifier frequency response-different ranges, short circuit and open circuit time constants, time response, transistor amplifiers with circuit capacitors-coupling capacitor effects, load capacitor effects, Bypass capacitor effects, Problem solving, combined effects of coupling and bypass capacitor, high-frequency response model for BJT and MOSFETs, short circuit current gain, Miller effect and its applications, unity-gain bandwidth in BJT and FET amplifiers, CE and CS circuits, CB and CG circuits, Cascode amplifier analysis, emitter and source follower circuits, high frequency response- design application.

Learning Outcomes: After completing this unit, the student will be able to:

- Analyze the frequency response of single stage amplifiers using BJT & FET at high and low frequencies. (L3)
- Design of single stage amplifiers using BJT and FET with and without coupling capacitors. (L4)

- Explore the various effects of load, bypass and coupling capacitor on the performance of amplifier circuits. (L5)

Unit III:
Differential and Multistage Amplifiers: Differential amplifier, basic BJT differential pair and its qualitative description, DC transfer characteristics, small signal equivalent circuit analysis, CMRR, differential and common mode gains, differential and common mode input impedances.
Basic differential FET pair, small signal equivalent circuit analysis, JFET differential amplifier, differential amplifier with active load, MOSFET differential amplifier with active load, two stage RC coupled amplifier, Darlington pair and simple emitter follower output, voltage gain, input and output impedances.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand basic concepts and need of Differential and multistage amplifiers. Also, various inter-stage coupling in multi-stage amplifiers. (L1)
- Analyze and examine few common two stage transistor amplifier circuits' viz., Cascade amplifiers, Cascade amplifiers, Darlington pairs. (L3)
- Design multiple stage amplifier circuits. (L4)

Unit IV:
Feedback Amplifiers: General Considerations, Properties of Negative Feedback, Types of Amplifiers, Sense and Return Techniques, Polarity of Feedback, Feedback Topologies, Effect of Nonideal I/O Impedances, Stability in Feedback Systems, Analysis of a feedback Amplifiers - Voltage – Series, Current Series, Current-shunt and Voltage-shunt, Illustrative problems.
Oscillators: General Considerations, LC Oscillators, Phase Shift Oscillator, Wien-Bridge Oscillator, Crystal Oscillators, Illustrative Problems.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand concept of different feedback topologies. (L1)
- Determine the effect of feedback on amplifier characteristics. (L2)
- Analyze characteristics of various types of feedback configurations (L3)
- Explore working principle of oscillator. Also examine different types of oscillators, RC & LC, with detailed mathematical analysis and illustrations. (L2)

Unit V:
Power Amplifiers:
Classes of amplifiers – Operations of Class A, B, AB, C, class-A: Inductively coupled amplifier, transformer – coupled common emitter amplifier, transformer-coupled emitter-follower amplifier,
Class-AB Push-pull complementary output stages-class-AB output stage with diode biasing, class-AB biasing using the V_{BE} multiplier, class-AB output stage with input buffer transistors, class –AB output stage utilizing the Darlington configuration, Illustrative Problems.

Tuned Amplifiers:
Introduction to tuned amplifiers, Role of Q-Factor, Single-tuned, Double-tuned and Stagger-tuned amplifiers.

Learning Outcomes: After completing this unit, the student will be able to:

- Know most common classes of power amplifier and their basic characteristics. (L2)

- Understand various distortions of amplifiers and the concept of heat sink. (L1)
- Analyze complementary symmetry topologies. (L3)
- Evaluate conversion efficiency of various topologies. (L4)
- Analyze different types of distortions in power amplifiers. (L3)
- Evaluate the resonant frequency for tuned amplifiers. Analyze characteristics of tuned amplifiers (L5)

TEXT BOOKS:

1. Donald A Neamen, "Electronic Circuits – Analysis and Design," 3rd Edition, McGraw Hill (India), 2019.
2. J. Millman, C Chalkias, "Integrated Electronics", 4th Edition, McGraw Hill Education (India) Private Ltd., 2015.
3. K.Lal Kishore, "Electronic Circuit Analysis", 2nd Edition, B S Publications, 2008.

REFERENCE BOOKS:

1. Behzad Razavi, "Fundamentals of Micro Electronics", Wiley, 2010.
2. Millman and Taub, Pulse, "Digital and Switching Waveforms", 3rd Edition, Tata McGraw-Hill Education, 2011
3. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits Theory", 9th Edition, Pearson/Prentice Hall, 2006.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

CO1: Understand the working principle of multistage amplifiers, Feedback amplifiers, power amplifiers, tuned amplifiers, Multivibrators and Time base generators

CO2: Analyze multistage amplifiers, multistage amplifiers, feedback amplifiers, power amplifiers, tuned amplifier and Multivibrators.

CO3: Design multistage amplifiers, feedback amplifiers, oscillators, Multivibrator, power amplifiers and tuned amplifiers for given specification.

CO4: Evaluate efficiency of large signal (power) amplifiers and voltage regulators.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to III Semester CE & ME and IV Semester CSE & ECE)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AMC9903	3	0	0	0	CIA	30 M
Course Title	:	BIOLOGY FOR ENGINEERS					SEE	--

COURSE OBJECTIVES: -

- ToprovidebasicunderstandingaboutlifeandlifeProcess. Animalandplant systems.Tounderstandwhatbiomolecules, are,theirstructuresarefunctions.Applicationof certainbiomoleculesinIndustry.
- Briefintroductionabouthumanphysiologyandbioengineering.
- Tounderstandhereditaryunits,i.e.,DNA(genes)andRNAandtheirsynthesisinliving organism.
- HowbiologyPrinciplescanbe appliedinourdailylifeusingdifferenttechnologies.
- Briefintroductiontotheproductionoftransgenicmicrobes,Plantsandanimals.

Unit I: IntroductiontoBasicBiology
CellasBasicunitoflife,celltheory, Cellshapes, Cellstructure, Cellcycle.Chromosomes. Prokaryotic andeukaryoticCell.PlantCell,AnimalCell,PlanttissuesandAnimaltissues,Brief introductiontofivekingdomsofclassification.

Learning Outcomes: Aftercompletingthisunit, thestudentwillbeableto

- Summarizethebasisoflife.(L1)
- Understandthedifferencebetweenlowerorganisms(prokaryotes)fromhigherorganisms (eukaryotes).(L2)
- Understandhoworganismsareclassified.(L3)

Unit II: IntroductiontoBiomolecules
Carbohydrates, lipids, proteins, Vitamins and minerals, Nucleic acids (DNA and RNA) and their types. Enzymes, Enzyme application in Industry. Large scale production of enzymes by Fermentation.

Learning Outcomes: Aftercompletingthisunit, thestudentwillbeableto

- Understandwhatarebiomolecules?theirroleinlivingcells,theirstructure,functionand howtheyareproduced.(L1)
- Interpretthe relationshipbetweenthestructureandfunctionofnucleic acids.(L2)
- Summarizetheapplicationsofenzymesinindustry.(L3)
- Understandwhatisfermentationandits applicationsoffermentationinindustry.(L4)

Unit III: HumanPhysiology
Nutrition: Nutrients or food substances. Digestive system, Respiratory system, (aerobic and anaerobic Respiration). Respiratory organs, respiratory cycle. Excretory system.

Learning Outcomes: Aftercompletingthisunit,thestudentwillbeableto

- Understandwhatnutrientsare(L1)
- Understandthemechanismandprocessofimportanthumanfunctions(L2&L3)

Unit IV: IntroductiontoMolecularBiologyandrecombinantDNATechnology
Prokaryotic gene and Eukaryotic gene structure. DNA replication, Transcription and

Translation. rDNA technology. Introduction to gene cloning.

Learning Outcomes: Aftercompletingthisunit,thestudentwillbeableto

- Understand and explain about gene structure and replication in prokaryotesand Eukaryotes (L1)
- How genetic material is replicated and also understands how RNA and proteins are synthesized. (L2)
- Understand about recombinant DNA technology and its application in differentfields. (L3)
- Explain what is cloning. (L4)

Unit V: ApplicationofBiology

Brief introduction to industrial Production of Enzymes, Pharmaceutical and therapeutic Proteins, Vaccines and antibodies. Basics of biosensors, biochips, Bio fuels, and Bio Engineering. Basics of Production of Transgenic plants and animals.

Learning Outcomes: Aftercompletingthisunit,thestudentwillbeabletoUnderstand.

- Howbiologyis appliedforproductionofusefulproductsformankind. (L1)
- Whatarebiosensors,biochipsetc.(L2)
- Understandtransgenicplantsandanimalsandtheirproduction(L3)

TEXT BOOKS:

1. P.K.Gupta,CellandMolecularBiology,5th Edition,RastogiPublications–
2. U.Satyanarayana.Biotechnology,Books&AlliedLtd2017

REFERENCE BOOKS:

1. N.A.Campbell,J.B.Reece,L.Urry,M.L.CainandS.A.Wasserman,“Biology:A GlobalApproach”,PearsonEducation Ltd,2018.
2. TJohnson,BiologyforEngineers,CRCpress,2011
3. J.M.WalkerandE.B.Gingold,MolecularBiologyandBiotechnology2nd ed..PanimaP ublications.PP434.
4. DavidHames,InstantNotesin Biochemistry–2016
5. PhilTunner,A.Mctennan,A. Bates &M.White,InstantNotes–MolecularBiology–2014

COURSE OUTCOMES: After successful completion of the course, the students will be able to:

1. Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
2. Explain about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry.
3. Briefly about human physiology.
4. Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
5. Know about application of biological Principles in different technologies for the production of medicines and pharmaceutical molecules through transgenic microbes, plants and animals.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to IV Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs.
Course Code	:	19AES0505T	3	0	0	3	CIA	30 M
Course Title	:	PYTHON PROGRAMMING FOR ENGINEERS LAB					SEE	70 M

COURSE OBJECTIVES: -

- To train the students in solving computational problems
- To elucidate solving mathematical problems using Python programming language
- To understand the fundamentals of Python programming concepts and its applications.

LIST OF TOPICS:

1. Write a program to demonstrate a) Different numeric data types and b) To perform different Arithmetic Operations on numbers in Python.
2. Write a program to create, append, and remove lists in Python.
3. Write a program to demonstrate working with tuples in Python.
4. Write a program to demonstrate working with dictionaries in Python.
5. Write a program to demonstrate a) arrays b) array indexing such as slicing, integer array indexing and Boolean array indexing along with their basic operations in NumPy.
6. Write a program that accepts a string from the user and display the same string after removing vowels from it.
7. Write a program to strip a set of characters from a string.
8. Write a function that prompts the user for the average temperature for each day of the week and returns a dictionary containing the required information.
9. Write a program that has the dictionary of your friends' names as keys and phone numbers as its values. Print the dictionary in a sorted order. Prompt the user to enter the name and check if it is present in the dictionary. If the name is not present, then enter the details in the dictionary.
10. Write a program to store the latitude and longitude of your house as a tuple and display it.
11. Write a program to do the following operations on files
    a) count the occurrence of each letter b) read the last n lines
    c) remove new line characters from the file d) read random line from a file
    e) read and write the contents from one csv file to another.
12. Write a program to add two polynomials using classes.
13. Create a class called library with data attributes accno, publisher, title and author. The methods of the class should include
    a) read () accno, title, author b) compute () – to accept the number of days late, calculate a display the fine charged at the rate of Rs. 10 per day.
    c) Display the data.
14. Create a program to compute summary statistics such as mean, median, mode, standard deviation and variance of the given different types of data.
15. Programs on Python packages NumPy, Pandas, Matplotlib

TEXT BOOKS:

1. Francois Chollet, Deep Learning with Python, 1/e, Manning Publications Company, 2017
2. Manohar Swaminathan, "Mastering Machine learning with Python in Six steps", A press.

3. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, “How to Think Like a Computer Scientist: Learning with Python 3”, 3rd edition, Available at http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
4. Paul Barry, “Head First Python a Brain Friendly Guide” 2nd Edition, O’Reilly, 2016
5. DainelY.Chen “Pandas for Everyone Python Data Analysis” Pearson Education, 2019

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Illustrate the use of various data structures. (L3)
2. Analyze and manipulate Data using Pandas (L4)
3. Design solutions to real-world problems using Python (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(IV Semester ECE)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs.
Course Code	:	19APC0409P	0	0	3	1.5	CIA	30 M
Course Title	:	ELECTRONIC CIRCUITS – ANALYSIS AND DESIGN LAB					SEE	70 M

COURSE OBJECTIVES: -

- To provide a practical exposure for design & analysis of electronic circuits for generation and amplification input signal.
- To learn the frequency response and finding gain, input & output impedance of multistage amplifiers
- To Design negative feedback amplifier circuits and verify the effect of negative feedback on amplifier parameters.
- To understand the application of positive feedback circuits & generation of signals.
- To understand the concept of design and analysis of Power amplifiers and tuned amplifiers

Note: Design & simulate any 12 experiments with Multisim / PSPICE or equivalent software and verify the results in hardware lab with discrete components.

List of experiments:

1. MOSFET Amplifier
   a. Design and simulate MOSFET (Depletion mode) amplifier using PSPICE /Multisim and study the Gain and Bandwidth of amplifier
   b. Design common source MOSFET (Enhance mode) amplifier with discrete components and calculate the bandwidth of amplifier from its frequency response
2. JFET Amplifier
   a. Design and simulate common source FET amplifier using PSPICE /Multisim and study the Gain and Bandwidth of amplifier
   b. Design common source FET amplifier with discrete components and calculate the bandwidth of amplifier from its frequency response
3. Common Emitter Amplifier (Self bias Amplifier)
   a. Design and simulate a self- bias (Emitter bias)Common Emitter amplifier using PSPICE /Multisim and study the Gain and Bandwidth of amplifier
   b. Design voltage divider based Common Emitter amplifier with discrete components and calculate the bandwidth of amplifier from its frequency response.
4. Design and simulate two stage RC coupled amplifier for given specifications. Determine Gain and Bandwidth from its frequency response curve.
5. Design and simulate Darlington amplifier. Determine Gain and Bandwidth from its frequency response curve.
6. Design and Simulate CE – CB Cascade amplifier. Determine Gain and Bandwidth from its frequency response curve.

7. Design and simulate voltage series feedback amplifier for the given specifications. Determine the effect of feedback on the frequency response of a voltage series feedback amplifier.
8. Design and simulate current shunt feedback for the given specifications. Determine the effect of feedback on the frequency response of a current shunt feedback amplifier.
9. Design and simulate RC Phase shift oscillator and Wien bridge oscillator for the given specification. Determine the frequency of oscillation.
10. Design and simulate Hartley and Colpitts oscillators for the given specifications. Determine the frequency of oscillation.
11. Design and simulate class A power amplifier and find out the efficiency. Plot the output waveforms.
12. Design and simulate class B push-pull amplifier and find out the efficiency. Plot the output waveforms.
13. Design and simulate single tuned amplifier. Determine the resonant frequency and bandwidth of a tuned amplifier.
14. Design and simulate double tuned amplifier. Determine the resonant frequency and bandwidth of a tuned amplifier.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

CO1: Understand Characteristics and frequency response of various amplifiers, basic equipment requirements for conducting the experiments.

CO2: Conduct various Experiments (both software and hardware related) to realize the concepts in coordination with fellow students in the batch.

CO3: Analyze negative feedback amplifier circuits, oscillators, Power amplifiers, tuned amplifiers and determine the efficiencies of power amplifiers.

CO4: Design RC and LC oscillators, Feedback amplifier for specified gain and multistage amplifiers for Low, Mid and high frequencies.

CO5: Simulate all the circuits and compare the performance.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
Course Structure for Four Year Regular B.Tech. Degree Program
(Effective for the batches admitted from 2019-20 onwards)

DEPARTMENT OF MECHANICAL ENGINEERING

INDUCTION PROGRAM (3 weeks duration)

- Physical activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas
- Familiarization to Dept./Branch & Innovations

B. Tech – I Semester (Theory – 4, Lab – 4)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9901	Mathematics – I	3	1	0	4	30	70	100
2	BS	19ABS9902	Engineering Physics	3	0	0	3	30	70	100
3	ES	19AES0201	Basic Electrical and Electronics Engineering	3	0	0	3	30	70	100
4	MC	19AMC9902	Environmental Sciences	3	0	0	0	30	-	30
PRACTICAL										
5	ES	19AES0301	Engineering Drawing Lab	1	0	4	3	30	70	100
6	BS	19ABS9903	Engineering Physics Lab	0	0	3	1.5	30	70	100
7	LC	19ALC0301	Engineering & IT Workshop Lab	0	0	3	1.5	30	70	100
8	ES	19AES0202	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5	30	70	100
TOTAL:				**13**	**01**	**13**	**17.5**	**240**	**490**	**730**

B. Tech – II Semester (Theory – 5, Lab – 3)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9906	Mathematics – II	3	1	0	4	30	70	100
2	BS	19ABS9904	Engineering Chemistry	3	0	0	3	30	70	100
3	ES	19AES0501	C Programming	3	1	0	4	30	70	100
4	HS	19AHS9901	Communicative English	2	0	0	2	30	70	100
5	MC	19AMC9901	Human Values & Professional Ethics	3	0	0	0	30	-	30
PRACTICAL										
6	BS	19ABS9905	Engineering Chemistry Lab	0	0	3	1.5	30	70	100
7	ES	19AES0502	C Programming Lab	0	0	3	1.5	30	70	100
8	HS	19AHS9902	Communicative English Lab	0	0	3	1.5	30	70	100
TOTAL:				**14**	**02**	**09**	**17.5**	**240**	**490**	**730**

B. Tech – III Semester (Theory – 7, Lab – 4)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9907	Complex Variables and Transforms	2	1	0	3	30	70	100
2	ES	19AES0503T	Data Structures	3	0	0	3	30	70	100
3	ES	19AES0505T	Python Programming for Engineers	2	1	0	3	30	70	100
4	PC	19APC0301	Engineering Mechanics	3	0	0	3	30	70	100
5	PC	19APC0302T	Manufacturing Processes	3	0	0	3	30	70	100
6	PC	19APC0303T	Material Science and Engineering	3	0	0	3	30	70	100
7	MC	19AMC9903	Biology for Engineers	3	0	0	0	30	00	30
PRACTICAL										
8	ES	19AES0503P	Data Structures Lab	0	0	3	1.5	30	70	100
9	PC	19APC0302P	Manufacturing Processes Lab	0	0	3	1.5	30	70	100
10	PC	19APC0303P	Material Science and Engineering Lab	0	0	3	1.5	30	70	100
11	LC	19ALC0302	Mechanical Engineering Workshop	0	0	3	1.5	30	70	100
TOTAL:				**19**	**02**	**12**	**24**	**330**	**700**	**1030**

B. Tech – IV Semester (Theory – 7, Lab – 4)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9908	Numerical Methods and Probability Theory	2	1	0	3	30	70	100
2	ES	19AES0506T	Internet of Things	2	0	0	2	30	70	100
3	HS	19AHS9904	Design Thinking and Product Innovation	2	0	0	2	30	70	100
4	PC	19APC0304	Thermodynamics	2	1	0	3	30	70	100
5	PC	19APC0305T	Mechanics of Materials	2	1	0	3	30	70	100
6	PC	19APC0306T	Fluid Mechanics and Hydraulic Machinery	2	1	0	3	30	70	100
7	PC	19APC0307	Kinematics of Machinery	2	1	0	3	30	70	100
PRACTICAL										
8	ES	19AES0506P	Internet of Things Lab	0	0	3	1.5	30	70	100
9	PC	19APC0305P	Mechanics of Materials Lab	0	0	3	1.5	30	70	100
10	PC	19APC0306P	Fluid Mechanics and Hydraulic Machinery Lab	0	0	3	1.5	30	70	100
11	PC	19APC0308	Computer Aided Machine Drawing	0	0	3	1.5	30	70	100
TOTAL:				**14**	**05**	**12**	**25**	**330**	**770**	**1100**

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE, ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9901	3	1	0	4	CIA	30 M
Course Title	:	MATHEMATICS – I					SEE	70 M

COURSE OBJECTIVES:

1. To enlighten the learners in the concept of differential equations, matrices and multivariable calculus.
2. To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

COURSE OUTCOMES:

After the completion of this course, the students will be able to:

1. Understand the effective mathematical tools for the solutions of differential equations that model physical processes.
2. Identify the essential characteristics of linear differential equations with constant coefficients and solve the linear differential equations with constant coefficients by appropriate method.
3. Solving systems of linear equations, using technology to facilitate row reduction determine the rank, Eigen values and Eigen vectors, diagonal form and different factorizations of a matrix.
4. Translate the given function as series of Taylor's and McLaren's with remainders and analyze the behavior of functions by using mean value theorems.
5. Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies and acquire the Knowledge maxima and minima of functions of several variables.

Unit I

Ordinary Differential Equations of First Order: Formation of the ordinary differential equations (ODEs) – Solution of an ordinary differential equation – Equations of the First Order and First Degree – Linear Differential Equation – Bernoulli's Equation – Exact Differential Equations – Equations Reducible to exact equations-Orthogonal Trajectories.

Ordinary Differential Equations of First Order but not First Degree: Equations solvable for p – Equations solvable for x – Equations solvable for y – Equations do not contain x(or y) – Clairaut's Equations.

Unit II

Ordinary Differential Equations of Higher Orders: Solutions of Linear Ordinary Differential Equations

With Constant Coefficients – Rules for finding the Complimentary Functions – Rules for finding the particular integral – Method of variation of parameters – Cauchy's linear equation – Legendre's Linear Equation.

Unit III

Matrices: Inverse and rank of a matrix - System of linear equations; Symmetric, skew-symmetric and orthogonal matrices - Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation.

Unit IV

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), indeterminate forms and L'Hospital's rule; Maxima and minima.

Unit V

Multivariable Calculus: Limit, continuity and partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd.
2. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
3. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9902	3	0	0	3	CIA	30 M
Course Title	:	ENGINEERING PHYSICS					SEE	70 M

COURSE OBJECTIVES:

1. To disseminate knowledge in basic concepts of mechanics and to understand the basic ideas of damping and resonance.
2. To interpret the significant concepts of magnetic materials which leads to potential applications and basics of electromagnetic waves.
3. To identify the importance of the optical phenomenon i.e. interference, diffraction andpolarization related to its Engineering applications.
4. To teach the concepts related to laser, fiberoptics and superconductivity which lead to their fascinating applications.
5. To familiarize the concept of Quantum mechanics and semiconductors relevant to engineering branches.

UNIT I

MECHANICS AND OSCILLATIONS:

Basic laws of vectors and scalars-rotational frames – conservative forces; F = – grad V, torque andangular momentum - Newton's laws in inertial and linear accelerating non-inertial frames ofreference.

Simple Harmonic motion –Characteristics of SHM; Damped harmonic motion – over-damped, critically damped and lightly damped oscillators; Forced oscillations and resonance.

UNIT II

ELECTROMAGNETISM AND MAGNETIC PROPERTIES OF MATERIALS:

Divergence of Electric and Magnetic Fields – Gauss theorem for divergence – Curl of Electric and Magnetic Fields – Stokes theorem for curl – Maxwell's Equations – Electromagnetic wave propagation (conducting and non-conducting media) – Poynting's Theorem.

Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Classification of Magnetic materials – Domain Concepts of ferromagnetism – Hysteresis – soft and hard magnetic materials – Magnetic device applications.

UNIT III

WAVE OPTICS: Interference:

Principle of superposition – Young's Experiment – Coherence – Interference in thin films, Wedge shaped film, Newton's Rings – Determination of wavelength.

Diffraction: Diffraction, differences between interference and diffraction, Fraunhofer diffraction due to Single slit

Polarization: Polarization by double refraction – Plane polarized light by Nicol's Prism – Half wave and Quarter wave plate – Engineering applications of Polarization.

UNIT IV

LASERS AND FIBER OPTICS:
Introduction, spontaneous and stimulated emissions, population inversions, pumping, Ruby laser, Gas laser (He-Ne Laser), Semiconductor laser, Applications of lasers.
Optical Fibre and Total Internal Reflection, Acceptance Angle and cone of a fibre, Numerical aperture, Fibre optics in communications, Types of Optical Fibres, Applications of optical fibers.
SUPERCONDUCTIVITY: Super conductivity, Meissner Effect, Basics of BSC theory, Types of Superconductors and Applications of Superconductors.

UNIT V

QUANTUM MECHANICS
: Introduction, Photoelectric Effect, de-Broglie's hypothesis, Wave-particle duality Heisenberg's Uncertainty principle, Schrodinger's time independent wave equation, Particle in one dimensional box.
SEMICONDUCTOR PHYSICS: Energy bands in solids, Types of electronic materials: metals, semiconductors, and insulators**.** Intrinsic and Extrinsic semiconductors, Direct and Indirect band gap semiconductors Hall effect – Applications of Hall effect – Drift and Diffusion currents – Continuity equation– Applications of Semiconductors.

COURSE OUTCOMES:

After the completion of this course, the student will be able to:

1. ExtendNewton's second law for inertial and non-inertial frame of reference and analyze the concept of resonance.
2. Applythe Gauss' theorem for divergence and Stokes' theorem for curl andClassifythe magnetic materials based on susceptibility
3. Interpret the differences between interference and diffraction, illustrate the concept of polarization of light and its applications and classify ordinary polarized light and extraordinary polarized light.
4. Applyelectromagnetic wave propagation in different Optical Fibers, the lasers concepts in various applicationsand explainMeissner's effect, BCS theory.

5. interpret the direct and indirect band gap in semiconductors and identify the type of semiconductor using Hall effect.
   Analyze the behavior of particles at very microscopic level by using wave nature of particles.

TEXT BOOKS:

1. Gaur R.K. and Gupta S.L., "Engineering Physics"-Dhanpat Rai publishers, 2012

2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Krshisagar - S. Chand publications, 11th Edition 2019.
3. Fundamentals of Physics by David Halliday and Robert Resnick – Part I and Part II - Wiley.
4. H.K. Malik & A.K. Singh “Engineering Physics” - McGraw Hill Publishing Company Ltd.
5. “Engineering Physics”, K.Thyagarajan - McGraw Hill Publishing Company Ltd., 2015.
6. D.Kleppner and Robert Kolenkow “An introduction to Mechanics”- II - Cambridge University Press, 2015

REFERENCE TEXT BOOKS:

1. M K Varma “Introduction to Mechanics”-Universities Press-2015.
2. I. G. Main, “Vibrations and waves in physics”, 3rd Edn., Cambridge University Press
3. D.K. Bhattacharya and A. Bhaskaran, “Engineering Physics”- Oxford Publications-2015
4. David J. Griffiths, “Introduction to Electrodynamics”- 4/e, Pearson Education, 2014
5. P.K. Palaniswamy, “Engineering Physics” Scitech Publications
6. Shatendra Sharma, Jyotsna Sharma, “Engineering Physics” Pearson Education, 2018
7. D.Kleppner and Robert Kolenkow “An introduction to Mechanics” – II – Cambridge University Press, 2015.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, ME and ECE & II Semester CSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0201	3	0	0	3	CIA	30 M
Course Title	:	BASIC ELECTRICAL AND ELECTRONICS ENGG.					SEE	70 M

COURSE OBJECTIVES:-

1. To introduce basics of simple electric circuits.
2. To impart knowledge on measuring devices for voltages and currents.
3. To provide comprehensive idea about working principle, operation and applications of PN junction diode & knowledge about semiconductors
4. To teach applications of electronic principles which are used in Engineering
5. To give knowledge about Special purpose diodes and applications

COURSE OUTCOMES:-

1. Able to recall Simple electrical connections.
2. Knowledge about the Measuring Instruments
3. Learning operation and properties of semiconductors
4. Useful knowledge on PN diode and simple applications.
5. Working and construction of Analog Electronic devices.

UNIT I

ELECTRICAL CIRCUITS: Basic Electrical Circuit elements – (R-L-C) – Ohms Law – Kirchoffs Law – Introduction to AC Circuits – and DC Circuits – Series connection – parallel connections, Analysis of single – phase ac circuits consisting of RL – RC – RLC series circuits – Nodal Analysis-Mesh Analysis.

UNIT II

MEASURING INSTRUMENTS: Moving coil and moving iron instruments (Ammeter and voltmeter) – Cathode ray oscilloscope – cathode ray tube - Regulated power supply – Digital Multi Meter (DMM) – Megger instrument-Introduction to Electric and magnetic fields – Thermistor – Linear Mode power supply.

UNIT III

SEMICONDUCTORS: Classification of semiconductors – Intrinsic semiconductors – Extrinsic semiconductors – conductivity of Intrinsic and Extrinsic semiconductors – P-type semiconductor – N-type semiconductor – Qualitative theory of P-N junction – V-I characteristics of PN junction diode – and simple applications – Ligiht Emitting Diode(LED).

UNIT IV

RECTIFIERS AND FILTERS: Introduction to Rectifiers – Half Wave Rectifiers – Full Wave Rectifiers – Bridge rectifier – Advantages of Bridge rectifier – Comparision of Rectifiers – Harmonic components in a Rectifier circuit – Introduction to Filters – Inductor Filter – capacitor Filter – LC or L-section Filter – Types of Voltage regulators – series voltage regulator – shunt voltage regulator – Clippers and Clampers.

UNIT V

ANALOG ELECTRONICS: Zener diode, Applications of diode as switch and rectifier, Zener diode as regulator, Breakdown mechanism – Avalanche zener Breakdown – special purpose diodes: Schottky diode, tunnel diode, varactor diode, photodiode, phototransistor ,Introduction to Bipolar Juntion Transistor – BJT construction, operation, configurations – CB, CE, CC. – Introduction to Basic Logic Gates.

Text Books:-

1. D.P. Kothari, I.J.Nagrath, Basic Electrical and Electronics Engineering, 2^{nd} Edition, McGraw Hill Education (India) Private Limited.
2. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, 2nd edition, Pearson India Private Limited.

Reference Books:-

1. Principles of Electrical Engineering and Electronics, V.K. Mehta & Rohit Mehta, S.Chand publications.
2. Electronic Devices and Circuit Theory by Robert L.Boylestad and Louis Nashelsky., pearson.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19AMC9902	3	0	0	0	CIA	30 M
Course Title	:	ENVIRONMENTAL SCIENCES					SEE	--

COURSE OBJECTIVES:-

1. Creating basic awareness on environment
2. Understanding the importance of ecological balance for sustainable development.
3. Creating awareness on biodiversity and its conservation
4. Understanding the impacts of developmental activities and mitigation measures.
5. Understanding the environmental policies and regulations.

COURSE OUTCOMES:

Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which in-turn helps in sustainable development.

UNIT I

Ecosystems: Definition, Scope and Importance ecosystem. Classification, Structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Energy flow in the ecosystem, Biogeochemical cycles, Bioaccumulation, ecosystem value, derives and carrying capacity, Field visits.

UNIT II

Natural Resources: Classification of Resources: Living and Non - Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable energy source, case studies.

UNIT III

Biodiversity and its Conservation: Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels - India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; Conservation of biodiversity: In-situ and Ex-situ conservation. National Biodiversity Act.

UNIT IV

Environmental Pollution and Control Technologies: Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary Tertiary.

Overview of air pollution control technology, Concept of bioremediation. Global Environmental Problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montreal Protocol.

UNIT V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio - economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).

Towards Sustainable Future: Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl Human Health, Environmental Ethics, Concept of Green Building, Ecological foot print, Life Cycle Assessment(LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCES:

1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.
2. Enviromental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela . 2008 PHI Learning Pvt Ltd.
4. Environmental Science by Daniel B. Botkin & Edwards A. Keller, Wiley INDIA edition.
5. Enviromental Studies by Anubha Kaushik, 4th Edition, New age international publishers.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0301	1	0	4	3	CIA	30 M
Course Title	:	ENGINEERING DRAWING LAB					SEE	70 M

COURSE OBJECTIVES:

1. To gain and understanding of the basics of geometrical constructions of various planes and solids, understanding system of graphical representation of various objects and various views to draft and read the products to be designed and eventually for manufacturing applications.
2. To learn about various projections, to understand complete dimensions and details of object.
3. Ultimately student must get imaginary skill to put an idea of object, circuit, assembly of parts in black & white, to design a product and to understand the composition, which can be understood universally.

COURSE OUTCOMES:

1. Drawing 2D and 3D diagrams of various objects.
2. Learning conventions of Drawing, which is an Universal Language of Engineers.
3. Drafting projections of points, planes and solids.

UNIT I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance – Conventions in Drawing – Lettering – BIS Conventions.
Curves used in Engineering Practice: (a) Conic Sections including the Rectangular Hyperbola – General method only, (b) Cycloid, Epicycloid and Hypocycloid, (c) Involutes.

UNIT II

Scales: Plain, Diagonal and Vernier.
Projection of Points: Principles of orthographic projection – Convention – First angle projections, projections of points.

UNIT III

Projections of Lines: Lines inclined to one or both planes, Problems on projections, Finding True lengths.
Projections of Planes: Projections of regular plane surfaces- plane surfaces inclined to both planes.

UNIT IV

Projections of Solids: Projections of Regular Solids with axis inclined to both planes.
Developments of Solids: Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid,

Cone.

UNIT V

Isometric and Orthographic Projections: Principles of isometric projection- Isometric Scale- Isometric Views- Conventions- Isometric Views of lines, Planes, Simple solids (cube, cylinder and cone). Isometric projections of spherical parts. Conversion of isometric Views to Orthographic Views.

Text Books:

1. Engineering Drawing, N.D. Bhatt, Charotar Publishers
2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai

References:

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers
2. Engineering Drawing, Shah and Rana,2/e, Pearson Education
3. Engineering Drawing and Graphics, Venugopal /New age Publishers
4. Engineering Graphics, K.C. John, PHI,2013
5. Engineering Drawing, B.V.R. Guptha, J.K. Publishers

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9903	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING PHYSICS LAB					SEE	70 M

COURSE OBJECTIVES:

1. To understand the phenomenon of interference and diffraction using Travelling Microscope and spectrometer.
2. To analyze the interaction of electromagnetic fields.
3. To understand the concept of polarization and classify polarized and unpolarized lights.
4. To realize the laws of resistance by using Carey Foster's bridge.
5. To analyze the frequencies of electrically maintained tuning fork by Melde's apparatus.

COURSE OUTCOMES:

After completion of this course, the students will be able to:

1. Apply the knowledge of optics to calculate geometrical parameters of thickness of thin object and radius of curvature of a lens.
2. Plot the intensity of the magnetic field of circular coil carrying current with varying distance.
3. Evaluate the Planck's constant value practically and analyze the characteristics of photo electric cell and Cauchy's constants.
4. Determine coefficient of thermal Conductivity of a Bad Conductor.

LIST OF EXPERIMENTS:

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.
2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying Circular Coil.
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer.
5. Determination of Refractive Index of Ordinary ray $\mu_0$and extraordinary$\mu_e$ray.
6. Determination of Thickness Given Paper Strip by Wedgeshape Method.
7. Calibration of LowRange Voltmeter.
8. Calibration of LowRange Ammeter.
9. Determination of Magnetic Moment and Horizontal Component of Earth's Magnetic Field.
10. Lees Method - Coefficient of thermal Conductivity of a Bad Conductor.
11. Carey Foster's Bridge – Verification of laws of Resistance and Determination of Specific Resistance.
12. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
13. Photoelectric cell-Characteristics.

14. Planks Constants.
15. Determination of Wavelength of Monochromaticsource using LASERdiffraction

Reference Books:

S.Balasubramanian, M.N. Srinivasan “A Text book of Practical Physics”- S.Chand Publishers, 2017.

1. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita Unive

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Laboratory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19ALC0301	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING & IT WORKSHOP LAB					SEE	70 M

ENGINEERING WORKSHOP LAB

COURSE OBJECTIVES:

4. The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labor involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

COURSE OUTCOMES:

1. Acquires basic knowledge of various tools and their uses in different sections of manufacturing.
2. Apply wood working skills in real world applications.
3. Design and model various basic prototypes in the trade of fitting.
4. Able to perform various basic House Wiring techniques.

TRADES FOR EXERCISES:

(a) Carpentry: Bench Work, tools used in carpentry.

Jobs for Class work: (i) Half lap joint (ii) Mortise and Tenon joint

(iii) Bridle joint (iv) Corner dovetail joint

(b) Fitting: Tools used in fitting work, Different files, chisels, hammers and bench vice.

Jobs for class work: (i) Vee Fit (ii) Square Fit
(iii) Dovetail Fit (iv) Half Round Fit

(c) House Wiring: Tools used in house wiring work.

Jobs for class work: (i) Series / Parallel Connection with three bulbs
(ii) Tube Light Connections (iii) Stair Case Connections
(iv) Measurement of Earth Resistance / Godown Wiring

Note: At least two exercises to be done from each trade.

TRADES FOR DEMONSTRATION:

a) Plumbing
b) Machine Shop

REFERENCE BOOKS:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

IT WORKSHOP LAB

COURSE OBJECTIVES:

1) Understand the basic components and peripherals of a computer.
2) To become familiar in configuring a system.
3) Learn the usage of productivity tools.
4) Acquire knowledge about the netiquette and cyber hygiene.
5) Get hands on experience in trouble shooting a system

COURSE OUTCOMES:

At the end of the course the students can able to

1) Assemble and disassemble the systems
2) Use the Microsoft Office Tools
3) Install various software
4) Know about various search engines
5) Trouble shoots various Hardware and Software problems.

LIST OF EXERCISES

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. Operating System Installation - Install Operating Systems like Windows, Linux along with necessary Device Drivers. The system should be configured as dual boot with both windows and Linux.
3. MS-Office / Open Office
   a) Word – All Toolbars, Page Setup, Page Background, Font, Para Graph, Page Borders, Headers & Footers, Mail Merge, Tables, Symbols, Equations, Saving, and Reviewing.
   b) Excel / Spread Sheet - All Toolbars, Cell Formatting, Grid Lines, Font, Page Setup, Organize data, Functions, Formulae, Headers & Footers, Tables, Graphs and Charts.
   c) Power Point Presentation – Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets, Numbering, Slide Show, Animations, Hyperlinks, Inserting – Images, Clip Art, Shapes, Objects, Tables and Charts, Audio, and Video files.
   d) Access - creation of database, validate data.
4. Network Configuration & Software Installation - Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. Internet and World Wide Web Search Engines, Types of search engines, netiquette, cyber hygiene.

6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.

Reference Books:

1. Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, K.L. James, Eastern Economy Edition.
2. Microsoft Office 2007: Introductory Concepts and Techniques, Windows XP Edition By Gary B. Shelly, Misty E. Vermaat and Thomas J. Cashman (2007, Paperback).
3. Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, Rudra Prathap, Oxford University Press, 2002.
4. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
5. The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dreamtech.
6. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
6) Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0202	0	0	3	1.5	CIA	30 M
Course Title	:	BASIC ELECTRICAL & ELECTRONICS ENGG. LAB					SEE	70 M

COURSE OBJECTIVES:

1. Get exposure to common electronic components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand usage of common electrical measuring instruments.
4. Determine performance characteristics of PN Junction diodes and applications.
5. Understanding simple Network connections Like series circuits

COURSE OUTCOMES:

1. To learn about the simple Logic gates functions.
2. Understanding the simple configurations of the Transistor.
3. Useful for the simple applications of PN diode.
4. To give knowledge about PN diode characteristics.
5. Knowledge about simple Network Analysis

BASIC ELECTRICAL ENGINEERING LAB
List of Experiments:

1. Verification of Ohms Law
2. Verification of KCL and KVL Laws
3. MESH analysis
4. NODAL analysis
5. Verification of RC and RL Parallel Resonance
6. Verification of R-L-C Series Resonance

BASIC ELECTRONICS ENGINEERING LAB
List of Experiments:

1. V-I Characteristics of PN DIODE
2. Half Wave Rectifier
3. Full Wave Rectifier
4. BJT Configuration of CB, CE, CC
5. ZENER Diode Characteristics
6. Basic LOGIC gates

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CSE, ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9906	3	1	0	4	CIA	30 M
Course Title	:	MATHEMATICS – II					SEE	70 M

COURSE OBJECTIVES:

1. To familiarize the prospective engineers with techniques in multivariate integration and partial differential equations.
2. To equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

COURSE OUTCOMES:

After the completion of this course, the students will be able to:

1. Understand beta and gamma functions and its relations and conclude the use of special function in evaluating definite integrals.
2. Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and apply double integration techniques in evaluating areas bounded by region.
3. Apply Del to Scalar and vector point functions and illustrate the physical interpretation of Gradient, Divergence and Curl.
4. Find the work done in moving a particle along the path over a force field and evaluate the rates of fluid flow along and across curves.
5. Apply a range of techniques to find solutions of standard PDEs and outline the basic properties of standard PDEs.

UNIT I

Sequences and Series: Convergence of sequence and series, tests for convergence;

Fourier series: Half range sine and cosine series, Parseval’s theorem.

UNIT II

Special Functions: Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions, evaluation of improper integrals.

UNIT III

Multiple Integrals: Double integrals, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves, Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates.

UNIT IV

Vector Calculus: Scalar and vector point functions, vector operator del, del applies to scalar point functions Gradient, del applied to vector point functions-Divergence and Curl, vector identities.

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

UNIT V

Partial Differential Equations: First order partial differential equations, solutions of first order linear and non-linear PDEs. Solutions to homogenous and non-homogenous higher order linear partial differential equations.

Text Books:

3. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers.
4. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons.

Reference Books:

4. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd.
5. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
6. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9904	3	0	0	3	CIA	30 M
Course Title	:	ENGINEERING CHEMISTRY					SEE	70 M

COURSE OBJECTIVES:

COURSE OUTCOMES:

At the end of the course the students will be able to:

1. To impart the concept of soft and hard waters, softening methods of hard water.
2. Explain the importance of polymers in our daily life and mechanism of conduction in the conducting polymers.
3. To analyze the fuel and methods for preparation of synthetic fuels.
4. To understand the basics of electrochemistry, conductometry and batteries.
5. To familiarizes the Engineering materials.

UNIT I **(10 hrs)**

Water Technology:
Sources of Water, Impurities and their Influence on Living Systems, Soft Water and Hardness of Water, Estimation of Hardness by EDTA Method, Boiler Troubles **-** Scale and Sludge, Industrial Water Treatment Internal Treatment Methods(Phosphate Conditioning, Calgon Conditioning), Water softening Methods (Zeolite and Ion-Exchange Processes), Specifications for Drinking Water, Bureau of Indian Standards(BIS) and World Health Organization(WHO), Municipal Water Treatment, Desalination of Brackish Water, Reverse Osmosis (RO) and Electrodialysis.

UNIT II **(10 hrs)**

Polymer Chemistry: Introduction to Polymers, Types of Polymerisation (Addition & Condensation), Mechanism of Addition Polymerisation (Ionic and Radical).
Plastics: Thermoplastics and Thermosettings. Preparation, Properties and Applications of Bakelite, Nylon-66.
Elastomers: Buna-S, Buna-N–Preparation, Properties and Applications.

Conducting Polymers: Polyacetylene, Polyaniline, Mechanism of Conduction and Applications.

UNIT III **(10 hrs)**

Fuel Technology: Fuels – Classification of fuels.

Solid Fuels: Wood and Coal, Ranking of Coal-Analysis (Proximate and Ultimate), Coke Manufacture Otto Hoffman Process.

Liquid Fuels: Petroleum Origin, Extraction, and Refining. Motor Fuels Petrol, Diesel Oil, Knocking Octane Number and Cetane Number; Synthetic petrol-Fischer-Tropsch's & Bergius process.

Gaseous Fuels: Composition and Uses of Natural Gas, LPG, and CNG. Flue gas analysis and its significance.

UNIT IV **(10 hrs)**

Electrochemistry: Introduction to Electrochemistry (Conductors, Semi-Conductors, Insulators, Conductance). Electrodes, Reference Electrodes, Electrochemical Cell, Nernst Equation, Cell Potential and its Calculations, Numerical Problems. Principle and Applications of Potentiometry, Conductometry.

Batteries: Primary Batteries – Zinc-Air Battery.
Secondary Batteries- Lithium Ion Batteries- Working of the Batteries including Cell Reactions.
Fuel Cell- Hydrogen-Oxygen.

UNIT V **(10 hrs)**

Materials of Engineering Chemistry:

Building materials: Portland Cement, Constituents, Phases and Reactivity of Clinker, Setting and Hardening of Cement.

Refractories: Classification, Properties, Factors affecting the Refractory Materials and Applications.

Lubricants: Classification of Lubricants with examples. Definition and Significance of the following Characteristics of a Good Lubricating Oil- Viscosity, Viscosity Index, Flash & Fire Point, Acid Number, Saponifaction Value, Pour Point and Cloud Point.

Text books:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Shashi Chawla, A Reading of Engineering Chemistry, 3rd Edition, Dhanpat Rai and Co., New Delhi, 2011,3rd edition.
3. Puri, Sharma and Pathania "Principles of Physical Chemistry". Vishal Publishing Co.,Jalandhar.1991, 31st edition
4. Gowariker *et al*., Polymer Science and Technology, Prentice Hall of India Pvt. Ltd., New Delhi, 2004, 10th reprint.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0501	3	1	0	4	CIA	30 M
Course Title	:	C PROGRAMMING					SEE	70 M

COURSE OBJECTIVES:

1. Introduce the internal parts of a computer, and peripherals.
2. Introduce the Concept of Algorithm and use it to solve computational problems
3. Identify the computational and non – computational problems
4. Teach the syntax and semantics of a C Programming language
5. Demonstrate the use of Control structures of C Programming language

COURSE OUTCOMES:

1. Illustrate the working of a computer and apply algorithmic approach for solving a problem.
2. Recognize the importance of programming language independent constructs
3. Select the control structure to solve computational problems
4. Design and implement programs to analyze the array applications.
5. Structure the individual data elements to simplify the solutions.

UNIT I

Introduction to Computer Programming Languages: Evolution of Computer Programming languages – Machine, Symbolic and high-level languages. Fundamentals of Algorithms (Pseudo Codes) and Flowcharts, Compiler, Interpreter, Loader, and Linker.
Creating and Running Programs: Writing, Editing, Compiling, Linking and Executing.
Program Control Structures: Sequence, Selection and Iteration. Software Development Method.

UNIT II

Introduction to C Language: Background, Basic Structure of a C Program – Steps to execute a C Program – Character Set of C Language – Basic I/O Statements – Basic Data Types and Sizes – C – Tokens: Identifiers, Keywords, Constants, and Variables. Sample Programs.
Input and output: standard input and output, formatted output – printf, formatted input – scanf.

UNIT III

Operators: Arithmetic, Relational, Logical, Increment and decrement, Conditional, Assignment, Bitwise – Operator Precedence – Expressions – Type Conversions, Conditional Expressions – Precedence and Order of Evaluation. Sample Programs.
Control Flow / Control Statements: Selection & Making Decisions – Logical Data and Operators – Two-way Selection, Multi-way selection – Standard Statements and blocks – Non-iterative Statements: (if, if-else, null else, nested if-else, if-else ladder, else-if, switch) – Repetitive / Iterative Statements: Concept of

loop – Pre-test and post-test loops – While loop, do-while loop, and for loops, initialization and updating, event and counter controlled loops. Branching: break, continue, and Goto. – Sample programs on applications.

UNIT IV

Arrays in C language: Concept – Definition – Declaration – Types of arrays – One Dimensional, two dimensional, multidimensional – initialization of arrays – Storing and assessing elements – Array applications.
Strings: Definition, Declaration, Initialization – Basic operations – String manipulations – String handling functions – Arrays using strings -

UNIT V

Pointers and arrays: Concept – Definition, Declaration, Initialization, pointer to pointer, functions and pointers, arrays and pointers, pointer as function arguments (call-by-reference), pointers and strings.
Functions: Concept – Definition, Declaration, Types of functions – parameter passing – passing arrays to functions, passing pointers to functions, Recursion – returning non-integers, external variables, scope variables, header variables, register variables, block structure. User defined functions – Standard Library Functions.
Structures: Definition – Declaration – Initialization - Accessing the structure elements – arrays of structures, Array with in structures, pointers to structures, Passing Structure to functions – nested structures, self-referential structures, unions, typedef.

Text Books:

1. Pradip Dey, and Manas Ghosh, “Programming in C”, 2018, Oxford University Press.
2. R.G. Dromey, “How to Solve it by Computer”. 2014, Pearson.
3. Brian W. Kernighan, and Dennis M. Ritchie, “The C Programming Language”, 2ndEdition, Pearson.

Reference Books:

1. RS Bichkar “Programming with C”, 2012, Universities Press.
2. Pelin Aksoy, and Laura Denardis, “Information Technology in Theory”, 2017, Cengage Learning.
3. Byron Gottfried and Jitender Kumar Chhabra, “Programming with C”, 4th Edition, 2019, McGraw Hill Education.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AHS9901	2	0	0	2	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH					SEE	70 M

COURSE OBJECTIVES:

Reading Skills

- Addressing explicit and implicit meanings of a text on current topics.
- Understanding the context.
- Learning new words and phrases.
- Using words and phrases in different contexts.

Writing Skills

- Using the basic structure of a sentence.
- Applying relevant writing formats to create paragraphs, essays, letters, emails, reports and presentations.
- Retaining a logical flow while writing.
- Planning and executing an assignment creatively.

Interactive Skills

- Analyzing a topic of discussion and relating to it.
- Participating in discussions and influencing them.
- Communicating ideas effectively.
- Presenting ideas coherently within a stipulated time.

Life Skills

- Examining self-attributes and identifying areas that require improvement: self-diagnosis and self-motivation.
- Adapting to a given situation and developing a functional approach to finding solutions: adaptability and problem solving.
- Understanding the importance of helping others: community services and enthusiasm.

COURSE OUTCOMES:

1. The student will acquire basic proficiency in English using all LSRW skills.
2. Read and explore for enrichment of works from various genres (Poems, essays etc.)
3. Make correct usage of grammar and Vocabulary in writing and speaking.
4. To make them develop Linguistic competence.
5. To make them understand the concept of redundancies in writing skills.

UNIT I

Reading : *On the conduct of life:* William Hazlitt
Grammar : Prepositions
Vocabulary : Word Formation I: Introduction to Word Formation
Writing : Clauses and Sentences

Life skills	**:**	**Values and Ethics** *If:* Rudyard Kipling

UNIT II

Reading	**:**	*The Brook:* Alfred Tennyson
Grammar	**:**	Articles
Vocabulary	**:**	Word Formation II: Root Words from other Languages
Writing	**:**	Punctuation
Life skills	**:**	**Self-Improvement** *How I Became a Public Speaker*: George Bernard Shaw

UNIT III

Reading	**:**	*The Death Trap*: Saki
Grammar	**:**	Noun-Pronoun Agreement Subject- Verb Agreement
Vocabulary	**:**	Word Formation III: Prefixes and Suffixes
Writing	**:**	Principles of Good Writing
Life skills	**:**	**Time Management** *On saving Time*: Seneca

UNIT IV

Reading	**:**	*Chindu Yellama*
Grammar	**:**	Misplaced Modifiers
Vocabulary	**:**	Synonyms; Antonyms
Writing	**:**	Essay Writing
Life skills	**:**	**Innovation** *Muhammad Yunus*

UNIT V

Reading	**:**	*Politics and the English Language*: George Orwell
Grammar	**:**	Clichés; Redundancies
Vocabulary	**:**	Common Abbreviations
Writing	**:**	Writing a Summary
Life skills	**:**	**Motivation** *The Dancer with a White Parasol*: Ranjana Dave

Prescribed Textbook: *Language and Life: A Skills Approach* Board of Editors, Orient Black Swan Publishers, India. 2018.

Suggested Readings

- Practical English Usage. Michael Swan. OUP. 1995.
- Remedial English Grammar. F.T. Wood. Macmillan.2007
- On Writing Well. William Zinsser. Harper Resource Book. 2001
- Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
- Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
- Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19AMC9901	3	0	0	0	CIA	30 M
Course Title	:	HUMAN VALUES AND PROFESSIONAL ETHICS					SEE	--

COURSE OBJECTIVES:- This introductory course input is intended.

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

UNIT I

Course Introduction – Need, basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration – what is it? – its content and process; 'Natural Acceptance' and Experiential Validation – as the mechanism for self exploration. Continuous Happiness and Prosperity – A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities – the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT II

Understanding Harmony in the Human Being – Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' – Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT III

Understanding Harmony in the Family and Society – Harmony in Human – Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human – human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti;

Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.

Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society – Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) – from family to world family!

UNIT IV

Understanding Harmony in the nature and Existence – Whole existence as Co- existence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature – recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astiva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT V

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order,
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order.

a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
b. At the level of society: as mutually enriching institutions and organizations.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.

8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9905	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING CHEMISTRY LAB					SEE	70 M

COURSE OBJECTIVES:

COURSE OUTCOMES: At the end of the course, the students will be able to

1. **Prepare** of various Solutions
2. **Determine** the hardness of water
3. **Analysis** of water
4. **Calculate** the cell constant and conductance of solutions
5. **Determine** the physical properties like viscosity, acid number, saponification number
6. **Estimate** the Iron and Calcium in cement

LIST OF EXPERIMENTS:

1. Preparation of Primary Standard (sodium carbonate) Solution.
2. Estimation of Hardness of Water by EDTA method.
3. Estimation of Dissolved Oxygen by Winkler's method.
4. Estimation of Available Chlorine in Bleaching Powder.
5. Estimation of Ferrous ion in the given Mohr Salt by using KMnO4 Solution
6. Determination of Strength of an Acid in Pb-Acid Battery.
7. Preparation of Polymer (Bakelite).
8. Determination of Cell Constant and Conductance of Solutions
9. Determination of Strength of Acid by Conductometric Titrations.
10. Estimation of Calcium in Port land Cement.
11. Determination of Iron in Cement Sample by Colorimeter.
12. Determination of Viscosity of Lubricating Oil using Ostwald Viscometer.
13. Determination of Average Molecular Mass of given Polymer (Polyvinyl Alcohol) by Using Ostwald Viscometer.
14. Determination of acid number of given lubricating oil.
15. Determination of Saponification number of given lubricating oil.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0502	0	0	3	1.5	CIA	30 M
Course Title	:	C PROGRAMMING LAB					SEE	70 M

COURSE OBJECTIVES:

1. To learn about the computer systems, computing environments, developing a computer program and structure of C.
2. To gain Knowledge of the operators, control statements in C.
3. To learn about the design concepts of arrays, strings and their usage.
4. To assimilate about pointers and dynamic memory allocation.

COURSE OUTCOMES:

1. Acquire skills to write, compile and debug programs in c language.
2. Be able to use different operators, data types and write programs
3. Acquire knowledge to select the best loop construct for a given problem.
4. Design and implement programs to analyze the array applications.
5. Design and implement C programs with Functions.

Exercise: 1

a) Write a C program to print a given statement.
b) Write a C program for exchanging (interchanging) values of two variables.
c) Write a C program to find the reverses of a given Number.

Exercise: 2

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program to find the second maximum number among the given list of numbers.
c) Write a C program to find the k^{th} smallest number among the given list of numbers.

Exercise: 3

a) Write a C program to demonstrate various operators (Arithmetic operator, increment & decrement operator, Relational operator, and Assignment operator).
b) Write a C Program, to counts number of positive and negative numbers separately and also compute the sum of them.

Exercise: 4

a) Write a C program to generate the first 'n' terms in the sequence of Fibonacci series.

Exercise: 5

a) Write a C program to generate all the prime numbers between 1 and n, where 'n' is the value given by the user.
b) Write a program which Prints the following patterns.

```
ABCDEFGFEDCBA        0
ABCDEF FEDCBA       111
ABCDE   EDCBA      22222
ABCD     DCBA     3333333
ABC       CBA    444444444
AB         BA
A           A
```

c) Write a C program to generate Pascal's triangle.
d) Write a C program to construct a pyramid of numbers.

Exercise: 6

a) Write a C program, for the arithmetic operators using switch case (which takes two integer operands and one operator from the user, performs the specified operation and then prints the result. (Consider the operators +,- ,*, /, % and use Switch Statement)
b) Write a program to find G.C.D (Greatest Common Divisor) of two numbers using recursion and non-recursion.
c) Write a program to find factorial of a number using recursion and non-recursion.

Exercise: 7

a) Write a C program to calculate distance between two points.
b) Write a program to find Roots of quadratic equation.

Exercise: 8

a) Write a C program to perform Matrix Addition
b) Write a C program to perform Matrix Multiplication
c) Write a C program to perform inverse of a Matrix.
d) Write a C program to find the transpose of a given matrix.

Exercise: 9

a) Write a C program for any numerical method.
b) Write a C program to make a simple calculator.

Exercise: 10

a) Write a C program to solve Towers of Hanoi problem by using recursive function.
b) Write a C program to know if the given string is a palindrome or non-palindrome.
c) Write a C program to find whether the given year is a leap year or not.

Exercise: 11

a) Write a C program to insert a sub-string in to the given main string.
b) Write a C program to demonstrate the parameter passing mechanism using: call-by-value, call-by-reference.

Exercise: 12

a) Implement the sorting algorithm: Insertion sort and Selection sort.
b) Write a C program to access elements of an array using pointers
c) Write a C program to find the sum of numbers with arrays and pointers.

Exercise: 13

a) Implementation of string using operations.
   i) Copy
   ii) Concatenate
   iii) Length
   iv) Compare

Exercise: 14

a) Write a C program to find the position of a substring.
b) Write a C program to represent complex numbers using structure.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AHS9902	0	0	3	1.5	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH LAB					SEE	70 M

COURSE OBJECTIVES:

1. Students will be exposed to a variety of self instructional, learner friendly modes of language learning
2. Students will cultivate the habit of reading passages from the computer monitor. Thus providing them with the required facility to face computer based competitive exams like GRE, TOEFL, and GMAT etc.
3. Students will learn better pronunciation through stress, intonation and rhythm
4. Students will be trained to use language effectively to face interviews, group discussions, public speaking
5. Students will be initiated into greater use of the computer in resume preparation, report writing, format making etc

COURSE OUTCOMES:

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

UNIT I

1. Phonetics for listening comprehension of various accents
2. Reading comprehension
3. Describing objects/places/persons

Learning Outcomes: At the end of the module, the learners will be able to

- understand different accents spoken by native speakers of English
- employ suitable strategies for skimming and scanning on monitor to get the general idea of a text and locate specific information
- learn different professional registers and specific vocabulary to describe different persons, places and objects

UNIT II

1. JAM
2. Small talks on general topics
3. Debates

Learning Outcomes: At the end of the module, the learners will be able to

- produce a structured talk extemporarily
- comprehend and produce short talks on general topics
- participate in debates and speak clearly on a specific topic using suitable discourse markers

UNIT III

1. Situational dialogues – Greeting and Introduction
2. Summarizing and Note making
3. Vocabulary Building

Learning Outcomes: At the end of the module, the learners will be able to

- Learn different ways of greeting and introducing oneself/others
- summarize the content with clarity and precision and take notes while listening to a talk/lecture and make use of them to answer questions
- replenish vocabulary with one word substitutes, homonyms, homophones, homographs to reduce errors in speech and writing

UNIT IV

1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

Learning Outcomes: At the end of the module, the learners will be able to

- Learn different ways of asking information and giving directions
- Able to transfer information effectively
- understand non-verbal features of communication

UNIT V

1. Oral Presentations
2. Précis Writing and Paraphrasing
3. Reading Comprehension and spotting errors

Learning Outcomes: At the end of the module, the learners will be able to

- make formal oral presentations using effective strategies
- learn different techniques of précis writing and paraphrasing strategies
- comprehend while reading different texts and edit short texts by correcting common errors.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester CE, ECE & ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9907	2	1	0	3	CIA	30 M
Course Title	:	COMPLEX VARIABLES AND TRANSFORMS					SEE	70 M

COURSE OBJECTIVES:-

- This course aims at providing the student to acquire the knowledge on the calculus of functions of complex variables. The student develops the idea of using continuous/discrete transforms.

UNIT I

Complex Variable – Differentiation

Introduction to functions of complex variable-concept of Limit & continuity- Differentiation, Cauchy-Riemann equations, analytic functions (exponential, trigonometric, logarithm), harmonic functions, finding harmonic conjugate-construction of analytic function by Milne Thomson method-Conformal mappings-standard and special transformations (sin z, e^z, cos z, z^2) Mobius transformations (bilinear) and their properties.

Learning Outcomes: Students will be able to:

- Understand functions of Complex variable and its properties.
- Find derivatives of complex functions.
- Understand the analyticity of complex functions.
- Understand the conformal mappings of complex functions.

UNIT II

Complex Variable – Integration

Line integral-Contour integration, Cauchy's integral theorem, Cauchy Integral formula, Liouville's theorem (without proof) and Maximum-Modulus theorem (without proof);power series expansions: Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals (around unit circle, semi circle with f(z) not having poles on real axis).

Learning Outcomes: Students will be able to

- Understand the integration of complex functions.
- Apply Cauchy's integral theorem and Cauchy's integral formula.
- Understand singularities of complex functions.
- Evaluate improper integrals of complex functions using Residue theorem.

UNIT III

Laplace Transforms

Definition-Laplace transform of standard functions-existence of Laplace Transform – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function. Differentiation and integration of transform – solving Initial value problems to ordinary differential equations with constant coefficients using Laplace transforms.

Learning Outcomes: Students will be able to

- Understand the concept of Laplace transforms and find the Laplace transforms of elementary functions.
- Find the Laplace transforms of general functions using its properties.
- understand Laplace transforms of special functions(Unit step function, Unit Impulse & Periodic).
- Apply Laplace transforms to solve Differential Equations.

UNIT IV

Fourier series

Determination of Fourier coefficients (Euler's) – Dirichlet conditions for the existence of Fourier series – functions having discontinuity-Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Half-range Fourier sine and cosine expansions- typical wave forms - Parseval's formula- Complex form of Fourier series.

Learning Outcomes: Students will be able to

- Understand finding Fourier series expression of the given function.
- Determine Fourier coefficients (Euler's) and identify existence of fourier series of the given function.
- Expand the given function in Fourier series given in Half range interval.
- Apply Fourier series to establish Identities among Euler coefficients.
- Find Fourier series of wave forms.

UNIT V

Fourier transforms& Z Transforms:

Fourier integral theorem (without proof) – Fourier sine and cosine integrals-complex form of Fourier integral. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – convolution theorem .

Z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

Learning Outcomes: Students will be able to

- Find Fourier Sine and cosine integrals.
- Understand Fourier transforms.
- Apply properties of Fourier transforms.
- Understand Z transforms.
- Apply properties of Z transforms.
- Apply Z transforms to solve difference equations.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
3. Advanced Engineering Mathematics, by R.K.Jain and S.R.K.Iyengar, Alpha Science International Ltd. Pangboume England.

REFERENCE BOOKS:

1. Higher Engineering Mathematics, by B.V.Ramana, McGraw Hill publishers.
2. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

COURSE OUTCOMES:

After the completion of course, students will be able to

1. Understand the analyticity of complex functions and conformal mappings.
2. Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.
3. Understand the usage of Laplace Transforms, Fourier Transforms and Z transforms.
4. Evaluate the Fourier series expansion of periodic functions.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester CE, CSE & ME)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0503T	3	0	0	3	CIA	30 M
Course Title	:	DATA STRUCTURES					SEE	70 M

COURSE OBJECTIVES:-

- To teach the representation of solution to the problem using algorithm
- To explain the approach to algorithm analysis
- To introduce different data structures for solving the problems
- To demonstrate modeling of the given problem as a graph
- To elucidate the existing hashing techniques

UNIT I: Introduction

Algorithm Specification, Performance analysis, Performance Measurement. Arrays: Arrays, Dynamically Allocated Arrays. Structures and Unions. Sorting: Motivation, Insertion sort, Quick sort, How fast can we sort, Merge sort, Heap sort.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Analyze the given algorithm to find the time and space complexities.(L4)
- Select appropriate sorting algorithm (L4)
- Design a sorting algorithm (L6)

UNIT II: Stack, Queue and Linked lists

Stacks, Stacks using Dynamic Arrays, Queues, Circular Queues Using Dynamic Arrays, Evaluation of Expressions, Multiple Stacks and Queues. Linked lists: Singly Linked Lists and Chains, Representing Chains in C, Linked Stacks and Queues, Additional List Operations, Doubly Linked Lists.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Evaluate expressions (L5)
- Develop the applications using stacks and queues (L3)
- Construct the linked lists for various applications (L6)

UNIT III: Trees

Introduction, Binary Trees, Binary Tree Traversals, Additional Binary Tree Operations, Binary Search Trees, Counting Binary Trees, Optimal Binary search Trees, AVL Trees. B-Trees: B-Trees, B + Trees.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain the concept of a tree (L2)
- Compare different tree structures (L4)
- Apply trees for indexing (L3)

UNIT IV: Graphs and Hashing

The Graph Abstract Data Type, Elementary Graph Operations, Minimum Cost Spanning Trees, Shortest Paths and Transitive Closure.
Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Recognize the importance of Graphs in solving real world problems (L2)
- Apply various graph traversal methods to applications (L3)
- Design a minimum cost solution for a problem using spanning trees (L6)
- Select the appropriate hashing technique for a given application (L5)
- Design a hashing technique (L6)

UNIT V: Files and Advanced sorting

File Organization: Sequential File Organization, Direct File Organization, Indexed Sequential File Organization.

Advanced sorting: Sorting on Several keys, List and Table sorts, Summary of Internal sorting, External sorting.

Learning Outcomes: Students will be able to

- Organize files (L3)
- Design the algorithms which sort the elements which doesn't fit in main memory (L6)

TEXT BOOKS:

3. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Data Structures in C", 2nd Edition, Galgotia Book Source, Pvt. Ltd., 2004.
4. ALAN L.THARP, "File Organization and Processing", Wiley and Sons, 1988.

REFERENCE BOOKS:

1) D. Samanta, "Classic Data Structures", 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012.
2) Peter Bras, "Advanced Data Structures", Cambridge University Press, 2016
3) Richard F.Gilberg, Behrouz A.Forouzan,"Data Structures A Pseudo code Approach with C", Second Edition, Cengage Learning 2005.

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1) Select Appropriate Data Structure for solving a real world problem. (L4)
2) Select appropriate file organization technique depending on the processing to be done. (L4)
3) Construct Indexes for Databases. (L6)
4) Analyse the Algorithms.(L4).
5) Develop Algorithm for Sorting large files of data.(L3).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to III Semester ME & IV Semester CE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0505T	3	0	0	3	CIA	30 M
Course Title	:	PYTHON PROGRAMMING FOR ENGINEERS					SEE	70 M

COURSE OBJECTIVES:-
- To teach the fundamentals of Python
- To elucidate problem-solving using a Python programming language
- To introduce a function-oriented programming paradigm through python
- To develop the skill of designing Graphical user Interfaces in Python
- To learn how to use lists, tuples, and dictionaries in Python programs.

UNIT I:

Introduction: What is a program, running python, Arithmetic operators, Value and Types?
Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments.
Functions: Function calls, Math functions, Composition, Adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.
Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Learning Outcomes: After successful completion of this unit, the students will be able to
- List the basic constructs of Python (L1)
- Solve the problems by applying modularity principle (L3)

UNIT II:

Conditionals and Recursion: Floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input.
Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, More recursion, Leap of Faith, Checking types
Iteration: Reassignment, Updating variables, The while statement, Break, Square roots, Algorithms.

Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, The in operator, String comparison.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Apply the conditional execution of the program (L3)
- Apply the principle of recursion to solve the problems (L3)

UNIT III:

Case Study: Reading word lists, Search, Looping with indices.
Lists: List is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Map filter and reduce, Deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.
Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables.

Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Use the data structures Lists, Dictionaries, and Tuples (L3)
- Design programs for manipulating strings (L6)

UNIT IV:

Files: Persistence, Reading and writing, Format operator, Filename and paths, Catching exceptions, Databases, Pickling, Pipes, Writing modules.
Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying.
Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning
Classes and Methods: Object oriented features, Printing objects, The init method, The __str__method, Operator overloading, Type-based Dispatch, Polymorphism, Interface and Implementation

Inheritance: Card objects, Class attributes, Comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Apply object orientation concepts (L3)
- Organize data in the form of files (L6)

UNIT V:
Overview of Packages for Scientific and Data Processing

Introduction to Machine Learning-History and Evolution, Artificial intelligence Evolution, Different Forms, Machine learning categories, Machine learning Python packages, Data Analysis packages, Machine learning core libraries.

Learning Outcomes: Students will be able to

- Understand Machine learning fundamentals (L2)
- Apply python packages for solving machine learning and data analysis problems (L3)

TEXT BOOKS:

5. Allen B. Downey, “Think Python”, 2nd edition, SPD/O’Reilly, 2016.
6. Manohar Swamynathan, “Mastering Machine learning with Python in Six steps”, Apress.

REFERENCE BOOKS:

4) Martin C.Brown, “The Complete Reference: Python”, McGraw-Hill, 2018.
5) Kenneth A. Lambert, B.L. Juneja, “Fundamentals of Python”, CENGAGE, 2015.
6) R. Nageswara Rao, “Core Python Programming”, 2nd edition, Dreamtech Press, 2019

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

6) Explain the features of Python language (L2)
7) Select appropriate data structure of Python for solving a problem (L4)
8) Design object oriented programs for solving real-world problems (L6)
9) Use Python packages (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester Mechanical Engineering)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0301	3	0	0	3	CIA	30 M
Course Title	:	ENGINEERING MECHANICS					SEE	70 M

COURSE OBJECTIVES:-

- Explain the effect of force and moment in different engineering applications.
- Teach centre of gravity and moment of inertia of solids and surfaces.
- Familiarize frictional forces in mechanical applications.
- Analysis of rigid bodies under dynamic conditions.

UNIT I: **12 hours**

Introduction to Engineering Mechanics: Composition and resolution of forces, parallelogram law, principle of transmissibility, types of force systems - concurrent and concurrent coplanar forces, resultant of coplanar force systems couple, moment of a force Varignon's theorem, concept of free body diagrams, concept of equilibrium of coplanar force systems.

Friction: Laws of friction, types of friction, equilibrium of force systems involving frictional forces, wedge friction. Free body diagrams involving frictional forces.

Learning Outcomes: After completing this unit, the student will be able to:

- Resolve the forces in mechanical systems (L2)
- Identify the moments and forces (L3)
- Draw free body diagram (L3)

UNIT II: **10 hours**

Analysis of Structures**:** Introduction to plane trusses, analysis of plane trusses by method of joints and method of sections.

Virtual Work: Equilibrium of ideal systems, work done by a force, work done by a couple, principle of virtual work.

Learning Outcomes: After completing this unit, the student will be able to:

- Identify different types of trusses. (l2)
- Analyze the plane trusses by method of joints and the method of sections. (l4)
- Demonstrate equilibrium of ideal system. (l2)
- Estimate the work done by a force and work done by a couple. (l3)

UNIT III: **10 hours**

Properties of Surfaces and Volumes: Centroid and center of gravity, derivation of centroids from first moment of area, centroids of composite sections, center of gravity of common volumes - cylinder, cone, sphere, theorem of Pappus-guidinus.

Moment of Inertia: Area moment of inertia of plane and composite shapes, parallel axis theorem, perpendicular axis theorem, polar moment of inertia, mass moment of inertia of common volumes -thin plates, thin rod, cylinder, cone, sphere, rectangular prism, radius of gyration.

Learning Outcomes: After completing this unit, the student will be able to:

- Identify the centre of gravity of composite sections. (L3)
- Determine the centre of gravity of common solids. (L3)
- Determine moment of inertia for composite volumes. (L3)

UNIT IV: **10 hours**

Kinematics**:** Equations of motion for rigid bodies, constant and variable acceleration, rectilinear and curvilinear motion, motion under gravity -projectile motion, use of rectangular coordinates, tangential and normal coordinates, radius of curvature, rotation of a rigid body about a fixed axis, introduction to plane motion.

Learning Outcomes: After completing this unit, the student will be able to:

- Write equations of motion for rigid bodies. (L3)
- Find velocity and acceleration in rectilinear and curvilinear motions (L4)
- Trace the path of projectile. (L3)

UNIT V: **10 hours**

Kinetics**:** Principles of dynamics - Newton's Laws of motion, D'Alembert's principle in rectilinear translation, principle of work and energy.
Ideal Systems: Principle of conservation of energy, concept of power, conservation of linear and angular momentum, principle of momentum and impulse, impact - types of impact.

Learning Outcomes: After completing this unit, the student will be able to:

- Apply D'Alembert's principle in rectilinear translation. (L3)
- Relate principle of work and energy in dynamic systems. (L3)
- Make use of principle of momentum and impulse to dynamic bodies. (L4)

TEXT BOOKS:

4. S S Bhavikatti, “Engineering Mechanics”, 4th edition, New Age International, 2008.
5. S Timoshenko, DH Young, JV Rao, Sukumar Pati, “Engineering Mechanics (in SI units)”, 5th edition, McGraw Hill, 2013.

REFERENCE BOOKS:

1. Basudeb Bhattacharya., “Engineering Mechanics”, 2nd edition, Oxford University Press (India), 2015.
2. Irving Shames, G K M Rao, “Engineering Mechanics: Statics and Dynam-ics”, 4th edition, Pearson, 2009.
3. K L Kumar, Veenu Kumar, “Engineering Mechanics”, 4th edition, Tata McGraw Hill,

COURSE OUTCOMES:

After successful completion of the course, the students will be able to

5. Resolve forces and couples in mechanical systems. (L3)
6. Identify the frictional forces and its influence on equilibrium. (L3)
7. Find the centre of gravity and moment of inertia for various geometric shapes (L3)
8. Develop equations for different motions. (L4)
9. Determine the displacement, velocity and acceleration relations in dynamic systems (L4)
10. Relate the impulse and momentum (L4)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester Mechanical Engineering)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0302T	3	0	0	3	CIA	30 M
Course Title	:	MANUFACTURING PROCESSES					SEE	70 M

COURSE OBJECTIVES:-

- Working principle of different metal casting processes and gating system.
- Nature of plastic deformation, cold and hot working process, working of a rolling mill and types, extrusion processes.
- Principles of forging, tools and dies, working of forging processes.
- Classification of the welding processes, working of different types of welding processes and welding defects
- Classification, applications and manufacturing methods of plastics, ceramics and powder metallurgy.
- Learning Characteristics of Unconventional Machining Processes

UNIT I: **08 hours**

Introduction : Importance and selection of manufacturing processes.
Casting Processes: Introduction to casting process, process steps; pattern: types, materials and allowance; Cores: Types of cores, core prints, principles and design of gating system; Solidification of casting: Concept, solidification of pure metal and alloy; Special casting processes: Shell casting, investment casting, die casting, centrifugal casting, casting defects and remedies.

Learning Outcomes: After completing this unit, the student will be able to:

- Selection of suitable manufacturing process for a given product. (L3)
- Understand the steps involved in metal casting, pattern making. (L2)
- Apply the knowledge of designing gating systems, risers. (L3)
- Compare the working of various metal casting processes. (L4)
- Identify the various casting defects. (L3)

UNIT II: **08 hours**

Metal Forming: Introduction, nature of plastic deformation, hot and cold working of metals, mechanics of metal forming; Rolling: Principle, types of rolling mill and products, roll passes, forces in rolling and power requirements; Extrusion: Basic extrusion process and its characteristics, hot extrusion and cold extrusion, wire drawing, tube drawing.
Forging: Principles of forging, tools and dies. Types: Smith forging, drop forging, forging hammers, rotary forging and forging defects. Sheet metal forming: Mechanics of sheet metal working, blanking, piercing,

bending, stamping.

Learning Outcomes: After completing this unit, the student will be able to:

- Compare cold working and hot working processes. (L4)
- Explain the working of rolling mills. (L2)
- Evaluate the forces and power in rolling and extrusion processes. (L5)
- Summarize the working of various extrusion processes. (L2)
- Identify the principles of forging, tools and dies. (L3)
- Summarize the various operations of Sheet metal forming. (L2)

UNIT III: **08 hours**

Metal Joining Processes: Classification of welding processes, types of welds and welded joints and V-I characteristics, arc welding, weld bead geometry, submerged arc welding, gas tungsten arc welding, gas metal arc welding. applications, advantages and disadvantages of the above processes, other fabrication processes. Heat affected zones in welding; soldering and brazing: Types and their applications, Welding defects: causes and remedies.

Learning Outcomes: After completing this unit, the student will be able to:

- Classify the working of various welding processes. (L2)
- Compare V-I characteristics of different welding processes. (L4)
- Summarize the applications, advantages of various welding processes. (L2)
- Identify the defects in welding. (L3)

UNIT IV:

Plastic Processing, Ceramics and Powder Metallurgy **08 hours**

Plastics: Types, properties and their applications, processing of plastics, extrusion of plastics, transfer molding and compression molding, injection molding, thermoforming, rotational molding and blow molding

Ceramics: Classification of ceramic materials, properties and their application, ceramic powder preparation; Processing of ceramic parts: Pressing, casting, sintering; Secondary processing of ceramics: Coatings, finishing.

Powder Metallurgy: Principle, manufacture of powders, steps involved.

Learning Outcomes: After completing this unit, the student will be able to:

- Learn the methods of manufacturing plastics parts. (L2)
- Explain the steps in making ceramics parts. (L2)
- Explain the steps in manufacturing of powder metallurgy parts. (L2)
- Demonstrate the application of plastic, ceramics and power metallurgy. (L2)

UNIT V: **10 hours**

Unconventional Machining Processes: Electrical discharge machining (EDM), principle and processes parameters, electro-chemical machining (ECM) Laser beam machining (LBM), plasma arc machining (PAM) and electron beam machining

Principles and process parameters of Abrasive jet machining (AJM), water jet machining, ultrasonic machining

Learning Outcomes: After completing this unit, the student will be able to:

- Identify different unconventional machining processes. (L3)
- Evaluate process parameters of EDM, ECM, LBM, PAM and AJM.(L5)
- Apply various unconventional machining processes. (L3)

TEXT BOOKS:

1 Rao P.N., "Manufacturing Technology – Volume I", 5th edition, McGraw-Hill Education, 2018.

2. Kalpakjain S and Schmid S.R., "Manufacturing Engineering and Technology", 7th edition, Pearson, 2018.

REFERENCE BOOKS:

1. Millek P. Groover, "Fundamentals of Modern Manufacturing": "Materials, Processes and Systems", 4th edition, John Wiley and Sons Inc, 2010.

2. Sharma P.C., "A Text book of Production Technology", 8th edition, S Chand Publishing, 2014.

COURSE OUTCOMES:

After successful completion of the course, the students will be able to

1. Demonstrate different metal casting processes and gating systems. (L2)
2. Classify working of various welding processes. (L2)
3. Evaluate the forces and power requirements in rolling process. (L5)
4. Apply the principles of various forging operations. (L3)
5. Outline the manufacturing methods of plastics, ceramics and powder metallurgy. (L1)
6. Identify different unconventional processes and their applications. (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester Mechanical Engineering)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0303T	3	0	0	3	CIA	30 M
Course Title	:	MATERIAL SCIENCE AND ENGINEERING					SEE	70 M

COURSE OBJECTIVES:-

- To teach the principles of physical metallurgy, i.e. crystallography of metals, constitution of alloys, phase diagrams.
- Expose commercially important metals and alloys (both ferrous and non ferrous) with engineering constraints.
- Explain the methods to change the properties of materials through heat treatment processes
- Familiarize properties and applications of ceramics, polymers and composite materials.
- Demonstrate the fundamental properties of nano-materials and their applications.

UNIT I: **10 hours**

Structure of Metals: Crystal Structures: Unit cells, Metallic crystal structures, Imperfection in solids: Point, Line, interstitial and volume defects; dislocation strengthening mechanisms and slip systems, critically resolved shear stress.

Constitution of Alloys: Necessity of Alloying, substitutional and interstitial solid solutions- Phase diagrams: Interpretation of binary phase diagrams and microstructure development; eutectic, peritectic, peritectoid and monotectic reactions. Iron-Iron-carbide diagram and microstructural aspects of ferrite, cementite, austenite, ledeburite, and cast iron.

Learning Outcomes: After completing this unit, the student will be able to:

- Explain the importance of material science in engineering.(L2)
- Recall the definitions and terminology of crystallography. (L1)
- Distinguish metals and alloys. (L4)
- Make use of the principles of construction of binary phase diagrams. (L3)
- Identify various invariant reactions in binary phase diagrams. (L3)
- Explain the concept of metallography in studying the microstructures of metals and alloys. (L2)

Unit II: Steels and Cast Irons **08 hours**

Steels: Plain carbon steels, use and limitations of plain carbon steels. AISI & BIS classification of steels. Classification of alloys steels. Micro structure, properties and applications of alloy steels-stainless steels and tool steels.

Cast irons: Micro structure, properties and applications of white cast iron, malleable cast iron, grey cast iron, nodular cast iron and alloy cast irons.

Learning Outcomes: After completing this unit, the student will be able to:

- Classify various types of steels, their properties and applications. (l2)
- Identify various types of cast irons, their properties and applications. (l3)
- Compare steels and cast irons and their limitations in applications. (l3)

Unit III: **08 hours**

Heat Treatment of Steels: Annealing, tempering, normalizing and Spheroidizing, isothermal transformation diagrams for Fe-Fe_3C alloys and microstructure development. Continious cooling curves and interpretation of final microstructures and properties- Austempering, Martempering, Case Hardening, Carburizing, Nitriding, Cyaniding, Carbo-Nitriding, Flame and Induction hardening, and Vacuum and Plasma Hardening.

Learning Outcomes: After completing this unit, the student will be able to:

- Understand the importance of steel and iron - iron carbide phase diagram. (L2)
- Explain the influence of heat treatment in modification of properties of steels. (L2)
- Develop a heat treatment cycle based on properties required. (L3)
- Explain the principles of surface hardening methods. (L2)

Unit IV: **08 hours**

Non-ferrous Metals and Alloys: Micro structure, properties and applications of copper and its alloys, aluminium and its alloys. Study of Al-Cu phase diagram, precipitation hardening. Micro structure, properties and applications of titanium and its alloys.

Learning Outcomes: After completing this unit, the student will be able to:

- Explain the importance of non-ferrous metals and alloys in engineering applications. (L2)
- Demonstrate various properties and applications of non-ferrous alloys. (L4)
- Differentiate between hardening of ferrous and non-ferrous alloys. (L4)

Unit V: **08 hours**

Ceramics, Polymers and Composites: Structure, properties and applications of ceramics, polymers and composites. Introduction to super alloys and nanomaterials.

Learning Outcomes: After completing this unit, the student will be able to:

- Explain the properties of ceramics and their applications. (L2)
- Summarize the properties of polymers and composites and their use. (L2)
- Interpret the properties of nano materials and their applications. (L2)
- Identify the difference between the micro and nano scale materials and their uses. (L3)

TEXT BOOKS:

11. V.Raghavan, “Material Science and Engineering”, 5th edition, Prentice Hall of India, 2004.

12. R.Balasubramaniam, Callister's "Material Science and Engineering:, 2^{nd} edition, Wiley India, 2014.

REFERENCE BOOKS:

3. Y. Lakhtin, "Engineering Physical Metallurgy", University Press of the Pacific, 2000.
4. S.H.Avner, "Introduction to Physical Metallurgy", 2^{nd} edition, Tata McGraw- Hill, 1997.
5. L.H.Van Vlack, "Elements of Material Science and Engineering", 6^{th} edition, Pearson Education, 2008.
6. George E.Dieter, "Mechanical Metallurgy", 3^{rd} edition, McGraw-Hill, 2013.

COURSE OUTCOMES:

After successful completion of the course, the students will be able to

13. Explain the principles of binary phases. (L2)
14. Select steels and cast irons for a given application. (L3)
15. Apply heat treatment to different applications. (L3)
16. Utilize nonferrous metals and alloys in engineering. (L3)
17. Choose composites for various applications. (L3)
18. Assess the properties of nano-scale materials and their applications. (L2)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to III Semester CE & ME and IV Semester CSE & ECE)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19AMC9903	3	0	0	0	CIA	30 M
Course Title	:	BIOLOGY FOR ENGINEERS					SEE	--

COURSE OBJECTIVES:-

- To provide basic understanding about life and life Process. Animal an plant systems. To understand what bimolecules, are, their structures are functions. Application of certain bimolecules in Industry.
- Brief introduction about human physiology and bioengineering.
- To understand hereditary units, i.e. DNA (genes) and RNA and their synthesis in living organism.
- How biology Principles can be applied in our daily life using different technologies.
- Brief introduction to the production of transgenic microbes, Plants and animals.

Unit I: Introduction to Basic Biology
Cell as Basic unit of life, cell theory, Cell shapes, Cell structure, Cell cycle. Chromosomes. Prokaryotic and eukaryotic Cell. Plant Cell, Animal Cell, Plant tissues and Animal tissues, Brief introduction to five kingdoms of classification.

Learning Outcomes: After completing this unit, the student will be able to

- Summarize the basis of life. (L1)
- Understand the difference between lower organisms (prokaryotes) from higher organisms (eukaryotes). (L2)
- Understand how organisms are classified. (L3)

Unit II: Introduction to Biomolecules
Carbohydrates, lipids, proteins, Vitamins and minerals, Nucleic acids (DNA and RNA) and their types. Enzymes, Enzyme application in Industry. Large scale production of enzymes by Fermentation.

Learning Outcomes: After completing this unit, the student will be able to

- Understand what are biomolecules? their role in living cells, their structure, function and how they are produced. (L1)
- Interpret the relationship between the structure and function of nucleic acids. (L2)

- Summarize the applications of enzymes in industry. (L3)
- Understand what is fermentation and its applications of fermentation in industry. (L4)

Unit III: Human Physiology

Nutrition: Nutrients or food substances. Digestive system, Respiratory system, (aerobic and anaerobic Respiration). Respiratory organs, respiratory cycle. Excretory system.

Learning Outcomes: After completing this unit, the student will be able to

- Understand what nutrients are (L1)
- Understand the mechanism and process of important human functions (L2 & L3)

Unit IV: Introduction to Molecular Biology and recombinant DNA Technology

Prokaryotic gene and Eukaryotic gene structure. DNA replication, Transcription and Translation. rDNA technology. Introduction to gene cloning.

Learning Outcomes: After completing this unit, the student will be able to

- Understand and explain about gene structure and replication in prokaryotes and Eukaryotes (L1)
- How genetic material is replicated and also understands how RNA and proteins are synthesized. (L2)
- Understand about recombinant DNA technology and its application in different fields.(L3)
- Explain what is cloning. (L4)

Unit V: Application of Biology

Brief introduction to industrial Production of Enzymes, Pharmaceutical and therapeutic Proteins, Vaccines and antibodies. Basics of biosensors, biochips, Bio fuels, and Bio Engineering. Basics of Production of Transgenic plants and animals.

Learning Outcomes: After completing this unit, the student will be able to Understand.

- How biology is applied for production of useful products for mankind.(L1)
- What are biosensors, biochips etc. (L2)
- Understand transgenic plants and animals and their production (L3)

TEXT BOOKS:

7. P.K.Gupta, Cell and Molecular Biology, 5th Edition, Rastogi Publications –

8. U. Satyanarayana. Biotechnology, Books & Allied Ltd 2017

REFERENCE BOOKS:

7) N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, "Biology: A Global Approach", Pearson Education Ltd, 2018.
8) T Johnson, Biology for Engineers, CRC press, 2011
9) J.M. Walker and E.B. Gingold, Molecular Biology and Biotechnology 2nd ed.. Panima Publications. PP 434.
10) David Hames, Instant Notes in Biochemistry –2016
11) Phil Tunner, A. Mctennan, A. Bates & M. White, Instant Notes – Molecular Biology – 2014

COURSE OUTCOMES: After successful completion of the course, the students will be able to:

10) Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
11) Explain about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry.
12) Briefly about human physiology.
13) Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
14) Know about application of biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester CE, CSE & ME)

(For III Semester ECE weekly 02 hrs with 01 Credits only)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0503P	0	0	3	1.5	CIA	30 M
Course Title	:	DATA STRUCTURES LAB					SEE	70 M

COURSE OBJECTIVES:-

- To introduce to the different data structures
- To elucidate how the data structure selection influences the algorithm complexity
- To explain the different operations that can be performed on different data structures
- To introduce the different search and sorting algorithms.

LIST OF EXPERIMENTS:

1. String operations using array of pointers
2. Searching Algorithms (With the Number of Key Comparisons) Sequential, Binary and Fibonacci Search Algorithms.
3. Sorting Algorithms: Insertion Sort, Selection Sort, Shell Sort, Bubble Sort, Quick Sort, Heap Sort, Merge Sort, and Radix Sort. Using the system clock, compute the time taken for sorting of elements. The time for other operations like I/O etc should not be considered while computing time.
4. Implementation of Singly Linked List, Doubly Linked List, Circular Linked List
5. Stack implementation using arrays
6. Stack implementation using linked lists
7. Queue implementation using arrays. Implement different forms of queue. While implementing you should be able to store elements equal to the size of the queue. No positions should be left blank.
8. Queue implementation using linked lists
9. Creation of binary search tree, performing operations insertion, deletion, and traversal.
10. Breadth first search
11. Depth first search
12. Travelling sales man problem
13. File operations
14. Indexing of a file

OPTIONAL:

15. Reversing the links (not just displaying) of a linked list.
16. Consider a linked list consisting of name of a person and gender as a node. Arrange the linked list using ‘Ladies first’ principle. You may create new linked lists if necessary.
17. An expression can be represented in three ways: infix, prefix and postfix. All the forms are necessary in different contexts. Write modules to convert from one form to another form.

18. A table can be defined as a collection of rows and columns. Each row and column may have a label. Different values are stored in the cells of the table. The values can be of different data types. Numerical operations like summation, average etc can be performed on rows/columns which contain numerical data. Such operations are to be prevented on data which is not numeric. User may like to insert row/columns in the already existing table. User may like to remove row/column. Create table data type and support different operations on it.

COURSE OUTCOMES: After successful completion of this Lab, the students will be able to:

15) Select the data structure appropriate for solving the problem (L5)
16) Implement searching and sorting algorithms (L3)
17) Design new data types (L6)
18) Illustrate the working of stack and queue (L4)
19) Organize the data in the form of files (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester Mechanical Engineering)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0302P	0	0	3	1.5	CIA	30 M
Course Title	:	MANUFACTURING PROCESSES LAB					SEE	70 M

COURSE OBJECTIVES:-

- Acquire practical knowledge on Metal Casting, Welding, Press Working and unconventional machining Processes.

LIST OF EXPERIMENTS:

1. **METAL CASTING**
    - Gating Design and pouring time and solidification time calculations.
    - Sand Properties Testing – Exercise for Strength and Permeability.
    - Molding, Melting and Casting for ferrous/ non ferrous materials.
2. **WELDING**
    - TIG Welding.
    - MIG Welding.
    - Friction stir welding
    - Any other Special Welding Processes.
3. **MECHANICAL PRESS WORKING**
    - Press Tool: Blanking and Piercing operation with Simple, Compound and Combination dies.
    - Closed die forging, Deep Drawing and Extrusion operations.
4. **UN CONVENTIONAL MANUFACTURING PROCESSES**
    - Electro Discharge Machining(EDM)/ Wire cut EDM
    - Plasma arc cutting / Abrasive jet machining (AJM)
    - Additive manufacturing with reverse engineering

COURSE OUTCOMES: After successful completion of the lab, the student will be able to:

1) Fabricate different types of components using various manufacturing techniques. (L6)
2) Adapt unconventional manufacturing methods. (L6).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester Mechanical Engineering)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0303P	0	0	3	1.5	CIA	30 M
Course Title	:	MATERIAL SCIENCE AND ENGINEERING LAB					SEE	70 M

COURSE OBJECTIVES:-

- To understand microstructure and hardness of engineering materials.
- To explain grain boundaries and grain sizes of different engineering materials.

LIST OF EXPERIMENTS:

1. Study of microstructure of pure metals – Iron, copper and aluminum.
2. Study of microstructure of low carbon steel, mild steel and high carbon steel.
3. Study of microstructure of cast irons.
4. Study of microstructure of non-ferrous alloys – Aluminum, Copper, Titanium, Nickel and their alloys.
5. Study hardenability of steels by Jominy End Quench Test.
6. Study of microstructure of heat treated steels.
7. Find hardness of various untreated and treated steels.
8. Study of microstructure of ceramics, polymeric materials.
9. Study of microstructure of super alloy and nano-materials.
10. Find the hardness of ceramics, super alloys, nano-materials and polymeric materials (one sample on each)

COURSE OUTCOMES: After successful completion of the lab, the students will be able to

19. Identify various microstructures of ferrous and non-ferrous metals and alloys. (L3)
20. Visualize grains and grain boundaries. (L3)
21. Importance of hardening of steels. (L2)
22. Evaluate hardness of treated and untreated steels. (L4)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester Mechanical Engineering)

Course Category	:	Laboratory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19ALC0302	0	0	3	1.5	CIA	30 M
Course Title	:	MECHANICAL ENGINEERING WORKSHOP					SEE	70 M

COURSE OBJECTIVES:-

- Familiarize moulding and casting skills.
- Train on different types welding joints.
- Develop assemble or disassembly skills.

Make plastic components.

- Familiarize with use power tools.
- Demonstrate assembly of computer and installation of software

LIST OF EXPERIMENTS

1) Foundry Practice: (2 Sessions)

(i) (a) Determination of average grain size for sand sample using sieve shaker
(b) Preparation of a green sand mould using single piece pattern
(ii) Preparation of a green sand mould using split piece pattern with core and demonstration of casting.

2) Welding Practice: (2 Sessions)

(i) Lap joint, butt joint and T joint using arc welding.
(ii) (a) Lap joint using resistance spot welding
(b) Lap and butt joints using gas welding

3) Assembling/Disassembling Practice: (3 Sessions)

(i) Bicycle
(ii) Clutch and carburetor
(iii) Two wheeler engine parts
(iv) Desktop Computer and installation of Operating system Software

4) Manufacture of a Plastic Component (2 Sessions)

(i) Use of injection moulding machine
(ii) FRP composite using hand layup method
(iii) Joining of plastic components

5) Manufacturing any two domestic utility products with any material by above methods (2 Sessions)

6) Use of Power Tools (2 Sessions)

Drilling, Cutting, Planing, Finishing, Etc,. on wood or metals

Text Books:

1) K. Venkata Reddy Workshop Manual 6th Ed., B.S. Publishers, 2013.
2) B.L. Juneja Workshop practice 1st Ed., Cengage, 2015.

COURSE OUTCOMES: After successful completion of the lab, the students will be able to

23. Make moulds for sand casting. (L3)
24. Develop different weld joints. (L3)
25. Assemble or disassemble of machine components. (L3)
26. Make plastic components. (L3)
27. Use power tools for different applications. (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to IV Semester CE & ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9908	3	0	0	3	CIA	30 M
Course Title	:	NUMERICAL METHODS AND PROBABILITY THEORY					SEE	70 M

COURSE OBJECTIVES:-

This course aims at providing the student with the knowledge on

1. Various numerical methods for solving equations, interpolating the polynomials, evaluation of integral equations and solution of differential equations.
2. The theory of Probability and random variables.

Unit I: Solution of Algebraic & Transcendental Equations

Introduction-Bisection method-Iterative method-Regulafalsi method-Newton Raphson method
System of Algebraic equations: Gauss Jordan method-Gauss Siedal method.

Learning Outcomes: After successful completion of this unit, the students will be able to:

1. Calculate the roots of equation using Bisection method and Iterative method.
2. Calculate the roots of equation using Regulafalsi method and Newton Raphson method.
3. Solve the system of algebraic equations using Gauss Jordan method and Gauss Siedal method.

Unit II: Interpolation

Finite differences-Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula.

Learning Outcomes: After successful completion of this unit, the students will be able to:

1. Understand the concept of interpolation.
2. Derive interpolating polynomial using Newton's forward and backward formulae.
3. Derive interpolating polynomial using Lagrange's formulae.
4. Derive interpolating polynomial using Gauss forward and backward formulae.

Unit III: Numerical Integration& Solution of Initial value problems to Ordinary differential equations

Numerical Integration: Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Modified Euler's Method-Runge-Kutta Methods.

Learning Outcomes: After successful completion of this unit, the students will be able to:

1. Solve integral equations using Simpson's 1/3 and Simpson's 3/8 rule.

2. Solve integral equations using Trapezoidal rule.
3. Solve initial value problems to ordinary differential equations using Taylor's method.
4. Solve initial value problems to ordinary differential equations using Euler's method and Runge Kutta methods.

Unit IV: Probability theory

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

Learning Outcomes: After successful completion of this unit, the students will be able to:

1. Understand the concept of Probability.
2. Solve problems on probability using addition law and multiplication law.
3. Understand Random variables and probability mass and density functions.
4. Understand statistical constants of random variables.

Unit V: Random variables & Distributions

Probability distribution - Binomial, Poisson approximation to the binomial distribution and normal distribution-their properties.

Learning Outcomes: After successful completion of this unit, the students will be able to:

1. Understand Probability distribution function.
2. Solve problems on Binomial distribution.
3. Solve problems on Poisson distribution.
4. Solve problems on Normal distribution.

TEXT BOOKS:

28. Higher Engineering Mathematics, B. S. Grewal, Khanna publishers.
29. Probability and Statistics for Engineers and Scientists, Ronald E. Walpole, PNIE.
30. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

REFERENCE BOOKS:

9. Higher Engineering Mathematics, by B. V. Ramana, McGraw Hill publishers.
10. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

COURSE OUTCOMES:

After the completion of course, students will be able to

31. Apply numerical methods to solve algebraic and transcendental equations
32. Derive interpolating polynomials using interpolation formulae
33. Solve differential and integral equations numerically
34. Apply Probability theory to find the chances of happening of events.
35. Understand various probability distributions and calculate their statistical constants.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(IV Semester ME)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0506T	2	0	0	2	CIA	30 M
Course Title	:	INTERNET OF THINGS					SEE	70 M

COURSE OBJECTIVES:-
- Introduce the fundamental concepts of IoT and physical computing
- Expose the student to a variety of embedded boards and IoT Platforms
- Create a basic understanding of the communication protocols in IoT communications.
- Familiarize the student with application program interfaces for IoT.
- Enable students to create simple IoT applications.

Unit I: Overview of IoT

The Internet of Things: An Overview, The Flavor of the Internet of Things, The “Internet” of “Things”, The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things?
Design Principles for Connected Devices: Calm and Ambient Technology, Privacy, Web Thinking for Connected Devices, Affordances.
Prototyping: Sketching, Familiarity, Costs Vs Ease of Prototyping, Prototypes and Production, Open source Vs Close source, Tapping into the community.

Learning Outcomes: After successful completion of this unit, the students will be able to
- Explain IoT architecture. [L2]
- Interpret the design principles that govern connected devices [L2]
- Summarize the roles of various organizations for IoT [L2]
- Understand the significance of Prototyping [L2]

Unit II: Embedded Devices
Electronics, Embedded Computing Basics, Arduino, Raspberry Pi, Mobile phones and tablets, Plug Computing: Always-on Internet of Things.

Learning Outcomes: After successful completion of this unit, the students will be able to
- Explain the basics of microcontrollers [L2]
- Outline the architecture of Arduino [L2]
- Develop simple applications using Arduino [L3]
- Outline the architecture of Raspberry Pi [L2]
- Develop simple applications using Raspberry Pi [L3]

- Select a platform for a particular embedded computing application [L3]

Unit III:

Communication in the IoT: Internet Communications: An Overview, IP Addresses, MAC Addresses, TCP and UDP Ports, Application Layer Protocols

Prototyping Online Components: Getting Started with an API, Writing a New API, Real-Time Reactions, Other Protocols Protocol.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Interpret different protocols and compare them [L2]
- Select which protocol can be used for a specific application [L3]
- Utilize the Internet communication protocols for IoT applications [L3]
- Select IoT APIs for an application [L3]
- Design and develop a solution for a given application using APIs [L6]
- Test for errors in the application [L4]

Unit IV:

Introduction to the Industrial IoT: What is Industrial Internet, The Power of 1%, Key IIoT technologies, Why Industrial Internet and Why now, Catalysts and Precursors of the IIoT, Innovation and the IIoT, Intelligent devices, Key opportunities and benefits, The Why behind the Buy, Selling light-not light bulbs, The Digital and Human Workforce.

Industrial Internet Use-cases – Logistics and the Industrial Internet

Introducing Industry 4.0: Introduction, Defining Industry 4.0, Why Industry 4.0 and Why now, Four main characteristics of Industry 4.0, The Value Chain, Creating a Value chain, Differential Prospective, Benefits to Business, Industry 4.0 Design principles, Building blocks of Industry 4.0, Industry 4.0 reference architecture, Smart manufacturing.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Understand Industry 4.0 [L2]
- Compare IoT and Industrial IoT [L4]

Unit V:

Smart Factories: Introducing the smart factory, Smart factories in Action, Why smart manufacturing is important, Winners and Losers, Real-world Smart Factories, Industry 4.0-The way forward.

Getting from Here to there-A Road map

Learning Outcomes: After successful completion of this unit, the students will be able to

- Employ novel manufacturing techniques [L4]
- Understand Smart Factory [L2]

TEXT BOOKS:

11. Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, Wiley Publications, 2012.
12. Alasdair Gilchrist, “Industry 4.0-The industrial Internet of Things”, APress.

REFERENCE BOOKS:

12) Arshdeep Bahga, Vijay Madisetti - Internet of Things: A Hands-On Approach, Universities Press, 2014.
13) The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.

REFERENCE SITES:

1) https://www.arduino.cc/
2) https://www.raspberrypi.org/

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

20) Choose the sensors and actuators for an IoT application (L1)
21) Select protocols for a specific IoT application (L2)
22) Utilize the cloud platform and APIs for IoT applications (L3)
23) Experiment with embedded boards for creating IoT prototypes (L3)
24) Design a solution for a given IoT application (L6)
25) Prepare for Industry 4.0 and Smart Factories [L6]

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(IV Semester ME)

Course Category	:	Humanities Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AHS9904	2	0	0	2	CIA	30 M
Course Title	:	DESIGN THINKING AND PRODUCT INNOVATION					SEE	70 M

Design is a realization of a concept or idea into a configuration, drawing or a product. Design thinking is cognitive and practical processes by which design concepts are developed by designers. Innovation is a new idea or a new concept. Product development is the creation of a new or different product that offers new benefits to the end user. This course introduces the design thinking in product innovation.

COURSE OBJECTIVES:-

- To bring awareness on innovative design and new product development.
- To explain the basics of design thinking.
- To familiarize the role of reverse engineering in product development.
- To train how to identify the needs of society and convert into demand.
- To introduce product planning and product development process.

Unit I:

Science to Engineering: Job of engineers, engineering units and measurement, elements of engineering analysis, forces and motion, energy, kinematics and motion, conversion of linear motion to rotary and vice versa, motion transmission.
Physics to Engineering: Application of Newton laws, Pascal's law, Bouncy, Bernoulli's theorem, Ohm's law, electrical induction in engineering products.
Learning Outcomes: After successful completion of this unit, the students will be able to

- Relate the principles of science to engineering (L2)
- Explain simple mechanics motion and force transmission (L2)
- Identify the laws of physics applied to engineering products (L3)

Unit II:
Historical Development: Invention wheel, early mechanics in design, mechanical advantages, industrial revolution, steam and petrol for mobility. Innovations in Electrical and Electronics: Electrical energy generation, electrical bulb, electrical equipment, electronics and automation, computing for early days to present, innovations in communications.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Identify innovation in early mechanical designs (L2)
- Explain development of electrical equipment (L2)
- List out the developments in computing machines (L4)

- Summarize innovations in communication systems (L2)

Unit III:

Systematic approach to product development: Design Thinking, Innovation, Empathize Design Thinking as a systematic approach to Innovation, brainstorming, visual thinking, design challenges, innovation, art of Innovation, strategies for idea generation, creativity, teams for innovation. Solution finding methods: Conventional, intuitive, discursive, methods for combining solution, decision making for new design.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain the steps in the design process (L2)
- Apply systematic approach in design (L3)
- Develop strategies for new product development (L3)

Unit IV:

Reverse engineering in product development: Reversing engineering methods, identifying the bad features in a product, reduction in size and weight, usage of new materials, 3D printing, study of introducing electrical and electronic controls to the old products, importance of ergonomics in product development, environmental considerations in design, safety considerations in design.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Understand reverse engineering methods in product development (L2)
- Use new materials to improve the product (L2)
- Apply electronic controls to improve the product acceptability (L3)
- Summarize the safety and environmental factors in new product design (L2)
- Understand 3D printing in manufacturing (L2)

Unit V:

Study of Product Development- Agriculture, development of machines for separation of corn seeds, peeling of groundnut shells, husk removing from paddy. Electrical: Design of burglar alarm, speedometer, water level indicator, smart gates, smart lights. Design of electrical vehicles, unmanned vehicles, design principles in drones.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Identify the needs for new product development in agriculture (L3)
- Develop simple electrical gadgets (L3)
- Explain the principles in design electrical vehicles and drones (L2)

TEXT BOOKS:

13. Philip Kosky, Robert T. Balmer, William D. Keat, George Wise, "Exploring Engineering: An Introduction to Engineering and Design", 4th edition, Elsevier, 2016.
14. David Ralzman, "History of Modern Design", 2nd edition, Laurence King Publishing Ltd., 2010
15. An AVA Book, "Design Thinking", AVA Publishing, 2010.

REFERENCE BOOKS:

14) G. Pahl, W.Beitz, J. Feldhusen, KH Grote, "Engineering Design: A Systematic Approach", 3rd edition, Springer, 2007.
15) Tom Kelley, Jonathan Littman, "Ten Faces in Innovation", Currency Books, 2006.

COURSE OUTCOMES:

After successful completion of this course, the students will be able to:

26) Summarize the importance of basic sciences in product development (L2)
27) Explain the historical developments in mechanical, electrical, communications and computational engineering (L3)
28) Apply systematic approach to innovative designs (L3)
29) Identify new materials and manufacturing methods in design (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(IV Semester Mechanical Engineering)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0304	2	1	0	3	CIA	30 M
Course Title	:	THERMODYNAMICS					SEE	70 M

COURSE OBJECTIVES:-

- Familiarize concepts of heat, work, energy and governing rules for conversion of one form to other.
- Explain relationships between properties of matter and basic laws of thermodynamics.
- Teach the concept of entropy for identifying the disorder and feasibility of a thermodynamic process.
- Introduce the concept of available energy for maximum work conversion.
- Familiarize steam properties to understand working of steam power plants.
- Provide fundamental concepts of air standard cycles used in steam power plants, IC engines and gas turbines

Unit I: **10 hours**

Introduction: Basic Concepts: Macroscopic and microscopic viewpoints, definitions of thermodynamic terms, quasi – static process, point and path function, forms of energy, ideal gas and real gas, Zeroth law of thermodynamics.

First law of Thermodynamics: Joule's experiment - first law of thermodynamics, corollaries-perpetual motion machines of first kind, first law applied to non-flow and flow process- limitations of first law of thermodynamics**.**

Learning Outcomes: After completing this unit, the student will be able to:

- Understand thermodynamic systems, properties and their importance in solving engineering problems. (L3)
- Make energy balance for closed systems and open systems. (L4)
- Solve simple thermodynamics problems. (L3)

Unit II: **08 hours**

Second Law of Thermodynamics: Kelvin - Planck statement and Clausius statement and their equivalence, corollaries - perpetual motion machines of second kind - reversibility and irreversibility, cause of irreversibility - Carnot cycle, heat engine, heat pump and refrigerator, Carnot theorem, Carnot efficiency.

Learning Outcomes: After completing this unit, the student will be able to:

- Apply second law of thermodynamics in design of heat engine, refrigerator and heat pump. (L3)
- Explain the efficiency of thermodynamic systems.(L2)
- Enumerate the causes for poor performance of thermodynamic systems. (L3)

Unit III: **08 hours**

Entropy: Clausius inequality - Concept of Entropy - entropy equation for different processes and systems

Availability and Irreversibility: Definition of exergy and anergy, expressions for availability and irreversibility. Availability in steady flow, non-flow processes and irreversibility.

Learning Outcomes: After completing this unit, the student will be able to:

- Apply entropy concepts to estimate the performance of systems. (L3)
- Evaluate entropy changes in a wide range of processes and determine the reversibility or irreversibility of a process. (L4)

Unit IV: **08 hours**

Properties of Steam and use of Steam Tables: Pure Substances, P-V-T surfaces, T-s and h-s diagram, Mollier chart, dryness fraction, property tables, analysis of steam undergoing various thermodynamic processes using Mollier chart– steam calorimetry.

Learning Outcomes: After completing this unit, the student will be able to:

- Apply properties of steam to design steam systems. (L3)
- Examine steam systems using conservation equations. (L4)
- Evaluate the dryness fraction and performance of steam systems. (L4)

Unit V: **08 hours**

Thermodynamic Relations: Maxwell relations, TdS equations, difference in heat capacities, ratio of heat capacities, Energy equation, Joule Thompson coefficient, Clausius-Clapeyron equation.
Air Standard Cycles: Otto, Diesel and dual cycles, P-V and T -S diagrams - description and efficiencies, mean effective pressures. Comparison of Otto, Diesel and dual cycles

Learning Outcomes: After completing this unit, the student will be able to:

- Explain the importance of T-ds equations. (L3)
- Relate specific heats, internal energy, enthalpy and Joule-Thomson coefficient in standard form. (L3)
- Examine the importance of compression ratio. (L4)
- Explain the cycles on which internal combustion engines work. (L3)

TEXT BOOKS:

36. P.K.Nag, “Engineering Thermodynamics:, 5th edition, Tata McGraw Hill, 2013.
37. Yunus A. Cengel, Michaela A. Boles, “Thermodynamics”, 7th edition, Tata McGraw Hill, 2011.

REFERENCE BOOKS:

7. J.B.Jones and G.A.Hawkins, "Introduction to Thermodynamics", 2^{nd} edition, John Wiley & Sons, 2012.
8. Moran, Michael J. and Howard N. Shapiro, "Fundamentals of Engineering Thermodynamics", 3^{rd} edition, Wiley, 2015
9. R.K. Rajput, S.Chand& Co., "Thermal Engineering", 6^{th} edition, Laxmi publications, 2010.

COURSE OUTCOMES:
After successful completion of the course, the students will be able to

Explain the importance of thermodynamic properties related to conversion of heat energy into work. (L3)
Apply the laws of thermodynamics to boilers, heat pumps, refrigerators, heat engines, compressors and nozzles. (L3)
Utilize steam properties to design steam based components. (L4)
Compare thermodynamic relations and air standard cycles. (L4)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(IV Semester Mechanical Engineering)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0305P	0	0	3	1.5	CIA	30 M
Course Title	:	MECHANICS OF MATERIALS LAB					SEE	70 M

COURSE OBJECTIVES:-

- To conduct uni-axial tension test on Steel, Aluminium, Copper and Brass.
- To perform compression tests on spring and wood.
- To determine elastic constants of materials using flexural and torsion tests.
- To find hardness of given metals.

List of Experiments:

1. Study the stress – strain relations of (a) Mild Steel b) Cast iron and (c) Tor Steel by conducting tension/compression test on U.T.M.
2. Study the stress – strain relation of (a) Copper and (b) Aluminium (c) other materials by conducting tension /compression test.
3. Find the compressive and shear strength of wood and shear strength of GI sheet by conducting relevant tests.
4. Find the Brinnell's and Vicker's hardness numbers of:
   (a) Steel (b) Brass (c) Aluminium (d) Copper.
5. Determine the Modulus of rigidity (a) Solid shaft (b) Hollow shaft made of steel and aluminium.
6. Find the spring index and modulus of rigidity of the material of a spring by conducting compression and tensile tests.
7. Determine the Young's modulus of the material by conducting deflection test on a simply supported, propped cantilever and continuous beams.
8. Find impact strength of a given material by conducting a) Charpy test and b) Izod test
9. Determine buckling load in a compressive member made with steel and aluminium.
10. Dethermine the deflection in leaf spring with a single leaf and multiple leafs.

COURSE OUTCOMES: After successful completion of this lab course, the students will be able to

1) Understand the stress-strain behavior of different materials.
2) Identify the difference between compression and tension testing.
3) Evaluate the hardness of different materials.
4) Correlate the elastic constants of the materials.
5) Explain the relation between elastic constants and hardness of materials.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(IV Semester Mechanical Engineering)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0306P	0	0	3	1.5	CIA	30 M
Course Title	:	FLUID MECHANICS AND HYDRAULIC MACHINERY LAB					SEE	70 M

COURSE OBJECTIVES:-

- The object of the course to make the students understand the fluid flow concepts and get familiarity with flow measuring devices.

List of Experiments:

1. Calibration of Venturi meter
2. Calibration of Orifice meter
3. Determination of Coefficient of discharge for a small orifice by a constant head method.
4. Determination of Coefficient of discharge for an external mouth piece by variable head method.
5. Calibration of contracted Rectangular Notch and /or Triangular Notch.
6. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
7. Verification of Bernoulli's equation.
8. Impact of jet on vanes.
9. Study of Hydraulic jump.
10. Performance test on Pelton wheel turbine.
11. Performance test on Francis turbine.
12. Efficiency test on centrifugal pump.

COURSE OUTCOMES: After successful completion of this lab course, the students will be able to

38. The various flow properties using various flow measuring devices
39. The performance of various turbines and pumps

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(IV Semester Mechanical Engineering)

Course Category	:	Professional Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0308	0	0	3	1.5	CIA	30 M
Course Title	:	COMPUTER AIDED MACHINE DRAWING					SEE	70 M

COURSE OBJECTIVES:-

- Introduce conventional representations of material and machine components.
- Train to use software for 2D and 3D modeling.
- Familiarize with thread profiles, riveted, welded and key joints.
- Teach solid modeling of machine parts and their sections.
- Explain creation of 2D assembly drawings from 3D assemblies.
- Familiarize with limits, fits and tolerances in mating components.

The following contents are to be done by any 2D software package Conventional representation of materials and components:

Detachable joints: Drawing of thread profiles, hexagonal and square-headed bolts and nuts, bolted joint with washer and locknut, stud joint, screw joint and foundation bolts.
Riveted joints: Drawing of rivet, lap joint, butt joint with single strap, single riveted , double riveted double strap joints.
Welded joints: Lap joint and T joint with fillet, butt joint with conventions.
Keys: Taper key, sunk taper key, round key, saddle key, feather key, woodruff key.
Shaft coupling, bushed pin-type flange coupling, universal coupling, Oldhams' coupling.

The following contents to be done by any 3D software package
Sectional views Creating solid models of complex machine parts and create sectional views.
Assembly drawings: (Any four of the following using solid model software)
Lathe tool post, tool head of shaping machine, tail stock, machine vice, gate valve, carburettor, piston, connecting rod, excentric, screw jack, plumber block, axle bearing, pipe vice, clamping device, Geneva cam, universal coupling,
Manufacturing drawing:
Representation of limits, fits and tolerances for mating parts. Use any four parts of above assembly drawings and prepare manufacturing drawing with dimensional and geometric tolerances.

TEXT BOOKS:

40. K.L.Narayana, P.Kannaiah, "A text book on Engineering Drawing", SciTech Publications, 2014
41. "Software tools/packages", Auto CAD, Solid works or equalent.

REFERENCE BOOKS:

1. Cecil Jensen, Jay Helsel and Donald D.Voisinet, "Computer Aided Engineering Drawing", Tata Mcgraw-Hill, NY, 2000.
2. James Barclay, Brain Griffiths, "Engineering Drawing for Manufacture", Kogan Page Science, 2003.
3. N.D.Bhatt, "Machine Drawing", Charotar, 50th edition, 2014.
4. K.L.Narayana, "Production Drawing", NewAge International Publishers, 3rd edition, 2014

COURSE OUTCOMES: After successful completion of the course, the students will be able to

42. Demonstrate the conventional representations of materials and machine components.
43. Model riveted, welded and key joints using CAD system.
44. Create solid models and sectional views of machine components.
45. Generate solid models of machine parts and assemble them.
46. Translate 3D assemblies into 2D drawings.
47. Create manufacturing drawing with dimensional and geometric tolerances.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(V Semester Mechanical Engineering)

Course Category	:	PROFESSIONAL COURSE	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0309T	2	1	0	3	CIA	30 M
Course Title	:	**APPLIED THERMODYNAMICS**					SEE	70 M

Course Objectives

- To familiarize the Working Principles of IC engines.
- To teach combustion process in SI and CI engines.
- To introduce different types of compressors.
- To familiarize concepts of thermodynamic cycles used in steam power plants and gas turbines
- To impart knowledge on the working of nozzles, turbines, refrigeration and air conditioning.

UNIT I **10 hours**

IC Engines: Working and classification of IC engines, comparison of two stroke and four stroke engines, comparison of SI and CI Engines.

Testing and Performance of IC Engines: Methods of testing IC Engines, performance analysis of IC Engines.

Combustion in IC Engines: SI engine: stages of combustion, normal combustion, abnormal combustion, variables effecting delay period and knocking, pre-ignition. CI engine: stages of combustion, normal combustion, abnormal combustion, variables effecting delay period and knocking. Fuel requirements and fuel rating.

Learning Outcomes:

After completion of this unit, students will be able to

- Understand working of IC engines on the basis of thermodynamic cycles. (L2)
- Estimate engine performance. (L5)
- Identify the effects of abnormal combustion in IC engines. (L3)

UNIT II **8 hours**

Air compressors

Reciprocating Compressor: Single stage reciprocating compressors, work required, effect of clearance in compressors, volumetric efficiency, multi stage compressor, effect of inter cooling in multi stage compressors, compressor performance.

Rotary Compressor: Working principle of a rolling piston type compressor (fixed vane type), multi vane type compressors, characteristics of rotary vane type compressor, working principle of centrifugal compression and axial flow compressors, velocity triangles.

Learning Outcomes:

After completion of this unit, students will be able to

- Classify different types of air compressors. (L2)
- Compare the performance of different types of air compressors (L2)

UNIT III **8 hours**

Vapour Power Cycles: Vapour power cycle, simple Rankine cycle, mean temp of heat addition thermodynamic variables effecting efficiency and output of Rankine cycle

Gas power Cycle: Simple gas turbine plant, Brayton cycle, closed cycle and open cycle for gas turbines, condition for maximum pressure ratio and optimum pressure ratio, actual cycle. Methods to improve performance: regeneration, intercooling and reheating. Introduction to jet propulsion: working principle of ramjet, turbojet, turbofan, turboprop and pulse jet engines,

Learning Outcomes:

After completion of this unit, students will be able to

- Explain concepts of vapour power cycle used in steam power plant. (l2)
- Evaluate the cycles used in gas turbines. (l5)
- Outline the jet propulsion system (l2)

UNIT IV **8 hours**

Nozzles: Type of nozzles - air and steam nozzles. Compressible flow through nozzle- condition for maximum discharge - nozzle efficiency.

Steam Turbines: Classification of steam turbines -impulse turbine and reaction turbine - compounding in turbines - velocity diagrams in impulse and reaction turbines, efficiency, degree of reaction - governing of turbines

Learning Outcomes:

After completion of this unit, students will be able to

- Compare the performance of nozzles, used in turbines. (l2)

- Classify steam turbines and applications. (l4)
- Analyse the performance of steam turbines under different operating conditions. (l5)

UNIT V **8 hours**

Refrigeration: Bell-Coleman cycle - vapour compression cycle, effect of vapour condition on COP of VCR, -vapour absorption cycle, properties of common refrigerants

Principles of Psychrometry and Air Conditioning: Psychometric terms, psychometric processes and air conditioning systems.

Learning Outcomes:

After completion of this unit, students will be able to

- Outline the operation of refrigerators. (l2)
- Identify different refrigerants and applications.(l3)
- Use properties of moist air in calculations for air-conditioning system. (l3)

Course Outcomes

After completing this course, the students can

- Explain working of IC engines with combustion process. (L2)
- Select compressors for different applications. (L1)
- Use T-s diagram in vapour power and gas power cycles. (L3)
- Explain the basic principles of steam turbines. (L2)
- Select appropriate refrigerant for different applications. (L1)

Text Book(s)

1. Ganesan V, “Internal Combustion Engines”, Tata McGraw Hill, 2017.
2. M.L.Mathur and F.S.Mehta, “Thermal Engineering”, Jain brothers,2014

References:

1. Mahesh V Rathore, “Thermal Engineering”, Tata McGraw Hill 2017
2. Yahya, S. M., Turbines, “Compressors and Fans”, 4th edition, Tata McGraw Hill, 2010.
3. Nag P.K, “Engineering Thermodynamics”, 4th edition, Tata McGraw-Hill, 2008.
4. Onkar Singh, “Thermal Turbomachines”, 3rd edition, Wiley India, 2014.
5. P.L.Ballaney, “Thermal Engineering”, 2nd edition, Khanna, 2005.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(V Semester Mechanical Engineering)

Course Category	:	PROFESSIONAL COURSE	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0311T	0	0	3	3	CIA	30 M
Course Title	:	**MANUFACTURING TECHNOLOGY**					SEE	70 M

Course Objectives:

- Explain parameters in the metal cutting operation.
- Relate tool wear and tool life and the variables that control them.
- Calculate machining times for different machining processes.
- Teach various metal cutting processes. (lathe, drilling, boring shaping, slotting, milling and grinding).
- Familiarise the principles of jigs and fixtures and types of clamping and work holding devices.

UNIT I:

Material Removal Processes: **8hrs**

Metal Cutting: Single and multi-point cutting, orthogonal cutting, various force components, chip formation, tool wear and tool life, surface finish and integrity, machinability, cutting tools and materials, cutting fluids, coatings.

Learning Outcomes:

At the end of the this unit, the student will be able to

- Describe cutting processes and variables. (l2)
- Classify various types of chips, cutting tool materials and cutting fluids. (l4)
- Calculate cutting force, speed and feed finding techniques during machining. (l5)

UNIT II:

Machining processes for round shapes: **12hrs**

Lathe and Lathe Operations: Principles of working, specifications, types of lathes, operations performed, work holders and tool holders. Taper turning, thread turning attachments for lathes. machining time calculations. Turret and capstan lathes - Principle of working, collect chucks, other work holders - tool holding devices.

Drilling and Drilling Machines: Principles of working, specifications, types, and operations performed - tool holding devices - nomenclature of twist drill.

Boring and Boring Machines- Principles of working, specifications, types, and operations performed - tool holding devices - nomenclature of boring tools

Reaming and Reamers: Principles of working, specifications, types, and operations performed - tool holding devices - nomenclature of reamers.

Taping and Taps: Principles of working, specifications, types, and operations performed - tool holding devices - nomenclature of taps.

Learning Outcomes:

At the end of this unit, the student will be able to

- List the specifications for various types of lathes. (l1)
- Determine cutting speeds for different machining operations. (l5)
- Identify parts of drilling, boring, reaming machines. (l3)

UNIT III:

Machine processes for other shapes: 8hrs

Milling operations and Milling machines - Principles of working, specifications, classifications of milling machines, machining operations, types and geometry of milling cutters, methods of indexing, and accessories to milling machines, machining time calculations.

Shaping, Slotting and planing machines - Principles of working - principal parts, specification, classification, operations performed, machining time calculations

Learning Outcomes:

At the end of this unit, the student will be able to

- Recognize the parts of milling, shaping, slotting and planing machine. (l3)
- Compare tool geometry for milling, shaping, slotting and planing operations. (l3)
- Calculate machining times. (l5)

UNIT IV:

Abrasive Machining: 6hrs

Grinding and grinding machines: Grinding process, types of grinding machines, grinding process parameters, honing, lapping, other finishing processes.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the basic principles of abrasive processes. (l2)
- Classify different types of grinding machines and their applications. (l4)

- Assess the grinding process and variables that effect the operation. (l5)
- Estimate the time and power required for the grinding operation. (l5)
- Explain various types of abrasive processes such as honing and lapping for final finishing operation. (l2)

UNIT V **8hrs**

Jigs and Fixtures Principles of design of Jigs and fixtures and uses, 3-2-1 principle of location and clamping, classification of Jigs & Fixtures, types of clamping and work holding devices, typical examples of jigs and fixtures.

Learning Outcomes:

At the end of this unit, the student will be able to

- Classify various types of jigs and fixtures. (l4)
- Identify various types of work and tool holding devices. (l3)
- Explain the design principles of jigs and fixtures. (l2)
- Design a jig and fixture for a given application. (l6)

Course Outcomes:

At the end of the course, the student will be able to

- Choose cutting processes and variables. (l3)
- Relate tool wear and tool life. (l1)
- Calculate the machining parameters for different machining processes. (l5)
- Identify methods to generate different types of surfaces. (l3)
- Explain work-holding requirements. (l2)
- Design jigs and fixtures. (l6)

Text books:

1. P.N. Rao, "Manufacturing Technology: Metal Cutting and Machine Tools", (Volume 2), 3rd edition, Tata McGraw-Hill Education, 2013
2. R.K. Jain and S.C. Gupta, "Production Technology", 17th edition, Khanna Publishers, 2012.

Reference books:

1. Kalpakzian S and Schmid SR, "Manufacturing Engineering and Technology", 7th edition, Pearson, 2018.
2. Milton C.Shaw , "Metal Cutting Principles", 2nd edition, Oxford, 2012
3. Hindustan Machine Tools, "Production Technology", TMH, 2001
4. V.K.Jain, Advanced Machining Process,12th edition, Allied Publications, 2010
5. AB. Chattopadhyay, "Machining and Machine Tools", 2nd edition, Wiley, 2017
6. Halmi A Yousuf & Hassan, "Machine Technology: Machine Tools and Operations", CRC Press Taylor and Francis Group, 2008

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(V Semester Mechanical Engineering)

Course Category	:	PROFESSIONAL COURSE	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0310	2	1	0	3	CIA	30 M
Course Title	:	**DYNAMICS OF MACHINERY**					SEE	70 M

Course Objectives:

The Objectives of this course are to

- Explain the importance of friction and apply for brakes and dynamometers
- Analyze the turning moment diagrams and discuss the applications of flywheel
- Familiarizes the concept of gyroscope and its applications for aero plane, motor cycle and motor cars
- Uses of governors and its applications
- Explain the need of balancing of rotating and reciprocating masses

UNIT I

FRICTION: Inclined plane, friction of screws and nuts, pivot and collar, uniform pressure, uniform wear. Friction circle and friction axis, lubricated surfaces, boundary friction, film lubrication.

CLUTCHES: Friction clutches- Single Disc or plate clutch, Multiple Disc Clutch, Cone Clutch, Centrifugal Clutch.

BRAKES AND DYNAMOMETERS: Simple block brakes, Band brake, internal expanding brake, braking of vehicle. Dynamometers – absorption and transmission types. General description and methods of operation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Know the applications and concepts of friction. (L3)
- Understand the significance of clutches. (L2)
- Know the applications of breaks and dynamometers. (L3)

UNIT II

PRECESSION: Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aeroplanes and ships. TURNING MOMENT DIAGRAMS AND **FLY WHEELS:** Turning moment diagrams for steam engine, IC Engine and multi cylinder engine. Crank effort - coefficient of Fluctuation of energy, coefficient of

Fluctuation of speed – Fly wheels and their design, Fly wheels for Punching machines.

Learning Outcomes:

At the end of this unit, the student will be able to

- To understand the concept and applications of gyroscopic couple. (L3)
- To draw the turning moment diagram for energy storage . (L2)
- To study the applications of flywheels. (L3)

UNIT III

GOVERNORS: Watt, Porter and Proell governors. Spring loaded governors – Hartnell and Hartung governors with auxiliary springs. Sensitiveness, isochronism and hunting. Effort and power of a governor.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand different types of governors. (L3)
- Analyse the sensitiveness and isochronisms of governors. (L2)
- Estimate the effort and power of governors. (L3)

UNIT IV

BALANCING: Balancing of rotating masses - single and multiple – single and different planes.
BALANCING OF RECIPROCATING MASSES: Primary and Secondary balancing of reciprocating masses. Analytical and graphical methods. Unbalanced forces and couples -V- engine, multi cylinder inline and radial engines for primary and secondary balancing.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the importance of balancing. (L3)
- Analyzing the balancing of reciprocating masses. (L2)
- Apply the balancing techniques. (L3)

UNIT V

VIBRATION: Free and forced vibration of single degree of freedom system, Role of damping, whirling of shafts and critical speeds. Simple problems on free, forced and damped vibrations.

Vibration Isolation & Transmissibility. Transverse vibrations of beams with concentrated and distributed loads. Dunkerly's method, Raleigh's method. Torsional vibrations - two and three rotor systems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Formulate the equations of motion and solve single degree of freedom system with damping. (L3)
- Estimate the natural frequency of vibrating systems. (L2)
- Explain the concept of vibration isolation of transmissibility. (L3)

Course Outcomes:

At the end of the course, the student will be able to

- Understand the effect of reactive gyroscopic couple on the stability of vehicles
- Understand the power lost and power transmitted due to friction
- Identify and correct the unbalances of rotating body
- Reduce the magnitude of vibration and isolate vibration of dynamic systems
- Determine dimensions of Governors for speed control.

TEXT BOOKS:

1. S.S. Rattan, “Theory of Machines”, MGH Publishers,3rd Edition,2013.
2. R.L. Norton, “Kinematics and Dynamics of Machinery”, Tata McGraw Hill.

REFERENCES:

1. Thomas bevan, “Theory of machines”, Pearson, 3rd edition,2012.
2. J.E. Shiegley, “The theory of machine”, Mcgraw hill .
3. Shigley et.al. “Theory of machines and mechanisms” of Oxford international student edition.
4. R.S Khurm, “Theory of machines”, S.Chand publications

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to IV Semester CSE & ECE)

Course Category	:	Humanities Sciences Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9905	3	0	0	3	CIA	30 M
Course Title	:	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS					SEE	70 M

COURSE OBJECTIVES:-

- To inculcate the basic knowledge of micro economics and financial accounting analysis
- To understand fundamentals of Production & Cost Concepts to take certain business decisions in the processes of optimum utilization of resources.
- To know various types of Market Structures & pricing methods and its strategies, and Trade Blocks.
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on Accounting and to explain the process of preparing Financial statements & analysis for effective business decisions.

Unit I: INTRODUCTION TO MANAGERIAL ECONOMICS & DEMAND

Managerial Economics – Definition – Nature & Scope - Contemporary importance of Managerial Economics - Demand Analysis **-** Concept of Demand **-** Demand Function - Law of Demand - Elasticity of Demand - Significance - Types of Elasticity - Measurement of Elasticity of Demand - Demand Forecasting - Factors governing Demand Forecasting - Methods of Demand Forecasting - Relationship of Managerial Economics with Financial Accounting and Management.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the nature and scope of Managerial Economics and its importance
- Understand the concept of demand and its determinants
- Analyze the Elasticity and degree of elasticity
- Evaluate Demand forecasting methods
- Design the process of demand estimation for different types of demand

Unit II: THEORY OF PRODUCTION AND COST ANALYSIS

Production Function – Least-cost combination - Short-run and Long-run Production Function - Isoquants and Isocosts, MRTS - Cobb-Douglas Production Function - Laws of Returns - Internal and External Economies of scale – **Cost & Break Even Analysis** - Cost concepts and Cost behavior - Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems) - Managerial significance and limitations of Break-Even Analysis.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the production function, Input-Output relationship and different cost concepts
- Apply the least-cost combination of inputs
- Analyze the behavior of various cost concepts

- Evaluate BEA for real time business decisions
- Develop profit appropriation for different levels of business activity

Unit III: INTRODUCTION MARKETS AND NEW ECONOMIC ENVIRONMENT

Market structures: Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition- Monopoly - Monopolistic Competition - Oligopoly - Price - Output Determination - Pricing Methods and Strategies

Forms of Business Organizations - Sole Proprietorship - Partnership – Joint Stock Companies - Public Sector Enterprises - New Economic Environment - Economic Liberalization - Privatization – Globalization - Trade Blocks (SAARC,EU,NAFTA,BRICS)-EXIM Policy-International Economic Environment.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the structure of markets, features of different markets and forms of business organizations
- Apply the price output relationship in different markets
- Analyze the optimum output levels to maximize profit in different markets
- Evaluate price-output relationship to optimize cost, revenue and profit
- Interpret Pricing Methods and Strategies

Unit IV: CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Significance **-** Types of Capital **-** Components of Working Capital - Sources of Short-term and Long-term Capital - Estimating Working capital requirements – Cash Budget - **Capital Budgeting** – Features of Capital Budgeting Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the concept of capital budgeting and its importance in business
- Contrast and compare different investment appraisal methods
- Analyze the process of selection of investment alternatives using different appraisal methods
- Evaluate methods of capital budgeting for investment decision making and for maximizing returns
- Design different investment appraisals and make wise investments

Unit V: INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Accounting Concepts and Conventions - Introduction to Double-Entry Book Keeping, Journal, Ledger, Trial Balance - Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios-Du Pont Chart.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the concept, convention and significance of accounting
- Apply the fundamental knowledge of accounting while posting the journal entries

- Analyze the process and preparation of final accounts and financial ratios
- Evaluate the financial performance of an enterprise by using financial statements

Data Books Required: Present Value Factors table

TEXT BOOKS:

1. Varshney & Maheswari: “Managerial Economics”, Sultan Chand, 2013.
2. Aryasri: “Business Economics and Financial Analysis”, 4th edition, MGH, 2019

REFERENCE BOOKS:

1. Ahuja Hl “Managerial economics” 3rd edition, Schand, ,2013
2. S.A. Siddiqui and A.S. Siddiqui: “Managerial Economics and Financial Analysis”, New Age International,. 2013.
3. Joseph G. Nellis and David Parker: “Principles of Business Economics”, 2nd edition, Pearson, New Delhi.
4. Domnick Salvatore: “Managerial Economics in a Global Economy”, Cengage, 2013.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

1) Analyze the fundamentals of Economics viz., Demand, Elasticity, forecasting, Production, cost, revenue and markets (L4)
2) Apply concepts of production , cost and revenues for effective business decisions (L3)
3) Identify the influence of various markets, the forms of business organization and its International Economic Environment (L1)
4) Analyze how to invest adequate amount of capital in order to get maximum return from selected business activity (L4)
5) Prepare and analyze accounting statements like income & expenditure statement, balance sheet apart from the fundamental knowledge, to understand financial performance of the business and to initiate the appropriate decisions to run the business profitably (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

Course Structure for Four Year Regular B.Tech. Degree Program

(Effective for the batches admitted from 2019-20 onwards)

CIVIL ENGINEERING

INDUCTION PROGRAM (3 weeks duration)

- Physical activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas
- Familiarization to Dept./Branch & Innovations

B. Tech – I Semester (Theory – 4, Lab – 4)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9901	Mathematics – I	3	1	0	4	30	70	100
2	BS	19ABS9902	Engineering Physics	3	0	0	3	30	70	100
3	ES	19AES0201	Basic Electrical and Electronics Engineering	3	0	0	3	30	70	100
4	MC	19AMC9902	Environmental Sciences	3	0	0	0	30	-	30
PRACTICAL										
5	ES	19AES0301	Engineering Drawing Lab	1	0	4	3	30	70	100
6	BS	19ABS9903	Engineering Physics Lab	0	0	3	1.5	30	70	100
7	LC	19ALC0301	Engineering & IT Workshop Lab	0	0	3	1.5	30	70	100
8	ES	19AES0202	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5	30	70	100
			TOTAL:	**13**	**01**	**13**	**17.5**	**240**	**490**	**730**

B. Tech – II Semester (Theory – 5, Lab – 3)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9906	Mathematics – II	3	1	0	4	30	70	100
2	BS	19ABS9904	Engineering Chemistry	3	0	0	3	30	70	100
3	ES	19AES0501	CProgramming	3	1	0	4	30	70	100
4	HS	19AHS9901	Communicative English	2	0	0	2	30	70	100
5	MC	19AMC9901	Human Values & Professional Ethics	3	0	0	0	30	-	30
PRACTICAL										
6	BS	19ABS9905	Engineering Chemistry Lab	0	0	3	1.5	30	70	100
7	ES	19AES0502	CProgramming Lab	0	0	3	1.5	30	70	100
8	HS	19AHS9902	Communicative English Lab	0	0	3	1.5	30	70	100
			TOTAL:	**14**	**02**	**09**	**17.5**	**240**	**490**	**730**

B. Tech – III Semester (Theory – 7, Lab – 4)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9907	Complex Variables &Transforms	2	1	0	3	30	70	100
2	ES	19AES0503T	Data Structures	2	1	0	3	30	70	100
3	PC	19APC0101T	Strength of Materials-I	2	1	0	3	30	70	100
4	PC	19APC0102T	Fluid Mechanics	2	1	0	3	30	70	100
5	PC	19APC0103T	Surveying	2	1	0	3	30	70	100
6	PC	19APC0104	Building Materials and Construction	3	0	0	3	30	70	100
7	MC	19AMC9903	Biology For Engineers	3	0	0	0	30	0	30
PRACTICAL										
8	ES	19AES0503P	Data Structures Lab	0	0	3	1.5	30	70	100
9	PC	19APC0101P	Strength of Materials Lab	0	0	3	1.5	30	70	100
10	PC	19APC0102P	Fluid Mechanics Lab	0	0	3	1.5	30	70	100
11	PC	19APC0103P	Surveying Lab	0	0	3	1.5	30	70	100
			TOTAL:	**16**	**05**	**12**	**24**	**330**	**700**	**1030**

B. Tech – IV Semester (Theory – 7, Lab – 3)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9908	Numerical Methods & Probability Theory	3	0	0	3	30	70	100
2	ES	19AES0505T	Python Programming for Engineers	2	1	0	3	30	70	100
3	PC	19APC0105	Strength of Materials-II	2	1	0	3	30	70	100
4	PC	19APC0106T	Hydraulics and Hydraulic Machinery	2	1	0	3	30	70	100
5	PC	19APC0107	Structural Analysis-I	2	1	0	3	30	70	100
6	PC	19APC0108	Concrete Technology	3	0	0	3	30	70	100
7	PC	19APC0109T	Transportation Engineering	3	0	0	3	30	70	100
PRACTICAL										
8	PC	19APC0106P	Hydraulic Machinery Lab	0	0	3	1.5	30	70	100
9	PC	19APC0109P	Transportation Engineering Lab	0	0	3	1.5	30	70	100
10	ES	19AES0505P	Python Programmingfor Engineers Lab	0	0	2	1	30	70	100
			TOTAL:	**16**	**05**	**08**	**25**	**300**	**700**	**1000**

Note: Environmental Engineering course is removed from IV semester and added in V Semester.

DETAILED SYLLABUS

B.TECH - I SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE, ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9901	3	1	0	4	CIA	30 M
Course Title	:	MATHEMATICS – I					SEE	70 M

COURSE OBJECTIVES:

1. To enlighten the learners in the concept of differential equations, matrices and multivariable calculus.
2. To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

COURSE OUTCOMES:

After the completion of this course, the students will be able to:

1. Understand the effective mathematical tools for the solutions of differential equations that model physical processes.
2. Identify the essential characteristics of linear differential equations with constant coefficients and solve the linear differential equations with constant coefficients by appropriate method.
3. Solving systems of linear equations, using technology to facilitate row reduction determine the rank, Eigen values and Eigen vectors, diagonal form and different factorizations of a matrix.
4. Translate the given function as series of Taylor's and McLaren's with remainders and analyze the behavior of functions by using mean value theorems.
5. Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies and acquire the Knowledge maxima and minima of functions of several variables.

Unit I

Ordinary Differential Equations of First Order: Formation of the ordinary differential equations (ODEs) – Solution of an ordinary differential equation – Equations of the First Order and First Degree – Linear Differential Equation – Bernoulli's Equation – Exact Differential Equations – Equations Reducible to exact equations-Orthogonal Trajectories.

Ordinary Differential Equations of First Order but not First Degree: Equations solvable for p – Equations solvable for x – Equations solvable for y – Equations do not contain x(or y) – Clairaut's Equations.

Unit II

Ordinary Differential Equations of Higher Orders: Solutions of Linear Ordinary Differential Equations With Constant Coefficients – Rules for finding the Complimentary Functions – Rules for finding the particular integral – Method of variation of parameters – Cauchy's linear equation – Legendre's Linear Equation.

Unit III

Matrices: Inverse and rank of a matrix – System of linear equations; Symmetric, skew – symmetric and orthogonal matrices – Eigen values and Eigen vectors and their properties, Cayley – Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley – Hamilton theorem, diagonalisation of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation.

Unit IV

Mean Value Theorems: Rolle’s Theorem, Lagrange’s mean value theorem, Cauchy’s mean value theorem, Taylor’s and Maclaurin theorems with remainders (without proof), indeterminate forms and L'Hospital's rule; Maxima and minima.

Unit V

Multivariable Calculus: Limit, continuity and partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons.

Reference Books:

1. R. K. Jain and S. R. K. Lyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd.
2. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
3. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9902	3	0	0	3	CIA	30 M
Course Title	:	ENGINEERING PHYSICS					SEE	70 M

COURSE OBJECTIVES:

1. To disseminate knowledge in basic concepts of mechanics and to understand the basic ideas of damping and resonance.
2. To interpret the significant concepts of magnetic materials which leads to potential applications and basics of electromagnetic waves.
3. To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications.
4. To teach the concepts related to laser, fiber optics and superconductivity which lead to their fascinating applications.
5. To familiarize the concept of Quantum mechanics and semiconductors relevant to engineering branches.

UNIT I

MECHANICS AND OSCILLATIONS: Basic laws of vectors and scalars – rotational frames – conservative forces; F = – grad V, torque and angular momentum – Newton's laws in inertial and linear accelerating non-inertial frames of reference.

Simple Harmonic motion – Characteristics of SHM; Damped harmonic motion – over – damped, critically damped and lightly damped oscillators; Forced oscillations and resonance.

UNIT II

ELECTROMAGNETISM AND MAGNETIC PROPERTIES OF MATERIALS: Divergence of Electric and Magnetic Fields – Gauss theorem for divergence – Curl of Electric and Magnetic Fields – Stokes theorem for curl – Maxwell's Equations – Electromagnetic wave propagation (conducting and non – conducting media) – Poynting's Theorem.

Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Classification of Magnetic materials – Domain Concepts of ferromagnetism – Hysteresis – soft and hard magnetic materials – Magnetic device applications.

UNIT III

WAVE OPTICS: Interference: Principle of superposition – Young's Experiment – Coherence – Interference in thin films, Wedge shaped film, Newton's Rings – Determination of wavelength.

Diffraction: Diffraction, differences between interference and diffraction, Fraunhofer diffraction due to Single slit

Polarization: Polarization by double refraction – Plane polarized light by Nicol's Prism – Half wave and Quarter wave plate – Engineering applications of Polarization.

UNIT IV

LASERS AND FIBER OPTICS: Introduction, spontaneous and stimulated emissions, population inversions, pumping, Ruby laser, Gas laser (He – Ne Laser), Semiconductor laser, Applications of lasers.

Optical Fiber and Total Internal Reflection, Acceptance Angle and cone of a fiber, Numerical aperture, Fiber optics in communications, Types of Optical Fibers, Applications of optical fibers.

SUPERCONDUCTIVITY: Super conductivity, Meissner Effect, Basics of BSC theory, Types of Superconductors and Applications of Superconductors.

UNIT V

QUANTUM MECHANICS: Introduction, Photoelectric Effect, de – Broglie's hypothesis, Wave – particle duality Heisenberg's Uncertainty principle, Schrodinger's time independent wave equation, Particle in one dimensional box.

SEMICONDUCTOR PHYSICS: Energy bands in solids, Types of electronic materials: metals, semiconductors, and insulators**.** Intrinsic and Extrinsic semiconductors, Direct and Indirect band gap semiconductors Hall effect – Applications of Hall effect – Drift and Diffusion currents – Continuity equation– Applications of Semiconductors.

COURSE OUTCOMES:

After the completion of this course, the student will be able to:

1. Extend Newton's second law for inertial and non-inertial frame of reference and analyze the concept of resonance.
2. Apply the Gauss' theorem for divergence and Stokes' theorem for curl and Classify the magnetic materials based on susceptibility
3. Interpret the differences between interference and diffraction, illustrate the concept of polarization of light and its applications and classify ordinary polarized light and extraordinary polarized light.
4. Apply electromagnetic wave propagation in different Optical Fibers; the lasers concepts in various application sand explain Meissner's effect, BCS theory.
5. Interpret the direct and indirect band gap in semiconductors and identify the type of semiconductor using Hall Effect.
   Analyze the behavior of particles at very microscopic level by using wave nature of particles.

TEXT BOOKS:

1. Gaur R.K. and Gupta S.L., "Engineering Physics"-Dhanpat Rai publishers, 2012
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Krshisagar - S. Chand publications, 11th Edition 2019.
3. Fundamentals of Physics by David Halliday and Robert Resnick – Part I and Part II - Wiley.
4. H.K. Malik & A.K. Singh "Engineering Physics" - McGraw Hill Publishing Company Ltd.
5. "Engineering Physics", K.Thyagarajan - McGraw Hill Publishing Company Ltd., 2015.
6. D. Kleppner and Robert Kolenkow "An introduction to Mechanics"- II - Cambridge University Press, 2015

REFERENCE TEXT BOOKS:

1. M K Varma "Introduction to Mechanics"-Universities Press-2015.
2. I. G. Main, "Vibrations and waves in physics", 3rd Edn., Cambridge University Press
3. D.K. Bhattacharya and A. Bhaskaran, "Engineering Physics"- Oxford Publications-2015
4. David J. Griffiths, "Introduction to Electrodynamics"- 4/e, Pearson Education, 2014
5. P.K. Palaniswamy, "Engineering Physics" Scitech Publications
6. Shatendra Sharma, Jyotsna Sharma, "Engineering Physics" Pearson Education, 2018
7. D. Kleppner and Robert Kolenkow "An introduction to Mechanics" – II – Cambridge University Press, 2015.

(Common to I Semester CE, ME and ECE & II Semester CSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0201	3	0	0	3	CIA	30 M
Course Title	:	BASIC ELECTRICAL AND ELECTRONICS ENGG.					SEE	70 M

COURSE OBJECTIVES:-

1. To introduce basics of simple electric circuits.
2. To impart knowledge on measuring devices for voltages and currents.
3. To provide comprehensive idea about working principle, operation and applications of PN junction diode & knowledge about semiconductors
4. To teach applications of electronic principles which are used in Engineering
5. To give knowledge about Special purpose diodes and applications

COURSE OUTCOMES:-

1. Able to recall Simple electrical connections.
2. Knowledge about the Measuring Instruments
3. Learning operation and properties of semiconductors
4. Useful knowledge on PN diode and simple applications.
5. Working and construction of Analog Electronic devices.

UNIT I

ELECTRICAL CIRCUITS: Basic Electrical Circuit elements – (R-L-C) – Ohms Law – Kirchoffs Law – Introduction to AC Circuits – and DC Circuits – Series connection – parallel connections, Analysis of single – phase ac circuits consisting of RL – RC – RLC series circuits – Nodal Analysis-Mesh Analysis.

UNIT II

MEASURING INSTRUMENTS: Moving coil and moving iron instruments (Ammeter and voltmeter) – Cathode ray oscilloscope – cathode ray tube - Regulated power supply – Digital Multi Meter (DMM) – Megger instrument – Introduction to Electric and magnetic fields – Thermistor – Linear Mode power supply.

UNIT III

SEMICONDUCTORS: Classification of semiconductors – Intrinsic semiconductors – Extrinsic semiconductors – conductivity of Intrinsic and Extrinsic semiconductors – P-type semiconductor – N-type semiconductor – Qualitative theory of P-N junction – V-I characteristics of PN junction diode – and simple applications – Ligiht Emitting Diode(LED).

UNIT IV

RECTIFIERS AND FILTERS: Introduction to Rectifiers – Half Wave Rectifiers – Full Wave Rectifiers – Bridge rectifier – Advantages of Bridge rectifier – Comparision of Rectifiers – Harmonic components in a Rectifier circuit – Introduction to Filters – Inductor Filter – capacitor Filter – LC or L-section Filter – Types of Voltage regulators – series voltage regulator – shunt voltage regulator – Clippers and Clampers.

UNIT V

ANALOG ELECTRONICS: Zener diode, Applications of diode as switch and rectifier, Zener diode as regulator, Breakdown mechanism – Avalanche zener Breakdown – special purpose diodes: Schottky diode, tunnel diode, varactor diode, photodiode, phototransistor ,Introduction to Bipolar Juntion Transistor – BJT construction, operation, configurations – CB, CE, CC. – Introduction to Basic Logic Gates.

Text Books:-

1. D.P. Kothari, I.J.Nagrath, Basic Electrical and Electronics Engineering, 2nd Edition, McGraw Hill Education (India) Private Limited.

2. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, 2nd edition, Pearson India Private Limited.

Reference Books:-

1. Principles of Electrical Engineering and Electronics, V.K. Mehta & Rohit Mehta, S.Chand publications.
2. Electronic Devices and Circuit Theory by Robert L.Boylestad and Louis Nashelsky., pearson.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19AMC9902	3	0	0	0	CIA	30 M
Course Title	:	ENVIRONMENTAL SCIENCES					SEE	--

COURSE OBJECTIVES:-

1. Creating basic awareness on environment
2. Understanding the importance of ecological balance for sustainable development.
3. Creating awareness on biodiversity and its conservation
4. Understanding the impacts of developmental activities and mitigation measures.
5. Understanding the environmental policies and regulations.

COURSE OUTCOMES:

Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which in – turn helps in sustainable development.

UNIT I

Ecosystems: Definition, Scope and Importance ecosystem. Classification, Structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Energy flow in the ecosystem, Biogeochemical cycles, Bioaccumulation, ecosystem value, derives and carrying capacity, Field visits.

UNIT II

Natural Resources: Classification of Resources: Living and Non – Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable energy source, and case studies.

UNIT III

Biodiversity and its Conservation: Introduction – Definition: genetic, species and ecosystem diversity. Bio – geographical classification of India – Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega diversity nation – Hot - sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man – wildlife conflicts; Conservation of biodiversity: In-situ and Ex-situ conservation. National Biodiversity Act.

UNIT IV

Environmental Pollution and Control Technologies: Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary Tertiary.

Overview of air pollution control technology, Concept of bioremediation. Global Environmental Problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montreal Protocol.

UNIT V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act – 1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio - economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl Human Health, Environmental Ethics, Concept of Green Building, Ecological foot print, Life Cycle Assessment(LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCES:

1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.
2. Enviromental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela . 2008 PHI Learning Pvt Ltd.
4. Environmental Science by Daniel B. Botkin & Edwards A. Keller, Wiley INDIA edition.
5. Enviromental Studies by Anubha Kaushik, 4th Edition, New age international publishers.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0301	1	0	4	3	CIA	30 M
Course Title	:	ENGINEERING DRAWING LAB					SEE	70 M

COURSE OBJECTIVES:

1. To gain and understanding of the basics of geometrical constructions of various planes and solids, understanding system of graphical representation of various objects and various views to draft and read the products to be designed and eventually for manufacturing applications.
2. To learn about various projections, to understand complete dimensions and details of object.
3. Ultimately student must get imaginary skill to put an idea of object, circuit, assembly of parts in black & white, to design a product and to understand the composition, which can be understood universally.

COURSE OUTCOMES:

1. Drawing 2D and 3D diagrams of various objects.
2. Learning conventions of Drawing, which is an Universal Language of Engineers.
3. Drafting projections of points, planes and solids.

UNIT I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance – Conventions in Drawing – Lettering – BIS Conventions. **Curves used in Engineering Practice:** (a) Conic Sections including the Rectangular Hyperbola – General method only, (b) Cycloid, Epicycloid and Hypocycloid, (c) Involutes.

UNIT II

Scales: Plain, Diagonal and Vernier. **Projection of Points**: Principles of orthographic projection – Convention – First angle projections, projections of points.

UNIT III

Projections of Lines: Lines inclined to one or both planes, Problems on projections, Finding True lengths.
Projections of Planes: Projections of regular plane surfaces- plane surfaces inclined to both planes.

UNIT IV

Projections of Solids: Projections of Regular Solids with axis inclined to both planes. **Developments of Solids**: Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid, Cone.

UNIT V

Isometric and Orthographic Projections: Principles of isometric projection- Isometric Scale – Isometric Views- Conventions – Isometric Views of lines, Planes, Simple solids (cube, cylinder and cone). Isometric projections of spherical parts. Conversion of isometric Views to Orthographic Views.

Text Books:

1. Engineering Drawing, N. D. Bhatt, Charotar Publishers
2. Engineering Drawing, K.L. Narayana & P. Kannaih, Scitech Publishers, Chennai

References:

1. Engineering Drawing, Johle, Tata McGraw - Hill Publishers
2. Engineering Drawing, Shah and Rana, 2/e, Pearson Education
3. Engineering Drawing and Graphics, Venugopal /New age Publishers
4. Engineering Graphics, K.C. John, PHI, 2013
5. Engineering Drawing, B.V.R. Guptha, J.K. Publishers

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9903	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING PHYSICS LAB					SEE	70 M

COURSE OBJECTIVES:

1. To understand the phenomenon of interference and diffraction using Travelling Microscope and spectrometer.
2. To analyze the interaction of electromagnetic fields.
3. To understand the concept of polarization and classify polarized and unpolarized lights.
4. To realize the laws of resistance by using Carey Foster's bridge.
5. To analyze the frequencies of electrically maintained tuning fork by Melde's apparatus.

COURSE OUTCOMES:

After completion of this course, the students will be able to:

1. Apply the knowledge of optics to calculate geometrical parameters of thickness of thin object and radius of curvature of a lens.
2. Plot the intensity of the magnetic field of circular coil carrying current with varying distance.
3. Evaluate the Planck's constant value practically and analyze the characteristics of photo electric cell and Cauchy's constants.
4. Determine coefficient of thermal Conductivity of a Bad Conductor.

LIST OF EXPERIMENTS:

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.
2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying Circular Coil.
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer.
5. Determination of Refractive Index of Ordinary ray μ_o and extraordinary μ_e ray.
6. Determination of Thickness Given Paper Strip by Wedge shape Method.
7. Calibration of Low Range Voltmeter.
8. Calibration of Low Range Ammeter.
9. Determination of Magnetic Moment and Horizontal Component of Earth's Magnetic Field.
10. Lees Method - Coefficient of thermal Conductivity of a Bad Conductor.
11. Carey Foster's Bridge – Verification of laws of Resistance and Determination of Specific Resistance.
12. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
13. Photoelectric cell – Characteristics.
14. Planks Constants.
15. Determination of Wavelength of Mono chromatic source using LASER diffraction

Reference Books:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S.Chand Publishers, 2017.
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Laboratory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19ALC0301	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING & IT WORKSHOP LAB					SEE	70 M

ENGINEERING WORKSHOP LAB

COURSE OBJECTIVES:

The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labor involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

COURSE OUTCOMES:

1. Acquires basic knowledge of various tools and their uses in different sections of manufacturing.
2. Apply wood working skills in real world applications.
3. Design and model various basic prototypes in the trade of fitting.
4. Able to perform various basic House Wiring techniques.

TRADES FOR EXERCISES:

(a) Carpentry: Bench Work, tools used in carpentry.

Jobs for Class work: (i) Half lap joint (ii) Mortise and Tenon joint (iii) Bridle joint (iv) Corner dovetail joint

(b) Fitting: Tools used in fitting work, Different files, chisels, hammers and bench vice.

Jobs for class work: (i) Vee Fit (ii) Square Fit (iii) Dovetail fit (iv) Half Round Fit

(c) House Wiring: Tools used in house wiring work.

Jobs for class work: (i) Series / Parallel Connection with three bulbs (ii) Tube Light Connections (iii) Stair Case Connections (iv) Measurement of Earth Resistance / Godown Wiring

Note: At least two exercises to be done from each trade.

TRADES FOR DEMONSTRATION:

a) Plumbing
b) Machine Shop

REFERENCE BOOKS:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P. Kannaiah/ K. L. Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

IT WORKSHOP LAB

COURSE OBJECTIVES:

1) Understand the basic components and peripherals of a computer.
2) To become familiar in configuring a system.
3) Learn the usage of productivity tools.
4) Acquire knowledge about the netiquette and cyber hygiene.

5) Get hands on experience in trouble shooting a system

COURSE OUTCOMES:

At the end of the course the students can able to

1) Assemble and disassemble the systems
2) Use the Microsoft Office Tools
3) Install various software
4) Know about various search engines
5) Trouble shoots various Hardware and Software problems.

LIST OF EXERCISES

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. Operating System Installation - Install Operating Systems like Windows, Linux along with necessary Device Drivers. The system should be configured as dual boot with both windows and Linux.
3. MS-Office / Open Office
   a) Word – All Toolbars, Page Setup, Page Background, Font, Para Graph, Page Borders, Headers & Footers, Mail Merge, Tables, Symbols, Equations, Saving, and Reviewing.
   b) Excel / Spread Sheet – All Toolbars, Cell Formatting, Grid Lines, Font, Page Setup, Organize data, Functions, Formulae, Headers & Footers, Tables, Graphs and Charts.
   c) Power Point Presentation – Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets, Numbering, Slide Show, Animations, Hyperlinks, Inserting – Images, Clip Art, Shapes, Objects, Tables and Charts, Audio, and Video files.
   d) Access – creation of database, validate data.
4. Network Configuration & Software Installation – Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. Internet and World Wide Web Search Engines, Types of search engines, netiquette, cyber hygiene.
6. Trouble Shooting – Hardware trouble shooting, Software trouble shooting.

Reference Books:

1. Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, K. L. James, Eastern Economy Edition.
2. Microsoft Office 2007: Introductory Concepts and Techniques, Windows XP Edition By Gary B. Shelly, Misty E. Vermaat and Thomas J. Cashman (2007, Paperback).
3. Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, Rudra Prathap, Oxford University Press, 2002.
4. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
5. The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dreamtech.
6. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
7. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0202	0	0	3	1.5	CIA	30 M
Course Title	:	BASIC ELECTRICAL & ELECTRONICS ENGG. LAB					SEE	70 M

COURSE OBJECTIVES:

1. Get exposure to common electronic components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand usage of common electrical measuring instruments.
4. Determine performance characteristics of PN Junction diodes and applications.
5. Understanding simple Network connections Like series circuits

COURSE OUTCOMES:

1. To learn about the simple Logic gates functions.
2. Understanding the simple configurations of the Transistor.
3. Useful for the simple applications of PN diode.
4. To give knowledge about PN diode characteristics.
5. Knowledge about simple Network Analysis

BASIC ELECTRICAL ENGINEERING LAB

List of Experiments:

2. Verification of Ohms Law
3. Verification of KCL and KVL Laws
4. MESH analysis
5. NODAL analysis
6. Verification of RC and RL Parallel Resonance
7. Verification of R-L-C Series Resonance

BASIC ELECTRONICS ENGINEERING LAB

List of Experiments:

1. V-I Characteristics of PN DIODE
2. Half Wave Rectifier
3. Full Wave Rectifier
4. BJT Configuration of CB, CE, CC
5. ZENER Diode Characteristics
6. Basic LOGIC gates

B.TECH – II SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CSE, ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9906	3	1	0	4	CIA	30 M
Course Title	:	MATHEMATICS – II					SEE	70 M

COURSE OBJECTIVES:

1. To familiarize the prospective engineers with techniques in multivariate integration and partial differential equations.
2. To equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

COURSE OUTCOMES:

After the completion of this course, the students will be able to:

1. Understand beta and gamma functions and its relations and conclude the use of special function in evaluating definite integrals.
2. Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and apply double integration techniques in evaluating areas bounded by region.
3. Apply Del to Scalar and vector point functions and illustrate the physical interpretation of Gradient, Divergence and Curl.
4. Find the work done in moving a particle along the path over a force field and evaluate the rates of fluid flow along and across curves.
5. Apply a range of techniques to find solutions of standard PDEs and outline the basic properties of standard PDEs.

Unit I

Sequences and Series: Convergence of sequence and series, tests for convergence;
Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit II

Special Functions: Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions, evaluation of improper integrals.

Unit III

Multiple Integrals: Double integrals, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves, Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co – ordinates.

Unit IV

Vector Calculus: Scalar and vector point functions, vector operator del, del applies to scalar point functions Gradient, del applied to vector point functions – Divergence and Curl, vector identities.

Line integral – circulation-work done, surface integral – flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Unit V

Partial Differential Equations: First order partial differential equations, solutions of first order linear and non – linear PDEs. Solutions to homogenous and non – homogenous higher order linear partial differential equations.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd.
2. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
3. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9904	3	0	0	3	CIA	30 M
Course Title	:	ENGINEERING CHEMISTRY					SEE	70 M

COURSE OBJECTIVES:

- To familiarize engineering chemistry and its applications
- To impart the concept of soft and hard waters, softening methods of hard water
- To train the students on the principles and applications of electrochemistry, polymers, surface chemistry, and cement.

COURSE OUTCOMES:

At the end of the course the students will be able to:

1. To impart the concept of soft and hard waters, softening methods of hard water.
2. Explain the importance of polymers in our daily life and mechanism of conduction in the conducting polymers.
3. To analyze the fuel and methods for preparation of synthetic fuels.
4. To understand the basics of electrochemistry, conductometry and batteries.
5. To familiarizes the Engineering materials.

Unit I **(10 hrs)**

Water Technology: Sources of Water, Impurities and their Influence on Living Systems, Soft Water and Hardness of Water, Estimation of Hardness by EDTA Method, Boiler Troubles – Scale and Sludge, Industrial Water Treatment Internal Treatment Methods(Phosphate Conditioning, Calgon Conditioning), Water softening Methods (Zeolite and Ion – Exchange Processes), Specifications for Drinking Water, Bureau of Indian Standards (BIS) and World Health Organization(WHO), Municipal Water Treatment, Desalination of Brackish Water, Reverse Osmosis (RO) and Electro dialysis.

Unit II **(10 hrs)**

Polymer Chemistry: Introduction to Polymers, Types of Polymerisation (Addition & Condensation), Mechanism of Addition Polymerisation (Ionic and Radical).

Plastics: Thermoplastics and Thermo settings. Preparation, Properties and Applications of Bakelite, Nylon – 66.

Elastomers: Buna – S, Buna – N – Preparation, Properties and Applications.

Conducting Polymers: Polyacetylene, Polyaniline, Mechanism of Conduction and Applications.

Unit III **(10 hrs)**

Fuel Technology: Fuels – Classification of fuels.

Solid Fuels: Wood and Coal, Ranking of Coal-Analysis (Proximate and Ultimate), Coke Manufacture Otto Hoffman Process.

Liquid Fuels: Petroleum Origin, Extraction, and Refining. Motor Fuels Petrol, Diesel Oil, Knocking Octane Number and Cetane Number; Synthetic petrol – Fischer – Tropsch's & Bergius process.

Gaseous Fuels: Composition and Uses of Natural Gas, LPG, and CNG. Flue gas analysis and its significance.

Unit IV **(10 hrs)**

Electrochemistry: Introduction to Electrochemistry (Conductors, Semi-Conductors, Insulators, Conductance). Electrodes, Reference Electrodes, Electrochemical Cell, Nernst Equation, Cell Potential and its Calculations, Numerical Problems. Principle and Applications of Potentiometry, Conductometry.

Batteries: Primary Batteries – Zinc – Air Battery.
Secondary Batteries – Lithium Ion Batteries – Working of the Batteries including Cell Reactions.
Fuel Cell – Hydrogen – Oxygen.

Unit V **(10 hrs)**

Materials of Engineering Chemistry:

Building materials: Portland Cement, Constituents, Phases and Reactivity of Clinker, Setting and Hardening of Cement.

Refractories: Classification, Properties, Factors affecting the Refractory Materials and Applications.

Lubricants: Classification of Lubricants with examples. Definition and Significance of the following Characteristics of a Good Lubricating Oil – Viscosity, Viscosity Index, Flash & Fire Point, Acid Number, Saponifaction Value, Pour Point and Cloud Point.

Text books:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Shashi Chawla, A Reading of Engineering Chemistry, 3rd Edition, Dhanpat Rai and Co., New Delhi, 2011,3rd edition.
3. Puri, Sharma and Pathania "Principles of Physical Chemistry". Vishal Publishing Co.,Jalandhar.1991, 31st edition
4. Gowariker *et al.*, Polymer Science and Technology, Prentice Hall of India Pvt. Ltd., New Delhi, 2004, 10th reprint.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0501	3	1	0	4	CIA	30 M
Course Title	:	C PROGRAMMING					SEE	70 M

COURSE OBJECTIVES:

1. Introduce the internal parts of a computer, and peripherals.
2. Introduce the Concept of Algorithm and use it to solve computational problems
3. Identify the computational and non – computational problems
4. Teach the syntax and semantics of a C Programming language
5. Demonstrate the use of Control structures of C Programming language

COURSE OUTCOMES:

1. Illustrate the working of a computer and apply algorithmic approach for solving a problem.
2. Recognize the importance of programming language independent constructs
3. Select the control structure to solve computational problems
4. Design and implement programs to analyze the array applications.
5. Structure the individual data elements to simplify the solutions.

Unit I

Introduction to Computer Programming Languages: Evolution of Computer Programming languages – Machine, Symbolic and high-level languages. Fundamentals of Algorithms (Pseudo Codes) and Flowcharts, Compiler, Interpreter, Loader, and Linker.

Creating and Running Programs: Writing, Editing, Compiling, Linking and Executing.

Program Control Structures: Sequence, Selection and Iteration. Software Development Method.

Unit II

Introduction to C Language: Background, Basic Structure of a C Program – Steps to execute a C Program – Character Set of C Language – Basic I/O Statements – Basic Data Types and Sizes – C – Tokens: Identifiers, Keywords, Constants, and Variables. Sample Programs.

Input and output: standard input and output, formatted output – printf, formatted input – scanf.

Unit III

Operators: Arithmetic, Relational, Logical, Increment and decrement, Conditional, Assignment, Bitwise – Operator Precedence – Expressions – Type Conversions, Conditional Expressions – Precedence and Order of Evaluation. Sample Programs.

Control Flow / Control Statements: Selection & Making Decisions – Logical Data and Operators – Two-way Selection, Multi-way selection – Standard Statements and blocks – Non-iterative Statements: (if, if – else, null else, nested if – else, if – else ladder, else – if, switch) – Repetitive / Iterative Statements: Concept of loop – Pre-test and post-test loops – While loop, do-while loop, and for loops, initialization and updating, event and counter controlled loops. Branching: break, continue, and Goto. – Sample programs on applications.

Unit IV

Arrays in C language: Concept – Definition – Declaration – Types of arrays – One Dimensional, two dimensional, multidimensional – initialization of arrays – Storing and assessing elements – Array applications.

Strings: Definition, Declaration, Initialization – Basic operations – String manipulations – String handling functions – Arrays using strings -

Unit V

Pointers and arrays: Concept – Definition, Declaration, Initialization, pointer to pointer, functions and pointers, arrays and pointers, pointer as function arguments (call – by – reference), pointers and strings.

Functions: Concept – Definition, Declaration, Types of functions – parameter passing – passing arrays to functions, passing pointers to functions, Recursion – returning non-integers, external variables, scope variables, header variables, register variables, block structure. User defined functions – Standard Library Functions.
Structures: Definition – Declaration – Initialization – Accessing the structure elements – arrays of structures, Array with in structures, pointers to structures, Passing Structure to functions – nested structures, self – referential structures, unions, typedef.

Text Books:

1. Pradip Dey, and Manas Ghosh, "Programming in C", 2018, Oxford University Press.
2. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.
3. Brian W. Kernighan, and Dennis M. Ritchie, "The C Programming Language", 2ndEdition, Pearson.

Reference Books:

1. RS Bichkar "Programming with C", 2012, Universities Press.
2. Pelin Aksoy, and Laura Denardis, "Information Technology in Theory", 2017, Cengage Learning.
3. Byron Gottfried and Jitender Kumar Chhabra, "Programming with C", 4th Edition, 2019, McGraw Hill Education.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AHS9901	2	0	0	2	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH					SEE	70 M

COURSE OBJECTIVES:

Reading Skills

- Addressing explicit and implicit meanings of a text on current topics.
- Understanding the context.
- Learning new words and phrases.
- Using words and phrases in different contexts.

Writing Skills

- Using the basic structure of a sentence.
- Applying relevant writing formats to create paragraphs, essays, letters, emails, reports and presentations.
- Retaining a logical flow while writing.
- Planning and executing an assignment creatively.

Interactive Skills

- Analyzing a topic of discussion and relating to it.
- Participating in discussions and influencing them.
- Communicating ideas effectively.
- Presenting ideas coherently within a stipulated time.

Life Skills

- Examining self-attributes and identifying areas that require improvement: self-diagnosis and self-motivation.
- Adapting to a given situation and developing a functional approach to finding solutions: adaptability and problem solving.
- Understanding the importance of helping others: community services and enthusiasm.

COURSE OUTCOMES:

1. The student will acquire basic proficiency in English using all LSRW skills.
2. Read and explore for enrichment of works from various genres (Poems, essays etc.)
3. Make correct usage of grammar and Vocabulary in writing and speaking.
4. To make them develop Linguistic competence.
5. To make them understand the concept of redundancies in writing skills.

UNIT I

Reading	:	*On the conduct of life:* William Hazlitt
Grammar	:	Prepositions
Vocabulary	:	Word Formation I: Introduction to Word Formation
Writing	:	Clauses and Sentences
Life skills	:	**Values and Ethics** *If:* Rudyard Kipling

UNIT II

Reading	:	*The Brook:* Alfred Tennyson
Grammar	:	Articles
Vocabulary	:	Word Formation II: Root Words from other Languages
Writing	:	Punctuation
Life skills	:	**Self-Improvement** *How I Became a Public Speaker*: George Bernard Shaw

UNIT III

Reading	**:**	*The Death Trap*: Saki
Grammar	**:**	Noun-Pronoun Agreement Subject- Verb Agreement
Vocabulary	**:**	Word Formation III: Prefixes and Suffixes
Writing	**:**	Principles of Good Writing
Life skills	**:**	**Time Management** *On saving Time*: Seneca

UNIT IV

Reading	**:**	*Chindu Yellama*
Grammar	**:**	Misplaced Modifiers
Vocabulary	**:**	Synonyms; Antonyms
Writing	**:**	Essay Writing
Life skills	**:**	**Innovation** *Muhammad Yunus*

UNIT V

Reading	**:**	*Politics and the English Language*: George Orwell
Grammar	**:**	Clichés; Redundancies
Vocabulary	**:**	Common Abbreviations
Writing	**:**	Writing a Summary
Life skills	**:**	**Motivation** *The Dancer with a White Parasol*: Ranjana Dave

Prescribed Textbook: *Language and Life: A Skills Approach* Board of Editors, Orient Black Swan Publishers, India. 2018.

Suggested Readings

- Practical English Usage. Michael Swan. OUP. 1995.
- Remedial English Grammar. F.T. Wood. Macmillan.2007
- On Writing Well. William Zinsser. Harper Resource Book. 2001
- Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
- Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
- Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19AMC9901	3	0	0	0	CIA	30 M
Course Title	:	HUMAN VALUES AND PROFESSIONAL ETHICS					SEE	--

COURSE OBJECTIVES:- This introductory course input is intended.

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

UNIT I

Course Introduction – Need, basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration – what is it? – its content and process; 'Natural Acceptance' and Experiential Validation – as the mechanism for self exploration. Continuous Happiness and Prosperity – A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities – the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT II

Understanding Harmony in the Human Being – Harmony in Myself! : Understanding human being as a co – existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' – Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT III

Understanding Harmony in the Family and Society – Harmony in Human – Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human – human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay – tripti;

Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah – astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society – Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) – from family to world family!

UNIT IV

Understanding Harmony in the nature and Existence – Whole existence as Co- existence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature – recyclability and self-regulation in nature. Understanding Existence as Co – existence (Sah – astiva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT V

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order,
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order.

a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
b. At the level of society: as mutually enriching institutions and organizations.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9905	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING CHEMISTRY LAB					SEE	70 M

COURSE OBJECTIVES:

1. To Verify the fundamental concepts with experiments

COURSE OUTCOMES: At the end of the course, the students will be able to

1. **Prepare** of various Solutions
2. **Determine** the hardness of water
3. **Analysis** of water
4. **Calculate** the cell constant and conductance of solutions
5. **Determine** the physical properties like viscosity, acid number, saponification number
6. **Estimate** the Iron and Calcium in cement

LIST OF EXPERIMENTS:

1. Preparation of Primary Standard (sodium carbonate) Solution.
2. Estimation of Hardness of Water by EDTA method.
3. Estimation of Dissolved Oxygen by Winkler's method.
4. Estimation of Available Chlorine in Bleaching Powder.
5. Estimation of Ferrous ion in the given Mohr Salt by using KMnO4 Solution
6. Determination of Strength of an Acid in Pb-Acid Battery.
7. Preparation of Polymer (Bakelite).
8. Determination of Cell Constant and Conductance of Solutions
9. Determination of Strength of Acid by Conductometric Titrations.
10. Estimation of Calcium in Port land Cement.
11. Determination of Iron in Cement Sample by Colorimeter.
12. Determination of Viscosity of Lubricating Oil using Ostwald Viscometer.
13. Determination of Average Molecular Mass of given Polymer (Polyvinyl Alcohol) by Using Ostwald Viscometer.
14. Determination of acid number of given lubricating oil.
15. Determination of Saponification number of given lubricating oil.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0502	0	0	3	1.5	CIA	30 M
Course Title	:	C PROGRAMMING LAB					SEE	70 M

COURSE OBJECTIVES:

1. To learn about the computer systems, computing environments, developing a computer program and structure of C.
2. To gain Knowledge of the operators, control statements in C.
3. To learn about the design concepts of arrays, strings and their usage.
4. To assimilate about pointers and dynamic memory allocation.

COURSE OUTCOMES:

1. Acquire skills to write, compile and debug programs in c language.
2. Be able to use different operators, data types and write programs
3. Acquire knowledge to select the best loop construct for a given problem.
4. Design and implement programs to analyze the array applications.
5. Design and implement C programs with Functions.

Exercise: 1

a) Write a C program to print a given statement.
b) Write a C program for exchanging (interchanging) values of two variables.
c) Write a C program to find the reverses of a given Number.

Exercise: 2

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program to find the second maximum number among the given list of numbers.
c) Write a C program to find the k^{th} smallest number among the given list of numbers.

Exercise: 3

a) Write a C program to demonstrate various operators (Arithmetic operator, increment & decrement operator, Relational operator, and Assignment operator).
b) Write a C Program, to counts number of positive and negative numbers separately and also compute the sum of them.

Exercise: 4

a) Write a C program to generate the first ‘n’ terms in the sequence of Fibonacci series.

Exercise: 5

a) Write a C program to generate all the prime numbers between 1 and n, where ‘n’ is the value given by the user.
b) Write a program which Prints the following patterns.

```
ABCDEFGFEDCBA          0
ABCDEF FEDCBA         111
ABCDE   EDCBA        22222
ABCD     DCBA       3333333
ABC       CBA      444444444
AB         BA
A           A
```

c) Write a C program to generate Pascal’s triangle.
d) Write a C program to construct a pyramid of numbers.

Exercise: 6

a) Write a C program, for the arithmetic operators using switch case (which takes two integer operands and one operator from the user, performs the specified operation and then prints the result. (Consider the operators +,- ,*, /, % and use Switch Statement)

b) Write a program to find G.C.D (Greatest Common Divisor) of two numbers using recursion and non-recursion.

c) Write a program to find factorial of a number using recursion and non-recursion.

Exercise: 7

a) Write a C program to calculate distance between two points.

b) Write a program to find Roots of quadratic equation.

Exercise: 8

a) Write a C program to perform Matrix Addition

b) Write a C program to perform Matrix Multiplication

c) Write a C program to perform inverse of a Matrix.

d) Write a C program to find the transpose of a given matrix.

Exercise: 9

a) Write a C program for any numerical method.

b) Write a C program to make a simple calculator.

Exercise: 10

a) Write a C program to solve Towers of Hanoi problem by using recursive function.

b) Write a C program to know if the given string is a palindrome or non-palindrome.

c) Write a C program to find whether the given year is a leap year or not.

Exercise: 11

a) Write a C program to insert a sub-string in to the given main string.

b) Write a C program to demonstrate the parameter passing mechanism using: call-by-value, call-by-reference.

Exercise: 12

a) Implement the sorting algorithm: Insertion sort and Selection sort.

b) Write a C program to access elements of an array using pointers

c) Write a C program to find the sum of numbers with arrays and pointers.

Exercise: 13

a) Implementation of string using operations.

   i) Copy

   ii) Concatenate

   iii) Length

   iv) Compare

Exercise: 14

a) Write a C program to find the position of a substring.

b) Write a C program to represent complex numbers using structure.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AHS9902	0	0	3	1.5	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH LAB					SEE	70 M

COURSE OBJECTIVES:

1. Students will be exposed to a variety of self instructional, learner friendly modes of language learning
2. Students will cultivate the habit of reading passages from the computer monitor. Thus providing them with the required facility to face computer based competitive exams like GRE, TOEFL, and GMAT etc.
3. Students will learn better pronunciation through stress, intonation and rhythm
4. Students will be trained to use language effectively to face interviews, group discussions, public speaking
5. Students will be initiated into greater use of the computer in resume preparation, report writing, format making etc

COURSE OUTCOMES:

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

Unit I

1. Phonetics for listening comprehension of various accents
2. Reading comprehension
3. Describing objects/places/persons

Learning Outcomes: At the end of the module, the learners will be able to

- understand different accents spoken by native speakers of English
- employ suitable strategies for skimming and scanning on monitor to get the general idea of a text and locate specific information
- learn different professional registers and specific vocabulary to describe different persons, places and objects

Unit II

1. JAM
2. Small talks on general topics
3. Debates

Learning Outcomes: At the end of the module, the learners will be able to

- produce a structured talk extemporarily
- comprehend and produce short talks on general topics
- participate in debates and speak clearly on a specific topic using suitable discourse markers

Unit III

1. Situational dialogues – Greeting and Introduction

2. Summarizing and Note making
3. Vocabulary Building

Learning Outcomes: At the end of the module, the learners will be able to

- Learn different ways of greeting and introducing oneself/others
- summarize the content with clarity and precision and take notes while listening to a talk/lecture and make use of them to answer questions
- replenish vocabulary with one word substitutes, homonyms, homophones, homographs to reduce errors in speech and writing

Unit IV

1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

Learning Outcomes: At the end of the module, the learners will be able to

- Learn different ways of asking information and giving directions
- Able to transfer information effectively
- understand non-verbal features of communication

Unit V

1. Oral Presentations
2. Précis Writing and Paraphrasing
3. Reading Comprehension and spotting errors

Learning Outcomes: At the end of the module, the learners will be able to

- make formal oral presentations using effective strategies
- learn different techniques of précis writing and paraphrasing strategies
- comprehend while reading different texts and edit short texts by correcting common errors.

B.TECH - III SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester CE, ECE & ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9907	2	1	0	3	CIA	30 M
Course Title	:	COMPLEX VARIABLES AND TRANSFORMS					SEE	70 M

COURSE OBJECTIVES:-

- This course aims at providing the student to acquire the knowledge on the calculus of functions of complex variables. The student develops the idea of using continuous/discrete transforms.

Unit I: Complex Variable – Differentiation

Introduction to functions of complex variable – concept of Limit & continuity – Differentiation, Cauchy – Riemann equations, analytic functions (exponential, trigonometric, logarithm), harmonic functions, finding harmonic conjugate – construction of analytic function by Milne Thomson method – Conformal mappings- standard and special transformations (sin z, e^z, cos z, z^2) Mobius transformations (bilinear) and their properties.

Learning Outcomes: Students will be able to:

- Understand functions of Complex variable and its properties.
- Find derivatives of complex functions.
- Understand the analyticity of complex functions.
- Understand the conformal mappings of complex functions.

Unit II: Complex Variable – Integration

Line integral – Contour integration, Cauchy's integral theorem, Cauchy Integral formula, Liouville's theorem (without proof) and Maximum – Modulus theorem (without proof); power series expansions: Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals (around unit circle, semi circle with f(z) not having poles on real axis).

Learning Outcomes: Students will be able to

- Understand the integration of complex functions.
- Apply Cauchy's integral theorem and Cauchy's integral formula.
- Understand singularities of complex functions.
- Evaluate improper integrals of complex functions using Residue theorem.

Unit III: Laplace Transforms

Definition – Laplace transform of standard functions – existence of Laplace Transform – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function. Differentiation and integration of transform – solving Initial value problems to ordinary differential equations with constant coefficients using Laplace transforms.

Learning Outcomes: Students will be able to

- Understand the concept of Laplace transforms and find the Laplace transforms of elementary functions.
- Find the Laplace transforms of general functions using its properties.
- understand Laplace transforms of special functions(Unit step function, Unit Impulse & Periodic).
- Apply Laplace transforms to solve Differential Equations.

Unit IV: Fourier series

Determination of Fourier coefficients (Euler's) – Dirichlet conditions for the existence of Fourier series – functions having discontinuity-Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Half-range Fourier sine and cosine expansions – typical wave forms – Parseval's formula – Complex form of Fourier series.

Learning Outcomes: Students will be able to

- Understand finding Fourier series expression of the given function.
- Determine Fourier coefficients (Euler's) and identify existence of fourier series of the given function.
- Expand the given function in Fourier series given in Half range interval.
- Apply Fourier series to establish Identities among Euler coefficients.
- Find Fourier series of wave forms.

Unit V: Fourier transforms& Z Transforms:

Fourier integral theorem (without proof) – Fourier sine and cosine integrals – complex form of Fourier integral. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – convolution theorem.

Z – transform – Inverse z – transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z – transforms.

Learning Outcomes: Students will be able to

- Find Fourier Sine and cosine integrals.
- Understand Fourier transforms.
- Apply properties of Fourier transforms.
- Understand Z transforms.
- Apply properties of Z transforms.
- Apply Z transforms to solve difference equations.

TEXT BOOKS:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna publishers.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
3. Advanced Engineering Mathematics, by R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd. Pangboume England.

REFERENCE BOOKS:

1. Higher Engineering Mathematics, by B. V. Ramana, McGraw Hill publishers.
2. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

COURSE OUTCOMES:

After the completion of course, students will be able to

1. Understand the analyticity of complex functions and conformal mappings.
2. Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.
3. Understand the usage of Laplace Transforms, Fourier Transforms and Z transforms.
4. Evaluate the Fourier series expansion of periodic functions.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester CE, CSE & ME)
(For III Semester ECE weekly 02 hrs with 02 Credits only)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0503T	3	0	0	3	CIA	30 M
Course Title	:	DATA STRUCTURES					SEE	70 M

COURSE OBJECTIVES:-

- To teach the representation of solution to the problem using algorithm
- To explain the approach to algorithm analysis
- To introduce different data structures for solving the problems
- To demonstrate modeling of the given problem as a graph
- To elucidate the existing hashing techniques

Unit I: Introduction

Algorithm Specification, Performance analysis, Performance Measurement. Arrays: Arrays, Dynamically Allocated Arrays. Structures and Unions. Sorting: Motivation, Insertion sort, Quick sort, How fast can we sort, Merge sort, Heap sort.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Analyze the given algorithm to find the time and space complexities.(L4)
- Select appropriate sorting algorithm (L4)
- Design a sorting algorithm (L6)

Unit II: Stack, Queue and Linked lists

Stacks, Stacks using Dynamic Arrays, Queues, Circular Queues Using Dynamic Arrays, Evaluation of Expressions, Multiple Stacks and Queues. Linked lists: Singly Linked Lists and Chains, Representing Chains in C, Linked Stacks and Queues, Additional List Operations, Doubly Linked Lists.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Evaluate expressions (L5)
- Develop the applications using stacks and queues (L3)
- Construct the linked lists for various applications (L6)

Unit III: Trees

Introduction, Binary Trees, Binary Tree Traversals, Additional Binary Tree Operations, Binary Search Trees, Counting Binary Trees, Optimal Binary search Trees, AVL Trees. B-Trees: B-Trees, B + Trees.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain the concept of a tree (L2)
- Compare different tree structures (L4)
- Apply trees for indexing (L3)

Unit IV: Graphs and Hashing

The Graph Abstract Data Type, Elementary Graph Operations, Minimum Cost Spanning Trees, Shortest Paths and Transitive Closure.

Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Recognize the importance of Graphs in solving real world problems (L2)
- Apply various graph traversal methods to applications (L3)
- Design a minimum cost solution for a problem using spanning trees (L6)
- Select the appropriate hashing technique for a given application (L5)
- Design a hashing technique (L6)

Unit V: Files and Advanced sorting

File Organization: Sequential File Organization, Direct File Organization, Indexed Sequential File Organization.

Advanced sorting: Sorting on Several keys, List and Table sorts, Summary of Internal sorting, External sorting.

Learning Outcomes: Students will be able to

- Organize files (L3)
- Design the algorithms which sort the elements which doesn't fit in main memory (L6)

TEXT BOOKS:

1. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Data Structures in C", 2nd Edition, Galgotia Book Source, Pvt. Ltd., 2004.
2. ALAN L.THARP, "File Organization and Processing", Wiley and Sons, 1988.

REFERENCE BOOKS:

1. D. Samanta, "Classic Data Structures", 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012.
2. Peter Bras, "Advanced Data Structures", Cambridge University Press, 2016
3. Richard F.Gilberg, Behrouz A.Forouzan,"Data Structures A Pseudo code Approach with C", Second Edition, Cengage Learning 2005.

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Select Appropriate Data Structure for solving a real world problem. (L4)
2. Select appropriate file organization technique depending on the processing to be done. (L4)
3. Construct Indexes for Databases. (L6)
4. Analyse the Algorithms.(L4).
5. Develop Algorithm for Sorting large files of data.(L3).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0101T	2	1	0	3	CIA	30 M
Course Title	:	STRENGTH OF MATERIALS - I					SEE	70 M

COURSE OBJECTIVES:-

- To make the student understand how to resolve forces and moments in a given system
- To demonstrate the student to determine the centroid and second moment of area
- To impart procedure for drawing shear force and bending moment diagrams for beams.
- To make the student able to analyze flexural stresses in beams due to different loads.
- To enable the student to apply the concepts of strength of materials in engineering applications and design problems.

Unit I:

Introduction to Mechanics: Basic Concepts, system of Forces Coplanar Concurrent Forces – Components in Space Resultant – Moment of Forces and its Application – Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial systems – **Center of Gravity and moment of inertia**: Introduction – Centroids of rectangular, circular, I, L and T sections – Centroids of built up sections. **Area moment of Inertia**: Introduction – Definition of Moment of Inertia of rectangular, circular, I, L and T sections – Radius of gyration. Moments of Inertia of Composite sections.

Learning Outcomes: Students will be able to

- Explain the basic concepts of forces
- Draw Free body Diagrams for forces
- Determine the centroid and moment of inertia for different cross section areas

Unit II: Simple Stresses and Strains:

Types of stresses and strains – Hooke's law – Stress – strain diagram for mild steel – working stress – Factor of safety – lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of Varying section – Composite bars – Temperature stresses. Strain energy – Resilience – Gradual, Sudden, impact and shock loadings – simple applications.

Learning Outcomes: Students will be able to

- List out the concepts of stresses, strains, elastic moduli and strain energy.
- Evaluate relations between different moduli
- Explain different type's loadings

Unit III: Shear Force and Bending Moment:

Definition of beam – types of beams – Concept of Shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and over changing beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – point of contra flexure – Relation between S.F, B.M and rate of loading at section of a beam.

Learning Outcomes: Students will be able to

- Draw the shear force and bending moment diagrams for cantilevers, simply supported beams and Overhanging beams with different loads

- Explain the relationship between shear force and bending moments

Unit IV: Flexural Stresses

Theory of simple bending – Assumptions – Derivation of bending equation – Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hallow), I, T, Angle and Channel Sections – Design of simple beam sections.

Learning Outcomes: Students will be able to

- Derive bending equations
- Compute the flexural stresses for different cross sections.
- Design beam sections for flexure

Unit V: Shear Stresses

Derivation of formula-Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T and angle sections. Combined bending and shear.
Analysis of trusses by Method of Joints & Sections.

Learning Outcomes: Students will be able to

- Determine shear stresses for different shapes.
- Evaluate effect of combined bending and shear on sections

TEXT BOOKS:

1. S. Timoshenko, D.H. Young and J.V. Rao, "Engineering Mechanics", Tata McGraw-Hill Company, 2017
2. Sadhu Singh, "Strength of Materials", 11th edition 2015, Khanna Publishers.

REFERENCE BOOKS:

1. S. S. Bhavikatti, "Strength of materials", Vikas publishing house Pvt. Ltd., 4/e,2013
2. R. Subramanian, "Strength of Materials", Oxford University Press, 2016.
3. R. K. Bansal, "Strength of Materials", Lakshmi Publications House Pvt. Ltd., 2018.
4. R.S. Khurmi and N. Khurmi, A text book of "Strength of Materials" "(Mechanics of Solids)", S Chand and Company Limited, Ramnagar, New Delhi-110 055, 2018

COURSE OUTCOMES:

After the completion of course, students will be able to

1. Explain the different types of couples and force systems
2. Determine the centroid and moment of inertia for different cross-sections
3. List out the concepts of stress, strain, generalized Hooke's law, elastic moduli and strain energy.
4. Develop shear force and bending moment diagrams for different load cases.
5. Compute the flexural stresses and shear stresses for different loading cases and different cross-sections.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0102T	2	1	0	3	CIA	30 M
Course Title	:	FLUID MECHANICS					SEE	70 M

COURSE OBJECTIVES:-

To explain concepts of fluid mechanics used in Civil Engineering.

- To explain basics of statics, kinematics and dynamics of fluids and various measuring techniques of hydrostatic forces on objects.
- To impart ability to solve engineering problems in fluid mechanics
- To enable the students measure quantities of fluid flowing in pipes, tanks and channels
- To teach integral forms of fundamental laws of fluid mechanics to predict relevant pressures, velocities and forces.
- To strengthen the students with fundamentals useful in application-intensive courses dealing with hydraulics, hydraulic machinery and hydrology in future courses.

Unit I: Basic concepts and definitions

Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; vapor pressure, boiling point, surface tension, capillarity, Bulk modulus of elasticity, compressibility.

Learning Outcomes:

Students will be able to

- List out the basic characteristics of fluids
- Explain the Newton's Law of Viscosity

Unit II: Fluid statics

Fluid Pressure: Pressure at a point, Pascal's law, pressure variation with temperature, density and altitude. Piezometer, U – Tube Manometer, Single Column Manometer, U Tube Differential Manometer. pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

Learning Outcomes:

Students will be able to

- Explain the concepts of fluid statics.
- List out the different equipment and their applications.
- Demonstrate stability of floating bodies

Unit III: Fluid kinematics

Classification of fluid flow : steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two and three – dimensional continuity equations in Cartesian coordinates.

Learning Outcomes:

Students will be able to

- Explain the fundamentals of fluid kinematics
- List out the different types of fluid flows

- Derivation of Continuity equations of using Cartesian coordinates

Unit IV: Fluid Dynamics

Surface and body forces; Equations of motion – Euler's equation; Bernoulli's equation – derivation; Energy Principle; Practical applications of Bernoulli's equation : Venturimeter, orifice meter and Pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced; Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number;

Learning Outcomes:

Students will be able to

- Demonstrate applications of Bernoulli's equations
- Experiment with different equipments under fluid flow
- Apply principles of fluid dynamics along with governing equations.

Unit V: Shear Stresses

Analysis Of Pipe Flow: Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length – Pipes in Parallel and Series.

Learning Outcomes:

Students will be able to

- Estimate Energy losses in pipelines
- Determine flow characteristics through Pipes.

TEXT BOOKS:

1. P. M. Modi and S. M. Seth, "Hydraulics and Fluid Mechanics", Standard Book House, 2019
2. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, "Fluid Mechanics and Machinery", Oxford University Press, 2010.

REFERENCE BOOKS:

1. S. C. Gupta, "Fluid Mechanics and Hydraulic Machines", Pearson publication, 2006.
2. R. K. Bansal, A text of "Fluid Mechanics and Hydraulic Machines", Laxmi Publications (P) Ltd., New Delhi, 2015.
3. K. Subrahmanya, "Theory and Applications of Fluid Mechanics", Tata McGraw Hill,1993
4. N. Narayana Pillai, Principles of "Fluid Mechanics and Fluid Machines", Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.

COURSE OUTCOMES:

After the completion of course, students will be able to:

1. Explain the principles of fluid statics, kinematics and dynamics.
2. Familiarize basic terms used in fluid mechanics.
3. List out the flow characteristics and classify the flows.
4. Apply the continuity, momentum and energy principles.
5. Estimate various losses in flow through channels.

(III Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0103T	2	1	0	3	CIA	30 M
Course Title	:	SURVEYING					SEE	70 M

COURSE OBJECTIVES:-

- To make the student to get well conversant with the fundamentals of various basic methods and instruments of surveying.
- To introduce to the students in identifying reduced level of the ground and its profile for finding areas and volumes of embankments and cuttings.
- To make the student to use angular measuring instruments for horizontal and vertical control.
- To enable the student to set simple horizontal curves.
- To introduce the knowledge construction surveys and usage of modern instrument such as total station.

Unit I:

Introduction and Basic Concepts: Introduction, Objectives, classification and principles of surveying, Scales, Shrinkage of Map, Conventional symbols and Code of Signals, Surveying accessories, phases of surveying. Measurement of Distances and Directions, Linear distances – Approximate methods, Direct Methods – Chains – Tapes, ranging, Tape corrections, indirect methods – optical methods – E.D.M. method.

Prismatic Compass - Bearings, included angles, Local Attraction, Magnetic Declination, and dip.

Plane table surveying: Introduction, accessories, setting up of plane table, techniques, testing, adjustments, errors, advantages and disadvantages.

Learning Outcomes: Students will be able to

- To impart basic concepts of surveying.
- To introduce the usage and applications of linear and angular measurements through chain, tape, compass and plane table.

Unit II:

Levelling – Basics definitions, types of levels and levelling staves, temporary adjustments, methods of levelling, booking and Determination of levels – HI Method – Rise and Fall method, Effect of Curvature of Earth and Refraction.

Contouring – Characteristics and uses of Contours, Direct & Indirect methods of contour surveying, interpolation and sketching of Contours.

Computation of Areas and Volumes: Areas – Determination of areas consisting of irregular boundary and regular boundary, Planimeter. Volumes – Computation of areas for level section and two level sections with and without transverse slopes, determination of volume of earth work in cutting and embankments, volume of borrow pits, capacity of reservoirs.

Learning Outcomes: Students will be able to

- To impart basic principles in levelling and contouring.
- To calculate the areas of irregular boundaries and volumes of earth work quantities.

Unit III:

Theodolite Surveying: Types of Theodolites, Fundamental Lines, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical levelling when base is accessible and inaccessible.

Traversing: Methods of traversing, traverse computations and adjustments, Gale's traverse table, Omitted measurements.

Learning Outcomes: Students will be able to
- To impart basic principles in Trigonometric levelling.
- To inculcate the knowledge of traversing.

Unit IV:

Tacheometric Surveying: Principles of Tacheometry, stadia and tangential methods of Tacheometry.
Curves: Types of curves and their necessity, elements of simple circular curve, setting out of simple horizontal circular curves.

Learning Outcomes: Students will be able to
- To impart basic principles in Tacheometric surveying.
- To inculcate the knowledge of simple horizontal circular curve setting.

Unit V:

Construction surveys: Introduction – staking out buildings - pipelines and sewers – highways – culverts. Bridge surveys – determining the length of a bridge – locating centers of piers – surface surveys and tunnel alignment – underground surveys-connection of surface and underground surveys – levelling in tunnels.

Total station Surveying: Basic principles, applications, comparison with conventional surveying. Electromagnetic wave theory – electromagnetic distance measuring system – principle of working and EDM instruments.

Learning Outcomes: Students will be able to
- To induce the knowledge of construction surveying.
- To inculcate the knowledge of advanced surveying instrument such as total station.

TEXT BOOKS:

1. S.S Bhavikatti, "Surveying theory and Practice", 2nd edition, Dreamtech press, Wiley distributors, 2019.
2. C.Venkatramaiah, "Text book of surveying", 2nd edition, Universities press, 2018

REFERENCE BOOKS:

1. Arora K R "Surveying" Vol 1, 2 & 3, Standard Book House, Delhi, 2004.
2. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, "Surveying" (Vol – 1, 2 & 3), - Laxmi Publications (P) ltd., New Delhi, 2016.
3. S K Duggal, "Surveying" (Vol – 1 & 2), Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2004.
4. R. Subramanian, "Surveying and leveling" Oxford university press, New Delhi, 2007

COURSE OUTCOMES: After the completion of course, students will be able to:
1. Calculate angles, distances and levels
2. Identify data collection methods and prepare field notes
3. Explain the working principles of survey instruments
4. Estimate the volumes of earth work
5. Able to use modern survey instruments.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0104	2	1	0	3	CIA	30 M

Course Title	:	BUILDING MATERIALS AND CONSTRUCTION	SEE	70 M

COURSE OBJECTIVES:-

- To impart knowledge on basic building materials such as stone and clay products.
- To teach properties of binding materials such as gypsum, lime and cement.
- To disseminate knowledge on ferrous and non ferrous materials and its applications.
- To explain basic concepts of building components such as stair case and masonry.
- To describe the properties and applications of plumbing, electrical and sanitary fittings.
- To explain the methodology of surface finishes such as pointing, distempering and painting.

Unit I: Basic Building materials

Properties and characteristics of Basic building materials – Stone – characteristics of good building stone – types of stone masonry – bricks – characteristics of good quality bricks – manufacturing of bricks – types of bonds in brick work – Cavity wall & hollow block construction – tiles-types of tiles – sand –sources of sand – properties of sand – Wood and Timber.

Learning Outcomes: Students will be able to

- Explain the properties of stones,.
- List out the properties of Bricks.
- Differentiate the properties of Tiles and sand.
- Describe the properties of Wood and Timber

Unit II: Binding Materials

Properties and characteristics of Binding materials – **Gypsum:** properties of gypsum plaster, building products made of gypsum and their uses. **Lime:** Manufacture of lime, classifications of limes, properties of lime – putty – characteristics and usage **Cement:** Raw materials used, Process of Manufacturing, Chemical composition, Bouge`s Compounds – Types of cement, Tests on cement – Uses of cement.

Learning Outcomes: Students will be able to

- Explain the properties of Gypsum.
- Describe the properties of Lime.
- To conduct test on Cement.

Unit III: Ferrous & Non – Ferrous Materials

Steel – characteristics of reinforcing steel – Hardness, Tensile, Compression, Impact, wear, and corrosion testing, Micro hardness and indentation fracture toughness, Creep and stress rupture tests, fatigue testing – steel fibers and its applications – **Plastics**: classification, advantages of plastics, Mechanical properties and use of plastic in construction – polypropylene fibers and its applications – **Glass**: Ingredients, properties, types and use in construction – Glass fibers and its applications

Learning Outcomes: Students will be able to

- To conduct various tests for determining the characteristics of steel
- Explain the properties of Plastics as building material
- Describe the properties of glass as building material.

Unit IV: Basics of Building Components

Components of building, area considerations, Construction Principle and Methods for layout, Damp proofing, anti termite treatment in buildings, Vertical circulation means: stair cases and their types. Different types of floors, and flooring materials.

Learning Outcomes: Students will be able to

- Explain the construction procedure of staircase.
- Describe the construction procedure of various types of floorings

Unit V: Internal and External Fittings of a Building

Doors and Windows: Construction details, types of doors and windows and their relative advantages & disadvantages. Types of roof – Lintels and Chajjas, Water Supply and Sanitary fittings (Plumbing), Electric Fittings, Mechanical Lifts and Escalators, Fire Fighting and Fire Protection of Buildings. Plastering and its types, pointing, Distempering, Colour washing, Painting.

Learning Outcomes: Students will be able to

- List out the components of doors and windows
- To gain knowledge on plumbing and electrical fittings in building construction
- Explain the procedures for surface finishes such as Plastering, Pointing and Painting

TEXT BOOKS:

1. S K Duggal, "Building Materials" New Age International, 2017.
2. BC Punmia, "Building Construction" Laxmi Publication, 2005

REFERENCE BOOKS:

1. PC Varghese, "Building Materials" PHI, 2015.
2. Mehta, "Building Construction Principles, Materials & Systems" 2/e, Pearson Education Noida, 2013.
3. Sandeep Mantri, "Practical building Construction and its Management" Satya Publisher, New Delhi, 2017.
4. Adams, "Adams' Building Construction Adams" CRC Press Taylor & Francis Group, 2011.

COURSE OUTCOMES: After the completion of course, students will be able to:

1. List out the characteristics of various building materials such as stone and clay product.
2. To evaluate the properties of the binding materials for their suitability in building construction.
3. To apply the ferrous and non-ferrous materials in building construction.
4. Explain the construction procedure of various building components such as stair cases, masonry and flooring.
5. Describe the installation of electrical, sanitary and plumbing fittings in buildings.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester CE & ME and IV Semester CSE & ECE)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19AMC9903	3	0	0	0	CIA	30 M
Course Title	:	BIOLOGY FOR ENGINEERS					SEE	--

COURSE OBJECTIVES:-

- To provide basic understanding about life and life Process. Animal an plant systems. To understand what bimolecules, are, their structures are functions. Application of certain bimolecules in Industry.
- Brief introduction about human physiology and bioengineering.
- To understand hereditary units, i.e. DNA (genes) and RNA and their synthesis in living organism.
- How biology Principles can be applied in our daily life using different technologies.
- Brief introduction to the production of transgenic microbes, Plants and animals.

Unit I: Introduction to Basic Biology

Cell as Basic unit of life, cell theory, Cell shapes, Cell structure, Cell cycle. Chromosomes. Prokaryotic and eukaryotic Cell. Plant Cell, Animal Cell, Plant tissues and Animal tissues, Brief introduction to five kingdoms of classification.

Learning Outcomes: After completing this unit, the student will be able to

- Summarize the basis of life. (L1)
- Understand the difference between lower organisms (prokaryotes) from higher organisms (eukaryotes). (L2)
- Understand how organisms are classified. (L3)

Unit II: Introduction to Biomolecules

Carbohydrates, lipids, proteins, Vitamins and minerals, Nucleic acids (DNA and RNA) and their types. Enzymes, Enzyme application in Industry. Large scale production of enzymes by Fermentation.

Learning Outcomes: After completing this unit, the student will be able to

- Understand what are biomolecules? Their role in living cells, their structure, function and how they are produced. (L1)
- Interpret the relationship between the structure and function of nucleic acids. (L2)
- Summarize the applications of enzymes in industry. (L3)
- Understand what is fermentation and its applications of fermentation in industry. (L4)

Unit III: Human Physiology

Nutrition: Nutrients or food substances. Digestive system, Respiratory system, (aerobic and anaerobic Respiration). Respiratory organs, respiratory cycle. Excretory system.

Learning Outcomes: After completing this unit, the student will be able to

- Understand what nutrients are (L1)
- Understand the mechanism and process of important human functions (L2 & L3)

Unit IV: Introduction to Molecular Biology and recombinant DNA Technology

Prokaryotic gene and Eukaryotic gene structure. DNA replication, Transcription and Translation. rDNA technology. Introduction to gene cloning.

Learning Outcomes: After completing this unit, the student will be able to

- Understand and explain about gene structure and replication in prokaryotes and Eukaryotes (L1)
- How genetic material is replicated and also understands how RNA and proteins are synthesized. (L2)
- Understand about recombinant DNA technology and its application in different fields.(L3)
- Explain what is cloning. (L4)

Unit V: Application of Biology

Brief introduction to industrial Production of Enzymes, Pharmaceutical and therapeutic Proteins, Vaccines and antibodies. Basics of biosensors, biochips, Bio fuels, and Bio Engineering. Basics of Production of Transgenic plants and animals.

Learning Outcomes: After completing this unit, the student will be able to Understand.

- How biology is applied for production of useful products for mankind.(L1)
- What are biosensors, biochips etc. (L2)
- Understand transgenic plants and animals and their production (L3)

TEXT BOOKS:

1. P. K. Gupta, Cell and Molecular Biology, 5^{th} Edition, Rastogi Publications –
2. U. Satyanarayana. Biotechnology, Books & Allied Ltd 2017

REFERENCE BOOKS:

1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, “Biology: A Global Approach”, Pearson Education Ltd, 2018.
2. T Johnson, Biology for Engineers, CRC press, 2011
3. J.M. Walker and E.B. Gingold, Molecular Biology and Biotechnology 2^{nd} ed.. Panima Publications. PP 434.
4. David Hames, Instant Notes in Biochemistry –2016
5. Phil Tunner, A. Mctennan, A. Bates & M. White, Instant Notes – Molecular Biology – 2014

COURSE OUTCOMES: After successful completion of the course, the students will be able to:

1. Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
2. Explain about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry.
3. Briefly about human physiology.
4. Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
5. Know about application of biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester CE, CSE & ME)

(For III Semester ECE weekly 02 hrs with 01 Credits only)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0503P	0	0	3	1.5	CIA	30 M
Course Title	:	DATA STRUCTURES LAB					SEE	70 M

COURSE OBJECTIVES:-

- To introduce to the different data structures
- To elucidate how the data structure selection influences the algorithm complexity
- To explain the different operations that can be performed on different data structures
- To introduce the different search and sorting algorithms.

LIST OF EXPERIMENTS:

1. String operations using array of pointers
2. Searching Algorithms (With the Number of Key Comparisons) Sequential, Binary and Fibonacci Search Algorithms.
3. Sorting Algorithms: Insertion Sort, Selection Sort, Shell Sort, Bubble Sort, Quick Sort, Heap Sort, Merge Sort, and Radix Sort. Using the system clock, compute the time taken for sorting of elements. The time for other operations like I/O etc should not be considered while computing time.
4. Implementation of Singly Linked List, Doubly Linked List, Circular Linked List
5. Stack implementation using arrays
6. Stack implementation using linked lists
7. Queue implementation using arrays. Implement different forms of queue. While implementing you should be able to store elements equal to the size of the queue. No positions should be left blank.
8. Queue implementation using linked lists
9. Creation of binary search tree, performing operations insertion, deletion, and traversal.
10. Breadth first search
11. Depth first search
12. Travelling sales man problem
13. File operations
14. Indexing of a file

OPTIONAL:

1. Reversing the links (not just displaying) of a linked list.
2. Consider a linked list consisting of name of a person and gender as a node. Arrange the linked list using ‘Ladies first’ principle. You may create new linked lists if necessary.
3. An expression can be represented in three ways: infix, prefix and postfix. All the forms are necessary in different contexts. Write modules to convert from one form to another form.
4. A table can be defined as a collection of rows and columns. Each row and column may have a label. Different values are stored in the cells of the table. The values can be of different data types. Numerical operations like summation, average etc can be performed on rows/columns which contain numerical data. Such operations are to be prevented on data which is not numeric. User may like to insert row/columns in the already existing table. User may like to remove row/column. Create table data type and support different operations on it.

COURSE OUTCOMES: After successful completion of this Lab, the students will be able to:

1. Select the data structure appropriate for solving the problem (L5)
2. Implement searching and sorting algorithms (L3)
3. Design new data types (L6)
4. Illustrate the working of stack and queue (L4)
5. Organize the data in the form of files (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0101P	0	0	3	1.5	CIA	30 M
Course Title	:	STRENGTH OF MATERIALS LAB					SEE	70 M

COURSE OBJECTIVES:-

- By performing this laboratory, the student will be able to know the structural behavior of various materials.

LIST OF EXPERIMENTS:

1. Tension test.
2. Bending test on (Steel/Wood) Cantilever beam.
3. Bending test on simply supported beam.
4. Torsion test.
5. Hardness test.
6. Compression test on Open coiled springs
7. Compression test on Closely coiled springs
8. Compression test on wood/ concrete
9. Izod / Charpy Impact test on metals
10. Shear test on metals
11. Use of electrical resistance strain gauges.
12. Continuous beam – deflection test.

COURSE OUTCOMES:

By performing the various tests in this laboratory the student will be able to know the structural behavior various structural elements when subjected to external loads

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0102P	0	0	3	1.5	CIA	30 M
Course Title	:	FLUID MECHANICS LAB					SEE	70 M

COURSE OBJECTIVES:-

By performing this laboratory, the student will be able to know the fluid flow measurements by considering different types flow measurement devices.

LIST OF EXPERIMENTS:

1. Verification of Bernoulli's equation.
2. Calibration of Venturimeter.
3. Calibration of Orifice meter
4. Determination of Coefficient of discharge for a small orifice by constant head method.
5. Determination of Coefficient of discharge for a small orifice by variable head method.
6. Determination of Coefficient of discharge for an external mouth piece by Constant head method.
7. Determination of Coefficient of discharge for an external mouth piece by variable head method.
8. Calibration of contracted Rectangular Notch.
9. Calibration of contracted Triangular Notch.
10. Determination of friction factor
11. Determination of loss of head in a sudden contraction.
12. Determination of loss of head in a sudden Expansion.

COURSE OUTCOMES:

By performing the various tests in this laboratory the student will be able to know the principles of discharge measuring devices and head loss due to sudden contraction and expansion in pipes.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(III Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0103P	0	0	3	1.5	CIA	30 M
Course Title	:	SURVEYING LAB					SEE	70 M

COURSE OBJECTIVES:-

- By performing this laboratory, the student will be able to know the usage of various surveying equipments and their practical applicability.

LIST OF EXPERIMENTS:

1. Setting up of Right angles using cross staff
2. Plane table survey; finding the area of a given boundary
3. Two Point Problem by the plane table survey.
4. Fly levelling: Height of the instrument method and rise and fall method.
5. Fly levelling; Longitudinal Section and Cross sections of a given road profile.
6. Theodolite Survey: Determining the Horizontal and Vertical Angles
7. Finding the distance between two inaccessible points using Theodolite
8. Tachometric survey: Heights and distance problems using tachometric principles.
9. One Exercise on Curve setting.
10. Total Station Determination of area using total station. Traversing and Contouring
11. Total Station: Determination of Remote height.
12. Developing a Contour map

COURSE OUTCOMES:

By performing the various tests in this laboratory the student will be able to know the principles of surveying in chain surveying, compass surveying, plane table surveying, levelling, theodolite surveying and total station

B.TECH - IV SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to IV Semester CE & ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9908	3	0	0	3	CIA	30 M
Course Title	:	NUMERICAL METHODS AND PROBABILITY THEORY					SEE	70 M

COURSE OBJECTIVES:-

This course aims at providing the student with the knowledge on

1. Various numerical methods for solving equations, interpolating the polynomials, evaluation of integral equations and solution of differential equations.
2. The theory of Probability and random variables.

Unit I: Solution of Algebraic & Transcendental Equations

Introduction – Bisection method – Iterative method – Regulafalsi method – Newton Raphson method System of Algebraic equations: Gauss Jordan method – Gauss Siedal method.

Learning Outcomes: After successful completion of this unit, the students will be able to:

1. Calculate the roots of equation using Bisection method and Iterative method.
2. Calculate the roots of equation using Regulafalsi method and Newton Raphson method.
3. Solve the system of algebraic equations using Gauss Jordan method and Gauss Siedal method.

Unit II: Interpolation

Finite differences – Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula.

Learning Outcomes: After successful completion of this unit, the students will be able to:

1. Understand the concept of interpolation.
2. Derive interpolating polynomial using Newton's forward and backward formulae.
3. Derive interpolating polynomial using Lagrange's formulae.
4. Derive interpolating polynomial using Gauss forward and backward formulae.

Unit III: Numerical Integration& Solution of Initial value problems to Ordinary differential equations

Numerical Integration: Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule

Numerical solution of Ordinary Differential equations: Solution by Taylor's series – Picard's Method of successive Approximations-Modified Euler's Method – Runge – Kutta Methods.

Learning Outcomes: After successful completion of this unit, the students will be able to:

1. Solve integral equations using Simpson's 1/3 and Simpson's 3/8 rule.
2. Solve integral equations using Trapezoidal rule.
3. Solve initial value problems to ordinary differential equations using Taylor's method.
4. Solve initial value problems to ordinary differential equations using Euler's method and Runge Kutta methods.

Unit IV: Probability theory

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

Learning Outcomes: After successful completion of this unit, the students will be able to:

1. Understand the concept of Probability.
2. Solve problems on probability using addition law and multiplication law.

3. Understand Random variables and probability mass and density functions.
4. Understand statistical constants of random variables.

Unit V: Random variables & Distributions

Probability distribution – Binomial, Poisson approximation to the binomial distribution and normal distribution – their properties.

Learning Outcomes: After successful completion of this unit, the students will be able to:

1. Understand Probability distribution function.
2. Solve problems on Binomial distribution.
3. Solve problems on Poisson distribution.
4. Solve problems on Normal distribution.

TEXT BOOKS:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna publishers.
2. Probability and Statistics for Engineers and Scientists, Ronald E. Walpole, PNIE.
3. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

REFERENCE BOOKS:

1. Higher Engineering Mathematics, by B. V. Ramana, McGraw Hill publishers.
2. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

COURSE OUTCOMES:

After the completion of course, students will be able to

1. Apply numerical methods to solve algebraic and transcendental equations
2. Derive interpolating polynomials using interpolation formulae
3. Solve differential and integral equations numerically
4. Apply Probability theory to find the chances of happening of events.
5. Understand various probability distributions and calculate their statistical constants.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester ME & IV Semester CE and ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0505T	3	0	0	3	CIA	30 M
Course Title	:	PYTHON PROGRAMMING FOR ENGINEERS					SEE	70 M

COURSE OBJECTIVES:-

- To teach the fundamentals of Python
- To elucidate problem – solving using a Python programming language
- To introduce a function – oriented programming paradigm through python
- To develop the skill of designing Graphical user Interfaces in Python
- To learn how to use lists, tuples, and dictionaries in Python programs.

Unit I:

Introduction: What is a program, running python, Arithmetic operators, Value and Types?

Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments.

Functions: Function calls, Math functions, Composition, Adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Learning Outcomes: After successful completion of this unit, the students will be able to

- List the basic constructs of Python (L1)
- Solve the problems by applying modularity principle (L3)

Unit II:

Conditionals and Recursion: Floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input.

Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, more recursion, Leap of Faith, Checking types

Iteration: Reassignment, Updating variables, the while statement, Break, Square roots, Algorithms.

Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, the in operator, String comparison.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Apply the conditional execution of the program (L3)
- Apply the principle of recursion to solve the problems (L3)

Unit III:

Case Study: Reading word lists, Search, Looping with indices.

Lists: List is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Map filter and reduce, Deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.

Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables.

Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable – length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Use the data structures Lists, Dictionaries, and Tuples (L3)
- Design programs for manipulating strings (L6)

Unit IV:

Files: Persistence, Reading and writing, Format operator, Filename and paths, Catching exceptions, Databases, Pickling, Pipes, Writing modules.

Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying.

Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning

Classes and Methods: Object oriented features, Printing objects, The init method, The __str__method, Operator overloading, Type – based Dispatch, Polymorphism, Interface and Implementation

Inheritance: Card objects, Class attributes, Comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Apply object orientation concepts (L3)
- Organize data in the form of files (L6)

Unit V: Overview of Packages for Scientific and Data Processing

Introduction to Machine Learning – History and Evolution, Artificial intelligence Evolution, Different Forms, Machine learning categories, Machine learning Python packages, Data Analysis packages, Machine learning core libraries.

Learning Outcomes: Students will be able to

- Understand Machine learning fundamentals (L2)
- Apply python packages for solving machine learning and data analysis problems (L3)

TEXT BOOKS:

1. Allen B. Downey, "Think Python", 2^{nd} edition, SPD/O'Reilly, 2016.
2. Manohar Swamynathan, "Mastering Machine learning with Python in Six steps", Apress.

REFERENCE BOOKS:

1. Martin C. Brown, "The Complete Reference: Python", McGraw-Hill, 2018.
2. Kenneth A. Lambert, B.L. Juneja, "Fundamentals of Python", CENGAGE, 2015.
3. R. Nageswara Rao, "Core Python Programming", 2^{nd} edition, Dreamtech Press, 2019

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Explain the features of Python language (L2)
2. Select appropriate data structure of Python for solving a problem (L4)
3. Design object oriented programs for solving real-world problems (L6)
4. Use Python packages (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0105	2	1	0	3	CIA	30 M
Course Title	:	STRENGTH OF MATERIALS – II					SEE	70 M

COURSE OBJECTIVES:-

- To teach the student with basic concepts for determination of principal stresses and strains in various structural elements.
- To demonstrate analytical methods for determining strength & stiffness and assess stability of structural members.
- To make the student analyze circular shafts subjected to torsion
- To make the student determine critical loads for columns with different end conditions.

Unit I: Compound Stresses and Strains

Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr circle of stress, and its applications. Two dimensional stress – strain system, principal strains and principal axis of strain, circle of strain.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Identify critical planes in two dimensional stress systems
- Estimate principals stresses
- Assess safety of structural elements under principal stresses

Unit II: Deflection of Beams

Uniform bending – slope, deflection and radius of curvature – Differential equation for elastic line of a beam – Double integration and Macaulay's methods. Determination of slope and deflection for cantilever and simply supported beams under point loads, U.D.L. uniformly varying load – Mohr's theorems – Moment area method – application to simply supported and overhanging beams – analysis of propped cantilever beams under UDL and point loads.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain types of loads acting on beams
- Compute slopes and deflections of beams with different boundary conditions
- Evaluate effect of different loads on propped cantilever beams

Unit III: Torsion

Theory of pure torsion – Assumptions and Derivation of Torsion formula for circular shaft – Torsional moment of resistance – Polar section modulus – power transmission through shafts – Combined bending and torsion –. Springs – Types of springs – deflection of close coiled helical springs under axial pull and axial couple – Carriage or leaf springs.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Analyze members subjected to torsion, combined torsion and bending moment
- Calculate power transmission through shafts
- Estimate energy absorption in springs.

Unit IV: Direct and Bending stresses

Introduction – eccentric loading – columns with eccentric loading – symmetrical columns with eccentric loading about one axis – about two axes – Unsymmetrical columns with eccentric loading – limit of eccentricity.

Theories of failure:

Maximum Principal stress theory – Maximum shear stress theory – Maximum strain theory – Maximum strain energy theory – Maximum distortion energy theory.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain the effect of eccentricity effect in columns
- List out the various theories of failures.

Unit V: Columns and Struts

Introduction – classification of columns – Axially loaded compression members – Euler's crippling load theory – derivation of Euler's critical load formulae for various end conditions – Equivalent length – Slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – eccentric loading and Secant formula – Prof. Perry's formula.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Classify columns
- Explain Euler's theory on columns and assess crippling loads
- Analyze compression members using different theories
- Assess load carrying capacity using different formulae

TEXT BOOKS:

1. R. S. Khurmi and N. Khurmi, "Strength of Materials (Mechanics of Solids)", S Chand And Company Limited, Ramnagar, New Delhi-110 055, 2019.
2. R. K. Bansal, "Strength of Materials", Laxmi Publications (P) Ltd., New Delhi, 2018.

REFERENCE BOOKS:

1. B. C. Punmia Strength of Materials, Laxmi publications, 2017.
2. D. S. Prakasa Rao Strength of Materials, Universities Press Pvt Ltd, Hyderabad.
3. Schaum's outline series - Strength of Materials, Mc Graw Hill International Editions, 6th edition, 2013.
4. L.S. Srinath, Strength of Materials, Macmillan India Ltd., New Delhi, 2001.

COURSE OUTCOMES:

After successful completion of this course, the students will be able to

1. Explain principal stresses and principal planes.
2. Determine deflection at any point on a beam under simple and combined loads
3. Analyze members under torsion, deformation in springs,
4. Know the effect of eccentricity of load in columns; apply failure criteria to implement in design of structural members.
5. Know the crippling load for the columns.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0106T	2	1	0	3	CIA	30 M
Course Title	:	HYDRAULICS AND HYDRAULIC MACHINERY					SEE	70 M

COURSE OBJECTIVES:-

- To Introduce concepts of laminar and turbulent flows
- To teach principles of uniform and non – uniform flows through open channel.
- To impart knowledge on design of turbines.
- To impart knowledge on design of pumps.

Unit I: Laminar & Turbulent flow in pipes

Laminar Flow – Laminar flow through: circular pipes, annulus and parallel plates. Stoke's law, Measurement of viscosity. Reynolds experiment, Transition from laminar to turbulent flow. Resistance to flow of fluid in smooth and rough pipes – Moody's diagram – Introduction to boundary layer theory.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain Laminar Flow through plates
- Describe Turbulent flow and transition
- Apply energy and momentum principles to fluid flow situations
- Solve problems for forces in static and moving fluids

Unit II: Uniform flow in Open Channels

Open Channel Flow-Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, Velocity Distribution of channel section. Uniform Flow - Continuity Equation, Energy Equation and Momentum Equation, Characteristics of uniform flow, Chezy's formula, Manning's formula. Computation of Uniform flow.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Differentiate open and closed channel flows
- Explain different formulae on open channel flow
- Design open - channel flow systems.

Unit III: Non-Uniform flow in Open Channels

Specific energy, critical flow, discharge curve, Specific force, Specific depth, and Critical depth. Measurement of Discharge and Velocity – Broad Crested Weir. Gradually Varied Flow – Dynamic Equation of Gradually Varied Flow. Hydraulic Jump and classification – Elements and characteristics - Energy dissipation.

Learning Outcomes: After successful completion of this unit, the students will be able to

- List out the concepts of varying flow in pipes
- Measure discharge and velocity
- Explain gradually varied flow
- Solve introductory problems of forces and dynamics

Unit IV:

Impact of Jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes - velocity triangles at inlet and outlet - Work done and efficiency.

Hydraulic Turbines: Classification of turbines; pelton wheel and its design. Francis turbine and its design - efficiency - Draft tube: theory - characteristic curves of hydraulic turbines. Cavitation: causes and effects.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain hydrodynamic force of jets different vanes
- Calculate efficiency of jets
- Differentiate and design Pelton wheel, Francis and Kaplan turbine

Unit V: Pumps

Working principles of a centrifugal pump, work done by impeller; heads, losses and efficiencies; minimum starting speed; Priming; specific speed; limitation of suction lift, net positive suction head (NPSH); Performance and characteristic curves; Cavitation effects; Multistage centrifugal pumps; troubles and remedies – Introduction to Reciprocating Pump.

Learning Outcomes: After successful completion of this unit, the students will be able to

- List out the principles of centrifugal pumps
- Calculate losses and efficiencies of centrifugal pumps
- Design centrifugal pumps including multi stage pumps.

TEXT BOOKS:

1. P. M. Modi and S. M. Seth, “Hydraulics and Fluid Mechanics”, Standard Book House, 22nd edition, 2019.
2. R. K. Bansal, A text of “Fluid Mechanics and Hydraulic Machines”, Laxmi Publications (P) Ltd., New Delhi, 2015.

REFERENCE BOOKS:

1. Rajput, “Fluid Mechanics and Fluid Machines”, S. Chand & Co, 2016.
2. D. S. Kumar, “Fluid Mechanics & Fluid Power Engineering”, Kataria & Sons, 9th edition, 2018.
3. K. Subramanya, Open channel Flow, Tata McGraw Hill, 2009.
4. S. C. Gupta, “Fluid Mechanics and Hydraulic Machines”, Pearson publications, 1st edition, 2006.

COURSE OUTCOMES:

After successful completion of this course, the students will be able to

1. Explain the characteristics of laminar and turbulent flows.
2. Analyze characteristics for uniform and non-uniform flows in open channels.
3. Design different types of turbines
4. Design centrifugal and multi stage pumps.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0107	2	1	0	3	CIA	30 M
Course Title	:	STRUCTURAL ANALYSIS-I					SEE	70 M

COURSE OBJECTIVES:-

- To impart knowledge on energy theorems.
- To enable the student analyze indeterminate trusses
- To make the student to understand the analysis procedures for analyzing fixed and
- Continuous beams.
- To enable the student to undergo analysis procedure using slope deflection method.
- To illustrate analysis procedure using moment distribution method.
- To demonstrate various methods of analysis of structural members such as indeterminate beams, frames, etc. which enables the student to solve for forces in various complex structural systems.

Unit I:

Introduction: Determinate and In-determinate Structures – Determination of static and kinematic indeterminacies.

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear force – Castigliano's first theorem – Deflections of simple beams and pin jointed trusses.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain Energy concepts
- Develop expression for strain energy
- Calculate deflections in simple beams and pin jointed trusses
- Analyze simple structural elements using energy principles.

Unit II: Analysis of Indeterminate Structures Solution of trusses up to two degrees of internal and external indeterminacy – Castigliano's second theorem.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Differentiate determinate and indeterminate structures
- Explain static and kinematic indeterminacies
- Solve truss problems

Unit III: Fixed Beams & Continuous Beams

Introduction to statically indeterminate beams – theorem of three moments-uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams – effect of sinking of support, effect of rotation of a support.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Categorize fixed and continuous beams and their performance
- Explain different loads on beams with different boundary conditions.
- Analyze the beams subjected to loads
- Study effect of sinking of supports of performance

Unit IV: Slope – Deflection Method

Introduction – derivation of slope deflection equation – application to continuous beams with and without settlement of supports – Analysis of single bay, single storey, portal frame including side sway.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Develop slope deflection expressions
- Analyze structures with and without support sinking
- Analyze 2D frames using slope-deflection method.

Unit V: Moment Distribution Method

Introduction to moment distribution method – application to continuous beams with and without settlement of supports. Analysis of single storey portal frames – including Sway.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Develop moment distribution expressions
- Analyze structures with and without support sinking
- Analyze single storey portal frames

TEXT BOOKS:

1. S. S. Bhavikatti, "Structural Analysis", Volume 1 and 2, Vikas Publishing House, Pvt. Ltd., 4th edition, 2013.
2. S. Ramamurtham, "Theory of Structures", Dhanpat Rai Publishing Company (p) Ltd, 2009

REFERENCE BOOKS:

1. Timoshenko & Young, "Theory of Structures", Tata McGraw Hill, 1945
2. S. B. Junarkar, "Structural Mechanics" Vol I & II, Charotar Publishers. 32 edition, 2016.
3. C. K. Wang, "Intermediate Structural Analysis", McGraw Hill, 2014.
4. C. S. Reddy, "Basic Structural Analysis", Tata McGraw Hill, 1994.

COURSE OUTCOMES:

After successful completion of this course, the students will be able to

1. Apply energy theorems for analysis of indeterminate structures
2. Analyze indeterminate structures with yielding of supports
3. Analyze beams using slope deflection and moment distribution methods
4. Analyze portal frames using slope deflection and moment distribution methods

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0108	3	0	0	3	CIA	30 M
Course Title	:	CONCRETE TECHNOLOGY					SEE	70 M

COURSE OBJECTIVES:-

- To explain the functional role of ingredients of concrete and apply this knowledge to mix design philosophy
- To develop fundamental knowledge in the fresh and hardened properties of concrete
- To inculcate the testing methodology to evaluate the properties of concrete during fresh and hardened stage
- To impart the knowledge on the behavior of concrete with response to stresses developed.
- To impart the knowledge on the special concretes And design a concrete mix which fulfils the required properties for fresh and hardened concrete

Unit I: Ingredients of concrete

Cement – Chemical composition – hydration process – Bogue's compound – Tests on properties of cement – Types of cement – IS Specifications. Aggregates- classification of aggregate – tests on properties of aggregates – characteristics of aggregate – I.S. Specifications. Water – quality of water – characteristics of water – IS Specifications. Admixtures – classification of chemical admixtures – properties and limitations – Classification of mineral admixtures – properties and limitations – IS Specifications.

Learning Outcomes: After successful completion of this unit, the students will be able to

- List out different ingredients of concrete
- Conduct tests on materials
- Explain characteristics of water
- Describe conformity to IS Codes

Unit II: Concrete Mix Design

Proportioning of Concrete Mixes – factors influencing – IS Code Methods – IS 456 provisions on Durability – Quality Control and Statistical Methods – Mix Design of High Strength concrete (using IS and ACI method).

Learning Outcomes: After successful completion of this unit, the students will be able to

- Study properties of concrete mixes
- Design concrete mixes using different methods
- Estimate quantities for target strength of concretes

Unit III: Properties of concrete

Fresh concrete: Mixing of concrete – workability – factors influencing workability – measurement of workability for conventional concrete (Slump Cone, Compaction Factor and Vee – Bee test) & SCC (V-Funnel, L – Box, U – Box, Slump Flow and J – Ring). **Hardened concrete**: Water/Cement Ratio(Abram's Law) – Gel Space Ratio - tests on hardened concrete – Destructive Tests (Compression, Split Tensile and Flexural) – Semi Destructive Tests (Core Cutter and Pull out test) and Non Destructive Tests (Rebound Hammer – UPV – Radiological methods) .

Learning Outcomes: After successful completion of this unit, the students will be able to

- List various properties of fresh concrete
- Conduct experiments for determination of fresh concrete properties

- List various properties of hardened concrete
- Conduct experiments for determination of hardened concrete properties
- Carryout Non Destructive tests on Concrete

Unit IV: Elasticity, Shrinkage and Creep

Curing of concrete – methods of curing – effects of improper curing – self curing – Modulus of Elasticity – Poisson's Ratio – Dynamic Modulus of Elasticity – Shrinkage and various types – Factors Affecting Shrinkage – Moisture Movement – Creep of Concrete – Factors Influencing Creep.
Durability – Permeability – Corrosion studies.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain curing methods and its importance
- Differentiate phenomenon of shrinkage and creep of concrete.
- Evaluate factors influencing creep and concrete

Unit V: Special Concretes

Light Weight Concrete – Cellular Concrete – No Fines Concrete – High Density Concrete – Fiber Reinforced Concrete – Polymer Concrete – Self Compacting Concrete.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Label different types of special concretes with the objectives
- Explain properties of special concretes.

TEXT BOOKS:

1. A. M. Neville, "Properties of Concrete", Pearson Publication – 5th Edition, 2012.
2. M. S. Shetty, A. K. Jain, "Concrete Technology Theory and Practice", S. Chand and Company Limited, New Delhi, 8th edition, 2019.

REFERENCE BOOKS:

1. M. L. Gambhir, "Concrete Technology", Tata Mc. Graw Hill Publishers, New Delhi, 2008.
2. N. Krishna Raju, "Design of Concrete Mixes", CBS Publishers, 4th edition, 2002.
3. P. K. Mehta And J. M. Monteiro, "Concrete: Micro Structure, Properties and Materials" Mc-Graw Hill Publishers, 2005.
4. J. Prasad, C.G.K. Nair, "Non-Destructive Test and Evaluation of Materials", Tata Mcgraw Hill Publishers, New Delhi, 2008.

COURSE OUTCOMES:

After successful completion of this course, the students will be able to

1. Explain various ingredients of concrete and their role.
2. Examine knowledge on the fresh and hardened properties of concrete.
3. Design concrete mixes using various methods.
4. Perceive special concretes for accomplishing performance levels.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0109T	3	0	0	3	CIA	30 M
Course Title	:	TRANSPORTATION ENGINEERING					SEE	70 M

COURSE OBJECTIVES:-

- To impart knowledge on highway development.
- To teach concepts of Geometric design and alignment.
- To throw light on different traffic surveys.
- To teach design of highway intersections
- To impart knowledge on highway materials and design of pavements.

Unit I: Highway development and planning

Highway development in India – Necessity for Highway Planning- Road Development Plans – Classification of Roads – Road Network Patterns – Highway Alignment and Influencing Factors – Engineering Surveys.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain the importance of highway development
- Classify highways based on hierarchy.

Unit II: Highway Geometric Design

Geometric Design – Design Criteria – Cross Section Elements – Sight Distances – Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance – Design of Horizontal Alignment – Design of Super elevation and Extra widening – Design of Transition Curves – Design of Vertical alignment – Gradients – Vertical curves.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain different aspects governing highway geometric design.
- Design vertical and horizontal alignment of highways.

Unit III: Traffic Engineering and Regulation

Basic Parameters – Traffic Volume Studies – Data Collection and Presentation – Speed Studies – Data Collection and Presentation – Parking Studies and Characteristics – Road Accidents – Causes and Preventive Measures – Accident Data Recording – Condition Diagram and Collision Diagrams – Road Traffic Signs – Road markings.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Identify need and methods of Traffic Surveys.
- Understand importance of parking and related surveys.
- Understand the role of engineering in road safety.

Unit IV: Intersection design

Conflicts at Intersections – Types of Intersections – Channelization – Traffic Islands and Design At – grade intersections and Grade separated intersections – Rotary Intersection and Design elements.

Learning Outcomes: After successful completion of this unit, the students will be able to

- List out the objectives of channelization.
- Explain the types of intersections and their design features.

Unit V: Highway materials and Pavement design

Highway materials – Road aggregates – desirable properties – tests on road aggregates. Bituminous materials – tests on bituminous materials. Flexible and Rigid Pavements – Components and Functions – design of Flexible pavement (G.I method and CBR Method as per IRC 37) – Design of Rigid pavements – Westergaard's stress equations – CC pavements design – stresses in pavements.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain the suitability of highway materials and tests on them
- List out the types of pavements and their structural properties.
- Design of rigid and flexible pavements.

TEXT BOOKS:

1. S. K. Khanna and C. E. G. Justo, "Highway Engineering", Nemchand & Bros., 7th edition (2000).
2. C. Venkataramaiah, "Transportation Engineering" (Vol – I), Universities Press Pvt Ltd, Hyderabad.

REFERENCE BOOKS:

1. L. R. Kadiyali and Lal, "Principles and Practice of Highway Engineering Design", Khanna Publications, 7th edition, 2013.
2. R. Srinivasa Kumar, "Highway Engineering", Universities Press Pvt Ltd, Hyderabad. 2011.
3. S K Sharma, "Highway Engineering", S. Chand and Company Limited, New Delhi, 3rd edition, 2018.
4. *S P Chandola, "Transportation Engineering",* S. Chand and Company Limited, New Delhi, 2016.

COURSE OUTCOMES:

After successful completion of this course, the students will be able to

1. Explain the importance of highways in economic development of nation.
2. Describe the history of road development in India and various road development plans.
3. Identify the highway materials and tests related to them.
4. Design horizontal and vertical alignment aspects.
5. Explain the surveys required for highway planning and design.
6. Differentiate between types of pavements and their design features.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0106P	0	0	3	1.5	CIA	30 M
Course Title	:	HYDRAULIC MACHINERY LAB					SEE	70 M

COURSE OBJECTIVES:-

The object of the course is to make the students understand the working principles of vanes under impact of water jets, various turbines and pumps.

List of Experiments:

1. Impact of jet on vanes
2. Study of Hydraulic jump.
3. Performance test on Pelton wheel turbine
4. Performance test on Francis turbine.
5. Efficiency test on centrifugal pump.
6. Efficiency test on reciprocating pump.
7. Efficiency test on multi stage centrifugal pump.
8. Head loss due to bend
9. Experiment on turbine flow meter (water meter)
10. Partial flume experiment.
11. Flow transitions – flow over hump above ground in open channel.
12. Flow transitions – flow over hump below (Depression) ground in open channel.

COURSE OUTCOMES:

By performing the various tests in this laboratory the student will be able to know the performance of various hydraulic machinery and flow characteristics.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester Civil Engineering)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0109P	0	0	3	1.5	CIA	30 M
Course Title	:	TRANSPORTATION ENGINEERING LAB					SEE	70 M

COURSE OBJECTIVES:-

- The object of the course is to enable the students to identify the physical characteristics of aggregates and bitumen.

List of Experiments:

I. Road Aggregates

1. Aggregate Crushing value Test.
2. Aggregate Impact Test.
3. Los Angeles Abrasion Test.
4. Shape tests
5. Specific gravity and Water absorption test

II. Bituminous Materials

6. Penetration Test.
7. Ductility Test.
8. Softening Point Test.
9. Flash and fire point tests

III. Traffic Studies

10. Volume Studies
11. Speed studies
12. Parking studies

COURSE OUTCOMES:

By performing the various tests in this laboratory the student will be able to know the physical characteristics of aggregates, bitumen and traffic studies.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to IV Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0505T	3	0	0	3	CIA	30 M
Course Title	:	PYTHON PROGRAMMING FOR ENGINEERS LAB					SEE	70 M

COURSE OBJECTIVES:-

- To train the students in solving computational problems
- To elucidate solving mathematical problems using Python programming language
- To understand the fundamentals of Python programming concepts and its applications.

LIST OF TOPICS:

1. Write a program to demonstrate a) Different numeric data types and b) To perform different Arithmetic Operations on numbers in Python.
2. Write a program to create, append, and remove lists in Python.
3. Write a program to demonstrate working with tuples in Python.
4. Write a program to demonstrate working with dictionaries in Python.
5. Write a program to demonstrate a) arrays b) array indexing such as slicing, integer array indexing and Boolean array indexing along with their basic operations in NumPy.
6. Write a program that accepts a string from the user and display the same string after removing vowels from it.
7. Write a program to strip a set of characters from a string.
8. Write a function that prompts the user for the average temperature for each day of the week and returns a dictionary containing the required information.
9. Write a program that has the dictionary of your friend's names as keys and phone numbers as its values. Print the dictionary in a sorted order. Prompt the user to enter the name and check if it is present in the dictionary. If the name is not present, then enter the details in the dictionary.
10. Write a program to store the latitude and longitude of your house as a tuple and display it.
11. Write a program to do the following operations on files
    a) Count the occurrence of each letter b) Read the last n lines
    c) Remove new line characters from the file d) Read random line from a file
    e) Read and write the contents from one csv file to another.
12. Write a program to add two polynomials using classes.
13. Create a class called library with data attributes accno, publisher, title and author. The methods of the class should include
    a) read() accno, title, author b) compute() – to accept the number of days late, calculate an display the fine charged at the rate of Rs. 10 per day. c) display the data.
14. Create a program to compute summary statistics such as mean, median, mode, standard deviation and variance of the given different types of data.
15. Programs on Python packages Numpy, Pandas, Matplotlib

TEXT BOOKS:

1. Francois Chollet, Deep Learning with Python, 1/e, Manning Publications Company, 2017
2. Manohar Swamynathan, "Mastering Machine learning with Python in Six steps", Apress.
3. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, "How to Think Like a Computer Scientist: Learning with Python 3", 3rd edition, Available at http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf

4. Paul Barry, “Head First Python a Brain Friendly Guide” 2nd Edition, O’Reilly, 2016
5. Dainel Y.Chen “Pandas for Everyone Python Data Analysis” Pearson Education, 2019

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Illustrate the use of various data structures. (L3)
2. Analyze and manipulate Data using Pandas (L4)
3. Design solutions to real-world problems using Python (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

Course Structure& Syllabifor Four Year Regular B.Tech. Degree Program

(Effective for the batches admitted from 2019-20 onwards)

COMPUTER SCIENCE & ENGINEERING

INDUCTION PROGRAM (3 weeks duration)

- Physical activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas
- Familiarization to Dept./Branch & Innovations

B. Tech – I Semester (Theory – 5, Lab – 3)

S.No	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
			THEORY							
1	BS	19ABS9901	Mathematics – I	3	1	0	4	30	70	100
2	BS	19ABS9904	Engineering Chemistry	3	0	0	3	30	70	100
3	ES	19AES0501	C Programming	3	1	0	4	30	70	100
4	HS	19AHS9901	Communicative English	2	0	0	2	30	70	100
5	MC	19AMC9901	Human Values & Professional Ethics	3	0	0	0	30	-	30
			PRACTICAL							
6	BS	19ABS9905	Engineering Chemistry Lab	0	0	3	1.5	30	70	100
7	ES	19AES0502	CProgramming Lab	0	0	3	1.5	30	70	100
8	HS	19AHS9902	Communicative English Lab	0	0	3	1.5	30	70	100
			TOTAL:	**14**	**2**	**9**	**17.5**	**240**	**490**	**730**

B. Tech – II Semester (Theory – 4, Lab – 4)

S.No	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
			THEORY							
1	BS	19ABS9906	Mathematics – II	3	1	0	4	30	70	100
2	BS	19ABS9902	Engineering Physics	3	0	0	3	30	70	100
3	ES	19AES0201	Basic Electrical and Electronics Engineering	3	0	0	3	30	70	100
4	MC	19AMC9902	Environmental Sciences	3	0	0	0	30	-	30
			PRACTICAL							
5	ES	19AES0301	Engineering Drawing Lab	1	0	4	3	30	70	100
6	BS	19ABS9903	Engineering Physics Lab	0	0	3	1.5	30	70	100
7	LC	19ALC0301	Engineering & IT Workshop Lab	0	0	3	1.5	30	70	100
8	ES	19AES0202	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5	30	70	100
			TOTAL:	**13**	**01**	**13**	**17.5**	**240**	**490**	**730**

B. Tech – III Semester (Theory – 7, Lab – 3)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19ABS9909	Probability & Statistics	3	0	0	3	30	70	100
2	ES	19AES0503T	Data Structures	3	0	0	3	30	70	100
3	ES	19AES0504T	Python Programming	3	0	0	3	30	70	100
4	HS	19AHS9903	Design Thinking	2	0	0	2	30	70	100
5	PC	19APC0501	Computer Organization	3	0	0	3	30	70	100
6	PC	19APC0502T	Database Management Systems	3	0	0	3	30	70	100
7	PC	19APC0503	Digital Logic Design	3	0	0	3	30	70	100
PRACTICAL										
8	ES	19AES0503P	Data Structures Lab	0	0	3	1.5	30	70	100
9	ES	19AES0504P	Python ProgrammingLab	0	0	2	1	30	70	100
10	PC	19APC0502T	Database Management Systems Lab	0	0	3	1.5	30	70	100
			TOTAL:	**20**	**00**	**08**	**24**	**300**	**700**	**1000**

B. Tech – IV Semester (Theory – 8, Lab – 3)

S. No.	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	19AHS9904	Discrete Mathematical Structures	3	0	0	3	30	70	100
2	HS	19AHS9905	Managerial Economics and Financial Analysis	3	0	0	3	30	70	100
3	PC	19APC0504	Formal Languages and Automata Theory	3	0	0	3	30	70	100
4	PC	19APC0505T	Object Oriented ProgrammingThrough Java	3	0	0	3	30	70	100
5	PC	19APC0506	Operating Systems	3	0	0	3	30	70	100
6	PC	19APC0507	Software Engineering	3	0	0	3	30	70	100
7	PC	19APC0509	Statistical Analysis using R	3	0	0	3	30	70	100
8	MC	19AMC9903	Biology for Engineers	3	0	0	0	30	0	30
PRACTICAL										
9	PC	19APC0505P	Object Oriented ProgrammingThrough Java Lab	0	0	3	1.5	30	70	100
10	PC	19APC0508	Operating Systems & Software Engineering Lab	0	0	3	1.5	30	70	100
11	PC	19APC0510	R Programming Lab	0	0	2	1	30	70	100
			TOTAL:	**24**	**0**	**8**	**25**	**330**	**700**	**1030**

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE, ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9901	3	1	0	4	CIA	30 M
Course Title	:	MATHEMATICS – I					SEE	70 M

COURSE OBJECTIVES:

1. To enlighten the learners in the concept of differential equations, matrices and multivariable calculus.
2. To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

COURSE OUTCOMES:

After the completion of this course, the students will be able to:

1. Understand the effective mathematical tools for the solutions of differential equations that model physical processes.
2. Identify the essential characteristics of linear differential equations with constant coefficients and solve the linear differential equations with constant coefficients by appropriate method.
3. Solving systems of linear equations, using technology to facilitate row reduction determine the rank, Eigen values and Eigen vectors, diagonal form and different factorizations of a matrix.
4. Translate the given function as series of Taylor's and McLaren's with remainders and analyze the behavior of functions by using mean value theorems.
5. Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies and acquire the Knowledge maxima and minima of functions of several variables.

Unit I

Ordinary Differential Equations of First Order: Formation of the ordinary differential equations (ODEs) – Solution of an ordinary differential equation – Equations of the First Order and First Degree – Linear Differential Equation – Bernoulli's Equation – Exact Differential Equations – Equations Reducible to exact equations-Orthogonal Trajectories.

Ordinary Differential Equations of First Order but not First Degree: Equations solvable for p – Equations solvable for x – Equations solvable for y – Equations do not contain x(or y) – Clairaut's Equations.

Unit II

Ordinary Differential Equations of Higher Orders: Solutions of Linear Ordinary Differential Equations With Constant Coefficients – Rules for finding the Complimentary Functions – Rules for finding the particular integral – Method of variation of parameters – Cauchy's linear equation – Legendre's Linear Equation.

Unit III

Matrices: Inverse and rank of a matrix - System of linear equations; Symmetric, skew-symmetric and orthogonal matrices - Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation.

Unit IV

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), indeterminate forms and L'Hospital's rule; Maxima and minima.

Unit V

Multivariable Calculus: Limit, continuity and partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd.
2. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
3. H. k Das, Er. RajnishVerma, Higher Engineering Mathematics, S. Chand.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9904	3	0	0	3	CIA	30 M
Course Title	:	ENGINEERING CHEMISTRY					SEE	70 M

COURSE OBJECTIVES:

COURSE OUTCOMES:

At the end of the course the students will be able to:

1. To impart the concept of soft and hard waters, softening methods of hard water.
2. Explain the importance of polymers in our daily life and mechanism of conduction in the conducting polymers.
3. To analyze the fuel and methods for preparation of synthetic fuels.
4. To understand the basics of electrochemistry, conductometry and batteries.
5. To familiarizes the Engineering materials.

Unit I **(10 hrs)**

Water Technology: Sources of Water, Impurities and their Influence on Living Systems, Soft Water and Hardness of Water, Estimation of Hardness by EDTA Method, Boiler Troubles **-** Scale and Sludge, Industrial Water Treatment Internal Treatment Methods(Phosphate Conditioning, Calgon Conditioning), Water softening Methods (Zeolite and Ion-Exchange Processes), Specifications for Drinking Water, Bureau of Indian Standards(BIS) and World Health Organization(WHO), Municipal Water Treatment, Desalination of Brackish Water, Reverse Osmosis (RO) and Electrodialysis.

Unit II **(10 hrs)**

Polymer Chemistry: Introduction to Polymers, Types of Polymerisation (Addition & Condensation), Mechanism of Addition Polymerisation (Ionic and Radical).

Plastics: Thermoplastics and Thermosettings. Preparation, Properties and Applications of Bakelite, Nylon-66.

Elastomers: Buna-S, Buna-N–Preparation, Properties and Applications.

Conducting Polymers: Polyacetylene, Polyaniline, Mechanism of Conduction and Applications.

Unit III **(10 hrs)**

Fuel Technology: Fuels –Classification of fuels.

Solid Fuels: Wood and Coal, Ranking of Coal-Analysis (Proximate and Ultimate), Coke Manufacture Otto Hoffman Process.

Liquid Fuels: Petroleum Origin, Extraction, and Refining. Motor Fuels Petrol, Diesel Oil, Knocking Octane Number and Cetane Number; Synthetic petrol-Fischer-Tropsch's& Bergius process.

Gaseous Fuels: Composition and Uses of Natural Gas, LPG, and CNG. Flue gas analysis and its significance.

Unit IV **(10 hrs)**

Electrochemistry: Introduction to Electrochemistry (Conductors, Semi-Conductors, Insulators, Conductance). Electrodes, Reference Electrodes, Electrochemical Cell, Nernst Equation, Cell Potential and its Calculations, Numerical Problems. Principle and Applications of Potentiometry, Conductometry.

Batteries: Primary Batteries – Zinc-Air Battery.

Secondary Batteries- Lithium Ion Batteries- Working of the Batteries including Cell Reactions.
Fuel Cell- Hydrogen-Oxygen.

Unit V **(10 hrs)**

Materials of Engineering Chemistry:

Building materials: Portland Cement, Constituents, Phases and Reactivity of Clinker, Setting and Hardening of Cement.

Refractories: Classification, Properties, Factors affecting the Refractory Materials and Applications.

Lubricants: Classification of Lubricants with examples. Definition and Significance of the following Characteristics of a Good Lubricating Oil- Viscosity, Viscosity Index, Flash & Fire Point, Acid Number, Saponifaction Value, Pour Point and Cloud Point.

Text books:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Shashi Chawla, A Reading of Engineering Chemistry, 3rd Edition, DhanpatRai and Co., New Delhi, 2011,3rd edition.
3. Puri, Sharma and Pathania “Principles of Physical Chemistry”. Vishal Publishing Co.,Jalandhar.1991, 31st edition
4. Gowariker*et al*., Polymer Science and Technology, Prentice Hall of India Pvt. Ltd., New Delhi, 2004, 10th reprint.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0501	3	1	0	4	CIA	30 M
Course Title	:	C PROGRAMMING					SEE	70 M

COURSE OBJECTIVES:

1. Introduce the internal parts of a computer, and peripherals.
2. Introduce the Concept of Algorithm and use it to solve computational problems
3. Identify the computational and non – computational problems
4. Teach the syntax and semantics of a C Programming language
5. Demonstrate the use of Control structures of C Programming language

COURSE OUTCOMES:

1. Illustrate the working of a computer and apply algorithmic approach for solving aproblem.
2. Recognize the importance of programming language independent constructs
3. Select the control structure to solve computational problems
4. Design and implement programs to analyze the array applications.
5. Structure the individual data elements to simplify the solutions.

Unit I

Introduction to Computer Programming Languages: Evolution of Computer Programming languages – Machine, Symbolic and high-level languages. Fundamentals of Algorithms (Pseudo Codes) and Flowcharts, Compiler, Interpreter, Loader, and Linker.

Creating and Running Programs: Writing, Editing, Compiling, Linking and Executing.

Program Control Structures: Sequence, Selection and Iteration. Software Development Method.

Unit II

Introduction to C Language: Background,Basic Structure of a C Program – Steps to execute a C Program – Character Set of C Language – Basic I/O Statements – Basic Data Types and Sizes – C – Tokens: Identifiers, Keywords, Constants, and Variables. Sample Programs.

Input and output: standard input and output, formatted output – printf, formatted input – scanf.

Unit III

Operators: Arithmetic, Relational, Logical, Increment and decrement, Conditional, Assignment, Bitwise – Operator Precedence – Expressions – Type Conversions, Conditional Expressions – Precedence and Order of Evaluation. Sample Programs.

Control Flow / Control Statements: Selection & Making Decisions – Logical Data and Operators – Two-way Selection, Multi-way selection – Standard Statements and blocks – Non-iterative Statements: (if, if-else, null else, nested if-else, if-else ladder, else-if, switch) – Repetitive / Iterative Statements: Concept of loop – Pre-test and post-test loops – While loop, do-while loop, and for loops, initialization and updating, event and counter controlled loops. Branching: break, continue, and Goto. – Sample programs on applications.

Unit IV

Arrays in C language: Concept – Definition – Declaration – Types of arrays – One Dimensional, two dimensional, multidimensional – initialization of arrays – Storing and assessing elements – Array applications.

Strings: Definition, Declaration, Initialization – Basic operations – String manipulations – String handling functions – Arrays using strings -

Unit V

Pointers and arrays: Concept –Definition,Declaration,Initialization, pointer to pointer, functions and pointers, arraysand pointers, pointer as function arguments (call-by-reference), pointers and strings.

Functions: Concept –Definition,Declaration, Types of functions – parameter passing – passing arrays to functions, passing pointers to functions, Recursion – returning non-integers, external variables, scope variables, header variables, register variables, block structure. User defined functions – Standard Library Functions.

Structures: Definition –Declaration – Initialization - Accessing the structure elements – arrays of structures, Array with in structures, pointers to structures, Passing Structure to functions – nested structures, self-referential structures, unions, typedef.

Text Books:

1. PradipDey, and Manas Ghosh, "Programming in C", 2018, Oxford University Press.
2. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.
3. Brian W. Kernighan, and Dennis M. Ritchie, "The C Programming Language", 2ndEdition, Pearson.

Reference Books:

1. RS Bichkar "Programming with C", 2012, Universities Press.
2. PelinAksoy, and Laura Denardis, "Information Technology in Theory", 2017, CengageLearning.
3. Byron Gottfried and Jitender Kumar Chhabra, "Programming with C", 4th Edition, 2019,McGraw Hill Education.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AHS9901	2	0	0	2	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH					SEE	70 M

COURSE OBJECTIVES:

Reading Skills

- Addressing explicit and implicit meanings of a text on current topics.
- Understanding the context.
- Learning new words and phrases.
- Using words and phrases in different contexts.

Writing Skills

- Using the basic structure of a sentence.
- Applying relevant writing formats to create paragraphs, essays, letters, emails, reports and presentations.
- Retaining a logical flow while writing.
- Planning and executing an assignment creatively.

Interactive Skills

- Analyzing a topic of discussion and relating to it.
- Participating in discussions and influencing them.
- Communicating ideas effectively.
- Presenting ideas coherently within a stipulated time.

Life Skills

- Examining self-attributes and identifying areas that require improvement: self-diagnosis and self-motivation.
- Adapting to a given situation and developing a functional approach to finding solutions: adaptability and problem solving.
- Understanding the importance of helping others: community services and enthusiasm.

COURSE OUTCOMES:

1. The student will acquire basic proficiency in English using all LSRW skills.
2. Read and explore for enrichment of works from various genres (Poems, essays etc.)
3. Make correct usage of grammar and Vocabulary in writing and speaking.
4. To make them develop Linguistic competence.
5. To make them understand the concept of redundancies in writing skills.

UNIT I

Reading : *On the conduct of life:* William Hazlitt
Grammar : Prepositions
Vocabulary : Word Formation I: Introduction to Word Formation
Writing : Clauses and Sentences
Life skills : **Values and Ethics**
If: Rudyard Kipling

UNIT II

Reading : *The Brook:* Alfred Tennyson
Grammar : Articles

Vocabulary	**:**	Word Formation II: Root Words from other Languages
Writing	**:**	Punctuation
Life skills	**:**	**Self-Improvement**
		How I Became a Public Speaker: George Bernard Shaw

UNIT III

Reading	**:**	*The Death Trap*: Saki
Grammar	**:**	Noun-Pronoun Agreement
		Subject- Verb Agreement
Vocabulary	**:**	Word Formation III: Prefixes and Suffixes
Writing	**:**	Principles of Good Writing
Life skills	**:**	**Time Management**
		On saving Time: Seneca

UNIT IV

Reading	**:**	*ChinduYellama*
Grammar	**:**	Misplaced Modifiers
Vocabulary	**:**	Synonyms; Antonyms
Writing	**:**	Essay Writing
Life skills	**:**	**Innovation**
		Muhammad Yunus

UNIT V

Reading	**:**	*Politics and the English Language*: George Orwell
Grammar	**:**	Clichés; Redundancies
Vocabulary	**:**	Common Abbreviations
Writing	**:**	Writing a Summary
Life skills	**:**	**Motivation**
		The Dancer with a White Parasol: Ranjana Dave

Prescribed Textbook:*Language and Life: A Skills Approach* Board of Editors,Orient Black Swan Publishers, India. 2018.

Suggested Readings

- Practical English Usage. Michael Swan. OUP. 1995.
- Remedial English Grammar. F.T. Wood. Macmillan.2007
- On Writing Well. William Zinsser. Harper Resource Book. 2001
- Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
- Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
- Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II SemesterECE, CE, and ME)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19AMC9901	3	0	0	0	CIA	30 M
Course Title	:	HUMAN VALUES AND PROFESSIONAL ETHICS					SEE	--

COURSE OBJECTIVES:-This introductory course input is intended.

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

UNIT I

Course Introduction – Need, basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration – what is it? – its content and process; 'Natural Acceptance' and Experiential Validation – as the mechanism for self exploration. Continuous Happiness and Prosperity – A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities – the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT II

Understanding Harmony in the Human Being – Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' – Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT III

Understanding Harmony in the Family and Society – Harmony in Human – Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human – human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti;

Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society – Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha) – from family to world family!

UNIT IV

Understanding Harmony in the nature and Existence – Whole existence as Co-existence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature – recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astiva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT V

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order,
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order.

a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
b. At the level of society: as mutually enriching institutions and organizations.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. SubbaRaju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 JeevanVidyaekParichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. SubhasPalekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) KrishiTantraShodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer& Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan& V. S Senthilkumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9905	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING CHEMISTRY LAB					SEE	70 M

COURSE OBJECTIVES:

COURSE OUTCOMES: At the end of the course, the students will be able to

1. **Prepare** of various Solutions
2. **Determine** the hardness of water
3. **Analysis** of water
4. **Calculate** the cell constant and conductance of solutions
5. **Determine** the physical properties like viscosity, acid number, saponification number
6. **Estimate** the Iron and Calcium in cement

LIST OF EXPERIMENTS:

1. Preparation of Primary Standard (sodium carbonate) Solution.
2. Estimation of Hardness of Water by EDTA method.
3. Estimation of Dissolved Oxygen by Winkler's method.
4. Estimation of Available Chlorine in Bleaching Powder.
5. Estimation of Ferrous ion in the given Mohr Salt by using KMnO4 Solution
6. Determination of Strength of an Acid in Pb-Acid Battery.
7. Preparation of Polymer (Bakelite).
8. Determination of Cell Constant and Conductance of Solutions
9. Determination of Strength of Acid by Conductometric Titrations.
10. Estimation of Calcium in Port land Cement.
11. Determination of Iron in Cement Sample by Colorimeter.
12. Determination of Viscosity of Lubricating Oil using Ostwald Viscometer.
13. Determination of Average Molecular Mass of given Polymer (Polyvinyl Alcohol) by Using Ostwald Viscometer.
14. Determination of acid number of given lubricating oil.
15. Determination of Saponification number of given lubricating oil.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0502	0	0	3	1.5	CIA	30 M
Course Title	:	C PROGRAMMING LAB					SEE	70 M

COURSE OBJECTIVES:

1. To learn about the computer systems, computing environments, developing a computer program and structure of C.
2. To gain Knowledge of the operators, control statements in C.
3. To learn about the design concepts of arrays, strings and their usage.
4. To assimilate about pointers and dynamic memory allocation.

COURSE OUTCOMES:

1. Acquire skills to write, compile and debug programs in c language.
2. Be able to use different operators, data types and write programs
3. Acquire knowledge to select the best loop construct for a given problem.
4. Design and implement programs to analyze the array applications.
5. Design and implement C programs with Functions.

Exercise:1

a) Write a C program to print a given statement.
b) Write a C program for exchanging (interchanging) values of two variables.
c) Write a C program to find the reverses of a given Number.

Exercise: 2

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program to find the second maximum number among the given list of numbers.
c) Write a C program to find the kthsmallest number among the given list of numbers.

Exercise: 3

a) Write a C program to demonstrate various operators (Arithmetic operator, increment & decrement operator, Relational operator, and Assignment operator).
b) Write a C Program, to counts number of positive and negative numbers separately and also compute the sum ofthem.

Exercise: 4

a) Write a C programto generate the first 'n' terms in the sequence of Fibonacci series.

Exercise: 5

a) Write a C program to generate all the prime numbers between 1 and n, where 'n' is the value given by the user.
b) Write a program which Prints the following patterns.

```
ABCDEFGFEDCBA          0
ABCDEF FEDCBA         111
ABCDE   EDCBA        22222
ABCD     DCBA       3333333
ABC       CBA      444444444
AB         BA
A           A
```

c) Write a C program to generate Pascal's triangle.
d) Write a C program to construct a pyramid of numbers.

Exercise: 6

a) Write a C program, for the arithmetic operators using switch case (which takes two integer operands and one operator from the user, performs the specified operation and then prints the result. (Consider theoperators +,- ,*, /, % and use Switch Statement)
b) Write a program to find G.C.D (Greatest Common Divisor) of two numbers using recursion and non-recursion.
c) Write a program to find factorial of a number using recursion and non-recursion.

Exercise: 7

a) Write a C program to calculate distance between two points.
b) Write a program to find Roots of quadratic equation.

Exercise: 8

a) Write a C program to perform Matrix Addition
b) Write a C program to perform Matrix Multiplication
c) Write a C program to perform inverse of a Matrix.
d) Write a C program to find the transpose of a given matrix.

Exercise: 9

a) Write a C program for any numerical method.
b) Write a C program to make a simple calculator.

Exercise: 10

a) Write a C program to solve Towers of Hanoi problem by using recursive function.
b) Write a C program to know if the given string is a palindrome or non-palindrome.
c) Write a C program to find whether the given year is a leap year or not.

Exercise: 11

a) Write a C program to insert a sub-string in to the given main string.
b) Write a C program to demonstrate the parameter passing mechanism using: call-by-value, call-by-reference.

Exercise: 12

a) Implement the sorting algorithm: Insertion sort and Selection sort.
b) Write a C program to access elements of an array using pointers
c) Write a C program to find the sum of numbers with arrays and pointers.

Exercise: 13

a) Implementation of string using operations.
   i) Copy
   ii) Concatenate
   iii) Length
   iv) Compare

Exercise: 14

a) Write a C program to find the position of a substring.
b) Write a C program to represent complex numbers using structure.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & II Semester ECE, CE, and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AHS9902	0	0	3	1.5	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH LAB					SEE	70 M

COURSE OBJECTIVES:

1. Students will be exposed to a variety of self instructional, learner friendly modes oflanguage learning
2. Students will cultivate the habit of reading passages from the computer monitor. Thus providing them with the required facility to face computer based competitive exams likeGRE, TOEFL, and GMAT etc.
3. Students will learn better pronunciation through stress, intonation and rhythm
4. Students will be trained to use language effectively to face interviews, group discussions,public speaking
5. Students will be initiated into greater use of the computer in resume preparation, reportwriting, format making etc

COURSE OUTCOMES:

1. Remember and understand the different aspects of the English languageproficiency with emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllabledivision for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professionalsettings.
5. Create awareness on mother tongue influence and neutralize it in order toimprove fluency in spoken English.

Unit I

1. Phonetics for listening comprehension of various accents
2. Reading comprehension
3. Describing objects/places/persons

Learning Outcomes: At the end of the module, the learners will be able to

- understand different accents spoken by native speakers of English
- employ suitable strategies for skimming and scanning on monitor to get the general ideaof a text and locate specific information
- learn different professional registers and specific vocabulary to describe differentpersons, places and objects

Unit II

1. JAM
2. Small talks on general topics
3. Debates

Learning Outcomes: At the end of the module, the learners will be able to

- produce a structured talk extemporarily
- comprehend and produce short talks on general topics
- participate in debates and speak clearly on a specific topic using suitable discoursemarkers

-

Unit III

1. Situational dialogues – Greeting and Introduction
2. Summarizing and Note making
3. Vocabulary Building

Learning Outcomes: At the end of the module, the learners will be able to

- Learn different ways of greeting and introducing oneself/others
- summarize the content with clarity and precision and take notes while listening to atalk/lecture and make use of them to answer questions
- replenish vocabulary with one word substitutes, homonyms, homophones, homographs toreduce errors in speech and writing

Unit IV

1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

Learning Outcomes: At the end of the module, the learners will be able to

- Learn different ways of asking information and giving directions
- Able to transfer information effectively
- understand non-verbal features of communication

Unit V

1. Oral Presentations
2. Précis Writing and Paraphrasing
3. Reading Comprehension and spotting errors

Learning Outcomes: At the end of the module, the learners will be able to

- make formal oral presentations using effective strategies
- learn different techniques of précis writing and paraphrasing strategies
- comprehend while reading different texts and edit short texts by correcting common errors.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CSE, ECE, CE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9906	3	1	0	4	CIA	30 M
Course Title	:	MATHEMATICS – II					SEE	70 M

COURSE OBJECTIVES:

1. To familiarize the prospective engineers with techniques in multivariate integration and partial differential equations.
2. To equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

COURSE OUTCOMES:

After the completion of this course, the students will be able to:

1. Understand beta and gamma functions and its relations and conclude the use of special function in evaluating definite integrals.
2. Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and apply double integration techniques in evaluating areas bounded by region.
3. Apply Del to Scalar and vector point functions and illustrate the physical interpretation of Gradient, Divergence and Curl.
4. Find the work done in moving a particle along the path over a force field and evaluate the rates of fluid flow along and across curves.
5. Apply a range of techniques to find solutions of standard PDEs and outline the basic properties of standard PDEs.

Unit I

Sequences and Series: Convergence of sequence and series, tests for convergence;
Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit II

Special Functions: Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions, evaluation of improper integrals.

Unit III

Multiple Integrals: Double integrals, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves, Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates.

Unit IV

Vector Calculus: Scalar and vector point functions, vector operator del, del applies to scalar point functionsGradient, del applied to vector point functions-Divergence and Curl, vector identities.

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Unit V

Partial Differential Equations: First order partial differential equations, solutions of first order linear and non-linear PDEs. Solutions to homogenous and non-homogenous higher order linear partial differential equations.

Text Books:

3. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers.
4. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons.

Reference Books:

4. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd.
5. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
6. H. k Das, Er. RajnishVerma, Higher Engineering Mathematics, S. Chand.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II SemesterCSE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9902	3	0	0	3	CIA	30 M
Course Title	:	ENGINEERING PHYSICS					SEE	70 M

COURSE OBJECTIVES:

1. To disseminate knowledge in basic concepts of mechanics and to understand the basic ideas of damping and resonance.
2. To interpret the significant concepts of magnetic materials which leads to potential applications and basics of electromagnetic waves.
3. To identify the importance of the optical phenomenon i.e. interference, diffraction andpolarization related to its Engineering applications.
4. To teach the concepts related to laser, fiberoptics and superconductivity which lead to their fascinating applications.
5. To familiarize the concept of Quantum mechanics and semiconductors relevant to engineering branches.

UNIT I

MECHANICS AND OSCILLATIONS: Basic laws of vectors and scalars-rotational frames – conservative forces; F = – grad V, torque andangular momentum - Newton's laws in inertial and linear accelerating non-inertial frames ofreference.

Simple Harmonic motion –Characteristics of SHM; Damped harmonic motion – over-damped, critically damped and lightlydampedoscillators; Forced oscillations and resonance.

UNIT II

ELECTROMAGNETISM AND MAGNETIC PROPERTIES OF MATERIALS: Divergence of Electric and Magnetic Fields – Gauss theorem for divergence – Curl of Electric and Magnetic Fields – Stokes theorem for curl – Maxwell's Equations – Electromagnetic wave propagation (conducting and non-conducting media) – Poynting's Theorem.

Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Classification of Magnetic materials – Domain Concepts of ferromagnetism – Hysteresis – soft and hard magnetic materials – Magnetic device applications.

UNIT III

WAVE OPTICS: Interference: Principle of superposition – Young's Experiment – Coherence – Interference in thin films,Wedge shaped film, Newton's Rings – Determination of wavelength.

Diffraction: Diffraction, differences between interference and diffraction, Fraunhofer diffraction due to Single slit

Polarization: Polarization by double refraction – Plane polarized light byNicol's Prism – Half wave and Quarter wave plate – Engineering applications of Polarization.

UNIT IV

LASERS AND FIBER OPTICS: Introduction, spontaneous and stimulated emissions, population inversions, pumping, Ruby laser, Gas laser (He-Ne Laser), Semiconductor laser, Applications of lasers.

Optical Fibre and Total Internal Reflection, Acceptance Angle and cone of a fibre, Numerical aperture, Fibre optics in communications, Types of Optical Fibres,Applications of optical fibers.

SUPERCONDUCTIVITY: Super conductivity, Meissner Effect, Basics of BSC theory, Types of Superconductors and Applications of Superconductors.

UNITV

QUANTUM MECHANICS: Introduction,Photoelectric Effect, de-Broglie's hypothesis, Wave-particle duality Heisenberg's Uncertainty principle,Schrodinger's time independent wave equation, Particle in one dimensional box.

SEMICONDUCTOR PHYSICS: Energy bands in solids, Types of electronic materials: metals, semiconductors, and insulators**.** Intrinsic and Extrinsic semiconductors, Direct and Indirect band gap semiconductors Hall effect – Applications of Hall effect – Drift and Diffusion currents – Continuity equation– Applications of Semiconductors.

COURSE OUTCOMES:

After the completion of this course, the student will be able to:

1. ExtendNewton's second law for inertial and non-inertial frame of reference and analyze the concept of resonance.
2. Applythe Gauss' theorem for divergence and Stokes' theorem for curl andClassifythe magnetic materials based on susceptibility
3. Interpretthe differences between interference and diffraction,illustratethe concept of polarization of light and its applications and classify ordinary polarized light and extraordinary polarized light.
4. Applyelectromagnetic wave propagation in different Optical Fibers, the lasers concepts in various applicationsandexplainMeissner's effect, BCS theory.
5. interpretthe direct and indirect band gap in semiconductors and identify the type of semiconductor using Hall effect.
   Analyze the behavior of particles at very microscopic level by using wave nature of particles.

TEXT BOOKS:

1. Gaur R.K. and Gupta S.L., "Engineering Physics"-DhanpatRai publishers, 2012
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Krshisagar - S. Chand publications,11thEdition 2019.
3. Fundamentals of Physics by David Halliday and Robert Resnick – Part I and Part II - Wiley.
4. H.K.Malik&A.K. Singh "Engineering Physics" - McGraw Hill Publishing Company Ltd.
5. "Engineering Physics",K.Thyagarajan - McGraw Hill Publishing Company Ltd.,2015.
6. D.Kleppner and Robert Kolenkow"An introduction to Mechanics"-II -Cambridge University Press,2015

REFERENCE TEXT BOOKS:

1. M K Varma "Introduction to Mechanics"-Universities Press-2015.
2. I. G. Main, "Vibrations and waves in physics", 3rdEdn., Cambridge University Press
3. D.K. Bhattacharya and A. Bhaskaran, "Engineering Physics"- Oxford Publications-2015
4. David J.Griffiths, "Introduction to Electrodynamics"- 4/e, Pearson Education,2014
5. P.K.Palaniswamy, "Engineering Physics" Scitech Publications
6. ShatendraSharma,Jyotsna Sharma, "Engineering Physics" Pearson Education,2018
7. D.Kleppner and Robert Kolenkow"An introduction to Mechanics" – II – CambridgeUniversity Press,2015.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, ME and ECE& II Semester CSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0201	3	0	0	3	CIA	30 M
Course Title	:	BASIC ELECTRICAL AND ELECTRONICS ENGG.					SEE	70 M

COURSE OBJECTIVES:-

1. To introduce basics of simple electric circuits.
2. To impart knowledge on measuring devices for voltages and currents.
3. To provide comprehensive idea about working principle, operation and applications of PN junction diode & knowledge about semiconductors
4. To teach applications of electronic principles which are used in Engineering
5. To give knowledge about Special purpose diodes and applications

COURSE OUTCOMES:-

1. Able to recall Simple electrical connections.
2. Knowledge about the Measuring Instruments
3. Learning operation and properties of semiconductors
4. Useful knowledge on PN diode and simple applications.
5. Working and construction of Analog Electronic devices.

UNIT I

ELECTRICAL CIRCUITS: Basic Electrical Circuit elements–(R-L-C)– Ohms Law–KirchoffsLaw–Introduction to AC Circuits – and DC Circuits – Series connection – parallel connections,Analysis of single – phase ac circuits consisting of RL – RC – RLC series circuits – Nodal Analysis-Mesh Analysis.

UNIT II

MEASURING INSTRUMENTS: Moving coil and moving iron instruments (Ammeter and voltmeter) – Cathoderayoscilloscope – cathoderaytube-Regulated power supply – Digital Multi Meter(DMM) – Megger instrument-Introduction to Electric and magnetic fields – Thermistor – LinearModepower supply.

UNIT III

SEMICONDUCTORS: Classification of semiconductors – Intrinsic semiconductors – Extrinsic semiconductors – conductivity of Intrinsic and Extrinsic semiconductors – P-type semiconductor – N-type semiconductor – Qualitativetheory of P-N junction – V-I characteristics of PN junction diode – and simple applications – LigihtEmittingDiode(LED).

UNIT IV

RECTIFIERS AND FILTERS: Introduction to Rectifiers – Half Wave Rectifiers – Full WaveRectifiers – Bridge rectifier – Advantages of Bridge rectifier – Comparision of Rectifiers – Harmonic components in a Rectifier circuit – Introduction to Filters – Inductor Filter – capacitor Filter – LC or L-section Filter – Types of Voltage regulators – series voltage regulator – shunt voltage regulator – Clippers and Clampers.

UNIT V

ANALOG ELECTRONICS: Zener diode, Applications of diode as switch and rectifier, Zener diode as regulator, Breakdown mechanism –Avalanche zener Breakdown– special purpose diodes: Schottky diode, tunnel diode, varactor diode, photodiode, phototransistor ,Introduction to Bipolar

JuntionTransistor–BJT construction, operation, configurations–CB,CE,CC.–Introduction to Basic Logic Gates.

Text Books:-

1. D.P. Kothari, I.J.Nagrath, Basic Electrical and Electronics Engineering, 2nd Edition, McGrawHill Education (India) Private Limited.
2. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, 2nd edition, Pearson India PrivateLimited.

Reference Books:-

1. Principles of Electrical Engineering and Electronics, V.K. Mehta & Rohit Mehta, S.Chandpublications.
2. Electronic Devices and Circuit Theory by Robert L.Boylestad and Louis Nashelsky.,pearson.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II SemesterCSE)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19AMC9902	3	0	0	0	CIA	30 M
Course Title	:	ENVIRONMENTAL SCIENCES					SEE	--

COURSE OBJECTIVES:-

1. Creating basic awareness on environment
2. Understanding the importance of ecological balance for sustainable development.
3. Creating awareness on biodiversity and its conservation
4. Understanding the impacts of developmental activities and mitigation measures.
5. Understanding the environmental policies and regulations.

COURSE OUTCOMES:

Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which in-turn helps in sustainable development.

UNIT I

Ecosystems: Definition, Scope and Importance ecosystem. Classification, Structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Energy flow in the ecosystem, Biogeochemical cycles, Bioaccumulation, ecosystem value, derives and carrying capacity, Field visits.

UNIT II

Natural Resources: Classification of Resources: Living and Non - Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable energy source, case studies.

UNIT III

Biodiversity and its Conservation: Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels -India as a megadiversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; Conservation of biodiversity: In-situ and Ex-situ conservation. National Biodiversity Act.

UNIT IV

Environmental Pollution and Control Technologies: Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary Tertiary.

Overview of air pollution control technology, Concept of bioremediation. Global Environmental Problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montreal Protocol.

UNIT V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio - economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan(EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl Human Health, Environmental Ethics, Concept of Green Building, Ecological foot print, Life Cycle Assessment(LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCES:

1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.
2. Enviromental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela . 2008 PHI Learning Pvt Ltd.
4. Environmental Science by Daniel B. Botkin& Edwards A. Keller, Wiley INDIA edition.
5. Enviromental Studies by AnubhaKaushik, 4th Edition, New age international publishers.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II SemesterCSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0301	1	0	4	3	CIA	30 M
Course Title	:	ENGINEERING DRAWING LAB					SEE	70 M

COURSE OBJECTIVES:

1. To gain and understanding of the basics of geometrical constructions of various planes and solids, understanding system of graphical representation of various objects and various views to draft and read the products to be designed and eventually for manufacturing applications.
2. To learn about various projections, to understand complete dimensions and details of object.
3. Ultimately student must get imaginary skill to put an idea of object, circuit, assembly of parts in black & white, to design a product and to understand the composition, which can be understood universally.

COURSE OUTCOMES:

1. Drawing 2D and 3D diagrams of various objects.
2. Learning conventions of Drawing, which is an Universal Language of Engineers.
3. Drafting projections of points, planes and solids.

UNIT I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance – Conventions in Drawing – Lettering – BIS Conventions.

Curves used in Engineering Practice: (a) Conic Sections including the Rectangular Hyperbola – General method only, (b) Cycloid, Epicycloid and Hypocycloid, (c) Involutes.

UNIT II

Scales: Plain, Diagonal and Vernier.

Projection of Points: Principles of orthographic projection – Convention – First angle projections, projections of points.

UNIT III

Projections of Lines: Lines inclined to one or both planes, Problems on projections, Finding True lengths.

Projections of Planes: Projections of regular plane surfaces- plane surfaces inclined to both planes.

UNIT IV

Projections of Solids: Projections of Regular Solids with axis inclined to both planes.

Developments of Solids: Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid, Cone.

UNIT V

Isometric and Orthographic Projections: Principles of isometric projection- Isometric Scale- Isometric Views- Conventions- Isometric Views of lines, Planes, Simple solids (cube, cylinder and cone).
Isometric projections of spherical parts. Conversion of isometric Views to Orthographic Views.

Text Books:

1. Engineering Drawing, N.D. Bhatt, Charotar Publishers
2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai

References:

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers
2. Engineering Drawing, Shah and Rana,2/e, Pearson Education
3. Engineering Drawing and Graphics, Venugopal /New age Publishers
4. Engineering Graphics, K.C. John, PHI,2013
5. Engineering Drawing, B.V.R. Guptha, J.K. Publishers

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II SemesterCSE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9903	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING PHYSICS LAB					SEE	70 M

COURSE OBJECTIVES:

1. To understand the phenomenon of interference and diffraction using Travelling Microscope and spectrometer.
2. To analyze the interaction of electromagnetic fields.
3. To understand the concept of polarization and classify polarized and unpolarized lights.
4. To realize the laws of resistance by using Carey Foster's bridge.
5. To analyze the frequencies of electrically maintained tuning fork by Melde's apparatus.

COURSE OUTCOMES:

After completion of this course, the students will be able to:

1. Apply the knowledge of optics to calculate geometrical parameters of thickness of thin object and radius of curvature of a lens.
2. Plot the intensity of the magnetic field of circular coil carrying current with varying distance.
3. Evaluate the Planck's constant value practically and analyze the characteristics of photo electric cell and Cauchy's constants.
4. Determine coefficient ofthermal Conductivity of a Bad Conductor.

LIST OF EXPERIMENTS:

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.
2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying Circular Coil.
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer.
5. Determination of Refractive Index of Ordinary ray $\mu_0$and extraordinary$\mu_e$ray.
6. Determination of Thickness Given Paper Strip by WedgeshapeMethod.
7. Calibration of LowRange Voltmeter.
8. Calibration of LowRange Ammeter.
9. Determination of Magnetic Moment and Horizontal Component of Earth's Magnetic Field.
10. Lees Method - Coefficient of thermal Conductivity of a Bad Conductor.
11. Carey Foster's Bridge – Verification of laws of Resistance and Determination of Specific Resistance.
12. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
13. Photoelectric cell-Characteristics.
14. Planks Constants.
15. Determination of Wavelength of Monochromaticsource using LASERdiffraction

Reference Books:

1. S.Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S.ChandPublishers, 2017.
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II SemesterCSE)

Course Category	:	Laboratory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19ALC0301	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING & IT WORKSHOP LAB					SEE	70 M

ENGINEERING WORKSHOP LAB

COURSE OBJECTIVES:

The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labor involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

COURSE OUTCOMES:

1. Acquires basic knowledge of various tools and their uses in different sections of manufacturing.
2. Apply wood working skills in real world applications.
3. Design and model various basic prototypes in the trade of fitting.
4. Able to perform various basic House Wiring techniques.

TRADES FOR EXERCISES:

(a) Carpentry: Bench Work, tools used in carpentry.

Jobs for Class work: (i) Half lap joint (ii) Mortise and Tenon joint (iii) Bridle joint (iv) Corner dovetail joint

(b) Fitting: Tools used in fitting work, Different files, chisels, hammers and bench vice.

Jobs for class work: (i) Vee Fit (ii) Square Fit (iii) Dovetail Fit (iv) Half Round Fit

(c) House Wiring: Tools used in house wiring work.

Jobs for class work: (i) Series / Parallel Connection with three bulbs (ii) Tube Light Connections (iii) Stair Case Connections (iv) Measurement of Earth Resistance / Godown Wiring

Note: At least two exercises to be done from each trade.

TRADES FOR DEMONSTRATION:

a) Plumbing
b) Machine Shop

REFERENCE BOOKS:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, SaravanaPandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

IT WORKSHOP LAB

COURSE OBJECTIVES:

1) Understand the basic components and peripherals of a computer.
2) To become familiar in configuring a system.
3) Learn the usage of productivity tools.
4) Acquire knowledge about the netiquette and cyber hygiene.
5) Get hands on experience in trouble shooting a system

COURSE OUTCOMES:

At the end of the course the students can able to

1) Assemble and disassemble the systems
2) Use the Microsoft Office Tools
3) Install various software
4) Know about various search engines
5) Trouble shoots various Hardware and Software problems.

LIST OF EXERCISES

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. Operating System Installation - Install Operating Systems like Windows, Linux along withnecessary Device Drivers.The system should be configured as dual boot with bothwindows and Linux.
3. MS-Office / Open Office
   a) Word – All Toolbars, Page Setup, Page Background, Font, Para Graph, Page Borders, Headers & Footers, Mail Merge, Tables, Symbols, Equations, Saving, and Reviewing.
   b) Excel / Spread Sheet - All Toolbars, Cell Formatting, Grid Lines, Font, Page Setup, Organize data, Functions, Formulae, Headers & Footers, Tables, Graphs and Charts.
   c) Power Point Presentation – Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets, Numbering, Slide Show, Animations, Hyperlinks, Inserting – Images, Clip Art, Shapes, Objects, Tables and Charts, Audio, and Video files.
   d) Access- creation of database, validate data.
4. Network Configuration & Software Installation-Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. Internet and World Wide Web Search Engines, Types of search engines, netiquette,cyber hygiene.
6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.

Reference Books:

1. Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, K.L. James, Eastern Economy Edition.
2. Microsoft Office 2007: Introductory Concepts and Techniques, Windows XP Edition By Gary B. Shelly, Misty E. Vermaat and Thomas J. Cashman (2007, Paperback).
3. Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, RudraPrathap, Oxford University Press, 2002.
4. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
5. The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dreamtech.
6. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
7. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester ECE, CE, and ME & II Semester CSE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0202	0	0	3	1.5	CIA	30 M
Course Title	:	BASIC ELECTRICAL & ELECTRONICS ENGG.LAB					SEE	70 M

COURSE OBJECTIVES:

1. Get exposure to common electronic components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand usage of common electrical measuring instruments.
4. Determine performance characteristics of PNJunction diodes and applications.
5. Understanding simple Network connections Like series circuits

COURSE OUTCOMES:

1. To learn about the simple Logicgates functions.
2. Understanding the simple configurations of the Transistor.
3. Useful for the simple applications of PN diode.
4. To give knowledge about PN diode characteristics.
5. Knowledge about simple Network Analysis

BASIC ELECTRICAL ENGINEERING LAB

List of Experiments:

1. Verification of Ohms Law
2. Verification of KCL and KVL Laws
3. MESH analysis
4. NODAL analysis
5. Verification of RC and RL Parallel Resonance
6. Verification of R-L-C Series Resonance

BASIC ELECTRONICS ENGINEERING LAB

List of Experiments:

1. V-I Characteristics of PN DIODE
2. Half Wave Rectifier
3. Full Wave Rectifier
4. BJT Configuration of CB, CE, CC
5. ZENER Diode Characteristics
6. Basic LOGIC gates

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester CSE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9909	3	0	0	3	CIA	30 M
Course Title	:	PROBABILITY AND STATISTICS					SEE	70 M

COURSE OBJECTIVES:-

- To familiarize the students with the foundations of probability and statistical methods
- To impart probability concepts and statistical methods in various applications Engineering

Unit I: Descriptive statistics 10 hrs Statistics Introduction, Measures of Variability (dispersion) Skewness Kurtosis, correlation, correlation coefficient, rank correlation, principle of least squares, method of least squares, regression lines, regression coefficients and their properties.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Summarize the basic concepts of data science and its importance in engineering (L2)
- Analyze the data quantitatively or categorically , measure of averages, variability (L4)
- Adopt correlation methods and principle of least squares, regression analysis (L5)

Unit II: Probability 08 hrs

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Define the terms trial, events, sample space, probability, and laws of probability (L1)
- Make use of probabilities of events in finite sample spaces from experiments (L3)
- Apply Baye's theorem to real time problems (L3)
- Explain the notion of random variable, distribution functions and expected value(L2)

Unit III: Probability distributions 08hrs

Discrete distribution - Binomial, Poisson approximation to the binomial distribution and their properties. Continuous distribution: normal distribution and their properties.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Apply Binomial and Poisson distributions for real data to compute probabilities, theoretical frequencies (L3)
- Interpret the properties of normal distribution and its applications (L2)

Unit IV: Estimation and Testing of hypothesis, large sample tests 08 hrs

Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain the concept of estimation, interval estimation and confidence intervals (L2)
- Apply the concept of hypothesis testing for large samples (L4)

Unit V: Small sample tests **08 hrs**

Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), χ^2 - test for goodness of fit, χ^2 - test for independence of attributes.

Learning Outcomes: Students will be able to

- Apply the concept of testing hypothesis for small samples to draw the inferences (L3)
- Estimate the goodness of fit (L5)

TEXT BOOKS:

1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.
2. Ronald E. Walpole, Raymond H Mayers, Sharon L.Myers, Keying Ye, Probability and statistics for Engineers & scientists., Pearson Publishers
3. Miller and Freunds, Probability and Statistics for Engineers,7/e, Pearson, 2008.

REFERENCE BOOKS:

1. S. Ross, a First Course in Probability, Pearson Education India, 2002.
2. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.
3. Peyton Z. Peebles ,Probability, Random Variables & Random Signal Principles -, McGraw Hill Education, 4th Edition, 2001.

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Make use of the concepts of probability and their applications (L3)
2. Apply discrete and continuous probability distributions (L3)
3. Classify the concepts of data science and its importance (L4)
4. Interpret the association of characteristics and through correlation and regression tools (L4)
5. Design the components of a classical hypothesis test (L6)
6. Infer the statistical inferential methods based on small and large sampling tests (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester CE, CSE & ME)

(For III Semester ECE weekly 02 hrs with 02 Credits only)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0503T	3	0	0	3	CIA	30 M
Course Title	:	DATA STRUCTURES					SEE	70 M

COURSE OBJECTIVES:-

- To teach the representation of solution to the problem using algorithm
- To explain the approach to algorithm analysis
- To introduce different data structures for solving the problems
- To demonstrate modeling of the given problem as a graph
- To elucidate the existing hashing techniques

Unit I: Introduction

Algorithm Specification, Performance analysis, Performance Measurement. Arrays: Arrays, Dynamically Allocated Arrays. Structures and Unions. Sorting: Motivation, Insertion sort, Quick sort, How fast can we sort, Merge sort, Heap sort.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Analyze the given algorithm to find the time and space complexities.(L4)
- Select appropriate sorting algorithm (L4)
- Design a sorting algorithm (L6)

Unit II: Stack, Queue and Linked lists

Stacks, Stacks using Dynamic Arrays, Queues, Circular Queues Using Dynamic Arrays, Evaluation of Expressions, Multiple Stacks and Queues. Linked lists: Singly Linked Lists and Chains, Representing Chains in C, Linked Stacks and Queues, Additional List Operations, Doubly Linked Lists.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Evaluate expressions (L5)
- Develop the applications using stacks and queues (L3)
- Construct the linked lists for various applications (L6)

Unit III: Trees

Introduction, Binary Trees, Binary Tree Traversals, Additional Binary Tree Operations, Binary Search Trees, Counting Binary Trees, Optimal Binary search Trees, AVL Trees. B-Trees: B-Trees, B + Trees.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain the concept of a tree (L2)
- Compare different tree structures (L4)
- Apply trees for indexing (L3)

Unit IV: Graphs and Hashing

The Graph Abstract Data Type, Elementary Graph Operations, Minimum Cost Spanning Trees, Shortest Paths and Transitive Closure.

Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Recognize the importance of Graphs in solving real world problems (L2)
- Apply various graph traversal methods to applications (L3)
- Design a minimum cost solution for a problem using spanning trees (L6)
- Select the appropriate hashing technique for a given application (L5)
- Design a hashing technique (L6)

Unit V: Files and Advanced sorting

File Organization: Sequential File Organization, Direct File Organization, Indexed Sequential File Organization.

Advanced sorting: Sorting on Several keys, List and Table sorts, Summary of Internal sorting, External sorting.

Learning Outcomes: Students will be able to

- Organize files (L3)
- Design the algorithms which sort the elements which doesn't fit in main memory (L6)

TEXT BOOKS:

1. Ellis Horowitz and SartajSahni, "Fundamentals of Data Structures in C", 2nd Edition, Galgotia Book Source, Pvt. Ltd., 2004.
2. ALAN L.THARP, "File Organization and Processing", Wiley and Sons, 1988.

REFERENCE BOOKS:

1. D. Samanta, "Classic Data Structures", 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012.
2. Peter Bras, "Advanced Data Structures", Cambridge University Press, 2016
3. Richard F.Gilberg, Behrouz A.Forouzan,"Data Structures A Pseudo code Approach with C", Second Edition, Cengage Learning 2005.

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Select Appropriate Data Structure for solving a real world problem. (L4)
2. Select appropriate file organization technique depending on the processing to be done. (L4)
3. Construct Indexes for Databases. (L6)
4. Analyse the Algorithms.(L4).
5. Develop Algorithm for Sorting large files of data.(L3).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester CSE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0504T	3	0	0	3	CIA	30 M
Course Title	:	PYTHON PROGRAMMING					SEE	70 M

COURSE OBJECTIVES:-

- To teach the fundamentals of Python
- To elucidate problem-solving using a Python programming language
- To introduce a function-oriented programming paradigm through python
- To develop the skill of designing Graphical user Interfaces in Python
- To learn how to use lists, tuples, and dictionaries in Python programs.

Unit I:

Introduction: What is a program, running python, Arithmetic operators, Value and Types?

Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments.

Functions: Function calls, Math functions, Composition, Adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Learning Outcomes: After successful completion of this unit, the students will be able to

- List the basic constructs of Python (L1)
- Solve the problems by applying modularity principle (L3)

Unit II:

Conditionals and Recursion: Floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input.

Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, More recursion, Leap of Faith, Checking types

Iteration: Reassignment, Updating variables, The while statement, Break, Square roots, Algorithms.

Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, The in operator, String comparison.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Apply the conditional execution of the program (L3)

- Apply the principle of recursion to solve the problems (L3)

Unit III:
Case Study: Reading word lists, Search, Looping with indices.

Lists: List is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Map filter and reduce, Deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.

Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables.

Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences.

Learning Outcomes: After successful completion of this unit, the students will be able to
- Use the data structures Lists, Dictionaries, and Tuples (L3)
- Design programs for manipulating strings (L6)

Unit IV:
Files: Persistence, Reading and writing, Format operator, Filename and paths, Catching exceptions, Databases, Pickling, Pipes, Writing modules.

Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying.

Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning

Classes and Methods: Object oriented features, Printing objects, Theinit method, The __str__method, Operator overloading, Type-based Dispatch, Polymorphism, Interface and Implementation

Inheritance: Card objects, Class attributes, Comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation.

Learning Outcomes: After successful completion of this unit, the students will be able to
- Apply object orientation concepts (L3)
- Organize data in the form of files (L6)

Unit V:
Introduction to data science:
Functional Programming, JSON and XML in Python, Numpy with Python, Pandas.

Learning Outcomes: Students will be able to
- Apply python programming for solving Data science problems (L3)
- Design solutions to Data science problems using the API supported by Python (L6)

TEXT BOOKS:

1. Allen B. Downey, “Think Python”, 2nd edition, SPD/O’Reilly, 2016.
2. Gowri Shankar S., Veena A, “Introduction to Python Programming”, CRC Press.

REFERENCE BOOKS:

1. Martin C.Brown, “The Complete Reference: Python”, McGraw-Hill, 2018.
2. Kenneth A. Lambert, B.L. Juneja, “Fundamentals of Python”, CENGAGE, 2015.
3. R. Nageswara Rao, “Core Python Programming”, 2nd edition, Dreamtech Press, 2019

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Explain the features of Python language (L2)
2. Select appropriate data structure of Python for solving a problem (L4)
3. Design object oriented programs for solving real-world problems (L6)
4. Design Data Science applications using Python (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester CSE)

Course Category	:	Humanities Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AHS9903	2	0	0	2	CIA	30 M
Course Title	:	DESIGN THINKING					SEE	70 M

COURSE OBJECTIVES:-

- To impart knowledge on design thinking process for understanding complex designs.
- To provide design skills to analyze design thinking issues and apply the tools techniques of design.
- To inculcate attitude to solve societal problems using design thinking tools.

Unit I: Introduction to Design Thinking

Design Thinking Process: Types of the thinking process, Common methods to change the human thinking process, Design thinking: Definition, Origin of design thinking, Importance of design thinking, Design vs Design thinking, Problem solving, Understanding design thinking and its process model, A framework of design thinking, The principles and the mindset of design thinking, Design thinking tools.

Unit II: Empathize

Design thinking phases, How to empathize, Role of empathy in design thinking, purpose of empathy maps, Things to be done prior to empathy mapping, Activities during and after the session, Understanding empathy tools : Customer Journey Map, Personas, Empathy changes experiences, The application of empathy to enhance marketing.

Unit III: Ideation

Challenges in idea generation, need for systematic method to connect to user, Visualize, Empathize, Ideate method, Importance of visualizing and empathizing before ideating, Applying the method, Ideation Tools: How Might We? (HMW), Story board, Brainstorming.

Unit IV: Prototyping

What is a prototype? - Prototyping as a mindset, prototype examples, prototyping for products; Why we prototype? Fidelity for prototypes, Process of prototyping- Minimum Viable prototype, Exploration centric, Audience centric, Assumption centric, Process in action- An Etsy case study.

Unit V: Testing Prototypes

Prototyping for digital products: What's unique for digital, Preparation, Low-Fidelity, Mid-Fidelity, High-Fidelity digital prototypes, prototyping for physical products: What's unique for physical products, Preparation, Low-Fidelity, Mid-Fidelity, High-Fidelity physical prototypes; Testing prototypes with users.

TEXT BOOKS:

1. S.Salivahanan, S.Suresh Kumar, D.Praveen Sam, "Introduction to Design Thinking",TataMcGraw Hill, First Edition,2019.
2. Kathryn McElroy, "Prototyping for Designers: Developing the best Digital and Physical Products", O'Reilly,2017.

REFERENCE BOOKS:

1. Michael G. Luchs, Scott Swan , Abbie Griffin, "Design Thinking – New Product Essentials from PDMA", Wiley, 2015.
2. Vijay Kumar, "101 Design Methods: A Structured Approach for Driving Innovation in Your Organization", 2012.

ADDITIONAL LEARNING RESOURCES:

1. https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process
2. https://www.ibm.com/design/thinking/page/toolkit
3. https://www.interaction-design.org/literature/article/define-and-frame-your-design-challenge-by-creating-your-point-of-view-and-ask-how-might-we
4. https://www.culturepartnership.eu/en/article/ten-tools-for-design-thinking
5. https://nptel.ac.in/courses/109/104/109104109/
6. https://nptel.ac.in/courses/110106124/

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

7. Analyze design thinking concepts and principles to perform human centered design process for creative problem solving (L4)
8. Create empathy maps to visualize user attitudes and behavior for gaining insights of customers (L6)
9. Develop innovative products/services for a customer base using ideation techniques(L3)
10. Build prototypes for complex problems using gathered user requirements (L6)
11. Apply design thinking tools techniques to produce good design and relevant products or services for a specific target market (L3)
12. Improve prototype by testing it with a specific set of users for making it sustainable by following ethics (L6).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0501	3	0	0	3	CIA	30 M
Course Title	:	COMPUTER ORGANISATION					SEE	70 M

COURSE OBJECTIVES:-

- Learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design
- Understand the structure and behavior of various functional modules of a computer.
- Discuss the techniques that computers use to communicate with I/O devices
- Study the concept of pipelining and the way it can speed up processing.
- Describe the basic characteristics of multiprocessors

Unit I:

Basic Structure of Computer: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer.

Machine Instructions and Programs: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines, Additional Instructions.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Identify the basic functional units and the ways they are interconnected to form a computer system (L2)
- Illustrate various addressing modes for accessing register and memory operands (L3)
- Describe the instruction sequencing and various types of instructions (L1)

Unit II:

Arithmetic: Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations.

Basic Processing Unit: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control, Multiprogrammed Control.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Outline the arithmetic operations on signed numbers (L2)
- Describe the operations performed on floating point numbers (L1)
- Distinguish between hardwired and microprogrammed control units (L4)

Unit III:

The Memory System: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Recognize the various types of memories (L2)
- Analyze the performance of cache memory (L4)
- Apply effective memory management strategies (L2)

Unit IV:

Input/output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Examine the basics of I/O data transfer synchronization (L4)
- Analyze the interrupt handling mechanisms of various processors (L4)
- Describe various techniques for I/O data transfer methods (L1)

Unit V:

Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets.

Large Computer Systems: Forms of Parallel Processing, Array Processors, The Structure of General-Purpose multiprocessors, Interconnection Networks.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Investigate the use of pipelining and multiple functional units in the design of high-performance processors (L4)
- Design and analyze a high performance processor (L6)
- Describe the interconnection networks for multiprocessors (L1)

TEXT BOOKS:

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky, “Computer Organization”, 5th Edition, McGraw Hill Education, 2013.

REFERENCE BOOKS:

1. M.Morris Mano, “Computer System Architecture”, 3rd Edition, Pearson Education.
2. Themes and Variations, Alan Clements, “Computer Organization and Architecture”, CENGAGE Learning.
3. SmrutiRanjanSarangi, “Computer Organization and Architecture”, McGraw Hill Education.
4. John P.Hayes, “Computer Architecture and Organization”, McGraw Hill Education

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Describe computer architecture concepts related to design of modern processors, memories and I/Os (L1)
2. Identify the hardware requirements for cache memory and virtual memory (L2)
3. Design algorithms to exploit pipelining and multiprocessors (L6)
4. Plan the use memory and I/O devices effectively (L6)
5. Identify pipeline hazards and identify possible solutions to those hazards (L2)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0502T	3	0	0	3	CIA	30 M
Course Title	:	DATA BASE MANAGEMENT SYSTEMS					SEE	70 M

COURSE OBJECTIVES:-

- Train in the fundamental concepts of database management systems, database modeling and design, SQL, PL/SQL,System implementation techniques.
- Enable students to model ER diagram for any customized applications
- Provide knowledge on concurrency techniques.

Unit I: Introduction

Database system, Characteristics (Database Vs File System), Database Users(Actors on Scene, Workers behind the scene), Advantages of Data base systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Distinguish between Database and File System (L2)
- Categorize different kinds of data models (L2)
- Define functional components of a DBMS. (L1)

Unit II:

Relational Model: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance.

Basic SQL: Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions(Date and Time, Numeric, String conversion).

Learning Outcomes: After successful completion of this unit, the students will be able to

- Outline the elements of the relational model such as domain, attribute, tuple, relation and entity (L2)
- Distinguish between various kinds of constraints like domain, key and integrity (L4)
- Define relational schema (L1)
- Develop queries using Relational Algebra and SQL (L3)
- Perform DML operations on databases (L3)

Unit III: Entity Relationship Model

Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams.

SQL: Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, view(updatable and non-updatable).

Learning Outcomes: After successful completion of this unit, the students will be able to

- Develop E-R model for the given problem (L3)
- Derive tables from E-R diagrams (L3)
- Formulate SQL queries using join operations on tables (L3)

Unit IV: Schema Refinement (Normalization)

Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3NF), concept of surrogate key, Boyce-codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

Learning Outcomes: After successful completion of this unit, the students will be able to

- Differentiate between various normal forms based on functional dependency (L2)
- Apply Normalization techniques to eliminate redundancy (L3)

Unit V: Transactions and Indexing Concepts

Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability, Failure Classification, Storage, Recovery and Atomicity, Recovery algorithm.

File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing: Tree based Indexing, Indexes and Performance Tuning

Learning Outcomes: After successful completion of this unit, the students will be able to

- Summarize transaction related concepts such as state, atomicity, durability, concurrency, serializability and recoverability(L2)
- Design atomic transactions for an application. (L3)

TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke, “Database Management Systems”, 3/e, TMH
2. A. Silberschatz, Korth “ Database System Concepts, ” 5/e, TMH 2019
3. C J Date, “Introduction to Database Systems”, 8/e, PEA.

REFERENCE BOOKS:

1. RamezElmasri, Shamkant B. Navathe, “Database Management System”, 6/e, PEA
2. Carlos Coronel, Steven Morris, Peter Robb, “Database Principles Fundamentals of Design Implementation and Management”, Cengage Learning.
3. A. Ananda Rao,Peter Robb,Carlos Coronel, “Database Management Systems”, Cengage Learning India, 2011

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Design a database for a real world information system (L6)
2. Apply Normalization techniques to eliminate redundancy.(L3)
3. Select the required information using SQL Query Language.(L1)
4. Organize the Database for efficient data retrieval. (L6)
5. Implement the Database transactions preserving the atomicity properties. (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0503	3	0	0	3	CIA	30 M
Course Title	:	DIGITAL LOGIC DESIGN					SEE	70 M

COURSE OBJECTIVES:-

- Understand basic number systems, codes and logical gates.
- Acquire the skills to manipulate and examine Boolean algebraic expressions, logical operations, and Boolean functions
- Acquaint with classical hardware design for both combinational and sequential logic circuits
- Study the design of combinational and sequential circuits.
- Explain the basics of various types of memories.

Unit I:

Digital Systems and Binary Numbers: Digital Systems, Binary Numbers, Number base conversions, Octal, Hexadecimal and other base numbers, complements, signed binary numbers, binary codes, binary storage and registers, binary logic

Boolean algebra and logic gates: Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, Digital Logic Gates.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Summarize the binary number system (L2)
- Illustrate various binary codes (L3)
- Describe the basic postulates of Boolean algebra (L1)
- Develop a logic diagram using gates from a Boolean function (L3)

Unit II:

Gate–Level Minimization: The Map Method, Four-Variable K-Map, sum of products , product of sums simplification, Don't care conditions, NAND and NOR implementation and other two level implementations, Exclusive-OR function.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Apply the map method for simplifying Boolean Expressions (L3)
- Apply Don't care conditions to simplify a Karnaugh map (L3)
- Design two-level Boolean functions with NAND gates and NOR gates (L6)

Unit III:

Combinational Logic: Combinational Circuits, Analysis of Combinational Circuits, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Select fundamental combinational logic circuits (L1)
- Analyze and design combinational circuits (L4)
- Design Boolean function with a multiplexer (L6)

Unit IV:

Synchronous Sequential Circuits: Latches, Flip-flops, analysis of clocked sequential circuits **Register and Counters:** Registers, Shift registers, Ripple counters, Synchronous counters, other counters.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain the functionalities of latch and different flip-flops (L2)
- Analyze and design clocked sequential circuits (L4)
- Describe the use of sequential circuit components in complex digital systems (L1)

Unit V:

Memory and Programmable Logic: Random-Access memory, Memory decoding, ROM,Programmable Logic Array, Programmable Array Logic, Sequential programmable devices.

Digital Integrated Circuits: RTL and DTL Circuits, Transistor-Transistor Logic (TTL), Emitter-Coupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families

Learning Outcomes: After successful completion of this unit, the students will be able to

- Interpret the types of memory (L2)
- Construct the Boolean functions with PLA and PAL (L3)
- Describe the most common integrated circuit digital logic families (L1)

TEXT BOOKS:

1. M. Morris Mano, M.D.Ciletti, “Digital Design”, 5th edition, Pearson, 2018.

REFERENCE BOOKS:

1. Donald P Leach, Albert Paul Malvino, GoutamSaha, “Digital Principles and applications”, McGrawHill , 8th Edition,2015.
2. David J. Comer, “Digital Logic & State Machine Design”, Oxford University Press, 3rd Reprinted Indian Edition, 2012
3. R.D. Sudhakar Samuel, “Digital Logic Design”, Elsevier

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Analyze the number systems and codes (L4)
2. Decide the Boolean expressions using Minimization methods (L5)
3. Design the sequential and combinational circuits (L6)
4. Apply state reduction methods to solve sequential circuits (L3)
5. Describe various types of memory (L1)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester CE, CSE & ME)

(For III Semester ECE weekly 02 hrs with 01 Credits only)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0503P	0	0	3	1.5	CIA	30 M
Course Title	:	DATA STRUCTURES LAB					SEE	70 M

COURSE OBJECTIVES:-

- To introduce to the different data structures
- To elucidate how the data structure selection influences the algorithm complexity
- To explain the different operations that can be performed on different data structures
- To introduce the different search and sorting algorithms.

LIST OF EXPERIMENTS:

1. String operations using array of pointers
2. Searching Algorithms (With the Number of Key Comparisons) Sequential, Binary and Fibonacci Search Algorithms.
3. Sorting Algorithms: Insertion Sort, Selection Sort, Shell Sort, Bubble Sort, Quick Sort, Heap Sort, Merge Sort, and Radix Sort. Using the system clock, compute the time taken for sorting of elements. The time for other operations like I/O etc should not be considered while computing time.
4. Implementation of Singly Linked List, Doubly Linked List, Circular Linked List
5. Stack implementation using arrays
6. Stack implementation using linked lists
7. Queue implementation using arrays. Implement different forms of queue. While implementing you should be able to store elements equal to the size of the queue. No positions should be left blank.
8. Queue implementation using linked lists
9. Creation of binary search tree, performing operations insertion, deletion, and traversal.
10. Breadth first search
11. Depth first search
12. Travelling sales man problem
13. File operations
14. Indexing of a file

OPTIONAL:

1. Reversing the links (not just displaying) of a linked list.
2. Consider a linked list consisting of name of a person and gender as a node. Arrange the linked list using 'Ladies first' principle. You may create new linked lists if necessary.
3. An expression can be represented in three ways: infix, prefix and postfix. All the forms are necessary in different contexts. Write modules to convert from one form to another form.
4. A table can be defined as a collection of rows and columns. Each row and column may have a label. Different values are stored in the cells of the table. The values can be of different data types. Numerical operations like summation, average etc can be performed on rows/columns which contain numerical data. Such operations are to be prevented on data which is not numeric. User may like to insert row/columns in the already existing table. User may like to remove row/column. Create table data type and support different operations on it.

COURSE OUTCOMES: After successful completion of this Lab, the students will be able to:

1. Select the data structure appropriate for solving the problem (L5)
2. Implement searching and sorting algorithms (L3)
3. Design new data types (L6)
4. Illustrate the working of stack and queue (L4)
5. Organize the data in the form of files (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester CSE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	19AES0504P	0	0	3	1.5	CIA	30 M
Course Title	:	PYTHON PROGRAMMING LAB					SEE	70 M

COURSE OBJECTIVES:-

- To train the students in solving computational problems
- To elucidate solving mathematical problems using Python programming language
- To understand the fundamentals of Python programming concepts and its applications.

LIST OF TOPICS / EXPERIMENTS:

1. Write a program to demonstrate a) Different numeric data types and b) To perform different Arithmetic Operations on numbers in Python.
2. Write a program to create, append, and remove lists in Python.
3. Write a program to demonstrate working with tuples in Python.
4. Write a program to demonstrate working with dictionaries in Python.
5. Write a program to demonstrate a) arrays b) array indexing such as slicing, integer array indexing and Boolean array indexing along with their basic operations in NumPy.
6. Write a program that accepts a string from the user and display the same string after removing vowels from it.
7. Write a program to strip a set of characters from a string.
8. Write a function that prompts the user for the average temperature for each day of the week and returns a dictionary containing the required information.
9. Write a program that has the dictionary of your friends names as keys and phone numbers as its values. Print the dictionary in a sorted order. Prompt the user to enter the name and check if it is present in the dictionary. If the name is not present, then enter the details in the dictionary.
10. Write a program to store the latitude and longitude of your house as a tuple and display it.
11. Write a program to do the following operations on files
    a) count the occurrence of each letter b) read the last n lines
    c) remove new line characters from the file d) read random line from a file
    e) read and write the contents from one csv file to another.
12. Write a program to add two polynomials using classes.
13. Create a class called library with data attributes accno, publisher, title and author. The methods of the class should include
    a) read() accno, title, author
    b) compute() – to accept the number of days late, calculate an display the fine charged at the rate of Rs. 10 per day.
    C) display the data.
14. Create a program to compute summary statistics such as mean, median, mode, standard deviation and variance of the given different types of data.
15. Write a program to create and display a DataFrame from a dictionary of data which has the index labels.
16. Write a program to create and display a one-dimensional array-like object containing an array of data using pandas library

17. Write a python pogram to add, subtract, multiply and divide two pandas series.

OPTIONAL

1. Develop a Python program to solve the n-queen problem with and without recursion.
   Problem Description
   The n-queen problem is the problem of placing n queens on an n x n chessboard such that no queen can attack another queen.
2. Design a python program to design a Calculator and Countdown timer.
3. Design a program in which the computer randomly chooses a number between 1 to 10, 1 to 100, or any range. Then give users a hint to guess the number. Every time the user guesses wrong, he gets another clue, and his score gets reduced. The clue can be multiples, divisible, greater or smaller, or a combination of all.
4. Design a simple youtube video downloader.
5. Develop a Python program which blocks the unnecessary website popups

TEXT BOOKS:

1. Francois Chollet, Deep Learning with Python, 1/e, Manning Publications Company, 2017
2. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, “How to Think Like a Computer Scientist: Learning with Python 3”, 3rd edition, Available at http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
3. Paul Barry, “Head First Python a Brain Friendly Guide” 2nd Edition, O’Reilly, 2016
4. DainelY.Chen “Pandas for Everyone Python Data Analysis” Pearson Education, 2019

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Illustrate the use of various data structures. (L3)
2. Analyze and manipulate Data using Pandas (L4)
3. Design solutions to real-world problems using Python (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(III Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0502P	0	0	3	1.5	CIA	30 M
Course Title	:	DATA BASE MANAGEMENT SYSTEMS LAB					SEE	70 M

Description of some of the Database Management Systems is given below. This is only for Reference. Instructors may use the following or use their own DBMS. Students should be asked to do the survey, identify the data that is essential, Identify the Nouns, Verbs and Attributes, Identify the keys including primary and Foreign keys, Represent them using ER diagram, Do the Normailization, Refine the ER diagrams if necessary, Identify the constraints and Triggers if any, Create tables along with keys, assertions and triggers, Design appropriate queries to retrieve the essential information as per the requirements related information gathered, Design PL/SQL programs or Procedures wherever appropriate. Instructors should ensure that all the DDL, DML statements of the DBMS which you are using are covered.

1. HOSPITAL MANAGEMENT SYSTEM

Arun hospital is a multi specialty hospital that includes a number of departments, rooms,doctors, nurses, compounders, and other staff working in the hospital. Patients having different kinds of ailments come to the hospital and get checkup done from the concerned doctors. If required they are admitted in the hospital and discharged after treatment.

The aim of this case study is to design and develop a database for the hospital to maintain the records of various departments, rooms, and doctors in the hospital. It also maintains records of the regular patients, patients admitted in the hospital, the check up of patients done by the doctors, the patients that have been operated, and patients discharged from the hospital.

Description:

In hospital, there are many departments like Orthopedic, Pathology, Emergency,Dental, Gynecology, Anesthetics, I.C.U., Blood Bank, Operation Theater, Laboratory, M.R.I., Neurology, Cardiology, Cancer Department, Corpse, etc. There is an OPD where patients come and get a card (that is, entry card of the patient) for check up from the concerned doctor. After making entry in the card, they go to the concerned doctor's room and the doctor checks up their ailments. According to the ailments, the doctor either prescribes medicine or admits the patient in the concerned department. The patient may choose either private or general room according to his/her need. But before getting admission in the hospital, the patient has to fulfill certain formalities of the hospital like room charges, etc. After the treatment is completed, the doctor discharges the patient. Before discharging from the hospital, the patient again has to complete certain formalities of the hospital like balance charges, test charges, operation charges (if any), blood charges, doctors' charges, etc.

Next we talk about the doctors of the hospital. There are two types of the doctors in the hospital, namely, *regular doctors* and *call on doctors*. Regular doctors are those doctors who come to the hospital daily. Calls on doctors are those doctors who are called by the hospital if the concerned doctor is not available.

1) **DEPARTMENT:** This table consists of details about the various departments in thehospital. The information stored in this table includes department name, department location, and facilities available in that department.

Constraint: Department name will be unique for each department.

2) **ALL_DOCTORS:** This table stores information about all the doctors working for thehospital and the departments they are associated with. Each doctor is given an identity number starting with DR or DC prefixes only.

   Constraint: Identity number is unique for each doctor and the correspondingdepartment should exist in DEPARTMENT table.

3) **DOC_REG:** This table stores details of regular doctors working in the hospital. Doctorsare referred to by their doctor number. This table also stores personal details of doctors like name, qualification, address, phone number, salary, date of joining, etc.

   Constraint: Doctor's number entered should contain DR only as a prefix and must existin ALL_DOCTORS table.

4) **DOC_ON_CALL:** This table stores details of doctors called by hospital when additionaldoctors are required. Doctors are referred to by their doctor number. Other personal details like name, qualification, fees per call, payment due, address, phone number, etc., are also stored.

   Constraint: Doctor's number entered should contain DC only as a prefix and must existin ALL_DOCTORS table.

5) **PAT_ENTRY:** The record in this table is created when any patient arrives in the hospitalfor a check up. When patient arrives, a patient number is generated which acts as a primary key. Other details like name, age, sex, address, city, phone number, entry date, name of the doctor referred to, diagnosis, and department name are also stored. After storing the necessary details patient is sent to the doctor for check up.

   Constraint: Patient number should begin with prefix PT. Sex should be*M*or*F*only.Doctor's name and department referred must exist.

6) **PAT_CHKUP:** This table stores the details about the patients who get treatment fromthe doctor referred to. Details like patient number from patient entry table, doctor number, date of check up, diagnosis, and treatment are stored. One more field status is used to indicate whether patient is admitted, referred for operation or is a regular patient to the hospital. If patient is admitted, further details are stored in PAT_ADMIT table. If patient is referred for operation, the further details are stored in PAT_OPR table and if patient is a regular patient to the hospital, the further details are stored in PAT_REG table.

   Constraint: Patient number should exist inPAT_ENTRYtable and it should be unique.

7) **PAT_ADMIT:** When patient is admitted, his/her related details are stored in this table.Information stored includes patient number, advance payment, mode of payment, room number, department, date of admission, initial condition, diagnosis, treatment, number of the doctor under whom treatment is done, attendant name, etc.

Constraint: Patient number should exist inPAT_ENTRYtable. Department, doctornumber, room number must be valid.

8) **PAT_DIS:** An entry is made in this table whenever a patient gets discharged from thehospital. Each entry includes details like patient number, treatment given, treatment advice, payment made, mode of payment, date of discharge, etc.

   Constraint: Patient number should exist inPAT_ENTRYtable.

9) **PAT_REG:** Details of regular patients are stored in this table. Information stored includesdate of visit, diagnosis, treatment, medicine recommended, status of treatment, etc.

   Constraint: Patient number should exist in patient entry table. There can be multipleentries of one patient as patient might be visiting hospital repeatedly for check up and there will be entry for patient's each visit.

10) **PAT_OPR:** If patient is operated in the hospital, his/her details are stored in this table.Information stored includes patient number, date of admission, date of operation, number of the doctor who conducted the operation, number of the operation theater in which operation was carried out, type of operation, patient's condition before and after operation, treatment advice, etc.

    Constraint: Patient number should exist inPAT_ENTRYtable. Department, doctornumber should exist or should be valid.

11) **ROOM_DETAILS:** It contains details of all rooms in the hospital. The details stored in thistable include room number, room type (general or private), status (whether occupied or not), if occupied, then patient number, patient name, charges per day, etc.

    Constraint: Room number should be unique. Room type can only be*G*or*P*and statuscan only be *Y* or *N* **E-R Diagram**

Relational Database Schema for Case Study

The relational database schema for *Hospital Management* database is as follows:

1. DEPARTMENT (D_NAME, D_LOCATION, FACILITIES)

2. ALL_DOCTORS (DOC_NO, DEPARTMENT)

3. DOC_REG(DOC_NO, D_NAME, QUALIFICATION, SALARY, EN_TIME, EX_TIME, ADDRESS, PH_NO, DOJ)

4. DOC_ON_CALL (DOC_NO, D_NAME, QUALIFICATION, FS_PR_CL, PYMT_DU, ADDRESS, PH_NO)

5. PAT_ENTRY (PAT_NO, PAT_NAME, CHKUP_DT, PT_AGE, SEX, RFRG_CSTNT, DIAGNOSIS, RFD, ADDRESS, CITY, PH_NO, DEPARTMENT)

6. PAT_CHKUP (PAT_NO, DOC_NO, DIAGNOSIS, STATUS, TREATMENT)

7. PAT_ADMIT (PAT_NO, ADV_PYMT, MODE_PYMT, ROOM_NO, DEPTNAME, ADMTD_ON, COND_ON, INVSTGTN_DN, TRMT_SDT, ATTDNT_NM)

8. PAT_DIS (PAT_NO, TR_ADVS, TR_GVN, MEDICINES, PYMT_GV, DIS_ON)

9. PAT_REG (PAT_NO, DATE_VIS, CONDITION, TREATMENT, MEDICINES, DOC_NO, PAYMT)

10. PAT_OPR (PAT_NO, DATE_OPR, IN_COND, AFOP_COND, TY_OPERATION, MEDICINES, DOC_NO, OPTH_NO, OTHER_SUG)

11. ROOM_DETAILS (<u>ROOM_NO</u>, TYPE, STATUS, RM_DL_CRG, OTHER_CRG)

2. RAILWAY RESERVATION

The railway reservation system facilitates the passengers to enquire about the trainsavailable on the basis of source and destination, booking and cancellation of tickets, enquire about the status of the booked ticket, etc.

The aim of case study is to design and develop a database maintaining the records of different trains, train status, and passengers. The record of train includes its number, name, source, destination, and days on which it is available, whereas record of train status includes dates for which tickets can be booked, total number of seats available, and number of seats already booked. The database has been developed and tested on the Oracle.

<u>Description:</u>

Passengers can book their tickets for the train in which seats are available. For this, passenger has to provide the desired train number and the date for which ticket is to be booked. Before booking a ticket for a passenger, the validity of train number and booking date is checked. Once the train number and booking date are validated, it is checked whether the seat is available. If yes, the ticket is booked with confirm status and corresponding ticket ID is generated which is stored along with other details of the passenger. After all the available tickets are booked, certain numbers of tickets are booked with waiting status. If waiting lot is also finished, then tickets are not booked and a message of non-availability of seats is displayed.

The ticket once booked can be cancelled at any time. For this, the passenger has to provide the ticket ID (the unique key). The ticket ID is searched and the corresponding record is deleted. With this, the first ticket with waiting status also gets confirmed.

<u>List of Assumption</u>

Since the reservation system is very large in reality, it is not feasible to develop the case study to that extent and prepare documentation at that level. Therefore, a small sample case study has been created to demonstrate the working of the reservation system. To implement this sample case study, some assumptions have been made, which are as follows:

1. The number of trains has been restricted to 5.
2. The booking is open only for next seven days from the current date.
3. Only two categories of tickets can be booked, namely, *AC* and *General*.
4. The total number of tickets that can be booked in each category (AC and General) is 10.

5. The total number of tickets that can be given the status of waiting is 2.
6. The in-between stoppage stations and their bookings are not considered.

Description of Tables and Procedures

Tables and procedures that will be created are as follows:

1) **TrainList:** This table consists of details about all the available trains. The informationstored in this table includes train number, train name, source, destination, fair for AC ticket, fair for general ticket, and weekdays on which train is available.

   Constraint: The train number is unique.

2) **Train_Status:** This table consists of details about the dates on which ticket can bebooked for a train and the status of the availability of tickets. The information stored in this table includes train number, train date, total number of AC seats, total number of general seats, number of AC seats booked, and number of general seats booked.
   Constraint: Train number should exist inTrainListtable.

3) **Passenger:** This table consists of details about the booked tickets. The informationstored in this table includes ticket ID, train number, date for which ticket is booked, name, age, sex and address of the passenger, status of reservation (either confirmed or waiting), and category for which ticket is booked.

   Constraint: Ticket ID is unique and the train number should exist inTrainListtable.

4) **Booking:** In this procedure, the train number, train date, and category is read from thepassenger. On the basis of the values provided by the passenger, corresponding record is retrieved from the Train_Status table. If the desired category is AC, then total number of AC seats and number of booked AC seats are compared in order to find whether ticket can be booked or not. Similarly, it can be checked for the general category. If ticket can be booked, then passenger details are read and stored in the Passenger table.

5) **Cancel:** In this procedure, ticket ID is read from the passenger and corresponding record issearched in the Passenger table. If the record exists, it is deleted from the table. After deleting the record (if it is confirmed), first record with waiting status for the same train and same category are searched from the Passenger table and its status is changed to confirm.

3. PAINTING HIRE BUSINESS

System Description:

A local businesswoman has decided to start her own Internet business, called Masterpieces Ltd, hiring paintings to private individuals and commercial companies.

Because of your reputation as a database designer she has called upon your services to design and implement a database to support her new business. At the initial planning meeting, to discuss the design, the following user requirements were requested.

The system must be able to manage the details of customers, paintings and those paintings currently on hire to customers. Customers are categorized as B (bronze), S (silver), G (gold) or P (platinum). These categories entitle a customer to a discount of 0%, 5%, 10% or 15% respectively.

Customers often request paintings by a particular artist or theme (eg animal, landscape, seascape, naval, still-life, etc). Over time a customer may hire the same painting more than once.

Each painting is allocated a customer monthly rental price defined by the owner. The owner of the painting is then paid 10% of that customer rental price. Any paintings that are not hired within six months are returned to the owner. However, after three months, an owner may resubmit a returned painting.

Each painting can only have one artist associated with it.

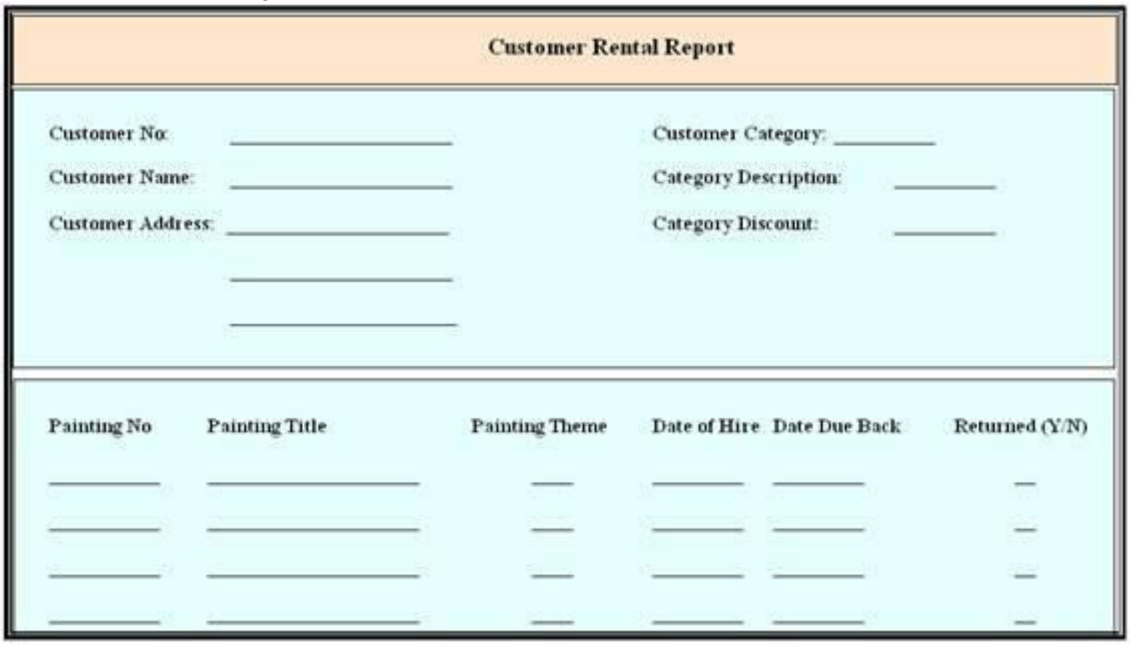
Several reports are required from the system. Three main ones are:

1) For each customer, a report showing an overview of all the paintings they have hired or are currently hiring
2) For each artist, a report of all paintings submitted for hire
3) For each artist, a returns report for those paintings not hired over the past six months

Remember to **identify key attributes** and any **foreign key attributes**.

PAGES TO BE CREATED

Customer Rental Report

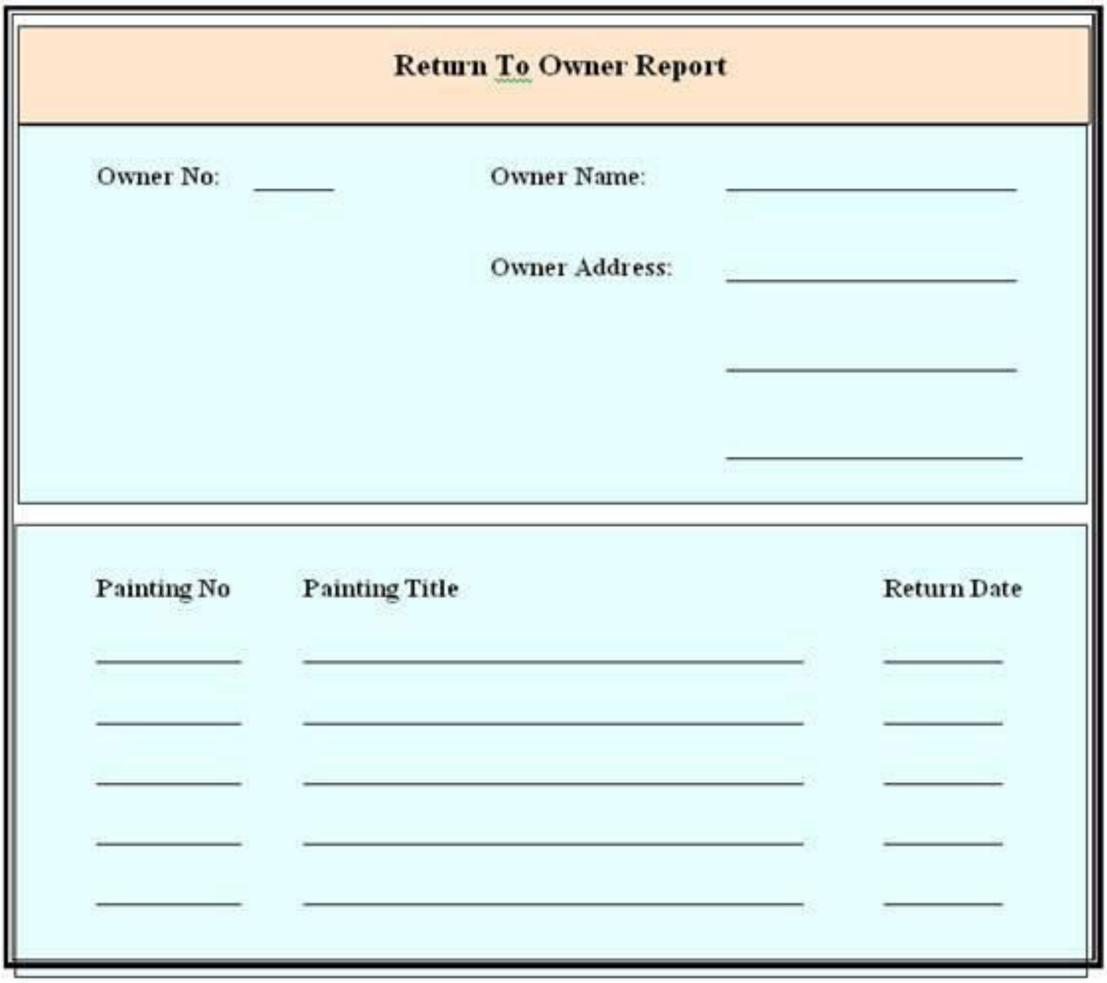

Customer Rental Report

Customer No: ____________ Customer Category: ____________
Customer Name: ____________ Category Description: ____________
Customer Address: ____________ Category Discount: ____________

Painting No	Painting Title	Painting Theme	Date of Hire	Date Due Back	Returned (Y/N)

Artist Report

Return to Owner Report



Return To Owner Report

Owner No: ______ Owner Name: ______

Owner Address: ______

Painting No	Painting Title	Return Date

4. NORMALIZATION

A relational database is to be designed for a medium sized Company dealing with industrial applications of computers. The Company delivers various products to its customers ranging from a single application program through to complete installation of hardware with customized software. The Company employs various experts, consultants and supporting staff. All personnel are employed on long- term basis, i.e. there is no short-term or temporary staff. Although the Company is somehow structured for administrative purposes (that is, it is divided into departments headed by department managers) all projects are carried out in an inter-disciplinary way. For each project a project team is selected, grouping employees from different departments, and a Project Manager (also an employee of the Company) is appointed who is entirely and exclusively responsible for the control of the project, quite independently of the Company's hierarchy. The following is a brief statement of some facts and policies adopted by the Company.

- Each employee works in some department.
- An employee may possess a number of skills
- Every manager (including the MD) is an employee
- A department may participate in none/one/many projects.
- At least one department participates in a project.
- An employee may be engaged in none/one/many projects
- Project teams consist of at least one member. For the above business stories you are expected to create the following. (i) Analyze the data required (ii) Normalize the attributes (iii) Create the logical data model (ER diagrams).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester CSE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9910	3	0	0	3	CIA	30 M
Course Title	:	DISCRETE MATHEMATICAL STRUCTURES					SEE	70 M

COURSE OBJECTIVES:-

- To explain about the Boolean Algebra, Graph theory and Recurrence relations.
- To demonstrate the application of basic methods of discrete mathematics in Computer Science problem solving.
- To elucidate solving mathematical problems from algorithmic perspective.
- To introduce the mathematical concepts which will be useful to study advanced courses Design and Analysis of Algorithms, Theory of Computation, Cryptography and Software Engineering etc.
- To reveal how solutions of graph theory can be applied to computer science problems

Unit I:

Statements and Notation, **Connectives**- Negation, Conjunction, Disjunction, Conditional and Bi-conditional, Statement formulas and Truth Tables. Well-formed formulas, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications.

Normal Forms: Disjunctive Normal Forms, Conjunctive Normal Forms, Principal Disjunctive Normal Forms (PDNF), Principal Conjunctive Normal Forms (PCNF), Ordering and Uniqueness of Normal Forms.

The Theory of Inference for the Statement Calculus: Rules of Inference, Consistency of Premises and Indirect Method of Proof.

The predicate Calculus, **Inference theory of the Predicate Calculus**.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Describe logical sentences in terms of predicates, quantifiers, and logical connectives (L1)
- Evaluate basic logic statements using truth tables and the properties of logic (L5).
- Apply rules of inference to test the consistency of premises and validity of arguments (L3).
- Verify the equivalence of two formulas and their duals (L4).
- Find the Principal Conjunctive and Principal Disjunctive Normal Forms of a statement formula (L1).

Unit II:

Set Theory: Basic concepts of Set Theory, Representation of Discrete structures, Relations and Ordering, Functions, Recursion.

Lattices and Boolean algebra: Lattices as Partially Ordered Sets, Boolean algebra, Boolean Functions, Representation and Minimization of Boolean Functions.

Algebraic Structures: Algebraic Systems: Examples and General Properties, Semi Groups and Monoids, Groups.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Describe equivalence, partial order and compatible relations (L1).

- Compute Maximal Compatibility Blocks (L3).
- Identify the properties of Lattices (L2).
- Evaluate Boolean functions and simplify expression using the properties of Boolean algebra (L5).
- Infer Homomorphism and Isomorphism (L4).
- Describe the properties of Semi groups, Monoids and Groups (L1).

Unit III:

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with repetitions, Enumerating Permutations and Combinations with constrained Representations, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion and Exclusion.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain fundamental principle of counting (L2).
- Examine the relation between permutation and combination (L4).
- Solve counting problems by applying elementary counting techniques using the product and sum rules (L3).

  Apply permutations, combinations, the pigeon-hole principle, and binomial expansion to solve counting problems (L3).

Unit IV:

Recurrence Relations: Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, The method of Characteristic Roots, Solution of Inhomogeneous Recurrence Relations.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Find the generating functions for a sequence (L1).
- Design recurrence relations using the divide-and-conquer algorithm (L6).
- Solve linear recurrence relations using method of Characteristic Roots (L3).
- Outline the general solution of homogeneous or Inhomogeneous Recurrence Relations using substitution and method of generating functions (L2).
- Solve problems using recurrence relations and recursion to analyze complexity of algorithms (L3).

Unit V:

Graphs: Basic Concepts, Isomorphism and Sub graphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatics Number, The Four-Color Problem.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Investigate if a given graph is simple or a multigraph, directed or undirected, cyclic oracyclic (L4).
- Describe complete graph and complete bipartite graphs (L1).
- Identify Euler Graphs, Hamilton Graph and Chromatic Number of a graph (L2).
- Apply the concepts of functions to identify the Isomorphic Graphs (L3).
- Apply depth-first and breadth-first search (L3).

- Apply Prim's and Kruskal's algorithms to find a minimum spanning tree (L3).

TEXT BOOKS:

1. Joe L. Mott. Abraham Kandel and Theodore P.Baker, "Discrete Mathematics for ComputerScientists& Mathematicians", 2nd Edition, Pearson, 2008.(For Units III to V).
2. J P Trembly and R Manohar, "Discrete Mathematical Structures with Applications to Computer Science", 1st Edition, McGraw Hill, 2017(For Unit I&II).

REFERENCE BOOKS:

3. Ralph P. Grimaldi and B.V.Ramana, "Discrete and Combinatorial Mathematics, an Applied Introduction", 5th Edition, Pearson, 2016.
4. NARSINGH DEO, "Graph Theory with Applications to Engineering", Prentice Hall, 1979.
5. D.S.Malik and M.K.Sen"Discrete Mathematics theory and Applications", First Edition, Cenegage Learning, 2012.
6. C L Liu and D P Mohapatra, "Elements of Discrete Mathematics, A computer Oriented approach by", 4th edition, MCGRAW-HILL, 2018.

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Evaluate elementary mathematical arguments and identify fallacious reasoning (L5).
2. Understand the properties of Compatibility, Equivalence and Partial Ordering relations, Lattices and Hassee Diagrams (L1).
3. Understand the general properties of Algebric Systems, Semi Groups, Monoids and Groups (L1).
4. Design solutions for problems using breadth first and depth first search techniques (L6)
5. Solve the homogeneous and non-homogeneous recurrence relations (L3).
6. Apply the concepts of functions to identify the Isomorphic Graphs (L3).
7. Identify Euler Graphs, Hamilton Graph and Chromatic Number of a graph (L2).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to IV Semester CSE & ECE)

Course Category	:	Humanities Sciences Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19ABS9905	3	0	0	3	CIA	30 M
Course Title	:	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS					SEE	70 M

COURSE OBJECTIVES:-

- To inculcate the basic knowledge of micro economics and financial accounting analysis
- To understand fundamentals of Production & Cost Concepts which is an important subject helps to the Technocrats to take certain business decisions in the processes of optimum utilization of resources.
- To know various types of Market Structures & pricing methods and its strategies, and Trade Blocks.
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills about accounting and to explain the process of preparing accounting statements & analysis for effective business decisions.

Unit I: INTRODUCTION TO MANAGERIAL ECONOMICS & DEMAND

Managerial Economics – Definition – Nature & Scope - Contemporary importance of Managerial Economics - Demand Analysis **-** Concept of Demand **-** Demand Function - Law of Demand - Elasticity of Demand - Significance - Types of Elasticity - Measurement of Elasticity of Demand - Demand Forecasting - Factors governing Demand Forecasting - Methods of Demand Forecasting - Relationship of Managerial Economics with Financial Accounting and Management.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the nature and scope of Managerial Economics and its importance
- Understand the concept of demand and its determinants
- Analyze the Elasticity and degree of elasticity
- Evaluate Demand forecasting methods
- Design the process of demand estimation for different types of demand

Unit II: THEORY OF PRODUCTION AND COST ANALYSIS

Production Function– Least-cost combination - Short-run and Long-run Production Function - Isoquants and Isocosts, MRTS - Cobb-Douglas Production Function - Laws of Returns - Internal and External Economies of scale – **Cost & Break Even Analysis**- Cost concepts and Cost behavior - Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems) - Managerial significance and limitations of Break-Even Analysis.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the production function, Input-Output relationship and different cost concepts
- Apply the least-cost combination of inputs
- Analyze the behavior of various cost concepts
- Evaluate BEA for real time business decisions
- Develop profit appropriation for different levels of business activity

Unit III: INTRODUCTION MARKETS AND NEW ECONOMIC ENVIRONMENT

Market structures: Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition- Monopoly - Monopolistic Competition - Oligopoly - Price - Output Determination - Pricing Methods and Strategies

Forms of Business Organizations - Sole Proprietorship - Partnership – Joint Stock Companies - Public Sector Enterprises - New Economic Environment - Economic Liberalization - Privatization – Globalization - Trade Blocks (SAARC,EU,NAFTA,BRICS)-EXIM Policy-International Economic Environment.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the structure of markets, features of different markets and forms of business organizations
- Apply the price output relationship in different markets
- Analyze the optimum output levels to maximize profit in different markets
- Evaluate price-output relationship to optimize cost, revenue and profit
- Interpret Pricing Methods and Strategies

Unit IV: CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Significance **-** Types of Capital **-** Components of Working Capital - Sources of Short-term and Long-term Capital - Estimating Working capital requirements – Cash Budget - **Capital Budgeting** – Features of Capital Budgeting Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the concept of capital budgeting and its importance in business
- Contrast and compare different investment appraisal methods
- Analyze the process of selection of investment alternatives using different appraisal methods
- Evaluate methods of capital budgeting for investment decision making and for maximizing returns
- Design different investment appraisals and make wise investments

Unit V:INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Accounting Concepts and Conventions - Introduction to Double-Entry Book Keeping, Journal, Ledger, Trial Balance - Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios-Du Pont Chart.

Learning Outcomes: After successful completion of this unit, the student will be able to:

- Know the concept, convention and significance of accounting
- Apply the fundamental knowledge of accounting while posting the journal entries
- Analyze the process and preparation of final accounts and financial ratios
- Evaluate the financial performance of an enterprise by using financial statements

Data Books Required: Present Value Factors table

TEXT BOOKS:

1. Varshney&Maheswari: “Managerial Economics”, Sultan Chand, 2013.
2. Ahuja Hl “Managerial economics” 3rd edition, S. Chand, ,2013

REFERENCE BOOKS:

1. Aryasri: “Business Economics and Financial Analysis”, 4th edition, MGH, 2019
2. S.A. Siddiqui and A.S. Siddiqui: “Managerial Economics and Financial Analysis”, New Age International,. 2013.
3. Joseph G. Nellis and David Parker: “Principles of Business Economics”, 2nd edition, Pearson, New Delhi.
4. Domnick Salvatore: “Managerial Economics in a Global Economy”, Cengage, 2013.

COURSE OUTCOMES: After successful completion of the course, the students will be able to

1. Analyze fundamentals of Economics such as Demand, Elasticity & Forecasting methods CO2 To apply production, pricing & supply concepts for effective business administration (L4)
2. Identify the influence of various markets, the forms of business organization and its International Economic Environment (L1)
3. Analyze how to invest adequate amount of capital in order to get maximum return from selected business activity (L4)
4. Prepare and analyze accounting statements like income & expenditure statement, balance sheet apart from the fundamental knowledge, to understand financial performance of the business and to initiate the appropriate decisions to run the business profitably (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0504	3	0	0	3	CIA	30 M
Course Title	:	FORMAL LANGUAGES AND AUTOMATA THEORY					SEE	70 M

COURSE OBJECTIVES:-

The course aims to introduce the basic methods and conclusions of the Theory of Computation. At the end of the course, students learn to apply these methods to problems from different fields and be guided by the results in searching for computational solutions to the problems. The

Objectives are:

1. Understand formal definitions of machine models.
2. Classify machines by their power to recognize languages.
3. Understanding of formal grammars, analysis
4. Understanding of the logical limits to computational capacity
5. Understanding of un decidable problems

Unit I:

Automata: The methods and the Madness:

Importance of automata theory, Introduction to formal proof, additional forms of proof, Inductive proofs, the central concepts of automata theory

Finite Automata: An informal picture of finite automata, Deterministic finite automata, Nondeterministic finite automata, An application: Text Search, Finite automata with Epsilon- Transitions

Unit II:

Regular Expressions and Languages:

Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, algebra laws for Regular Expressions

Properties of Regular Languages:

Proving language not to be regular, closure properties of regular languages, Decisions properties of regular languages, Equivalences and minimizations of automata

Unit III:

Context Free Grammars:

Examples and definitions, more examples, Regular grammars, Derivations Trees and ambiguity, an unambiguous CFG for algebraic expressions, simplified forms and normal forms

Pushdown Automata:

Introduction by way of an example, the definitions of a pushdown automaton, deterministic pushdown automata, A PDA corresponding to a given context free grammar, a context free grammar corresponding to a Given PDA, Parsing

Unit IV:

Context Free and Non Context Free languages:

The Pumping lemma for context-free languages, Intersections and Complements of Context free languages, Decision problems Involving context free Languages

Turing Machines: Definitions and Examples, Computing a partial function with a Turing machine, combining turning machines, variations of Turing machines: Multitape TMs, Non deterministic Turing machines, universal turning machines, models of computation and the Church Turing Thesis

Recursively Enumerable Languages:

Recursively enumerable and recursive, enumerating a language, more general grammars, context sensitive languages and the Chomsky hierarchy, Not all languages are recursively enumerable

Unit V:

Unsolvable problems: A non recursive language and an unsolvable problem, reducing one problem to another: The Halting problem, other unsolvable problem involving TMs, Rice's theorems and more unsolvable problems, Post's correspondence problems, Unsolvable problems involving context free languages

Computable Functions:

Primitive Recursive Functions, Primitive Recursive predicates and some bounded operations, unbounded minimalization and μ-Recursive functions, Godel numbering, all Computable functions are μ-Recursive, Nonnumeric functions and other approaches to computability.

TEXT BOOKS:

1. "Introduction To Languages And The Theory of Computation", John C Martin, The McGraw-Hill Companies, Third Edition,2015.
2. "Introduction to Automata Theory, Languages, and Computation", John E.Hopcroft, Rajeev Motwani, Jeffery D. Ullman, PEARSON, Third Edition,2011.

REFERENCE BOOKS:

1. "Introduction to the theory of computation", Michael sipser, cengage learning, 3rd Edition
2. "Introduction to Automata Theory, Formal Languages and Computation", Shyamalendukandar, PEARSON.
3. "Theory of computer Science Automata, Languages and Computation", K.L.P. Mishra, N. Chandrasekaran, PHI, Third Edition.
4. "Formal Languages and Automata Theory", C.K. Nagpal, OXFORD.
5. "Fundamentals of the Theory of Computation, Principles and Practice", Raymond Greenlaw, H. James Hoover, MK(MORGAN KAUFMANN)
6. "Introduction to Formal Languages, Automata Theory and Computation", Kamala Krithivasan, Rama R, PEARSON.
7. "Theory of Computation", Vivek Kulkarni, OXFORD

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Construct finite state diagrams while solving problems of computer science
2. Find solutions to the problems using Turing machines
3. Design of new grammar and language

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0505T	3	0	0	3	CIA	30 M
Course Title	:	**OBJECT ORIENTED PROGRAMMING THROUGH JAVA**					SEE	70 M

COURSE OBJECTIVES:-

1. To introduce object oriented approach for problem solving
2. To enumerate classes, objects in JAVA Programming Language
3. To explain the basics of java Console and GUI based programming
4. To demonstrate creation of user interface
5. To expose to Network programming through JAVA

Unit I: Object Oriented Thinking and Java Basics:

The History and evolution of Java, An Overview of Java, Data types, Variables and Arrays, Operators and Control Statements.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Summarize the programming constructs of JAVA (L2)
- Select appropriate control structure in solving a problem (L4)

Unit II: Classes and Inheritance

Introducing classes, A Closer look at Methods and Classes.

Inheritance: Inheritance basics, using super, creating multilevel hierarchy, when constructors are executed, method overriding, Dynamic method dispatch, Using Abstract Classes, Using final with Inheritance, The object Class.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Illustrate various types of Inheritances (L4)
- Organize the solution to the problem using inheritance (L6)
- Organize data and methods in the form of a class (L6)

Unit III: Packages, Interface, Exceptions, Multithreading

Packages and Interfaces: Packages, Packages and Member Access, Importing Packages, Interfaces, Default interface methods, use static methods in an interface, private interface methods and final thoughts on packages and interfaces, Exception Handling and Multithreading.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Organize large programs in the form of packages (L6)
- Design error free Programs using exception handling mechanism (L6)
- Apply Multithreading for improved performance (L3)

Unit IV: Event Handling and AWT

Two Event handling mechanisms, Delegation Event Model, Event Classes, The key Event Class, Sources of Events, Event Listener Interfaces, Adapter Classes and Inner classes.
Introducing the AWT: working with windows, Graphics and Text, Using AWT Controls, Layout Managers and Menus.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Explain Event Handling Mechanism (L2)
- Build Graphical User Interface using AWT Components (L6)
- Select appropriate event during the execution of the program (L5)

Unit V: Applets and Swings

Applet: Types, Basics, Class, Architecture, Skeleton, Swing Applets
Swing: Introduction, Exploring swings, Introducing swing menus.
Learning Outcomes: After successful completion of this unit, the students will be able to

1. Design Applets for web applications (L6)
2. Develop Graphical User Interface using swing components (L3)

TEXT BOOKS:

1. Herbert Schildt, "Java the Complete Reference", 10^{th} Edition, TMH, 2018.

REFERENCE BOOKS:

1. An Introduction to Programming and OO Design using Java, J.Nino and F.A. Hosch, John wiley& Sons.
2. Understanding OOP with Java Updated Edition, T. Budd, Pearson Education.
3. Joel Murac, "Java Programming", 5th Edition, SPD Publishers, 2017.

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Apply object orientation in solving the problem (L3)
2. Select Java programming construct in solving to real world problems (L3)
3. Design Web based Programming using Applets and GUI Components (L6)
4. Develop reliable programs (L3)
5. Divide a large program into packages and classes (L4)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0506	3	0	0	3	CIA	30 M
Course Title	:	OPERATING SYSTEMS					SEE	70 M

COURSE OBJECTIVES:-

1. Provide knowledge about the services rendered by operating systems
2. Present detail discussion on processes, threads and scheduling algorithms.
3. Discuss various file-system design and implementation issues
4. Provide good insight on various memory management techniques
5. Expose the students with different techniques of handling deadlocks
6. Familiarize students with the basics of Linux operating system and perform administrative tasks on Linux servers
7. Discuss how protection domains help to achieve security in a system

Unit I:

Operating Systems Overview: Operating system functions, Operating system structure, Operating systems operations, protection and security, Computing environments, Open-Source Operating Systems

System Structures: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Recognize operating system structure and functions(L2)
- Recognize operating system services(L2)
- Identify different system calls(L2)

Unit II:

Process Concept: Process scheduling, Operations on processes, Inter-process communication, Communication in client server systems.

Multithreaded Programming: Multithreading models, Thread libraries, Threading issues, Examples.

Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling, Thread scheduling, Examples.

Inter-process Communication: Race conditions, Critical Regions, Mutual exclusion with busy waiting, Sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosophers problem, Readers and writers problem.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Differentiate between preemptive, non-preemptive and real time CPU scheduling (L4)
- Identify how to achieve mutual exclusion in uniprocessor systems (L2)
- Outline Classical IPC Problems(L4)

Unit III:

Memory-Management Strategies: Introduction, Swapping, Contiguous memory allocation, Paging, Segmentation, Examples.

Virtual Memory Management: Introduction, Demand paging, Copy on-write, Page replacement, Frame allocation, Thrashing, Memory-mapped files, Kernel memory allocation, Examples.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Examine the ability to implement various memory management techniques (L4)
- Illustrate various demand paging techniques. (L4)
- Summarize Page replacement techniques and allocation of frames(L2)

Unit IV:

Deadlocks: Resources, Conditions for resource deadlocks, Ostrich algorithm, Deadlock detection And recovery, Deadlock avoidance, Deadlock prevention.

File Systems: Files, Directories, File system implementation, management and optimization.

Secondary-Storage Structure: Overview of disk structure, and attachment, Disk scheduling, RAID structure, Stable storage implementation.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Examine file systems in various operating systems (L4)
- Analyze different disk scheduling algorithms (L4)
- Investigate Deadlocks (L4)

Unit V:

System Protection: Goals of protection, Principles and domain of protection, Access matrix, Access control, Revocation of access rights.

System Security: Introduction, Program threats, System and network threats, Cryptography for security, User authentication, implementing security defenses, firewalling to protect systems and networks, Computer security classification.

Case Studies: Linux, Microsoft Windows.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Infer various schemes available for achieving system protection(L4)
- Implement various schemes available for achieving system security(L3)
- Outline protection and security in Linux and Microsoft Windows.(L1)

TEXT BOOKS:

1. Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2013.
2. Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008. (forInterprocess Communication and File systems.)

REFERENCE BOOKS:

1. Tanenbaum A S, Woodhull A S, Operating Systems Design and Implementation, 3rd edition, PHI, 2006.
2. Dhamdhere D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGraw-Hill, 2012.

3. Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009
4. Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Recognize how applications interact with the operating system (L2)
2. Analyze the functioning of a kernel in an OS (L4)
3. Summarize resource management in operating systems (L2)
4. Examine concurrency in Operating Systems (L4)
5. Select memory management techniques in operating systems(L2)
6. Compare file system interfaces for various operating systems (L2)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0507	3	0	0	3	CIA	30 M
Course Title	:	SOFTWARE ENGINEERING					SEE	70 M

COURSE OBJECTIVES:-

1. To teach the basic concepts of software engineering and life cycle models
2. To explore the issues in software requirements specification and enable students to write SRS documents for software development problems
3. To elucidate the basic concepts of software design and enable students to carry out procedural design of software development problems
4. To teach the basic concepts of black box and white box software testing and enable students to design test cases for unit, integration, and system testing
5. To reveal the basic concepts in software project management

Unit I: Basic concepts in software engineering and software project management

Basic concepts: abstraction versus decomposition, evolution of software engineering techniques, Software development life cycle (SDLC) models: Iterative waterfall model, Prototype model, Evolutionary model, Spiral model, RAD model, Agile models, software project management: project planning, project estimation, COCOMO, Halstead's Software Science, project scheduling, staffing, Organization and team structure, risk management, configuration management.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Recognize the basic issues in commercial software development (L2)
- Summarize software lifecycle models (L2)
- Infer Workout project cost estimates using COCOMO and schedules using PERT and GANTT charts (L4)

Unit II: Requirements analysis and specification

Requirements gathering and analysis, software requirements specification, Traceability, Characteristics of a Good SRS Document, IEEE 830 guidelines, Representing complex requirements using decision tables and decision trees, overview of formal system development techniques. axiomatic specification, algebraic specification.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Identify basic issues in software requirements analysis and specification (L4)
- Develop SRS document for sample problems using IEEE 830 format (L3)
- Develop algebraic and axiomatic specifications for simple problems (L3)

Unit III: Software Design

Good Software Design, Cohesion and coupling, Control Hierarchy: Layering, Control Abstraction, Depth and width, Fan-out, Fan-in, Software design approaches, object oriented vs. function oriented design. Overview of SA/SD methodology, structured analysis, Data flow diagram, Extending DFD technique to real life systems, Structured design, Detailed design, Design review, Characteristics of a good user interface, User Guidance and Online Help, Mode-based Vs Mode-less Interface, Types of user interfaces, Component-based GUI development, User interface design methodology: GUI design methodology, Task and object modeling, Selecting a metaphor, Interaction design and rough layout, User interface inspection.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Identify the basic issues in software design (L4)
- Apply the structured analysis and structured design (SA/SD) technique (L3)
- Recognize the basic issues in user interface design (L2)

Unit IV: Coding and Testing

Coding standards and guidelines, code review, software documentation, unit testing, black-box testing, white-box testing, debugging, integration testing, system testing, performance testing, regression testing.

Learning Outcomes: After successful completion of this unit, the students will be able to

- Identify the basic issues in coding practice (L4)
- Recognize the basic issues in software testing (L2)
- Design test cases for black box and white box testing (L6)

Unit V: Software quality, reliability, and other issues

Software reliability, Statistical testing, Software quality and management, ISO 9000, SEI capability maturity model (CMM), Personal software process (PSP), Six sigma, Software quality metrics, CASE and its scope, CASE environment, CASE support in software life cycle, Characteristics of software maintenance, Software reverse engineering, Software maintenance processes model, Estimation maintenance cost. Basics issues in any reuse program, Reuse approach, Reuse at organization level

Learning Outcomes: After successful completion of this unit, the students will be able to

- Summarize various methods of software quality management (L2).
- Instruct the quality management standards ISO 9001, SEI CMM, PSP, and Six Sigma (L3)
- Outline software quality assurance, quality measures, and quality control (L4)
- Identify the basic issues in software maintenance, CASE support, and software reuse (L4)

TEXT BOOKS:

1. Rajib Mall, “Fundamentals of Software Engineering”, 5th Edition, PHI, 2018.

REFERENCE BOOKS:

1. JalotePankaj, “An integrated approach to Software Engineering”, Narosa.
2. Pressman R, “Software Engineering- Practioner Approach”, McGraw Hill.
3. Somerville, “Software Engineering”, Pearson.
4. Richard Fairley, “Software Engineering Concepts”, Tata McGraw Hill.

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Teach basic software life cycle activities (L3)
2. Design software requirements specification for given problems (L6).
3. Implement structure analysis and design for given problems (L3)
4. Design test cases for given problems (L6)
5. Apply quality management concepts at the application level (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0509	3	0	0	3	CIA	30 M
Course Title	:	STATISTICAL ANALYSIS USING R					SEE	70 M

COURSE OBJECTIVES:-

1. Understanding and being able to use basic programming concepts
2. Automate data analysis
3. Working collaboratively and openly on code
4. Knowing how to generate dynamic documents
5. Being able to use a continuous test-driven development approach Course Outcomes:
6. Be able to use and program in the programming language R
7. Be able to use R to solve statistical problems
8. Be able to implement and describe Monte Carlo the technology
9. Be able to minimize and maximize functions using R

Unit I:

Introduction: Overview of R, R data types and objects, reading and writing data, sub setting R Objects, Essentials of the R Language, Installing R, Running R, Packages in R, Calculations, Complex numbers in R, Rounding, Arithmetic, Modulo and integer quotients, Variable names and assignment, Operators, Integers, Factors, Logical operations

Unit II:

Control structures, functions, scoping rules, dates and times, Introduction to Functions, preview of Some Important R Data Structures, Vectors, Character Strings, Matrices, Lists, Data Frames, Classes Vectors: Generating sequences, Vectors and subscripts, Extracting elements of a vector using subscripts, Working with logical subscripts, Scalars, Vectors, Arrays, and Matrices, Adding and Deleting Vector Elements, Obtaining the Length of a Vector, Matrices and Arrays as Vectors Vector Arithmetic and Logical Operations, Vector Indexing, Common Vector Operations

Unit III:

Lists: Creating Lists, General List Operations, List Indexing Adding and Deleting List Elements, Getting the Size of a List, Extended Example: Text Concordance Accessing List Components and Values Applying Functions to Lists, DATA FRAMES, Creating Data Frames, Accessing Data Frames, Other Matrix-Like Operations

Unit IV:

FACTORS AND TABLES, Factors and Levels, Common Functions Used with Factors, Working with Tables, Matrix/Array-Like Operations on Tables , Extracting a Subtable, R16 B.TECH IT Finding the Largest Cells in a Table, Math Functions, Calculating a Probability, Cumulative Sums and Products, Minima and Maxima, Calculus, Functions for Statistical Distributions

Unit V:

OBJECT-ORIENTED PROGRAMMING: S Classes, S Generic Functions, Writing S Classes, Using Inheritance, S Classes, Writing S Classes, Implementing a Generic Function on an S Class, visualization, Simulation, code profiling, Statistical Analysis with R, data manipulation

TEXT BOOKS:

1. R Programming for Data Science by Roger D. Peng
2. The Art of R Programming by Prashanthsingh, VivekMourya, Cengage Learning India.

REFERENCE BOOKS:

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Understand the relation between the fields Statistics and Databases (L2)
2. Apply statistical techniques on data (L3)
3. Summarize and graph data (L2)
4. Build Hypotheses tests (L6)
5. Assess Goodness-of-fit (L5)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to III Semester CE& ME and IV Semester CSE& ECE)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	19AMC9903	3	0	0	0	CIA	30 M
Course Title	:	BIOLOGY FOR ENGINEERS					SEE	--

COURSE OBJECTIVES:-

- ToprovidebasicunderstandingaboutlifeandlifeProcess. Animalanplant systems.Tounderstandwhatbimolecules, are,theirstructuresarefunctions.Applicationof certainbimoleculesinIndustry.
- Briefintroductionabouthumanphysiologyandbioengineering.
- Tounderstandhereditaryunits,i.e.DNA(genes)andRNAandtheirsynthesisinliving organism.
- HowbiologyPrinciplescanbe appliedinourdailylifeusingdifferenttechnologies.
- Briefintroductiontotheproductionoftransgenicmicrobes,Plantsandanimals.

Unit I: IntroductiontoBasicBiology

CellasBasicunitoflife,celltheory, Cellshapes, Cellstructure, Cellcycle.Chromosomes. Prokaryotic andeukaryoticCell.PlantCell,AnimalCell,PlanttissuesandAnimaltissues,Brief introductiontofivekingdomsofclassification.

Learning Outcomes: Aftercompletingthisunit, thestudentwillbeableto

- Summarizethebasisoflife.(L1)
- Understandthedifferencebetweenlowerorganisms(prokaryotes)fromhigherorganisms (eukaryotes).(L2)
- Understandhoworganismsareclassified.(L3)

Unit II: IntroductiontoBiomolecules

Carbohydrates, lipids, proteins, Vitamins and minerals, Nucleic acids (DNA and RNA) and their types. Enzymes, Enzyme application in Industry. Large scale production of enzymes by Fermentation.

Learning Outcomes: Aftercompletingthisunit, thestudentwillbeableto

- Understandwhatarebiomolecules?theirroleinlivingcells,theirstructure,functionand howtheyareproduced.(L1)
- Interpretthe relationshipbetweenthestructureandfunctionofnucleic acids.(L2)
- Summarizetheapplicationsofenzymesinindustry.(L3)
- Understandwhatisfermentationandits applicationsoffermentationinindustry.(L4)

Unit III: HumanPhysiology

Nutrition: Nutrients or food substances. Digestive system, Respiratory system, (aerobic and anaerobic Respiration). Respiratory organs, respiratory cycle. Excretory system.

Learning Outcomes: Aftercompletingthisunit,thestudentwillbeableto

- Understandwhatnutrientsare(L1)
- Understandthemechanismandprocessofimportanthumanfunctions(L2&L3)

Unit IV: IntroductiontoMolecularBiologyandrecombinantDNATechnology

Prokaryotic gene and Eukaryotic gene structure. DNA replication, Transcription and Translation. rDNA technology. Introduction to gene cloning.

Learning Outcomes: Aftercompletingthisunit,thestudentwillbeableto

- Understand and explain about gene structure and replication in prokaryotes and Eukaryotes (L1)
- How genetic material is replicated and also understands how RNA and proteins are synthesized. (L2)
- Understand about recombinant DNA technology and its application in different fields.(L3)
- Explain what is cloning. (L4)

Unit V: ApplicationofBiology

Brief introduction to industrial Production of Enzymes, Pharmaceutical and therapeutic Proteins, Vaccines and antibodies. Basics of biosensors, biochips, Bio fuels, and Bio Engineering. Basics of Production of Transgenic plants and animals.

Learning Outcomes: Aftercompletingthisunit,thestudentwillbeabletoUnderstand.

- Howbiologyis appliedforproductionof usefullproductsformankind.(L1)
- Whatarebiosensors,biochipsetc.(L2)
- Understandtransgenicplantsandanimalsandtheirproduction(L3)

TEXT BOOKS:

1. P.K.Gupta,CellandMolecularBiology,5thEdition,RastogiPublications–
2. U.Satyanarayana.Biotechnology,Books&AlliedLtd2017

REFERENCE BOOKS:

1. N.A.Campbell, J.B.Reece, L.Urry, M.L.CainandS.A.Wasserman,“Biology:AGlobalApproach”,PearsonEducation Ltd,2018.
2. TJohnson,BiologyforEngineers,CRCpress,2011
3. J.M.WalkerandE.B.Gingold, MolecularBiologyandBiotechnology2nded..PanimaPublications.PP434.
4. DavidHames,InstantNotesin Biochemistry–2016
5. PhilTunner,A.Mctennan,A. Bates &M.White,InstantNotes–MolecularBiology– 2014

COURSE OUTCOMES: After successful completion of the course, the students will be able to:

1. Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
2. Explain about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry.
3. Briefly about human physiology.
4. Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
5. Know about application of biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0505P	0	0	3	1.5	CIA	30 M
Course Title	:	OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB					SEE	70 M

COURSE OBJECTIVES:-

1. To introduce the concepts of JAVA.
2. To demonstrate the concepts using simple JAVA programs
3. To illustrate building of real-time JAVA programs

List of Experiments:

1. Write a JAVA program to display the size of primitive data types of JAVA
2. Write JAVA programs to illustrate the concepts
   - Constructor overloading
   - Method overloading
   - Different types of Inheritance
   - Interfaces
   - Exception handling: built-in, User-defined
   - Static and Dynamic Polymorphism
   - Multithreading
   - Applets
   - AWT
   - Swings
   - Keyboard and Mouse events
3. Display digital and analog clock using Applets
4. Objective test:

   Number of users will write a test from different clients. The question paper is stored in the server. Use multithreading and assume different machines. The question paper is for a maximum of 100 marks. The question paper consists of three sections for 20, 30 and 50 marks respectively. The duration of the examination is 100 minutes. At a point of time the user may answer questions from any section. The questions can be multiple choice with single or multiple answers, and True/False type. The questions are to be displayed on the left side and the status of questions answered/not-interested/marked for answering are displayed on the other side. Initially all questions are in Not-answered state. If the user answers a question and goes to the next question, then the answer is saved automatically. The user is supposed to submit the answers at the end by pressing submit button. On-time out all answered questions are automatically saved. The keyboard must be disabled during the exam time as soon as user enters his credentials.

   Write JAVA program for the above problem.
5. A College Website has to collect some credentials from students. The credentials are username, password, Account number, Bank IFCS code, and AAdhar number. Except username and Bank IFCS code, the other things should not be displayed in plain text form. For security reasons the physical keyboard is disabled. Design a virtual keyboard for the same.
6. Design a virtual keyboard. Design a simple calculator which performs basic numerical operations.

7. Spatial Attention span test: Design a 3x3 block. A '*' symbol is displayed randomly in nine blocks with 'p' seconds time interval. P is not constant and the user should be able to configure it. The user should watch the display of stars in nine blocks and answer the sequence of blocks in which '*' is displayed. The system should evaluate the answer.
8. Java program for solving the producer and consumer problem.
9. Design a simple car game which allows a line-drawn car to be controlled with the arrow buttons of the keyboard. The car should move along the path displayed. If the car goes out of the path, the car has to be moved to the shed.
10. E-Voting: Assume 'n' number of candidates are contesting the elections and each is given a symbol. When the user presses a button next to his symbol, the number of votes he got should be incremented and also a receipt has to be generated for the same. Assume NOTA. At the end, count the number of votes and display the winner.

REFERENCE BOOKS:

1. Joshua Bloch, "Effective JAVA", 2nd Edition, Pearson, 2016.
2. Robert C. Martin, "Clean Code: A Handbook of Agile Software Craftsmanship", 1st edition, Prentice Hall, 2008.
3. Craig Walls, "Spring in Action", 4th edition, Dreamtech Press, 2015.
4. Scott Oaks, "Java Performance: The Definitive Guide", 1st edition, O'Reilly, 2014

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Recognize the JAVA programming environment (L1)
2. Develop efficient programs using multithreading (L6)
3. Design reliable programs using JAVA exception handling features (L6)
4. Extend the programming functionality supported by JAVA (L3)
5. Select appropriate programming construct to solve a problem (L5)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0508	0	0	3	1.5	CIA	30 M
Course Title	:	**OPERATING SYSTEMS & SOFTWARE ENGINEERING LAB**					SEE	70 M

PART-A : OPERATING SYSTEMS

COURSE OBJECTIVES:-

1. To familiarize students with the architecture of OS.
2. To provide necessary skills for developing and debugging CPU Scheduling algorithms.
3. To elucidate the process management and scheduling and memory management.
4. To explain the working of an OS as a resource manager, file system manager, process manager, memory manager, and page replacement tool.
5. To provide insights into system calls, file systems and deadlock handling.

List of Experiments:

1. Simulate the following CPU scheduling algorithms
   a. (a) Round Robin (b) SJF (c) FCFS (d) Priority
2. Simulate all file allocation strategies
   a. (a) Sequential (b) Indexed (c) Linked
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques
   a. (a) Single level directory (b) Two level (c) Hierarchical (d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms
   a. (a) FIFO (b) LRU (c) LFU Etc. …
8. Simulate Paging Technique of memory management
9. Control the number of ports opened by the operating system with
   a. (a) Semaphore (b) monitors
10. Simulate how parent and child processes use shared memory and address space
11. Simulate sleeping barber problem
12. Simulate dining philosopher's problem
13. Simulate producer and consumer problem using threads (use java)
14. Assume there are five jobs with different weights with values ranging between 1 and 5. Implement round robin algorithm with time slice equivalent to weight.
15. Implement priority scheduling algorithm. While executing, no process should wait for more than 10sec. If waiting time is more than 10sec, that process has to executed for at least 1sec before waiting again.
16. Implement dynamic priority scheduling algorithm.

REFERENCE BOOKS:

1. "Operating System Concepts", Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth Edition, John Wiley.
2. "Operating Systems: Internals and Design Principles", Stallings, Sixth Edition–2009, Pearson Education
3. "Modern Operating Systems", Andrew S Tanenbaum, Second Edition, PHI.

4. "Operating Systems", S.Haldar, A.A.Aravind, Pearson Education.
5. "Principles of Operating Systems", B.L.Stuart, Cengage learning, India Edition 2013-2014
6. "Operating Systems", A.S.Godbole, Second Edition, TMH.
7. "An Introduction to Operating Systems", P.C.P. Bhatt, PHI

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. Trace different CPU Scheduling algorithm (L2).
2. Implement Bankers Algorithms to Avoid and prevent the Dead Lock (L3).
3. Evaluate Page replacement algorithms (L5).
4. Illustrate the file organization techniques (L4).
5. Illustrate shared memory process (L4).
6. Design new scheduling algorithms (L6)

PART-B : SOFTWARE ENGINEERING

Choose any one project

1) Student Result Management System
2) Library management system
3) Inventory control system
4) Accounting system
5) Fast food billing system
6) Bank loan system
7) Blood bank system
8) Railway reservation system
9) Automatic teller machine
10) Video library management system
11) Hotel management system
12) Hostel management system
13) E-ticketing
14) Share online trading

Do the following tasks for that project

1) Write the complete problem statement
2) Write the software requirement specification document
3) Draw the entity relationship diagram
4) Draw the data flow diagrams at level 0 and level 1
5) Draw use case diagram
6) Draw activity diagram of all use cases.
7) Draw state chart diagram of all use cases
8) Draw sequence diagram of all use cases
9) Draw collaboration diagram of all use cases
10) Assign objects in sequence diagram to classes and make class diagram.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(IV Semester CSE)

Course Category	:	Professional Core	L	T	P	C	Exam	3 Hrs
Course Code	:	19APC0510	0	0	2	1	CIA	30 M
Course Title	:	R PROGRAMMING LAB					SEE	70 M

COURSE OVERVIEW:

- Understand the fundamentals of 'R' programming
- Learn how to carry out a range of commonly used statistical methods including analysis of variance and linear regression.
- Explore data-sets to create testable hypotheses and identify appropriate statistical tests.

List of Experiments:

TASK-1 R BASIC PROGRAMS

1. R Multiplication Table
2. R Program to Check Prime Number
3. R Program to check Armstrong Number
4. R Program to Print the Fibonacci Sequence
5. R Program to Check for Leap Year
6. Check if a Number is Odd or Even in R Programming
7. R Program to Check if a Number is Positive, Negative or Zero
8. R Program to Find the Sum of Natural Numbers
9. Convert Decimal into Binary using Recursion in R
10. R program to Find the Factorial of a Number Using Recursion
11. R Program to Find the Factors of a Number
12. Fibonacci Sequence Using Recursion in R
13. R Program to Find H.C.F. or G.C.D.
14. R Program to Find L.C.M.
15. R Program to Make a Simple Calculator
16. Sum of Natural Numbers Using Recursion

TASK-2

1. Creating Vectors and sequences numbers
2. Importing Tabular data,
3. Simple summaries of categorical and continuous data.
4. Manipulating data frames and lists.
5. Writing functions in R using If/else statements.

TASK-3 A COMMON DATA CLEANING TASK

1. Write a Program on For/while loops.
2. Write a Program on Using apply() to iterate over data.
3. Write a Program on Using with() to specify environment.
4. Multivariate statistical summaries using plyr
5. Program using ggplot2 graphics

TASK-4 STATISTICAL TESTS AND MODELS

1. Write a Program on Testing for differences in means between two groups
2. Write a Program on QQ plots
3. Write a Program on Tests for 2x2 tables
4. Write a Program on Plotting confidence intervals
5. Write a Program and calculate ANOVA
6. Write a Program on Linear regression
7. Write a Program on Assessing multicollinearity
8. Write a Program on Diagnosing and interpreting regression

TASK-5 LINEAR REGRESSION

1. Write a Program on Interpreting categorical variables in regression
2. Write a Program on Interaction terms in regression

TASK-6 LOGISTIC REGRESSION

1. Program on Logstic regression

TEXT BOOKS:

1. "Beginning R the statistical programming language" Dr. Mark Gardener, Wiley Publications, 2015.

REFERENCE BOOKS:

1. Hands-On Programming with R Paperback by Grolemund (Author), Garrett (Author), SPD, 2014.
2. The R Book, Michael J. Crawley, WILEY, 2012.

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

1. List motivation for learning a programming language
2. Access online resources for R and import new function packages into the R workspace
3. Import, review, manipulate and summarize data-sets in R
4. Explore data-sets to create testable hypotheses and identify appropriate statistical tests
5. Perform appropriate statistical tests using R
6. Create and edit visualizations with R

RAYALASEEMA UNIVERSITY

(UGC 2 (f) & 12B, accredited by NAAC with 'B' Grade)

KURNOOL.

Prof.R.Sanjeeva Rao, Dean
Dean, Academic Affairs

Ph.No.9494481961
Email:deanacademicru@gmail.com

No:RU/Academic Affairs//Engg. College/BoS-Meeting/2020-21. Date:29-01-2021

Sir / Madam,

Greetings from Rayalaseema University, Kurnool !!!

I am by direction of the Hon'ble Vice Chancellor of **Rayalaseema University, Kurnool** to inform you that the Virtual **Board of Studies (BoS) meeting through ONLINE mode** has been scheduled on **02-February-2021 (Tuesday)** from **10:30 AM to 01:30 PM.**

In this regard, all the Chairpersons and Members of different Boards of Studies are hereby invited and requested to attend the meeting.

AGENDA OF THE MEETING:

To discuss and approve the following in respect of B.Tech courses in **Civil Engineering**, **Computer Science & Engineering**, **Electronics & Communication Engineering** and **Mechanical Engineering.**

1) New Academic Regulations RU20
2) The Course Structure ~~for~~
3) The Detailed Syllabi for B.Tech I Year courses

An online meeting link for the Common Boards of Studies meeting will be shared to you at least one hour before commencement of meeting on 02-02-21.

Individual Chairpersons are requested to create a meeting link for their respective Boards and share the same well in advance to the members concerned to convene the online meeting of their respective boards.

Also, the chairpersons are requested to coordinate with their respective members to have informal discussion at least a day before the meeting.

Initially, the common BoS meeting will commence at 10:30 AM, and the Hon'ble Vice Chancellor of RAYALASEEMA UNIVERSITY, Prof. A. Ananda Rao garu will address the meeting. Soon after the completion of the common Boards of Studies meeting, the individual Boards of Studies may proceed for meetings of individual boards online through the links already created by them.

Thanking you,

DEAN
Academic Affairs
Rayalaseema University,
Kurnool.

DEAN
ACADEMIC AFFAIRS
RAYALASEEMA UNIVERSITY
KURNOOL 518007 (A.P.)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
Course Structure & Syllabus for B.Tech. Degree Program
(Effective for the batches admitted from 2020-21 onwards)
COMPUTER SCIENCE & ENGINEERING

INDUCTION PROGRAM (3 weeks duration)

- Physical activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas
- Familiarization to Dept./Branch & Innovations

B. Tech – I Semester (Theory – 4, Lab – 5)

S.No	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
			THEORY							
1	BS	20ABS5401	Linear Algebra and Calculus	3	0	0	3	30	70	100
2	BS	20ABS5101T	Chemistry	3	0	0	3	30	70	100
3	ES	20AES0201T	Basic Electrical & Electronics Engg.	3	0	0	3	30	70	100
4	ES	20AES0501T	C Programming & Data Structures	3	0	0	3	30	70	100
			PRACTICAL							
5	BS	20ABS5101P	Chemistry Lab	0	0	3	1.5	30	70	100
6	ES	20AES0201P	Basic Electrical & Electronics Engineering Lab	0	0	3	1.5	30	70	100
7	ES	20AES0501P	C Programming & Data Structures Lab	0	0	3	1.5	30	70	100
8	ES	20AES0302	Engineering Workshop	0	0	3	1.5	30	70	100
9	ES	20AES0502	IT Workshop	0	0	3	1.5	30	70	100
			TOTAL:	**12**	**0**	**15**	**19.5**	**270**	**630**	**900**

B. Tech – II Semester (Theory – 6, Lab – 4)

S.No	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
			THEORY							
1	BS	20ABS5402	Differential Equations and Vector Calculus	3	0	0	3	30	70	100
2	BS	20ABS5601T	Applied Physics	3	0	0	3	30	70	100
3	HS	20AHS5201T	Communicative English	3	0	0	3	30	70	100
4	ES	20AES0503T	Python Programming	3	0	0	3	30	70	100
5	ES	20AES0301T	Engineering Drawing	1	0	2	2	30	70	100
6	MC	20AMC9902	Universal Human Values	3	0	0	0	30	--	30
			PRACTICAL							
7	BS	20ABS5601P	Applied Physics Lab	0	0	3	1.5	30	70	100
8	HS	20AHS5201P	Communicative English Lab	0	0	3	1.5	30	70	100
9	ES	20AES0503P	Python Programming Lab	0	0	3	1.5	30	70	100
10	ES	20AES0301P	Engineering Graphics Lab	0	0	2	1	30	70	100
			TOTAL:	**16**	**00**	**13**	**19.5**	**300**	**630**	**930**

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, CSE, ECE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5401	3	0	0	3	CIE	30 M
Course Title	:	LINEAR ALGEBRA AND CALCULUS					SEE	70 M

COURSE OBJECTIVES:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Bridge Course: Limits, continuity, Types of matrices

Unit I: Matrices (10 hrs)

Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homogeneous equations linear equations. Eigenvalues and Eigenvectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix.

Learning Outcomes:

At the end of this unit, the student will be able to

- Solving systems of linear equations, using technology to facilitate row reduction determine the rank, eigenvalues and eigenvectors (L3).
- Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics; (L3)

Unit II: Mean Value Theorems (06 hrs)

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), related problems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Translate the given function as series of Taylor's and Maclaurin's with remainders (L3)
- Analyze the behaviour of functions by using mean value theorems (L3)

Unit III: Multivariable calculus (10 hrs)

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. (L3)
- Acquire the Knowledge maxima and minima of functions of several variable (L1)
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables (L3)

Unit IV: Multiple Integrals **(10 hrs)**

Double integrals, change of order of integration, change of variables. Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates. Finding areas and volumes using double and triple integrals.

Learning Outcomes:

- At the end of this unit, the student will be able to
- Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates (L5)
- Apply double integration techniques in evaluating areas bounded by region (L4)
- Evaluate multiple integrals in Cartesian, cylindrical and spherical geometries (L5)

Unit V: Beta and Gamma functions **(06 hrs)**

Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand beta and gamma functions and its relations (L2)
- Conclude the use of special function in evaluating definite integrals (L4)

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 201.
4. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education

Course Outcomes:

At the end of the course, the student will be able to

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- Utilize mean value theorems to real life problems (L3)
- Familiarize with functions of several variables which is useful in optimization (L3)
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems (L5)
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ECE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5101T	3	0	0	3	CIE	30 M
Course Title	:	CHEMISTRY					SEE	70 M

COURSE OBJECTIVES:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry, Spectroscopy and polymers
- To introduce instrumental methods and modern engineering materials.

Unit I: Structure and Bonding Models **(10 hrs)**

Planck's quantum theory, dual nature of matter, Schrodinger equation, significance of Ψ and Ψ^2, applications to hydrogen, molecular orbital theory – bonding in homo- and hetero-nuclear diatomic molecules – energy level diagrams of N_2, O_2, CO and NO, π-molecular orbitals of butadiene and benzene, calculation of bond order.

Learning outcomes:

At the end of this unit, the students will be able to

- **Apply** Schrodinger wave equation to hydrogen atom (L3)
- **Recall** molecular orbital theory and energy level diagrams of atoms (L1)
- **Illustrate** the molecular orbital energy level diagram of different molecular species (L2)
- **Explain** the calculation of bond order of O_2 and CO molecules (L2)
- **Discuss** the basic concept of molecular orbital theory (L3)

Unit II: Modern Engineering Materials **(12 hrs)**

i) **Understanding of materials:** Crystal field theory – salient features – splitting in octahedral, tetrahedral and square planar geometry. Properties of coordination compounds- oxidation state, coordination number, magnetic properties and colour.

ii) **Semiconductor materials, superconductors:** Basic concept, band diagrams for conductors, semiconductors and insulators, effect of doping on band structures.

iii) **Super capacitors:** Introduction, basic concept-classification – applications.

iv) **Nano chemistry:** Introduction, classification of nano materials, properties and applications of fullerenes, carbon nano tubes and graphenenano particles.

Learning Outcomes:

At the end of this unit, the students will be able to

- **Explain** splitting of in octahedral and tetrahedral geometry of complexes (L2).
- **Recall** applications of semiconductors, super conductors, nano materials (L1)
- **Discuss** the magnetic behaviour and colour of coordination compounds (L3).
- **Explain** the band theory of solids for conductors, semiconductors and insulators (L2)
- **Demonstrate** the application of fullerenes, carbon nano tubes and graphene nanoparticles (L2).

Unit III: Electrochemistry and Applications **(12hrs)**

Introduction to electrochemistry, electrodes – concepts of reference electrodes (Calomel electrode, Ag/AgCl electrode and glass electrode); Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, pH metry, potentiometry- potentiometric titrations (redox titrations), concept of conductivity- Specific, equivalent & molar conductance and cell constant, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors (glucose potentiometric sensor), amperometric sensors (Estimation of Uric Acid (UA))

Primary cells – Zinc-air, Na-Air batteries, secondary cells – Nickel-Cadmium (NiCd),and lithium ion batteries- working of the batteries including cell reactions; fuel cells: hydrogen-oxygen, methanol fuel cells – working of the cells and applications.

Learning Outcomes:

At the end of this unit, the students will be able to

- **Apply** Nernst equation for calculating electrode and cell potentials (L3)
- **Recall** applications of various batteries (L1).
- **Explain** the theory of construction of battery and fuel cells (L2)
- **Solve** problems based on cell potential (L3)

Unit IV: Polymer Chemistry **(10 hrs)**

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (addition and condensation).

Plastics: Thermoplastics and Thermosettings, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres. Calculation of molecular Weight of polymer by weight average and number average methods, polydispersity index

Elastomers: Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers: Polyacetylene, Polyaniline, Polypyrroles – mechanism of conduction and applications.

Learning Outcomes:

At the end of this unit, the students will be able to

- **Explain** the different types of polymers and their applications (L2)
- **Find** number average and weight average of polymer (L1)
- **Explain** the preparation, properties and applications of Bakelite, Nylon-6,6, and carbon fibres (L2)
- **Describe** the mechanism of conduction in conducting polymers (L2)
- **Discuss** Buna-S and Buna-N elastomers and their applications (L2)

Unit V: Instrumental Methods and Applications **(08 hrs)**

Regions of electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible**,** IR Spectroscopies- Principle, selection rules and applications. Solid-Liquid Chromatography–TLC, retardation factor.

Learning outcomes:

At the end of this unit, the students will be able to:

- **Explain** the different types of spectral series in electromagnetic spectrum (L2)
- **Understand** the principles of UV-Vis, IR Spectroscopy (L2)
- **Find** retention time and volumes of samples (L1**)**
- **Explain** the various applications of analytical instruments (L2)

Text Books:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. ArunBahl, B.S. Bahl and G.D. Tuli, Essentials of Physical Chemistry, S.Chand Publication, New Delhi 2012.

Reference Books:

1. J.D. Lee, Concise Inorganic Chemistry, 5/e, Oxford University Press, 2008.
2. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
3. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Course Outcomes:

At the end of the course, the students will be able to:

- **Compare** the materials for construction of battery and electrochemical sensors (L2)
- **Recall** properties and applications of polymers and engineering materials (L1)
- **Explain** the preparation, properties, and applications of thermoplastics & thermosetting, elastomers & conducting polymers. (L2)
- **Explain** the principles of spectrometry, TLC in separation of solid and liquid mixtures (L2)
- **Apply** the principle of Band diagrams in application of conductors and semiconductors (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, CSE and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0201T	3	0	0	3	CIA	30 M
Course Title	:	BASIC ELECTRICAL & ELECTRONICS ENGG.					SEE	70 M

PART-A: BASIC ELECTRICAL ENGINEERING

COURSE OBJECTIVES:-

- To introduce basics of electric circuits.
- To teach DC and AC electrical circuit analysis.
- To explain working principles of transformers and electrical machines.
- To impart knowledge on Power system generation, transmission and distribution

UNIT I: DC & AC Circuits

Electrical circuit elements (R - L and C) - Kirchhoff laws - Series and parallel connection of resistances with DC excitation. Superposition Theorem - Representation of sinusoidal waveforms - peak and rms values - phasor representation - real power - reactive power - apparent power – power factor - Analysis of single-phase ac circuits consisting of RL - RC - RLC series circuits, Resonance.

Learning Outcomes

At the end of this unit, the student will be able to

- Recall Kirchoff laws
- Analyze simple electric circuits with DC excitation
- Apply network theorems to simple circuits
- Analyze single phase AC circuits consisting of series RL - RC - RLC combinations

UNIT II: DC & AC Machines:

Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator – principle and operation of DC Motor – Performance Characteristics of DC Motor - Speed control of DC Motor – Principle and operation of Single Phase Transformer - OC and SC tests on transformer - Principle and operation of 3-phase AC machines [Elementary treatment only]

Learning Outcomes

At the end of this unit, the student will be able to

- Explain principle and operation of DC Generator & Motor.
- Perform speed control of DC Motor
- Explain operation of transformer and induction motor.
- Explain construction & working of induction motor - DC motor

UNIT III: Basics of Power Systems

Layout & operation of Hydro, Thermal, Nuclear Stations - Solar & wind generating stations – Typical AC Power Supply scheme – Elements of Transmission line – Types of Distribution systems: Primary & Secondary distribution systems.

Learning Outcomes

At the end of this unit, the student will be able to

- Understand working operation of various generating stations
- Explain the types of Transmission and Distribution systems

Text Books:

1. D. P. Kothari and I. J. Nagrath - "Basic Electrical Engineering" - Tata McGraw Hill - 2010.
2. V.K. Mehta &Rohit Mehta, "Principles of Power System" – S.Chand – 2018.

References:

1. L. S. Bobrow - "Fundamentals of Electrical Engineering" - Oxford University Press - 2011.
2. E. Hughes - "Electrical and Electronics Technology" - Pearson - 2010.
3. C.L. Wadhwa – "Generation Distribution and Utilization of Electrical Energy", 3rd Edition, New Age International Publications.

Course Outcomes:

The student should be able to

- Apply concepts of KVL/KCL in solving DC circuits
- Understand and choose correct rating of a transformer for a specific application
- Illustrate working principles of DC Motor
- Identify t ype of electrical machine based on their operation
- Understand the basics of Power generation, Transmission and Distribution

PART-B: <u>ELECTRONICS ENGINEERING</u>

COURSE OBJECTIVES:-

- **Understand principles and terminology of electronics.**
- **Familiar with the theory, construction, and operation of electronic devices.**
- **Learn about biasing of BJTs and FETs.**
- **Design and construct amplifiers.**
- **Understand the concept & principles of logic devices.**

Unit I:

Diodes and Applications: Semiconductor Diode, Diode as a Switch& Rectifier, Half Wave and Full Wave Rectifiers with and without Filters; Operation and Applications of Zener Diode, LED, Photo Diode.

Transistor Characteristics: Bipolar Junction Transistor (BJT) – Construction, Operation, Amplifying Action, Common Base, Common Emitter and Common Collector Configurations, Operating Point, Biasing of Transistor Configuration; Field Effect Transistor (FET) – Construction, Characteristics of Junction FET, Concepts of Small Signal Amplifiers –CE & CC Amplifiers.

Learning outcomes:

1. Remember and understand the basic characteristics of semiconductor diode. (L1)
2. Understand principle of operation of Zener diode and other special semiconductor diodes. (L1)
3. Analyze BJT based biasing circuits. (L3)
4. Design an amplifier using BJT based on the given specifications. (L4)

Unit II:

Operational Amplifiers and Applications: Introduction to Op-Amp, Differential Amplifier Configurations, CMRR, PSRR, Slew Rate; Block Diagram, Pin Configuration of 741 Op-Amp, Characteristics of Ideal Op-Amp, Concept of Virtual Ground; Op-Amp Applications - Inverting, Non-Inverting, Summing and Difference Amplifiers, Voltage Follower, Comparator, Differentiator, Integrator.

Learning outcomes:

1. Describe operation of Op-Amp based linear application circuits, converters, amplifiers and non-linear circuits. (L2)
2. Analyze Op-Amp based comparator, differentiator and integrator circuits. (L3)

Unit III:

Digital Electronics: Logic Gates, Simple combinational circuits–Half and Full Adders, BCD Adder. Latches and Flip-Flops (S-R, JK and D), Shift Registers and Counters. Introduction to Microcontrollers and their applications (Block diagram approach only).

Learning outcomes:

1. Explain the functionality of logic gates. (L2)
2. Apply basic laws and De Morgan’s theorems to simplify Boolean expressions. (L3)
3. Analyze standard combinational and sequential circuits. (L4)
4. Distinguish between 8085 & 8086 microprocessors also summarize features of a microprocessor. (L5)

Text Books:

1. R. L. Boylestad& Louis Nashlesky, Electronic Devices &Circuit Theory, Pearson Education,2007.
2. Ramakanth A. Gayakwad, Op-Amps & Linear ICs, 4thEdition, Pearson, 2017.
3. R. P. Jain, Modern Digital Electronics,3rd Edition, Tata Mcgraw Hill,2003.
4. Raj Kamal, Microcontrollers: Architecture, Programming, Interfacing and System Design, 2nd Edition, Pearson, 2012.

Reference Books:

1. SantiramKal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India,2002.
2. R. S. Sedha, A Text Book of Electronic Devices and Circuits, S.Chand& Co,2010.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

COURSE OUTCOMES:

After the completion of the course students will able to

CO1: Explain the theory, construction, and operation of electronic devices.

CO2: Apply the concept of science and mathematics to explain the working of diodes and its applications, working of transistor and its characteristics.

CO3: Design and analyze small signal amplifier circuits applying the biasing techniques.

CO4: Solve problems of various digital logic gates and circuits.

CO5: Correlate the fundamental concepts to various Real life applications of today.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0501T	3	0	0	3	CIE	30 M
Course Title	:	C PROGRAMMING & DATA STRUCTURES					SEE	70 M

COURSE OBJECTIVES:

- To illustrate the basic concepts of C programming language.
- To discuss the concepts of Functions, Arrays, Pointers and Structures of C Programming Language.
- To discuss the syntax and semantics of C Programming language
- To familiarize with Stack, Queue, Linked lists, Tree and graph data structures.
- To demonstrate programming by choosing appropriate Data Structures and Features of the C language.

Unit I:

Getting Started: What is C, The C Character Set, Constants, Variables and Keywords, Types of C Constants, Rules for Constructing Integer Constants, Rules for Constructing Real Constants, Rules for Constructing Character Constants, Types of C Variables, Rules for Constructing Variable Names, C Keywords, Form of a C Program, Comments in a C Program, What is main, Variables and their Usage, printf( ) and its Purpose, Compilation and Execution, Receiving Input.

Data Types Revisited: Integers, long and short, Integers, signed and unsigned, Chars, signed and unsigned, Floats and Doubles, A Few More Issues, Storage Classes in C-Automatic Storage Class, Register Storage Class, Static Storage Class, and External Storage Class.

C Instructions: Types of Instructions, Type Declaration Instruction, Arithmetic Instructions, Integer and Float Conversions, Type Conversion in Assignments, Hierarchy of Operations, Associativity of Operators, Control Instructions.

Decision Control Instruction: Decisions! Decisions, The if Statement, The Real Thing, Multiple Statements within if, The if-else Statement, Nested if-elses, Forms of if.

Learning Outcomes:

1. Understand the basic concepts of C language (L2)
2. Learn the functionality of operators and Control Statements of C (L2)
3. Use the if control structure of the C language (L3)

Unit II:

More Complex Decision Making: Use of Logical Operators, The else if Clause, The ! Operator, Hierarchy of Operators Revisited, a Word of Caution, the Conditional Operators.

Loop Control Instruction: Loops, the while Loop, Tips and Traps, More Operators.

More Complex Repetitions: The for Loop, Nesting of Loops, Multiple Initializations in the for Loop, The break Statement, The continue Statement, The do-while Loop, The Odd Loop.

Case Control Instruction: Decisions using switch, The Tips and Traps, switch versus if-else Ladder, The goto Keyword.

Functions: What is a Function?, Why use Functions?, Passing Values between Functions, Scope Rule of Functions, Order of Passing Arguments, Using Library Functions, One Dicey Issue, Return Type of Function.

Learning Outcomes:

1. Apply the concept of Loops in various applications. (L3)
2. Design programs using modular approach (L6)

Unit III:

Recursion: Recursion, Recursion and Stack

Pointers: Call by Value and Call by Reference, an Introduction to Pointers, Pointer Notation, Back to Function Calls.

The C Preprocessor: Features of C Preprocessor, Macro Expansion, Macros with Arguments, Macros versus Functions, File Inclusion.

Arrays: What are Arrays?, A Simple Program using Array, More on Arrays, Array Initialization Array Elements in Memory, Bounds Checking, Passing Array Elements to a Function, Pointers and Arrays, Passing an Entire Array to a Function, The Real Thing.

Multidimensional Arrays: Two-Dimensional Arrays, Initializing a Two-Dimensional Array, Memory Map of a Two-Dimensional Array, Pointers and Two-Dimensional Arrays, Pointer to an Array, Passing 2-D Array to a Function, Array of Pointers, Three-Dimensional Array.

Learning Outcomes:

1. Solve problems by using Recursion (L3)
2. Understand the concept of Array (L2)
3. Use pointers to efficiently use memory (L3)

Unit IV:

Strings: What are Strings, More about Strings, Pointers and Strings

Standard Library String Functions-strlen ( ), strcpy ( ), strcat ( ), strcmp ( ).

Handling Multiple Strings: Two-Dimensional Array of Characters, Array of Pointers to Strings, Limitation of Array of Pointers to Strings.

Structures: Why use Structures? Declaring a Structure, Accessing Structure Elements, How Structure Elements are Stored? Array of Structures, Additional Features of Structures, Uses of Structures.

Console Input/output: Types of I/O, **Console I/O Functions**-Formatted Console I/O Functions, sprintf ( ) and sscanf ( ) Functions Unformatted Console I/O Functions

File Input/output: Data Organization, **File Operations**-Opening a File, Reading from a File, Trouble in Opening a File, Closing the File, Counting Characters, Tabs, Spaces, **A File-Copy Program**-Writing to a File, File Opening Modes, **String (Line) I/O in Files**-The Awkward Newline, Record I/O in Files, Text Files and Binary Files, Record I/O Revisited, Database Management, **Low-Level File I/O** -A Low-Level File-Copy Program, I/O under Windows.

Learning Outcomes:

1. Understand the concept of Strings (L2)
2. Learn Structures and Unions (L2)
3. Operate Files through C Programs (L4)
4. Manipulate strings (L3)

Unit V:

Data Structures: Linked List-Single Linked List, Double Linked List, Circular Linked List. Stacks-Using Arrays and Linked List, Stack Applications.

Queue- Arrays and Linked List, Circular Queue, Priority Queue.

Trees-Binary Trees, Binary Search Tree.

Graphs-Graphs Implementation using Arrays and Linked List, Traversal of Graphs.

Learning Outcomes:

1. Implements basic data structures such as stacks, queues and trees.(L3)
2. Apply algorithms and data structures in solving problems. (L3)
3. Design indexing structures (L6)

Text Books:

1. YashavantKanetkar, "Let Us C", Fourteenth Edition, BPB Publications.
2. K R Venugopal, Sudeep R Prasad, "Mastering C", McGrawHill publications
3. Jeri R. hanly, Elliot B. Koffman, Ashok Kamthane, A. Ananda Rao, "Programming in C and Data Structures", Pearson.

Reference Books:

1. Brian W Kernighan and Dennis M Ritchie, "The C Programming Language", Second Edition, Prentice Hall Publication.
2. Ellis Horowitz, SartajSahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Computer Science Press.
3. PradipDey and Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition 2011.
4. Richard F. Gilberg&Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C", Second Edition, CENGAGE Learning, 2011.

Course Outcomes:

1. Learn the concepts of C Programming language. (L2)
2. Design applications in C, using functions, arrays, pointers and structures. (L6)
3. Apply the concepts of Stacks and Queues in solving the problems. (L3)
4. Explore various operations on Linked lists. (L5)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ECE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5101P	0	0	3	1.5	CIE	30 M
Course Title	:	CHEMISTRY LAB					SEE	70 M

COURSE OBJECTIVES:

- Verify the fundamental concepts with experiments.

List of Experiments:

1. Conductometric titration of Strong acid vs Strong base.
2. Conductometric titration of weak acid vs Strong base.
3. Determination of cell constant and conductance of solutions.
4. Potentiometry - determination of redox potentials and EMF.
5. Acid-Base titration by pH metry.
6. Determination of Strength of an acid in Pb-Acid battery.
7. Preparation of polymer- Bakelite.
8. Verification Lambert-Beer's law.
9. Estimation of manganese by Colorimetry.
10. Separation of organic mixtures by Thin layer chromatography (TLC).
11. Identification of simple organic compounds by IR.
12. Preparation of nano materials by precipitation.
13. Estimation of Ferrous Iron by Potassium dichromate.
14. Measurement of 10Dq by spectrophotometric method.
15. Models of potential energy surfaces.

Course Outcomes:

At the end of the course, the students will be able to

- **Determine** the cell constant and conductance of solutions (L3)
- **Find** conductivity of acid and base (L1)
- **Prepare** polymer Bakelite materials (L2)
- **Measure** the strength of an acid present in secondary batteries (L3)
- **Analyse**the IR spectra of some organic compounds (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, CSE and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0201P	3	0	0	3	CIA	30 M
Course Title	:	BASIC ELECTRICAL & ELECTRONICS ENGG. LAB					SEE	70 M

PART-A: BASIC ELECTRICAL ENGINEERING LAB

COURSE OBJECTIVES:-

- To Verify Kirchoff's laws and Superposition theorem
- To learn performance characteristics of DC Machines.
- To perform various tests on 1- Phase Transformer.
- To Study the I – V Characteristics of Solar PV Cell

LIST OF EXPERIMENTS: -

1. Verification of Kirchhoff laws.
2. Verification of Superposition Theorem.
3. Magnetization characteristics of a DC Shunt Generator.
4. Speed control of DC Shunt Motor.
5. OC & SC test of 1 – Phase Transformer.
6. Load test on 1-Phase Transformer.
7. I – V Characteristics of Solar PV cell
8. Brake test on DC Shunt Motor.

COURSE OUTCOMES:

After completing the course, the student will be able to

- Understand Kirchoff's Laws & Superposition theorem.
- Analyze the various characteristics on DC Machines by conducting various tests.
- Analyze I – V Characteristics of PV Cell
- Apply the knowledge to perform various tests on 1-phase transformer

PART-B: ELECTRONICS ENGINEERING LAB

COURSE OBJECTIVES:-

- To verify the theoretical concepts practically from all the experiments.
- To analyze the characteristics of Diodes, BJT, MOSFET, UJT.
- To design the amplifier circuits from the given specifications.
- Exposed to linear and digital integrated circuits.

LIST OF EXPERIMENTS: (**Execute Six experiments**).

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Full Wave Rectifier with & without filter.
4. Wave Shaping Circuits. (Clippers & Clampers)
5. Input & Output characteristics of Transistor in CB / CE configuration.
6. Frequency response of CE amplifier.
7. Inverting and Non-inverting amplifiers using Op-Amps.
8. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.

9. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

COURSE OUTCOMES:

CO1: Learn the characteristics of basic electronic devices like PN junction diode, Zener diode & BJT.

CO2: Analyze the application of diode as rectifiers, clippers and clampers.

CO3: Learn the fundamental principles of amplifier circuits and need of Bias in Amplifier circuits.

CO4: Learn the basics of linear integrated circuits and understand characteristics of operational amplifier.

CO5: Learn about available digital ICs and verify truth tables of Logic gates and Flipflops.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0501P	0	0	3	1.5	CIE	30 M
Course Title	:	C PROGRAMMING & DATA STRUCTURES LAB					SEE	70 M

COURSE OBJECTIVES:

- To illustrate the concepts of C programming language
- To discuss the syntax and semantics of C programming language.
- To demonstrate using arrays, strings, pointers and structures.
- To illustrate the use of Stacks and Queues
- To teach different operations on linked lists.
- To demonstrate Binary search tree traversal techniques.

Week 1

For the first few weeks students have to do some practice programs to understand the concepts of the C programming language

Week 2

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program that uses functions to perform the following:
   (i) Addition of Two Matrices (ii) Multiplication of Two Matrices

Week 3

a) Write a C program that uses functions to perform the following operations:
   (i) To insert a sub-string in to a given main string from a given position.
   (ii) To delete n characters from a given position in a given string.

Week 4

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn‘t contain T.
b) Write a C program to count the lines, words and characters in a given text.

Week 5

a) Write a C Program to perform various arithmetic operations on pointer variables.
b) Write a C Program to demonstrate the following parameter passing mechanisms:
   (i) call-by-value (ii) call-by-reference

Week 6

Write a C program that uses functions to perform the following operations:

(i) Reading a complex number
(ii) Writing a complex number
(iii) Addition of two complex numbers
(iv) Multiplication of two complex numbers
(Note: represent complex number using a structure.)

Week 7

Write C programs that implement stack (its operations) using

(i) Arrays (ii) Pointers

Week 8

Write C programs that implement Queue (its operations) using

(i) Arrays (ii) Pointers

Week 9

Write a C program that uses Stack operations to perform the following:

(i) Converting infix expression into postfix expression

(ii) Evaluating the postfix expression

Week 10

Write a C program that uses functions to perform the following operations on singly linked list.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 11

Write a C program that uses functions to perform the following operations on Doublylinkedlist.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 12

Write a C program that uses functions to perform the following operations on circular linkedlist.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 13

Write a C program that uses functions to perform the following:

(i) Creating a Binary Tree of integers

(ii) Traversing the above binary tree in preorder, inorder and postorder.

Week 14

Write C programs that use both recursive and non-recursive functions

(i) To find the factorial of a given integer.

(ii) To find the GCD (greatest common divisor) of two given integers.

(iii) To solve Towers of Hanoi problem.

Week 14

Write C programs that use both recursive and non-recursive functions to perform the following searching operations for a key value in a given list of integers:

(i) Linear search (ii) Binary search

Week 15

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

(i) Bubble sort (ii) Selection sort (iii) Insertion sort

Week 16 Application development

College information system – The students in groups can collect the information about the college and design a project which automates the some of the tasks like Attendance calculation, Grade calculation, etc.

TEXT BOOKS:

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
2. B.A. Forouzon and R.F. Gilberg, “COMPUTER SCIENCE: A Structured Programming Approach Using C”, Third edition, CENGAGE Learning, 2016.
3. Richard F. Gilberg&Behrouz A. Forouzan, “Data Structures: A Pseudocode Approach with C”, Second Edition, CENGAGE Learning, 2011.

REFERENCE BOOKS:

1. PradipDey and ManasGhosh, Programming in C, Oxford University Press, 2nd Edition 2011.
2. E.Balaguruswamy, “C and Data Structures”, 4th Edition, Tata McGraw Hill.
3. A.K.Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press.
4. M.T.Somashekara, “Problem Solving Using C”, PHI, 2nd Edition 2009.

COURSE OUTCOMES:

1. Demonstrate basic concepts of C programming language. (L2)
2. Develop C programs using functions, arrays, structures and pointers. (L6)
3. Illustrate the concepts Stacks and Queues. (L2)
4. Design operations on Linked lists. (L6)
5. Apply various Binary tree traversal techniques. (L3)
6. Develop searching and sorting methods. (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0302	0	0	3	1.5	CIE	30 M
Course Title	:	ENGINEERING WORKSHOP					SEE	70 M

COURSE OBJECTIVES:

- To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills.

LIST OF EXPERIMENTS

Trade I: Wood Working

Familiarity with different types of woods and tools used in wood working and make following joints

(a) Half – Lapjoint (b) Mortise and Tenonjoint (c) Corner Dovetail joint or Bridlejoint

Trade II: Sheet Metal Working

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets

(a) Taperedtray (b)Conicalfunnel (c)Elbowpipe (d)Brazing

Trade III: Fitting

Familiarity with different types of tools used in fitting and do the following fitting exercises.

(a) V-fit (b)Dovetailfit (c) Semi-circularfit

(d) Bicycle tyre puncture and change of two wheeler tyre.

Trade IV: Electrical Wiring

Familiarities with different types of basic electrical circuits and make the following connections

(a) Parallelandseries (b) Twowayswitch (c)Godownlighting

(d) Tubelight (e) Threephasemotor (f) Soldering ofwires

COURSE OUTCOMES:

After completion of this lab the student will be able to

- Apply wood working skills in real world applications.(l3)
- Build different objects with metal sheets in real world applications.(l3)
- Apply fitting operations in various applications.(l3)
- Apply different types of basic electric circuit connections.(l3)
- Use soldering and brazing techniques.(l2)

Note: In each section a minimum of three exercises are to be carried out.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0502	0	0	3	1.5	CIE	30 M
Course Title	:	IT WORKSHOP					SEE	70 M

COURSE OBJECTIVES:

- To make the students know about the internal parts of a computer, assembling and dissembling a computer from the parts, preparing a computer for use by installing the operating system
- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, and Presentations
- To demonstrate Networking of computers and use Internet facility for Browsing and Searching
- To illustrate the need for security while using applications and devices.

Preparing your Computer

Task 1:

Learn about Computer: Identify the internal parts of a computer, and its peripherals, Represent the same in the form of diagrams including Block diagram of a computer, Write specifications for each part of a computer including peripherals and specification of a Desktop computer.

Task 2:

Assembling a Computer: Disassemble and assemble the PC back to working condition, Trouble shoot the computer and identify working and non-working parts, Identify the problem correctly by various methods like beeps.

Task 3:

Install Operating system and Applications: Install Linux on the computer, Install another operating system and make the system dual boot or multi boot, Install operating systems using Virtual machine.
Access the computing resources like CD/DVD drives, Pen drives, Printers, Speakers, Microphone, etc.
Install device drivers and install application programs.

Networking and Internet

Task 4:

Networking: Connect two computers directly using a cable or wireless connectivity and share information, Connect two or more computers using switch/hub and share information, Phuscally connect computers using crimpling activity, logical configuration, etc.

Task 5:

Browsing Internet: Access the Internet for Browsing, Search the Internet for required information, Create e-mail account, send and receive email, Get acquaintance with applications like Facebook, skype, etc.

Task 6:
Antivirus: Download freely available Antivirus software, install it and use it to check for threats to the computer being used, Submit information about the features of the antivirus used, installation process, virus definitions, virus engine, etc. Configure the computer for high security.

Productivity tools
Task 7:
Word Processor: Create documents using the word processor tool, Inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc.
Prepare project cover pages, content sheet, and chapter pages.

Task 8:
Presentations: Creating, opening, saving, and running the presentations, selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show.

Task 9:
Spreadsheet: Create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells.

Applications
Task 10:
Database management system: Install a Database management system, configure users, do some administration tasks.

Task 11:
Language Translators
Install different Natural language translators in a Computer/Mobile. Use them to convert text between different languages.
Use Voice to access applications and make them perform different tasks like calling users, etc.

Task 12:
Sharing
Install applications github, dropbox, google forms, google docs and use them to share information and work on a common project. It is a Team task.

Task 13:
IDE
Install applications like Vscode, and Eclipse and use the integrated development environment of those applications and perform tasks like editing, compiling, executing, etc.

Task 14:

Cyber Security

Practice the following Cyber Security related tasks

- Cyber Hygiene Practices of Personal digital devices
- Cyber Hygiene Practices for Home
- Cyber Hygiene Practices for Remote working and Learning
  Websource: Cyber Hygiene Practices - ISEA (infosecawareness.in)

References:

1. Peter Norton , Introduction to Computers, McGraw Hill
2. Joan Lambert, Joyce Cox, MOS study guide for word, Excel, Powerpoint& Outlook Exams, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Rusen , Networking your computers and devices, PHI
5. Bigelows , Trouble shooting, Maintaining & Repairing PCs, TMH
6. Major reference is Websites like Google.com, dropbox.com, github.com and others.

Course Outcomes:

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use. (L6)
- Prepare the Documents using Word processors and Prepare spread sheets for calculations using excel. (L3)
- Design Slide presentations using the presentation tool. (L6)
- Interconnect two or more computers for information sharing. (L4)
- Access the Internet and Browse it to obtain the required information. (L4)
- Analyze the vulnerabilities of the devices, and apply security features (L4)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, CSE, ECE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5402	3	0	0	3	CIE	30 M
Course Title	:	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS					SEE	70 M

COURSE OBJECTIVES:

1) To enlighten the learners in the concept of differential equations and multivariable calculus.
2) To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

UNIT I: Linear differential equations of higher order (Constant Coefficients) (10 hrs)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskean, method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Mass spring system.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify the essential characteristics of linear differential equations with constant coefficients (L3)
- Solve the linear differential equations with constant coefficients by appropriate method (L3)
- Classify and interpret the solutions of linear differential equations (L3)
- Formulate and solve the higher order differential equation by analyzing physical situations (L3)

UNIT II: Partial Differential Equations (08 hrs)

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order equations using Lagrange's method.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply a range of techniques to find solutions of standard PDEs (L3)
- Outline the basic properties of standard PDEs (L2)

UNIT III: Applications of Partial Differential Equations (10 hrs)

Classification of PDE, method of separation of variables for second order equations. Applications of Partial Differential Equations: One dimensional Wave equation, One dimensional Heat equation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Calcify the PDE (L3)
- Learn the applications of PDEs(L2)

UNIT IV: Vector differentiation (06 hrs)

Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions-Divergence and Curl, vector identities.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply del to Scalar and vector point functions (L3)

- Illustrate the physical interpretation of Gradient, Divergence and Curl (L3)

UNIT 5: Vector integration **(08 hrs)**

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Learning Outcomes:

At the end of this unit, the student will be able to

- find the work done in moving a particle along the path over a force field (L4)
- evaluate the rates of fluid flow along and across curves (L4)
- apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals (L3)

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

Reference Books:

1. George B.Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
2. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
4. S L Ross , Differential Equations ,Wiley India, year 2007 edition.

Course Outcomes:

At the end of the course, the student will be able to

- Solve the differential equations related to various engineering fields (L6)
- Identify solution methods for partial differential equations that model physical processes (L3)
- Interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
- Estimate the work done against a field, circulation and flux using vector calculus (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CSE and ECE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5601T	3	0	0	3	CIA	30 M
Course Title	:	APPLIED PHYSICS					SEE	70 M

COURSE OBJECTIVES:

- To make a bridge between the physics in school and engineering courses.
- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
- To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibres along with engineering applications.
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- To enlighten the concepts of Quantum Mechanics and to provide fundamentals of de'Broglie waves, quantum mechanical wave equation and its applications, the importance of free electron theory and band theory of solids.
- Evolution of band theory to distinguish materials, basic concepts and transport phenomenon of charge carriers in semiconductors. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

UNIT I: Wave Optics **(12 hrs)**

Interference- Principle of superposition – Interference of light – Conditions for sustained interference - Interference in thin films (Reflection Geometry) – Colors in thin films – Newton's Rings – Determination of wavelength and refractive index.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Grating spectrum.

Polarization-Introduction – Types of polarization – Polarization by reflection, refraction and double refraction - Nicol's Prism - Half wave and Quarter wave plates with applications.

Learning Outcomes:

The students will be able to

1. **Explain** the need of coherent sources and the conditions for sustained interference (L2)
2. **Identify** engineering applications of interference (L3)
3. **Analyze** the differences between interference and diffraction with applications (L4)
4. **Illustrate** the concept of polarization of light and its applications (L2)
5. **Classify** ordinary polarized light and extraordinary polarized light (L2)

Unit II: Lasers and Fiber optics **(08 hrs)**

Lasers: Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Lasing action – Pumping mechanisms – Nd-YAG laser – He-Ne laser – Applications of lasers.

Fiber optics: Introduction – Principle of optical fiber – Acceptance Angle – Numerical Aperture – Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers – Propagation Losses (qualitative) – Applications.

Learning Outcomes:
The students will be able to

1. **Understand** the basic concepts of LASER light Sources (L2)
2. **Apply** the concepts to learn the types of lasers (L3)
3. **Identifies** the Engineering applications of lasers (L2)
4. **Explain** the working principle of optical fibers (L2)
5. **Classify** optical fibers based on refractive index profile and mode of propagation (L2)
6. **Identify** the applications of optical fibers in various fields (L2)

Unit III: Dielectric and Magnetic Materials (08 hrs)

Dielectric Materials-Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – Types of polarizations: Electronic and Ionic, Orientation polarizations (Qualitative) – Lorentz internal field – Clausius-Mossotti equation-Dielectric loss.

Magnetic Materials-Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and Permeability – Origin of permanent magnetic moment – Classification of magnetic materials: Dia, para & Ferro-Domain concept of Ferromagnetism (Qualitative) – Hysteresis – Soft and Hard magnetic materials.

Learning Outcomes:
The students will be able to

1. **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
2. **Summarize** various types of polarization of dielectrics (L2)
3. **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
4. **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2)
5. **Explain** the applications of dielectric and magnetic materials (L2)
6. **Apply** the concept of magnetism to magnetic devices (L3)

Unit IV:Quantum Mechanics, Free Electron Theory and Band theory of Solids (10 hrs)

Quantum Mechanics- Dual nature of matter – Schrodinger's time independent and dependent wave equations – Significance of wave function – Particle in a one-dimensional infinite potential well.

Free Electron Theory-Classical free electron theory (Merits and demerits only) – Quantum free electron theory – Equation for electrical conductivity based on quantum free electron theory – Fermi-Dirac distribution – Density of states – Fermi energy.

Band theory of Solids- Bloch's Theorem (Qualitative) – Kronig-Penney model (Qualitative) – E vs k diagram – Classification of crystalline solids – Effective mass of electron – m^*vs k diagram – Concept of hole.

Learning Outcomes:
The students will be able to

1. **Explain** the concept of dual nature of matter (L2)
2. **Understand** the significance of wave function (L2)
3. **Interpret** the concepts of classical and quantum free electron theories (L2)
4. **Explain** the importance of K-P model
5. **Classify** the materials based on band theory (L2)
6. **Apply** the concept of effective mass of electron (L3)

Unit V: Semiconductors and Superconductors (10 hrs)

Semiconductors- Introduction – Intrinsic semiconductors – Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors – Density of charge carriers – Dependence of Fermi energy on carrier concentration and temperature – Drift and diffusion currents – Einstein's equation – Direct and indirect band gap semiconductors – Hall effect – Hall coefficient – Applications of Hall effect.

Superconductors- Introduction – Properties of superconductors – Meissner effect – Type I and Type II superconductors – BCS theory – Josephson effects (AC and DC) – High T_c superconductors – Applications of superconductors.

Learning Outcomes:
The students will be able to

1. **Classify** the energy bands of semiconductors (L2)
2. **Interpret** the direct and indirect band gap semiconductors (L2)
3. **Identify** the type of semiconductor using Hall effect (L2)
4. **Identify** applications of semiconductors in electronic devices (L2)
5. **Explain** how electrical resistivity of solids changes with temperature (L2)
6. **Classify** superconductors based on Meissner's effect (L2)
7. **Explain** Meissner's effect, BCS theory & Josephson effect in superconductors (L2)

Text books:

1. Engineering Physics – Dr. M.N. Avadhanulu& Dr. P.G. Kshirsagar, S. Chand and Company
2. Engineering Physics – B.K. Pandey and S. Chaturvedi, Cengage Learning.

Reference Books:

1. Engineering Physics – Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018
2. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press
3. Semiconductor physics and devices- Basic principle – Donald A, Neamen, McGraw Hill
4. Introduction to solid state physics – Charles Kittel, Wiley Publishers

COURSE OUTCOMES:

1. **Explain** the need of coherent sources and the conditions for sustained interference (L2). **Identify** the applications of interference in engineering (L3). **Analyze** the differences between interference and diffraction with applications (L4). **Illustrate** the concept of polarization of light and its applications (L2). **Classify** ordinary polarized light and extraordinary polarized light (L2).
2. **Explain** various types of emission of radiation (L2). **Identify** the role of laser in engineering applications (L3). **Describe** the construction and working principles of various types of lasers (L1). **Explain** the working principle of optical fibers (L2). **Classify** optical fibers based on refractive index profile and mode of propagation (L2). **Identify** the applications of optical fibers in medical, communication and other fields (L2). **Apply** the fiber optic concepts in various fields (L3).
3. **Explain** the concept of dielectric constant and polarization in dielectric materials (L2). **Summarize** various types of polarization of dielectrics (L2). **Interpret** Lorentz field and Claussius-Mosotti relation in dielectrics (L2). **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2). **Explain** the applications of dielectric and magnetic materials (L2). **Apply** the concept of magnetism to magnetic devices (L3).
4. **Describes** the dual nature of matter (L1). **Explains** the significance of wave function (L2). **Identify** the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). **Identify** the role of classical and quantum free electron theory in the study of electrical conductivity (L3).
5. **Classify** the energy bands of semiconductors (L2). **Outline** the properties of charge carriers (L2). **Interpret** the direct and indirect band gap semiconductors (L2). **Identify** the type of semiconductor using Hall effect (L2). **Identify** applications of semiconductors in electronic devices (L2). **Explain** how electrical resistivity of solids changes with temperature (L2).

Classify superconductors based on Meissner's effect (L2).**Explain** Meissner's effect, BCS theory & Josephson effect in superconductors (L2).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE and ECE)
(Common to II Semester CSE and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AHS5201T	3	0	0	3	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH					SEE	70 M

INTRODUCTION:

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

COURSE OBJECTIVES:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Unit I: On the Conduct of Life: William Hazlitt

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph. **Grammar and Vocabulary:** Parts of Speech, Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Learning Outcomes

At the end of the module, the learners will be able to

1. understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
2. ask and answer general questions on familiar topics and introduce oneself/others
3. employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
4. recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs

5. form sentences using proper grammatical structures and correct word forms

Unit II: The Brook: Alfred Tennyson

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs/small groups on specific topics followed by short structured talks.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters.

Grammar and Vocabulary: Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Learning Outcomes

At the end of the module, the learners will be able to

1. comprehend short talks on general topics
2. participate in informal discussions and speak clearly on a specific topic using suitable discourse markers
3. understand the use of cohesive devices for better reading comprehension
4. write well structured paragraphs on specific topics
5. identify basic errors of grammar/ usage and make necessary corrections in short texts

Unit III: The Death Trap: Saki

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

Writing: Summarizing, Paragraph Writing.

Grammar and Vocabulary: Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Learning Outcomes

At the end of the module, the learners will be able to

1. Comprehend short talks and summarize the content with clarity and precision
2. Participate in informal discussions and report what is discussed
3. Infer meanings of unfamiliar words using contextual clues
4. Write summaries based on global comprehension of reading/listening texts
5. Use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing

Unit IV: Innovation: Muhammad Yunus

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.

Writing: Letter Writing: Official Letters/Report Writing.

Grammar and Vocabulary: Quantifying expressions - adjectives and adverbs; comparing and contrasting; Voice - Active & Passive Voice

Learning Outcomes
At the end of the module, the learners will be able to

1. Infer and predict about content of spoken discourse
2. Understand verbal and non-verbal features of communication and hold formal/informal conversations
3. Interpret graphic elements used in academic texts
4. Produce a coherent paragraph interpreting a figure/graph/chart/table
5. Use language appropriate for description and interpretation of graphical elements

Unit V: Politics and the English Language: George Orwell
Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides.
Reading: Reading for comprehension.
Writing: Writing structured essays on specific topics using suitable claims and evidences.
Grammar and Vocabulary: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Learning Outcomes
At the end of the module, the learners will be able to

- ➢ take notes while listening to a talk/lecture and make use of them to answer questions
- ➢ make formal oral presentations using effective strategies
- ➢ comprehend, discuss and respond to academic texts orally and in writing
- ➢ produce a well-organized essay with adequate support and detail
- ➢ edit short texts by correcting common errors

Text Books:

1. **Language and Life: A Skills Approach- I Edition 2019, Orient Black Swan.**

Reference Books:

1. Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
2. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
3. Raymond Murphy's *English Grammar in Use* Fourth Edition (2012) E-book
4. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
5. Oxford Learners Dictionary, 12th Edition, 2011
6. Norman Lewis *Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary* (2014)
7. *Speed Reading with the Right Brain: Learn to Read Ideas Instead of Just Words* by David Butler.

Web links

- www.englishclub.com
- www.easyworldofenglish.com
- www.languageguide.org/english/
- www.bbc.co.uk/learningenglish
- www.eslpod.com/index.html
- www.myenglishpages.com

COURSE OUTCOMES

At the end of the course, the learners will be able to

1. **Understand** the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
2. **Apply** grammatical structures to formulate sentences and correct word forms
3. **Analyze** discourse markers to speak clearly on a specific topic in informal discussions
4. **Evaluate** reading/listening texts and to write summaries based on global comprehension of these texts.
5. **Create** a coherent paragraph interpreting a figure/graph/chart/table

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(II Semester CSE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0503T	3	0	0	3	CIE	30 M
Course Title	:	PYTHON PROGRAMMING					SEE	70 M

COURSE OBJECTIVES:

- To teach the fundamentals of Python
- To elucidate problem-solving using a Python programming language
- To introduce a function-oriented programming paradigm through python
- To develop the skill of designing Graphical user Interfaces in Python
- To learn how to use lists, tuples, and dictionaries in Python programs.

Unit I:

Introduction: What is a program, running python, Arithmetic operators, Value and Types?

Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments.

Functions: Function calls, Math functions, Composition, Adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Learning Outcomes: Student should be able to

- List the basic constructs of Python (L1)
- Solve the problems by applying modularity principle (L3)

Unit II:

Conditionals and Recursion: Floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input.

Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, More recursion, Leap of Faith, Checking types

Iteration: Reassignment, Updating variables, The while statement, Break, Square roots, Algorithms.

Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, The in operator, String comparison.

Learning Outcomes: Student should be able to

- Apply the conditional execution of the program (L3)
- Apply the principle of recursion to solve the problems (L3)

Unit III:

Case Study: Reading word lists, Search, Looping with indices.

Lists: List is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Map filter and reduce, Deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.

Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables.
Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences.

Learning Outcomes: Student should be able to

- Use the data structures Lists, Dictionaries, and Tuples (L3)
- Design programs for manipulating strings (L6)

Unit IV:
Files: Persistence, Reading and writing, Format operator, Filename and paths, Catching exceptions, Databases, Pickling, Pipes, Writing modules.
Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying.
Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning
Classes and Methods: Object oriented features, Printing objects, Theinit method, The __str__method, Operator overloading, Type-based Dispatch, Polymorphism, Interface and Implementation
Inheritance: Card objects, Class attributes, Comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation.

Learning Outcomes: Student should be able to

- Apply object orientation concepts (L3)
- Organize data in the form of files (L6)

Unit V: Introduction to data science:
Functional Programming, JSON and XML in Python, Numpy with Python, Pandas.

Learning Outcomes: Student should be able to

- Apply python programming for solving Data science problems (L3)
- Design solutions to Data science problems using the API supported by Python (L6)

Text books:

1) Allen B. Downey, “Think Python”, 2nd edition, SPD/O’Reilly, 2016.
2) GowriShankar S., Veena A, “Introduction to Python Programming”, CRC Press.

Reference Books:

1) Martin C.Brown, “The Complete Reference: Python”, McGraw-Hill, 2018.
2) Kenneth A. Lambert, B.L. Juneja, “Fundamentals of Python”, CENGAGE, 2015.
3) R. Nageswara Rao, “Core Python Programming”, 2nd edition, Dreamtech Press, 2019

Course Outcomes: Student should be able to

- Explain the features of Python language (L2)
- Select appropriate data structure of Python for solving a problem (L4)
- Design object oriented programs for solving real-world problems (L6)
- Design Data Science applications using Python (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE & ECE and II Semester CSE & ME)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0301T	3	0	0	3	CIE	30 M
Course Title	:	ENGINEERING DRAWING					SEE	70 M

COURSE OBJECTIVES:

- Bring awareness that Engineering Drawing is the Language ofEngineers.
- Familiarize how industry communicates technicalinformation.
- Teach the practices for accuracy and clarity in presenting the technicalinformation.
- Develop the engineering imagination essential for successfuldesign.

Unit I:

Introduction to Engineering Drawing: Principles of Engineering Drawing and its significance - Conventions in drawing - lettering - BIS conventions.

(a) Conic sections including the rectangular hyperbola- general methodonly,
(b) Cycloid, epicycloids andhypocycloid c) Involutes

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the significance of engineering drawing
- Know the conventions used in the engineering drawing
- Identify the curves obtained in different conic sections
- Draw different curves such as cycloid, involute and hyperbola

Unit II:

Projection of points, lines and planes: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the meaning of projection
- Know how to draw the projections of points, lines
- Differentiate between projected length and true length
- Find the true length of the lines

Unit III:

Projections of solids: Projections of regular solids inclined to one or both planes by rotational or auxiliaryviewsmethod.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the procedure to draw projection of solids
- Differentiate between rotational method and auxillary view method.
- Draw the projection of solid inclined to one plain

- Draw the projection of solids inclined to both the plains

Unit IV:
Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone. True shapes of the sections.

Learning Outcomes:
At the end of this unit the student will be able to
- Understand different sectional views of regular solids
- Obtain the true shapes of the sections of prism
- Draw the sectional views of prism, cylinder, pyramid and cone

Unit V:
Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts.

Learning Outcomes:
At the end of this unit the student will be able to
- Understand the meaning of development of surfaces
- Draw the development of regular solids such as prism, cylinder, pyramid and cone
- Obtain the development of sectional parts of regular shapes

Text Books:

1) K.L.Narayana&P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
2) N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers,2016.

Reference Books:

1) Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right,2009
2) Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers,2000
3) Shah and Rana, Engineering Drawing, 2/e, Pearson Education,2009
4) K.C.John, Engineering Graphics, 2/e, PHI,2013
5) Basant Agarwal &C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Course Outcomes:
After completing the course, the student will be able to
- Draw various curves applied in engineering. (l2)
- Show projections of solids and sections graphically. (l2)
- Draw the development of surfaces of solids.(l3)

Additional Sources
Youtube: http-sewor,Carleton.cag,kardos/88403/drawings.html conic sections-online, red woods.edu

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CSE and ME)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	20AMC9902	3	0	0	0	CIA	30 M
Course Title	:	UNIVERSAL HUMAN VALUES					SEE	--

INTRODUCTION

This course discusses the role of human values in one's family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course names as Universal Human Values is designed which, may be covered in their I-I or I-II Semester.

In the Induction Program, students would get an initial exposure to human values through Universal Human Values-I. This exposure is to be augmented by this compulsory full semester foundation course.

COURSE OBJECTIVES

1. Exposure to the value of life, society and harmony
2. Leading towards holistic perspective based on self-exploration about themselves (human being), family, and society and nature/existence.
3. Bringing transition from the present state to Universal Human Order
4. Instill commitment and courage to act.
5. Know about appropriate technologies and management patterns

UNIT I:Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Universal Human Values-I - Self-Exploration - content and process; 'Natural Acceptance' and Experiential Validation - self-exploration - Continuous Happiness and Prosperity - Human Aspirations - current scenario - Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT II: Understanding Harmony in the Human Being - Harmony in Myself!

Human being as a co-existence of the sentient 'I' and the material 'Body' - the needs - happiness and physical facility -the Body as an instrument of 'I' - the characteristics and activities of 'I' and harmony in 'I' - the harmony of I with the Body

UNIT III: Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship

Values in human relationship; meaning of Justice; Trust and Respect; Difference between intention and competence; the other salient values in relationship - the harmony in the society: Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals - Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

UNIT IV: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

The harmony in the Nature - Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature - Understanding Existence as Co-existence of mutually interacting units in all- pervasive space - Holistic perception of harmony at all levels of existence.

UNIT V: Implications of the above Holistic Understanding of Harmony on Professional Ethics
Humanistic Education - Competence in professional ethics: professional competence - people friendly and eco-friendly production systems - appropriate technologies and management patterns for above production systems. Individuals as socially and ecologically responsible engineers, technologists and managers

TEXT BOOKS:

1. *A Foundation Course in Human Values and Professional Ethics*, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2. Teachers' Manual for *A Foundation Course in Human Values and Professional Ethics*, R.R. Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

REFERENCE BOOKS:

1. JeevanVidya: EkParichaya, ANagaraj, JeevanVidyaPrakashan, Amarkantak, 1999
2. HumanValues, A.N.Tripathi, New Age Intl.Publishers, NewDelhi,2004.
3. The Story of Stuff (Book).
4. Economy of Permanence - J C Kumarappa 8. Bharat Mein Angreji Raj – PanditSunderlal 9. Rediscovering India – by Dharampal
5. Hind Swaraj or Indian Home Rule - by Mohandas K.Gandhi
6. India Wins Freedom - Maulana Abdul Kalam Azad 12. Vivekananda - Romain Rolland(English)

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

COURSE OUTCOMES:
By the end of the course the student will be able to:

1. Define terms like Natural Acceptance, Happiness and Prosperity
2. Understand awareness of oneself, and ones surroundings (family, society, Nature)
3. Apply what they have learnt to their own self in different day-to-day Settings in real life
4. Relate human values with human relationship and human society.
5. Justify the need for universal human values and harmonious existence.
6. Develop as socially and ecologically responsible engineers.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CSE and ECE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5601P	0	0	3	1.5	CIA	30 M
Course Title	:	APPLIED PHYSICS LAB					SEE	70 M

COURSE OBJECTIVES:

- Understands the concepts of interference, diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semiconductor.
- Illustrates the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

Note: In the following list, out of 15 experiments, any 10 experiments must be performed in a semester

List of Experiments:

1. Determine the thickness of the wire using wedge shape method

    Experimental outcomes:

    Operates optical instrument like travelling microscope. (L2)
    Estimate the thickness of the wire using wedge shape method (L2)
    Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)

2. Determination of the radius of curvature of the lens by Newton's ring method

    Experimental outcomes:

    Operates optical instrument like travelling microscope. (L2)
    Estimate the radius of curvature of the lens (L2)
    Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)
    Plots the square of the diameter of a ring with no. of rings (L3)

3. Determination of wavelength by plane diffraction grating method

    Experimental outcomes:

    Operates optical instrument like spectrometer. (L2)
    Estimate the wavelength of the given source (L2)
    Identifies the formation of grating spectrum due diffraction. (L2)

4. Determination of dispersive power of prism.

    Experimental outcomes:

    Operates optical instrument like spectrometer. (L2)
    Estimate the refractive index and dispersive power of the given prism (L2)
    Identifies the formation of spectrum due to dispersion. (L2)

5. Determination of wavelength of LASER light using diffraction grating.

    Experimental outcomes:

    Operates various instrument (L2)
    Estimate the wavelength of laser source (L2)
    Identifies the formation of grating spectrum due diffraction. (L2)

6. Determination of particle size using LASER.

Experimental outcomes:

Operates various instrument (L2)

Estimate the Particles size using laser (L2)

Identifies the application of laser (L2)

7. To determine the numerical aperture of a given optical fiber and hence to find its acceptance angle

   Experimental outcomes:

   Operates various instruments and connect them as per the circuit. (L2)

   Estimate the numerical aperture and acceptance angle of a given optical fiber. (L2)

   Identifies the significance of numerical aperture and acceptance angle of an optical fiber in various engineering applications. (L2)

8. Determination of dielectric constant by charging and discharging method.

   Experimental outcomes:

   Operates various instruments and connect them as per the circuit. (L2)

   Estimate the dielectric constant of the given substance. (L2)

   Identifies the significance of dielectric constant in various devices. (L2)

9. Determination of magnetic field along the axis of a circular coil carrying current by Stewart and Gee's method.

   Experimental outcomes:

   Operates various instruments and connect them as per the circuit. (L2)

   Estimate the magnetic field along the axis of a circular coil carrying current. (L2)

   Plots the intensity of the magnetic field of circular coil carrying current with distance (L3)

10. Measurement of magnetic susceptibility by Gouy's method

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)

    Estimate the magnetic susceptibility of the given material. (L2)

    Identifies the significance of magnetic susceptibility in various engineering applications. (L2)

11. To Study the variation of B versus H by magnetizing the magnetic material (B-H loop)

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)

    Estimate the hysteresis loss, coercivity and retentivity of the ferromagnetic material. (L2)

    Classifies the soft and hard magnetic material based on B-H curve. (L2)

    Plots the magnetic field H and flux density B (L3)

12. To determine the resistivity of semiconductor by Four probe method

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)

    Estimate the resistivity of a semiconductor. (L2)

    Identifies the importance of four probe method in finding the resistivity of semiconductor. (L3)

13. To determine the energy gap of a semiconductor

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)

    Estimate the energy gap of a semiconductor. (L2)

    Illustrates the engineering applications of energy gap. (L3)

    Plots1/T with log R (L3)

14. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall Effect.

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)

    Estimate the charge carrier concentration and mobility in a semiconductor. (L2)

Illustrates the applications of Hall Effect. (L3)
Plots the voltage with current and voltage with magnetic field (L3)

15. Measurement of resistance with varying temperature.

Experimental outcomes:

Operates various instruments and connect them as per the circuit. (L2)
Estimate the resistance with varying temperature. (L2)
Plots resistance R with temperature T (L3)

Course Outcomes:

The students will be able to

1. **Operate** optical instruments like microscope and spectrometer (L2)
2. **Determine** thickness of a hair/paper with the concept of interference (L2)
3. **Estimate** the wavelength of different colors using diffraction grating and resolving power (L2)
4. **Plot** the intensity of the magnetic field of circular coil carrying current with distance (L3)
5. **Evaluate** the acceptance angle of an optical fiber and numerical aperture (L3)
6. **Determine** the resistivity of the given semiconductor using four probe method (L3)
7. **Identify** the type of semiconductor i.e., n-type or p-type using hall effect (L3)
8. **Calculate** the band gap of a given semiconductor (L3)

References:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE and ECE)

(Common to II Semester CSE and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AHS5201P	0	0	3	1.5	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH LAB					SEE	70 M

COURSE OBJECTIVES:

- Students will be exposed to a variety of self instructional, learner friendly modes of language learning
- Students will learn better pronunciation through stress, intonation and rhythm
- Students will be trained to use language effectively to face interviews, group discussions, public speaking
- Students will be initiated into greater use of the computer in resume preparation, report writing, format making etc

LIST OF TOPICS

1. Phonetics
2. Reading comprehension
3. Describing objects/places/persons
4. Role Play or Conversational Practice
5. Just-A-Minute (JAM)
6. Etiquettes of Telephonic Communication
7. Information Transfer
8. Note Making and Note Taking
9. E-mail Writing
10. Group Discussions
11. Resume Writing
12. Debates
13. Oral Presentations
14. Poster Presentation
15. Interviews Skills

Suggested Software

- Orell
- Walden Infotech
- Young India Films

Reference Books

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
5. A Textbook of English Phonetics for Indian Students by T.Balasubramanyam

Web Links

- **www.esl-lab.com**
- **www.englishmedialab.com**
- **www.englishinteractive.net**

Course Outcomes

1. Listening and repeating the sounds of English Language
2. Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
3. Apply communication skills through various language learning activities.
4. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
5. Evaluate and exhibit acceptable etiquette essential in social and professional settings
6. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(II Semester CSE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0503P	0	0	3	1.5	CIE	30 M
Course Title	:	PYTHON PROGRAMMING LAB					SEE	70 M

COURSE OBJECTIVES:

- To train the students in solving computational problems
- To elucidate solving mathematical problems using Python programming language
  To understand the fundamentals of Python programming concepts and its applications.

LIST OF TOPICS

1. Write a program to demonstrate:
   (a) Different numeric data types, and
   (b) To perform different Arithmetic Operations on numbers in Python.
2. Write a program to create, append, and remove lists in Python.
3. Write a program to demonstrate working with tuples in Python.
4. Write a program to demonstrate working with dictionaries in Python.
5. Write a program to demonstrate a) arrays b) array indexing such as slicing, integer array indexing and Boolean array indexing along with their basic operations in NumPy.
6. Write a program that accepts a string from the user and display the same string after removing vowels from it.
7. Write a program to strip a set of characters from a string.
8. Write a function that prompts the user for the average temperature for each day of the week and returns a dictionary containing the required information.
9. Write a program that has the dictionary of your friends names as keys and phone numbers as its values. Print the dictionary in a sorted order. Prompt the user to enter the name and check if it is present in the dictionary. If the name is not present, then enter the details in the dictionary.
10. Write a program to store the latitude and longitude of your house as a tuple and display it.
11. Write a program to do the following operations on files:
    (a) Count the occurrence of each letter
    (b) read the last n lines
    (c) remove new line characters from the file
    (d) read random line from a file
    (e) read and write the contents from one csv file to another.
12. Write a program to add two polynomials using classes.
13. Create a class called library with data attributes accno, publisher, title and author. The methods of the class should include
    (a) read() accno, title, author
    (b) compute() – to accept the number of days late, calculate an display the fine charged at the rate of Rs. 10 per day.
    (c) display the data.
14. Create a program to compute summary statistics such as mean, median, mode, standard deviation and variance of the given different types of data.

15. Write a program to create and display a Data Frame from a dictionary of data which has the index labels.
16. Write a program to create and display a one-dimensional array-like object containing an array of data using pandas library
17. Write a python program to add, subtract, multiply and divide two pandas series.

Optional

18. Develop a Python program to solve the n-queen problem with and without recursion.
    Problem Description
    The n-queen problem is the problem of placing n queens on an n x n chessboard such that no queen can attack another queen.
19. Design a python program to design a Calculator and Countdown timer.
20. Design a program in which the computer randomly chooses a number between 1 to 10, 1 to 100, or any range. Then give users a hint to guess the number. Every time the user guesses wrong, he gets another clue, and his score gets reduced. The clue can be multiples, divisible, greater or smaller, or a combination of all.
21. Design a simple youtube video downloader.
22. Develop a Python program which blocks the unnecessary website popups

Textbooks:

1. Francois Chollet, Deep Learning with Python, 1/e, Manning Publications Company, 2017
2. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, “How to Think Like a Computer Scientist: Learning with Python 3”, 3rd edition, Available at http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
3. Paul Barry, “Head First Python a Brain Friendly Guide” 2nd Edition, O’Reilly, 2016
4. DainelY.Chen “Pandas for Everyone Python Data Analysis” Pearson Education, 2019

COURSE OUTCOMES:

At the end of the course, the student will be able to

- Illustrate the use of various data structures. (L3)
- Analyze and manipulate Data using Pandas (L4)
- Design solutions to real-world problems using Python (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to Semester CE & ECE and II Semester CSE & me)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0301P	3	0	0	3	CIE	30 M
Course Title	:	ENGINEERING GRAPHICS LAB					SEE	70 M

COURSE OBJECTIVES:

- Instruct the utility of drafting & modeling packages in orthographic and isometric drawings.
- Train the usage of 2D and 3Dmodeling.
- Instruct graphical representation of machinecomponents.

Computer Aided Drafting:

Introduction to AutoCAD: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, stretching, fillets,arrays,dimensions.
Dimensioning principles and conventional representations.

Orthographic Projections: Systems of projections, conventions and application to orthographic projections - simple objects.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

TEXT BOOKS:

1) K. Venugopal, V.Prabhu Raja, Engineering Drawing + Auto Cad, New Age International Publishers.
2) Kulkarni D.M, AP Rastogi and AK Sarkar, Engineering Graphics with Auto Cad, PHI Learning, Eastern Economy editions.

REFERENCE BOOKS:

1) T. Jayapoovan, Engineering Graphics using Auto Cad, Vikas Publishing House
2) K.L.Narayana&P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
3) LinkanSagar, BPB Publications, Auto Cad 2018 Training Guide.
4) K.C.John, Engineering Graphics, 2/e, PHI,2013
5) Basant Agarwal &C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

COURSE OUTCOMES:

After completing the course, the student will be able to

- Use computers as a drafting tool. (L2)
- Draw isometric and orthographic drawings using CAD packages.(L3)

ADDITIONAL SOURCES

Youtube: http-sewor,Carleton.cag, kardos/88403/drawings.html conic sections-online, red woods.edu

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
Course Structure & Syllabus for First Year Regular B.Tech. Degree Program
(Effective for the batches admitted from 2020-21 onwards)

ELECTRONICS & COMMUNICATION ENGINEERING

INDUCTION PROGRAM (3 weeks duration)

- Physical activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas
- Familiarization to Dept./Branch & Innovations

B. Tech – I Semester (Theory – 5, Lab – 4)

S.No	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	20ABS5401	Linear Algebra and Calculus	3	0	0	3	30	70	100
2	BS	20ABS5101T	Chemistry	3	0	0	3	30	70	100
3	HS	20AHS5201T	Communicative English	3	0	0	3	30	70	100
4	ES	20AES0202T	Fundamentals of Electrical Engineering	3	0	0	3	30	70	100
5	ES	20AES0301T	Engineering Drawing	1	0	2	2	30	70	100
PRACTICAL										
6	BS	20ABS5101P	Chemistry Lab	0	0	3	1.5	30	70	100
7	HS	20AHS5201P	Communicative English Lab	0	0	3	1.5	30	70	100
8	ES	20AES0202P	Fundamentals of Electrical Engineering Lab	0	0	3	1.5	30	70	100
9	ES	20AES0301P	Engineering Graphics Lab	0	0	2	1	30	70	100
			TOTAL:	**13**	**00**	**13**	**19.5**	**270**	**630**	**900**

B. Tech – II Semester (Theory – 5, Lab – 5)

S.No	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BS	20ABS5402	Differential Equations and Vector Calculus	3	0	0	3	30	70	100
2	BS	20ABS5601T	Applied Physics	3	0	0	3	30	70	100
3	ES	20AES0501T	C Programming & Data Structures	3	0	0	3	30	70	100
4	ES	20AES0401T	Electronic Devices & Circuits	3	0	0	3	30	70	100
5	MC	20AMC9901	Environmental Science	3	0	0	0	30	-	30

PRACTICAL										
6	BS	20ABS5601P	Applied Physics Lab	0	0	3	1.5	30	70	100
7	ES	20AES0501P	C Programming & Data Structures Lab	0	0	3	1.5	30	70	100
8	ES	20AES0401P	Electronic Devices & Circuits Lab	0	0	3	1.5	30	70	100
9	ES	20AES0302	Engineering Workshop	0	0	3	1.5	30	70	100
10	ES	20AES0402	Electronics & IT Workshop	0	0	3	1.5	30	70	100
			TOTAL:	**15**	**00**	**15**	**19.5**	**300**	**630**	**930**

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, CSE, ECE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5401	3	0	0	3	CIE	30 M
Course Title	:	LINEAR ALGEBRA AND CALCULUS					SEE	70 M

COURSE OBJECTIVES:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Bridge Course: Limits, continuity, Types of matrices

Unit I: Matrices **(10 hrs)**

Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homogeneous equations linear equations. Eigenvalues and Eigenvectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix.

Learning Outcomes:

At the end of this unit, the student will be able to

- Solving systems of linear equations, using technology to facilitate row reduction determine the rank, eigenvalues and eigenvectors (L3).
- Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics; (L3)

Unit II: Mean Value Theorems **(06 hrs)**

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), related problems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Translate the given function as series of Taylor's and Maclaurin's with remainders (L3)
- Analyze the behaviour of functions by using mean value theorems (L3)

Unit III: Multivariable calculus **(10 hrs)**

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. (L3)
- Acquire the Knowledge maxima and minima of functions of several variable (L1)
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables (L3)

Unit IV: Multiple Integrals **(10 hrs)**

Double integrals, change of order of integration, change of variables. Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates. Finding areas and volumes using double and triple integrals.

Learning Outcomes:

- At the end of this unit, the student will be able to
- Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates (L5)
- Apply double integration techniques in evaluating areas bounded by region (L4)
- Evaluate multiple integrals in Cartesian, cylindrical and spherical geometries (L5)

Unit V: Beta and Gamma functions (06 hrs)

Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand beta and gamma functions and its relations (L2)
- Conclude the use of special function in evaluating definite integrals (L4)

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 201.
4. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education

Course Outcomes:

At the end of the course, the student will be able to

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- Utilize mean value theorems to real life problems (L3)
- Familiarize with functions of several variables which is useful in optimization (L3)
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems (L5)
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ECE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5101T	3	0	0	3	CIE	30 M
Course Title	:	CHEMISTRY					SEE	70 M

COURSE OBJECTIVES:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry, Spectroscopy and polymers
- To introduce instrumental methods and modern engineering materials.

Unit I: Structure and Bonding Models (10 hrs)

Planck's quantum theory, dual nature of matter, Schrodinger equation, significance of Ψ and Ψ^2, applications to hydrogen, molecular orbital theory – bonding in homo- and hetero-nuclear diatomic molecules – energy level diagrams of N_2, O_2, CO and NO, π-molecular orbitals of butadiene and benzene, calculation of bond order.

Learning outcomes:

At the end of this unit, the students will be able to

- **Apply** Schrodinger wave equation to hydrogen atom (L3)
- **Recall** molecular orbital theory and energy level diagrams of atoms (L1)
- **Illustrate** the molecular orbital energy level diagram of different molecular species (L2)
- **Explain** the calculation of bond order of O_2 and CO molecules (L2)
- **Discuss** the basic concept of molecular orbital theory (L3)

Unit II: Modern Engineering Materials (12 hrs)

i) **Understanding of materials:** Crystal field theory – salient features – splitting in octahedral, tetrahedral and square planar geometry. Properties of coordination compounds- oxidation state, coordination number, magnetic properties and colour.

ii) **Semiconductor materials, superconductors:** Basic concept, band diagrams for conductors, semiconductors and insulators, effect of doping on band structures.

iii) **Super capacitors:** Introduction, basic concept-classification – applications.

iv) **Nano chemistry:** Introduction, classification of nano materials, properties and applications of fullerenes, carbon nano tubes and graphene nano particles.

Learning Outcomes:

At the end of this unit, the students will be able to

- **Explain** splitting of in octahedral and tetrahedral geometry of complexes (L2).
- **Recall** applications of semiconductors, super conductors, nano materials (L1)
- **Discuss** the magnetic behaviour and colour of coordination compounds (L3).
- **Explain** the band theory of solids for conductors, semiconductors and insulators (L2)
- **Demonstrate** the application of fullerenes, carbon nano tubes and graphene nanoparticles (L2).

Unit III: Electrochemistry and Applications (12hrs)

Introduction to electrochemistry, electrodes – concepts of reference electrodes (Calomel electrode, Ag/AgCl electrode and glass electrode); Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, pH metry, potentiometry- potentiometric titrations (redox titrations), concept of conductivity- Specific, equivalent & molar conductance and cell constant, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors (glucose potentiometric sensor), amperometric sensors (Estimation of Uric Acid (UA))

Primary cells – Zinc-air, Na-Air batteries, secondary cells – Nickel-Cadmium (NiCd),and lithium ion batteries- working of the batteries including cell reactions; fuel cells: hydrogen-oxygen, methanol fuel cells – working of the cells and applications.

Learning Outcomes:

At the end of this unit, the students will be able to

- **Apply** Nernst equation for calculating electrode and cell potentials (L3)
- **Recall** applications of various batteries (L1).
- **Explain** the theory of construction of battery and fuel cells (L2)
- **Solve** problems based on cell potential (L3)

Unit IV: Polymer Chemistry **(10 hrs)**

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (addition and condensation).

Plastics: Thermoplastics and Thermosettings, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres. Calculation of molecular Weight of polymer by weight average and number average methods, polydispersity index

Elastomers: Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers: Polyacetylene, Polyaniline, Polypyrroles – mechanism of conduction and applications.

Learning Outcomes:

At the end of this unit, the students will be able to

- **Explain** the different types of polymers and their applications (L2)
- **Find** number average and weight average of polymer (L1)
- **Explain** the preparation, properties and applications of Bakelite, Nylon-6,6, and carbon fibres (L2)
- **Describe** the mechanism of conduction in conducting polymers (L2)
- **Discuss** Buna-S and Buna-N elastomers and their applications (L2)

Unit V: Instrumental Methods and Applications **(08 hrs)**

Regions of electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible**,** IR Spectroscopies- Principle, selection rules and applications. Solid-Liquid Chromatography–TLC, retardation factor.

Learning outcomes:

At the end of this unit, the students will be able to:

- **Explain** the different types of spectral series in electromagnetic spectrum (L2)
- **Understand** the principles of UV-Vis, IR Spectroscopy (L2)
- **Find** retention time and volumes of samples (L1**)**
- **Explain** the various applications of analytical instruments (L2)

Text Books:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Arun Bahl, B.S. Bahl and G.D. Tuli, Essentials of Physical Chemistry, S.Chand Publication, New Delhi 2012.

Reference Books:

1. J.D. Lee, Concise Inorganic Chemistry, 5/e, Oxford University Press, 2008.
2. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
3. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Course Outcomes:

At the end of the course, the students will be able to:

- **Compare** the materials for construction of battery and electrochemical sensors (L2)
- **Recall** properties and applications of polymers and engineering materials (L1)
- **Explain** the preparation, properties, and applications of thermoplastics & thermosetting, elastomers & conducting polymers. (L2)
- **Explain** the principles of spectrometry, TLC in separation of solid and liquid mixtures (L2)
- **Apply** the principle of Band diagrams in application of conductors and semiconductors (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE and ECE)
(Common to II Semester CSE and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AHS5201T	3	0	0	3	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH					SEE	70 M

INTRODUCTION:
The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

COURSE OBJECTIVES:
- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Unit I: On the Conduct of Life: William Hazlitt
Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.
Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph. **Grammar and Vocabulary:** Parts of Speech, Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Learning Outcomes
At the end of the module, the learners will be able to
1. understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
2. ask and answer general questions on familiar topics and introduce oneself/others
3. employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
4. recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
5. form sentences using proper grammatical structures and correct word forms

Unit II: The Brook: Alfred Tennyson
Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs/small groups on specific topics followed by short structured talks. **Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
Writing: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters.
Grammar and Vocabulary: Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Learning Outcomes
At the end of the module, the learners will be able to
1. comprehend short talks on general topics
2. participate in informal discussions and speak clearly on a specific topic using suitable discourse markers
3. understand the use of cohesive devices for better reading comprehension
4. write well structured paragraphs on specific topics
5. identify basic errors of grammar/ usage and make necessary corrections in short texts

Unit III: The Death Trap: Saki
Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed
Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Summarizing, Paragraph Writing.
Grammar and Vocabulary: Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Learning Outcomes
At the end of the module, the learners will be able to
1. Comprehend short talks and summarize the content with clarity and precision
2. Participate in informal discussions and report what is discussed
3. Infer meanings of unfamiliar words using contextual clues
4. Write summaries based on global comprehension of reading/listening texts
5. Use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing

Unit IV: Innovation: Muhammad Yunus
Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.
Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters/Report Writing.
Grammar and Vocabulary: Quantifying expressions - adjectives and adverbs; comparing and contrasting; Voice - Active & Passive Voice

Learning Outcomes
At the end of the module, the learners will be able to
1. Infer and predict about content of spoken discourse
2. Understand verbal and non-verbal features of communication and hold formal/informal conversations
3. Interpret graphic elements used in academic texts
4. Produce a coherent paragraph interpreting a figure/graph/chart/table
5. Use language appropriate for description and interpretation of graphical elements

Unit V: Politics and the English Language: George Orwell

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.

Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides.
Reading: Reading for comprehension.

Writing: Writing structured essays on specific topics using suitable claims and evidences.

Grammar and Vocabulary: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Learning Outcomes

At the end of the module, the learners will be able to

- take notes while listening to a talk/lecture and make use of them to answer questions
- make formal oral presentations using effective strategies
- comprehend, discuss and respond to academic texts orally and in writing
- produce a well-organized essay with adequate support and detail
- edit short texts by correcting common errors

Text Books:

1. **Language and Life: A Skills Approach- I Edition 2019, Orient Black Swan.**

Reference Books:

1. Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
2. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
3. Raymond Murphy's *English Grammar in Use* Fourth Edition (2012) E-book
4. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
5. Oxford Learners Dictionary, 12th Edition, 2011
6. Norman Lewis *Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary* (2014)
7. *Speed Reading with the Right Brain: Learn to Read Ideas Instead of Just Words* by David Butler.

Web links

- www.englishclub.com
- www.easyworldofenglish.com
- www.languageguide.org/english/
- www.bbc.co.uk/learningenglish
- www.eslpod.com/index.html
- www.myenglishpages.com

COURSE OUTCOMES

At the end of the course, the learners will be able to

1. **Understand** the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
2. **Apply** grammatical structures to formulate sentences and correct word forms
3. **Analyze** discourse markers to speak clearly on a specific topic in informal discussions
4. **Evaluate** reading/listening texts and to write summaries based on global comprehension of these texts.
5. **Create** a coherent paragraph interpreting a figure/graph/chart/table

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(I Semester ECE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0202T	3	0	0	3	CIA	30 M
Course Title	:	FUNDAMENTALS OF ELECTRICAL ENGINEERING					SEE	70 M

COURSE OBJECTIVES:-
To make the student learn about
1. Basic circuit components and Network theorems
2. Basic characteristics of R, L, C parameters, their Voltage and Current Relations and Various combinations of these parameters.
3. Series and parallel circuits and their sinusoidal analysis
4. Basic concepts on Transformers and various tests on transformers
5. AC and DC machines, its operation, characteristics and various tests

UNIT I: INTRODUCTION
Basic Components, Voltage and current laws, Nodal and Mesh Analysis – Single loop and multi loop circuits, single node pair and multi node pair circuits, super mesh and super node analysis, delta -Wye conversion.
Network Theorems: Linearity and Superposition, Source Transformation, Thevenin's and Norton's Equivalent Circuits, Maximum Power Transfer, Reciprocity– Problem solving.

Learning Outcomes:
- Understand the basic circuit theory concepts
- Verification of various network theorems

UNIT II: DC Transient Circuits:
Capacitors and Inductors, RL and RC circuits – Source free RL and RC circuits, Initial conditions, Response to DC, Step, and Pulse signals, Problem solving.
RLC circuits – Source free RLC series and parallel circuits, Initial conditions, Overdamped, Critical damped and under damped RLC circuits, complete response of the RLC circuits.
Unit Outcomes:
- Construction of various circuit configurations
- Determination of responses for RL, RC and RLC circuits with various excitations

UNIT III: Sinusoidal Analysis and Transformers:
Sinusoidal Analysis: Sinusoidal Steady State Analysis – Phasor diagrams for R, L, C, Concept of impedance, Instantaneous, and average power, Effective or RMS values of voltage and current – RL, RC and RLC series and parallel circuits-Problem solving.

Transformers: Single Phase Transformers- Constructional Details- Emf Equation - Operation on No Load and on Load - Phasor Diagrams-Equivalent Circuit - Losses and Efficiency-Regulation- OC and SC Tests.

Unit Outcomes:
- Apply the concepts to construct RL, RC and RLC series and parallel circuits
- Understand the basic concept of Transformers and calculation of various losses

UNIT IV: DC Machines (Elementary treatment only)
DC Generators – Constructional Features – E.M.F Equation–Methods of Excitation – Build-Up of E.M.F - Load

Characteristics of Generators- Applications

D.C Motors – Back E.M.F. –Torque Equation – Characteristics and Applications -Speed Control. Three Point Starter-Losses –Calculation of Efficiency - Swinburne's Test.

Unit Outcomes:
- Understand the basic concept on DC generators and determination of Load characteristics
- Understand the basic concept on DC motors and determination of losses and efficiency

UNIT V: AC Machines (Elementary treatment only)
Three phase Induction motor: Revolving magnetic field theory, Principle of operation, Torque equation, and Performance characteristics.

Three phase Synchronous Machines: Principle and Constructional Features of Salient Pole and Round Rotor Machines – E.M.F Equation- Voltage Regulation by Synchronous Impedance Method- Theory of Operation of Synchronous Motor.

Unit Outcomes:
- Understand the basic concept of 3-phase Induction motor and determination of performance characteristics
- Understand the basic concept of 3-phase synchronous machine and determination of emf equation

Text Books:-
1. D. P. Kothari and I. J. Nagrath, Basic Electrical Engineering, Tata McGraw Hill, 2010.
2. Charles K. Alexander and Matthew. N. O. Sadiku, Fundamentals of Electric Circuits, Mc Graw Hill, 5th Edition, 2013.

Reference Books:-
1. William Hayt and Jack E. Kemmerly, Engineering circuit analysis, Mc Graw Hill Company, 7th Edition, 2006.
2. M.E Van Valkenberg, Network Analysis, Prentice Hall (India), 3rd Edition, 1999.
3. L. S. Bobrow, Fundamentals of Electrical Engineering, Oxford University Press, 2011.
4. E. Hughes, Electrical and Electronics Technology, Pearson Education, 2010.

COURSE OUTCOMES:
After completion of the course, the student should be able to
1. Understand the basic circuit components and Network theorems
2. Analyze the basic characteristics of R, L, C parameters, their Voltage and Current Relations
3. Apply the knowledge to design Series and parallel circuits and determination of their sinusoidal response analysis
4. Understand the basic concepts on Transformers and apply the concept to perform various tests on transformers
5. Understand the basic concepts on AC and DC machines, its operation, characteristics and analyze the characteristics by conducting various tests

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE & ECE and II Semester CSE & ME)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0301T	3	0	0	3	CIE	30 M
Course Title	:	ENGINEERING DRAWING					SEE	70 M

COURSE OBJECTIVES:
- Bring awareness that Engineering Drawing is the Language of Engineers.
- Familiarize how industry communicates technical information.
- Teach the practices for accuracy and clarity in presenting the technical information.
- Develop the engineering imagination essential for successful design.

Unit I:
Introduction to Engineering Drawing: Principles of Engineering Drawing and its significance -Conventions in drawing - lettering - BIS conventions.
(a) Conic sections including the rectangular hyperbola- general method only,
(b) Cycloid, epicycloids and hypocycloid c) Involutes

Learning Outcomes:
At the end of this unit the student will be able to
- Understand the significance of engineering drawing
- Know the conventions used in the engineering drawing
- Identify the curves obtained in different conic sections
- Draw different curves such as cycloid, involute and hyperbola

Unit II:
Projection of points, lines and planes: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.

Learning Outcomes:
At the end of this unit the student will be able to
- Understand the meaning of projection
- Know how to draw the projections of points, lines
- Differentiate between projected length and true length
- Find the true length of the lines

Unit III:
Projections of solids: Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.

Learning Outcomes:
At the end of this unit the student will be able to
- Understand the procedure to draw projection of solids
- Differentiate between rotational method and auxillary view method.
- Draw the projection of solid inclined to one plain
- Draw the projection of solids inclined to both the plains

Unit IV:
Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone. True shapes of the sections.

Learning Outcomes:
At the end of this unit the student will be able to
- Understand different sectional views of regular solids
- Obtain the true shapes of the sections of prism
- Draw the sectional views of prism, cylinder, pyramid and cone

Unit V:
Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts.

Learning Outcomes:
At the end of this unit the student will be able to
- Understand the meaning of development of surfaces
- Draw the development of regular solids such as prism, cylinder, pyramid and cone
- Obtain the development of sectional parts of regular shapes

Text Books:
1) K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
2) N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.

Reference Books:
1) Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009
2) Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000
3) Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009
4) K.C.John, Engineering Graphics, 2/e, PHI, 2013
5) Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Course Outcomes:
After completing the course, the student will be able to
- Draw various curves applied in engineering. (l2)
- Show projections of solids and sections graphically. (l2)
- Draw the development of surfaces of solids. (l3)

Additional Sources
Youtube: http-sewor,Carleton.cag,kardos/88403/drawings.html conic sections-online, red woods.edu

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ECE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5101P	0	0	3	1.5	CIE	30 M
Course Title	:	CHEMISTRY LAB					SEE	70 M

COURSE OBJECTIVES:

- Verify the fundamental concepts with experiments.

List of Experiments:

1. Conductometric titration of Strong acid vs Strong base.
2. Conductometric titration of weak acid vs Strong base.
3. Determination of cell constant and conductance of solutions.
4. Potentiometry - determination of redox potentials and EMF.
5. Acid-Base titration by pH metry.
6. Determination of Strength of an acid in Pb-Acid battery.
7. Preparation of polymer- Bakelite.
8. Verification Lambert-Beer's law.
9. Estimation of manganese by Colorimetry.
10. Separation of organic mixtures by Thin layer chromatography (TLC).
11. Identification of simple organic compounds by IR.
12. Preparation of nano materials by precipitation.
13. Estimation of Ferrous Iron by Potassium dichromate.
14. Measurement of 10Dq by spectrophotometric method.
15. Models of potential energy surfaces.

Course Outcomes:

At the end of the course, the students will be able to

- **Determine** the cell constant and conductance of solutions (L3)
- **Find** conductivity of acid and base (L1)
- **Prepare** polymer Bakelite materials (L2)
- **Measure** the strength of an acid present in secondary batteries (L3)
- **Analyse** the IR spectra of some organic compounds (L3)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE and ECE)
(Common to II Semester CSE and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AHS5201P	0	0	3	1.5	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH LAB					SEE	70 M

COURSE OBJECTIVES:

- Students will be exposed to a variety of self instructional, learner friendly modes of language learning
- Students will learn better pronunciation through stress, intonation and rhythm
- Students will be trained to use language effectively to face interviews, group discussions, public speaking
- Students will be initiated into greater use of the computer in resume preparation, report writing, format making etc

LIST OF TOPICS

1. Phonetics
2. Reading comprehension
3. Describing objects/places/persons
4. Role Play or Conversational Practice
5. Just-A-Minute (JAM)
6. Etiquettes of Telephonic Communication
7. Information Transfer
8. Note Making and Note Taking
9. E-mail Writing
10. Group Discussions
11. Resume Writing
12. Debates
13. Oral Presentations
14. Poster Presentation
15. Interviews Skills

Suggested Software

- Orell
- Walden Infotech
- Young India Films

Reference Books

1. Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
2. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
5. A Textbook of English Phonetics for Indian Students by T.Balasubramanyam

Web Links

- www.esl-lab.com
- www.englishmedialab.com
- www.englishinteractive.net

Course Outcomes

1. Listening and repeating the sounds of English Language
2. Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
3. Apply communication skills through various language learning activities.
4. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
5. Evaluate and exhibit acceptable etiquette essential in social and professional settings
6. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(I Semester ECE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0202T	0	0	3	1.5	CIA	30 M
Course Title	:	FUNDAMENTALS OF ELECTRICAL ENGINEERING LAB					SEE	70 M

COURSE OBJECTIVES:- The students will be able to

1. Remember, understand and apply various theorems and verify practically.
2. Understand and analyze RL, RC and RLC circuit responses for various excitations.
3. Design various configurations on AC and DC machines to determine various characteristics
4. Apply various procedures to perform tests on 1-ϕ transformer

List of Experiments: (**All experiments are compulsory**)

ELECTRIC CIRCUITS:

1. Verification of Kirchhoff's laws
2. Verification of Superposition Theorem
3. Verification of Thevenin's & Norton's Theorems
4. Response characteristics of series RL, RC and RLC circuits for Sinusoidal excitation
5. Verification of Reciprocity Theorem
6. Response characteristics of an RC/RL circuit for a pulse excitation

ELECTRICAL MACHINES:

1. Magnetization characteristics of a separately excited DC generator
2. Load characteristics of DC shunt generator
3. Load characteristics of DC shunt motor
4. Break test on 3-phase Induction motor
5. OC & SC tests on a 1-ϕ transformer
6. Predetermination of regulation of alternator by Synchronous impedance method

COURSE OUTCOMES:

The students should be able to

1. Understand various network theorems and verify practically.
2. Understand RL, RC and RLC circuit configurations and analyze their responses for various excitations.
3. Design different configurations on AC and DC machines to determine various characteristics
4. Apply various procedures to perform tests on 1-ϕ transformer

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE & ECE and II Semester CSE & ME)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0301P	3	0	0	3	CIE	30 M
Course Title	:	ENGINEERING GRAPHICS LAB					SEE	70 M

COURSE OBJECTIVES:

- Instruct the utility of drafting & modeling packages in orthographic and isometric drawings.
- Train the usage of 2D and 3D modeling.
- Instruct graphical representation of machine components.

Computer Aided Drafting:

Introduction to AutoCAD: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, stretching, fillets, arrays, dimensions.
Dimensioning principles and conventional representations.

Orthographic Projections: Systems of projections, conventions and application to orthographic projections - simple objects.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

TEXT BOOKS:

1) K. Venugopal, V.Prabhu Raja, Engineering Drawing + Auto Cad, New Age International Publishers.
2) Kulkarni D.M, AP Rastogi and AK Sarkar, Engineering Graphics with Auto Cad, PHI Learning, Eastern Economy editions.

REFERENCE BOOKS:

1) T. Jayapoovan, Engineering Graphics using Auto Cad, Vikas Publishing House
2) K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
3) Linkan Sagar, BPB Publications, Auto Cad 2018 Training Guide.
4) K.C.John, Engineering Graphics, 2/e, PHI, 2013
5) Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

COURSE OUTCOMES:

After completing the course, the student will be able to

- Use computers as a drafting tool. (L2)
- Draw isometric and orthographic drawings using CAD packages. (L3)

ADDITIONAL SOURCES

Youtube: http-sewor,Carleton.cag, kardos/88403/drawings.html conic sections-online, red woods.edu

B.TECH - II SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, CSE, ECE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5402	3	0	0	3	CIE	30 M
Course Title	:	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS					SEE	70 M

COURSE OBJECTIVES:

1) To enlighten the learners in the concept of differential equations and multivariable calculus.
2) To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

UNIT I: Linear differential equations of higher order (Constant Coefficients) (10 hrs)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskean, method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Mass spring system.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify the essential characteristics of linear differential equations with constant coefficients (L3)
- Solve the linear differential equations with constant coefficients by appropriate method (L3)
- Classify and interpret the solutions of linear differential equations (L3)
- Formulate and solve the higher order differential equation by analyzing physical situations (L3)

UNIT II: Partial Differential Equations (08 hrs)

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order equations using Lagrange's method.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply a range of techniques to find solutions of standard PDEs (L3)
- Outline the basic properties of standard PDEs (L2)

UNIT III: Applications of Partial Differential Equations (10 hrs)

Classification of PDE, method of separation of variables for second order equations. Applications of Partial Differential Equations: One dimensional Wave equation, One dimensional Heat equation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Calcify the PDE (L3)
- Learn the applications of PDEs(L2)

UNIT IV: Vector differentiation (06 hrs)

Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions-Divergence and Curl, vector identities.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply del to Scalar and vector point functions (L3)

- Illustrate the physical interpretation of Gradient, Divergence and Curl (L3)

UNIT 5: Vector integration **(08 hrs)**

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Learning Outcomes:

At the end of this unit, the student will be able to

- find the work done in moving a particle along the path over a force field (L4)
- evaluate the rates of fluid flow along and across curves (L4)
- apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals (L3)

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

Reference Books:

1. George B.Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
2. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
4. S L Ross , Differential Equations ,Wiley India, year 2007 edition.

Course Outcomes:

At the end of the course, the student will be able to

- Solve the differential equations related to various engineering fields (L6)
- Identify solution methods for partial differential equations that model physical processes (L3)
- Interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
- Estimate the work done against a field, circulation and flux using vector calculus (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CSE and ECE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5601T	3	0	0	3	CIA	30 M
Course Title	:	APPLIED PHYSICS					SEE	70 M

COURSE OBJECTIVES:

- To make a bridge between the physics in school and engineering courses.
- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
- To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibres along with engineering applications.
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- To enlighten the concepts of Quantum Mechanics and to provide fundamentals of de'Broglie waves, quantum mechanical wave equation and its applications, the importance of free electron theory and band theory of solids.
- Evolution of band theory to distinguish materials, basic concepts and transport phenomenon of charge carriers in semiconductors. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

UNIT I: Wave Optics (12 hrs)

Interference- Principle of superposition – Interference of light – Conditions for sustained interference - Interference in thin films (Reflection Geometry) – Colors in thin films – Newton's Rings – Determination of wavelength and refractive index.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Grating spectrum.

Polarization- Introduction – Types of polarization – Polarization by reflection, refraction and double refraction - Nicol's Prism - Half wave and Quarter wave plates with applications.

Learning Outcomes:

The students will be able to

1. **Explain** the need of coherent sources and the conditions for sustained interference (L2)
2. **Identify** engineering applications of interference (L3)
3. **Analyze** the differences between interference and diffraction with applications (L4)
4. **Illustrate** the concept of polarization of light and its applications (L2)
5. **Classify** ordinary polarized light and extraordinary polarized light (L2)

Unit II: Lasers and Fiber optics (08 hrs)

Lasers: Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Lasing action – Pumping mechanisms – Nd-YAG laser – He-Ne laser – Applications of lasers.

Fiber optics: Introduction – Principle of optical fiber – Acceptance Angle – Numerical Aperture – Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers – Propagation Losses (qualitative) – Applications.

Learning Outcomes:
The students will be able to

1. **Understand** the basic concepts of LASER light Sources (L2)
2. **Apply** the concepts to learn the types of lasers (L3)
3. **Identifies** the Engineering applications of lasers (L2)
4. **Explain** the working principle of optical fibers (L2)
5. **Classify** optical fibers based on refractive index profile and mode of propagation (L2)
6. **Identify** the applications of optical fibers in various fields (L2)

Unit III: Dielectric and Magnetic Materials (08 hrs)
Dielectric Materials- Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – Types of polarizations: Electronic and Ionic, Orientation polarizations (Qualitative) – Lorentz internal field – Clausius-Mossotti equation-Dielectric loss.

Magnetic Materials- Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and Permeability – Origin of permanent magnetic moment – Classification of magnetic materials: Dia, para & Ferro- Domain concept of Ferromagnetism (Qualitative) – Hysteresis – Soft and Hard magnetic materials.

Learning Outcomes:
The students will be able to

1. **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
2. **Summarize** various types of polarization of dielectrics (L2)
3. **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
4. **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2)
5. **Explain** the applications of dielectric and magnetic materials (L2)
6. **Apply** the concept of magnetism to magnetic devices (L3)

Unit IV: Quantum Mechanics, Free Electron Theory and Band theory of Solids (10 hrs)
Quantum Mechanics- Dual nature of matter – Schrodinger's time independent and dependent wave equations – Significance of wave function – Particle in a one-dimensional infinite potential well.

Free Electron Theory- Classical free electron theory (Merits and demerits only) – Quantum free electron theory – Equation for electrical conductivity based on quantum free electron theory – Fermi-Dirac distribution – Density of states – Fermi energy.

Band theory of Solids- Bloch's Theorem (Qualitative) – Kronig-Penney model (Qualitative) – E vs k diagram – Classification of crystalline solids – Effective mass of electron – m^* vs k diagram – Concept of hole.

Learning Outcomes:
The students will be able to

1. **Explain** the concept of dual nature of matter (L2)
2. **Understand** the significance of wave function (L2)
3. **Interpret** the concepts of classical and quantum free electron theories (L2)
4. **Explain** the importance of K-P model
5. **Classify** the materials based on band theory (L2)
6. **Apply** the concept of effective mass of electron (L3)

Unit V: Semiconductors and Superconductors (10 hrs)
Semiconductors- Introduction – Intrinsic semiconductors – Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors – Density of charge carriers – Dependence of Fermi energy on carrier concentration and temperature – Drift and diffusion currents – Einstein's equation – Direct and indirect band

gap semiconductors – Hall effect – Hall coefficient – Applications of Hall effect.

Superconductors- Introduction – Properties of superconductors – Meissner effect – Type I and Type II superconductors – BCS theory – Josephson effects (AC and DC) – High T_c superconductors – Applications of superconductors.

Learning Outcomes:
The students will be able to
1. **Classify** the energy bands of semiconductors (L2)
2. **Interpret** the direct and indirect band gap semiconductors (L2)
3. **Identify** the type of semiconductor using Hall effect (L2)
4. **Identify** applications of semiconductors in electronic devices (L2)
5. **Explain** how electrical resistivity of solids changes with temperature (L2)
6. **Classify** superconductors based on Meissner's effect (L2)
7. **Explain** Meissner's effect, BCS theory & Josephson effect in superconductors (L2)

Text books:
1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, S. Chand and Company
2. Engineering Physics – B.K. Pandey and S. Chaturvedi, Cengage Learning.

Reference Books:
1. Engineering Physics – Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018
2. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press
3. Semiconductor physics and devices- Basic principle – Donald A, Neamen, Mc Graw Hill
4. Introduction to solid state physics – Charles Kittel, Wiley Publishers

COURSE OUTCOMES:
1. **Explain** the need of coherent sources and the conditions for sustained interference (L2). **Identify** the applications of interference in engineering (L3). **Analyze** the differences between interference and diffraction with applications (L4). **Illustrate** the concept of polarization of light and its applications (L2). **Classify** ordinary polarized light and extraordinary polarized light (L2).
2. **Explain** various types of emission of radiation (L2). **Identify** the role of laser in engineering applications (L3). **Describe** the construction and working principles of various types of lasers (L1). **Explain** the working principle of optical fibers (L2). **Classify** optical fibers based on refractive index profile and mode of propagation (L2). **Identify** the applications of optical fibers in medical, communication and other fields (L2). **Apply** the fiber optic concepts in various fields (L3).
3. **Explain** the concept of dielectric constant and polarization in dielectric materials (L2). **Summarize** various types of polarization of dielectrics (L2). **Interpret** Lorentz field and Claussius-Mosotti relation in dielectrics (L2). **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2). **Explain** the applications of dielectric and magnetic materials (L2). **Apply** the concept of magnetism to magnetic devices (L3).
4. **Describes** the dual nature of matter (L1). **Explains** the significance of wave function (L2). **Identify** the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). **Identify** the role of classical and quantum free electron theory in the study of electrical conductivity (L3).
5. **Classify** the energy bands of semiconductors (L2). **Outline** the properties of charge carriers (L2). **Interpret** the direct and indirect band gap semiconductors (L2). **Identify** the type of semiconductor using Hall effect (L2). **Identify** applications of semiconductors in electronic devices (L2). **Explain** how electrical resistivity of solids changes with temperature (L2). **Classify** superconductors based on Meissner's effect (L2). **Explain** Meissner's effect, BCS theory & Josephson effect in superconductors (L2).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0501T	3	0	0	3	CIE	30 M
Course Title	:	C PROGRAMMING & DATA STRUCTURES					SEE	70 M

COURSE OBJECTIVES:

- To illustrate the basic concepts of C programming language.
- To discuss the concepts of Functions, Arrays, Pointers and Structures of C Programming Language.
- To discuss the syntax and semantics of C Programming language
- To familiarize with Stack, Queue, Linked lists, Tree and graph data structures.
- To demonstrate programming by choosing appropriate Data Structures and Features of the C language.

Unit I:

Getting Started: What is C, The C Character Set, Constants, Variables and Keywords, Types of C Constants, Rules for Constructing Integer Constants, Rules for Constructing Real Constants, Rules for Constructing Character Constants, Types of C Variables, Rules for Constructing Variable Names, C Keywords, Form of a C Program, Comments in a C Program, What is main, Variables and their Usage, printf( ) and its Purpose, Compilation and Execution, Receiving Input.

Data Types Revisited: Integers, long and short, Integers, signed and unsigned, Chars, signed and unsigned, Floats and Doubles, A Few More Issues, Storage Classes in C-Automatic Storage Class, Register Storage Class, Static Storage Class, and External Storage Class.

C Instructions: Types of Instructions, Type Declaration Instruction, Arithmetic Instructions, Integer and Float Conversions, Type Conversion in Assignments, Hierarchy of Operations, Associativity of Operators, Control Instructions.

Decision Control Instruction: Decisions! Decisions, The if Statement, The Real Thing, Multiple Statements within if, The if-else Statement, Nested if-elses, Forms of if.

Learning Outcomes:

1. Understand the basic concepts of C language (L2)
2. Learn the functionality of operators and Control Statements of C (L2)
3. Use the if control structure of the C language (L3)

Unit II:

More Complex Decision Making: Use of Logical Operators, The else if Clause, The ! Operator, Hierarchy of Operators Revisited, a Word of Caution, the Conditional Operators.

Loop Control Instruction: Loops, the while Loop, Tips and Traps, More Operators.

More Complex Repetitions: The for Loop, Nesting of Loops, Multiple Initializations in the for Loop, The break Statement, The continue Statement, The do-while Loop, The Odd Loop.

Case Control Instruction: Decisions using switch, The Tips and Traps, switch versus if-else Ladder, The goto Keyword.

Functions: What is a Function?, Why use Functions?, Passing Values between Functions, Scope Rule of Functions, Order of Passing Arguments, Using Library Functions, One Dicey Issue, Return Type of Function.

Learning Outcomes:

1. Apply the concept of Loops in various applications. (L3)
2. Design programs using modular approach (L6)

Unit III:
Recursion: Recursion, Recursion and Stack
Pointers: Call by Value and Call by Reference, an Introduction to Pointers, Pointer Notation, Back to Function Calls.
The C Preprocessor: Features of C Preprocessor, Macro Expansion, Macros with Arguments, Macros versus Functions, File Inclusion.
Arrays: What are Arrays?, A Simple Program using Array, More on Arrays, Array Initialization Array Elements in Memory, Bounds Checking, Passing Array Elements to a Function, Pointers and Arrays, Passing an Entire Array to a Function, The Real Thing.
Multidimensional Arrays: Two-Dimensional Arrays, Initializing a Two-Dimensional Array, Memory Map of a Two-Dimensional Array, Pointers and Two-Dimensional Arrays, Pointer to an Array, Passing 2-D Array to a Function, Array of Pointers, Three-Dimensional Array.

Learning Outcomes:
1. Solve problems by using Recursion (L3)
2. Understand the concept of Array (L2)
3. Use pointers to efficiently use memory (L3)

Unit IV:
Strings: What are Strings, More about Strings, Pointers and Strings
Standard Library String Functions-strlen ( ), strcpy ( ), strcat ( ), strcmp ( ).

Handling Multiple Strings: Two-Dimensional Array of Characters, Array of Pointers to Strings, Limitation of Array of Pointers to Strings.

Structures: Why use Structures? Declaring a Structure, Accessing Structure Elements, How Structure Elements are Stored? Array of Structures, Additional Features of Structures, Uses of Structures.

Console Input/output: Types of I/O, **Console I/O Functions**-Formatted Console I/O Functions, sprintf ( ) and sscanf ( ) Functions Unformatted Console I/O Functions

File Input/output: Data Organization, **File Operations**-Opening a File, Reading from a File, Trouble in Opening a File, Closing the File, Counting Characters, Tabs, Spaces, **A File-Copy Program**-Writing to a File, File Opening Modes, **String (Line) I/O in Files**-The Awkward Newline, Record I/O in Files, Text Files and Binary Files, Record I/O Revisited, Database Management, **Low-Level File I/O** -A Low-Level File-Copy Program, I/O under Windows.
Learning Outcomes:
1. Understand the concept of Strings (L2)
2. Learn Structures and Unions (L2)
3. Operate Files through C Programs (L4)
4. Manipulate strings (L3)

Unit V:
Data Structures: Linked List-Single Linked List, Double Linked List, Circular Linked List. Stacks-Using Arrays and Linked List, Stack Applications.
Queue- Arrays and Linked List, Circular Queue, Priority Queue.
Trees-Binary Trees, Binary Search Tree.
Graphs-Graphs Implementation using Arrays and Linked List, Traversal of Graphs.

Learning Outcomes:

1. Implements basic data structures such as stacks, queues and trees.(L3)
2. Apply algorithms and data structures in solving problems. (L3)
3. Design indexing structures (L6)

Text Books:

1. Yashavant Kanetkar, “Let Us C”, Fourteenth Edition, BPB Publications.
2. K R Venugopal, Sudeep R Prasad, “Mastering C”, Mc GrawHill publications
3. Jeri R. hanly, Elliot B. Koffman, Ashok Kamthane, A. Ananda Rao, “Programming in C and Data Structures”, Pearson.

Reference Books:

1. Brian W Kernighan and Dennis M Ritchie, “The C Programming Language”, Second Edition, Prentice Hall Publication.
2. Ellis Horowitz, SartajSahni, Susan Anderson-Freed, “Fundamentals of Data Structures in C”, Computer Science Press.
3. Pradip Dey and Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition 2011.
4. Richard F. Gilberg & Behrouz A. Forouzan, “Data Structures: A Pseudocode Approach with C”, Second Edition, CENGAGE Learning, 2011.

Course Outcomes:

1. Learn the concepts of C Programming language. (L2)
2. Design applications in C, using functions, arrays, pointers and structures. (L6)
3. Apply the concepts of Stacks and Queues in solving the problems. (L3)
4. Explore various operations on Linked lists. (L5)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(II Semester ECE)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0401T	3	0	0	3	CIA	30 M
Course Title	:	ELECTRONIC DEVICES AND CIRCUITS					SEE	70 M

COURSE OBJECTIVES:-

- **To understand the basic principles of all semiconductor devices.**
- **To be able to solve problems related to diode circuits, and amplifier circuits.**
- **To analyze diode circuits, various biasing and small signal equivalent circuits of amplifiers.**
- **To be able to compare the performance of BJTs and MOSFETs**
- **To design rectifier circuits and various amplifier circuits using BJTs and MOSFETs.**

Unit I:

Review of Semiconductors: Intrinsic semiconductors, Doped Semiconductors, Current Flow in Semiconductors, PN Junction with Open Circuit, PN Junction with Applied Voltage, Capacitive Effects in PN Junction.

Diodes: Introduction, The Ideal Diode – current voltage characteristic, rectifier, diode logic gates, Terminal Characteristics of Junction Diodes– forward bias, reverse bias, and breakdown regions, Modeling the Diode Forward Characteristics- exponential model, graphical analysis and Iterative analysis using the exponential model, constant voltage drop model, the small signal model.

Learning outcomes:

1. Remember and understand the basic characteristics of semiconductor diode (L1)
2. Understand iterative and graphical analysis of simple diode circuits (L1)

Unit II:

Zener Diodes– Zener diode Characteristics, Voltage shunt regulator, Temperature Effects, Rectifier Circuits– half-wave, full-wave and bridge rectifier circuits, rectifier with a filter capacitor, C-L-C filter, Clipping and Clamping Circuits– limiter circuit, the clamped capacitor, voltage doubler, Special Diode Types– UJT, Schottky barrier diode, Varactor diode, photo diode, light emitting diode(LED).

Bipolar Junction Transistors(BJTs): Physical Operation - simplified structure and modes of operation, Operation of the npn, and pnp transistors: cutoff, active, and saturation modes, V-I Characteristics- of different configurations - graphical representation of transistor characteristics, dependence of collector current on collector voltage, the Early Effect.

Learning outcomes:

1. Understand principle of operation of Zener diode and other special semiconductor diodes (L1)
2. Understand the V-I characteristics of BJT and its different configurations (L1)
3. Analyze various applications of diode and special purpose diodes (L3)
4. Design rectifier and voltage regulator circuits (L4)

Unit III:

Bipolar Junction Transistor (BJT): BJT circuits at DC, Applying the BJT in Amplifier Design- Voltage Amplifier, Voltage Transfer Characteristic (VTC), Small-Signal Voltage Gain, determining the VTC by Graphical Analysis, Q-point, Small-signal operation and models- the trans conductance, input resistance at the base, input resistance at the emitter, Voltage gain, separating the Signal and the DC Quantities, The Hybrid-π Model, the T Model, Basic BJT Amplifier Configurations - Common-Emitter (CE) amplifier without and with emitter resistance, Common-Base (CB) amplifier, Common-Collector (CC) amplifier or Emitter Follower, Biasing in BJT Amplifier Circuits- Fixed bias, Self bias, voltage divider bias circuits, biasing using a Constant-Current Source, CE amplifier – Small signal analysis and design, Transistor breakdown and Temperature Effects.

Learning outcomes:

1. Solve problems on various biasing circuits using BJT (L2)
2. Analyze BJT based biasing circuits (L3)
3. Design an amplifier using BJT based on the given specifications (L4)

Unit IV

MOS Field-Effect Transistors (MOSFETs): Introduction, Device Structure and Physical Operation – device structure, operation with zero gate voltage, creating a channel for current flow, operation for different drain to source voltages, the P-channel MOSFET,CMOS, V-I characteristics– i_D - v_{DS} characteristics, i_D – v_{GS} characteristics, finite output resistance in saturation, characteristics of the p-Channel MOSFET, MOSFET Circuits at DC, Applying the MOSFET in Amplifier Design – voltage transfer characteristics, biasing the MOSFET to obtain linear amplification, the small signal voltage gain, graphical analysis, the Q-point.

Learning outcomes:

1. Understand principle of operation of various types of MOSFET devices (L1)
2. Understand the V-I characteristics of MOSFET devices and their configurations (L1)

Unit V

MOSFET Small Signal Operation Models – the dc bias, separating the DC analysis and the signal analysis, Small signal equivalent circuit models, the transconductance, the T equivalent circuit model, Basic MOSFET Amplifier Configurations– three basic configurations, characterizing amplifiers, common source(CS) amplifier without and with source resistance, common gate (CG) amplifier, source follower, the amplifier frequency response, Biasing in MOSFET Amplifier Circuits– biasing by fixing V_{GS} with and without source resistance, biasing using drain to gate feedback resistor, biasing using constant current source, Common Source Amplifier using MOSFETs – Small signal analysis and design, Body Effect.

Learning outcomes:

1. Solve problems on small signal equivalent of MOSFET devices (L2)
2. Analyze various biasing circuits based on different types of MOSFETs (L3)
3. Design an amplifier using BJT based on the given specifications (L4)

Text Books:

1. Adel S. Sedra and Kenneth C. Smith, “Microelectronic Circuits – Theory and Applications”, 6th Edition, Oxford Press, 2013.
2. Donald A Neamen, “Electronic Circuits – analysis and design”, 3rdEdition, McGraw Hill (India), 2019.

References:

1. J. Milliman and C Halkias, “Integrated electronics”, 2nd Edition, Tata McGraw Hill, 1991.
2. Behzad Razavi, “Microelectronics”, Second Edition, Wiley, 2013.
3. R.L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuits,” 9thEdition, Pearson, 2006.
4. Jimmie J Cathey, “Electronic Devices and Circuits,” Schaum’s outlines series, 3rd Edition, McGraw-Hill (India), 2010.

COURSE OUTCOMES:

After the completion of the course students will able to

CO1: **Understand principle of operation, characteristics and applications of Semiconductor diodes, Bipolar Junction Transistor and MOSFETs.**

CO2: **Applying the basic principles solving the problems related to Semiconductor diodes, BJTs, and MOSFETs.**

CO3: **Analyze diode circuits for different applications such as rectifiers, clippers and clampers also analyze biasing circuits of BJTs, and MOSFETs.**

CO4: **Design of diode circuits and amplifiers using BJTs, and MOSFETs.**

CO5: **Compare the performance of various semiconductor devices.**

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CE & ECE)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	20AMC9901	3	0	0	0	CIA	30 M
Course Title	:	ENVIRONMENTAL SCIENCES					SEE	--

COURSE OBJECTIVES

- To make the students to get awareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life.
- To save earth from the inventions by the engineers.

UNIT I:

Multidisciplinary Nature Of Environmental Studies: – Definition, Scope and Importance – Need for Public Awareness.

Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

Learning Outcomes:

- To know the importance of public awareness.
- To know about the various resources.

UNIT II:

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

(a) Forest ecosystem.
(b) Grass land ecosystem
(c) Desert ecosystem
(d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its Conservation : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Learning Outcomes:

- To know about various echo systems and their characteristics
- To know about the biodiversity and its conservation

UNIT III:

Environmental Pollution: Definition, Cause, effects and control measures of:

(a) Air Pollution.
(b) Water pollution
(c) Soil pollution
(d) Marine pollution
(e) Noise pollution
(f) Thermal pollution
(g) Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

Learning Outcomes:

- To know about the various sources of pollution.
- To know about the various sources of solid waste and preventive measures.
- To know about the different types of disasters and their managerial measures.

UNIT IV:

Social issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

Learning Outcomes:

- To know about the social issues related to environment and their protection acts.
- To know about the various sources of conservation of natural resources.
- To know about the wild life protection and forest conservation acts.

UNIT V:

Human Population And The Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc..

Learning Outcomes:

- To know about the population explosion and family welfareprogrammes.
- To identify the natural assets and related casestudies.

TEXT BOOKS:

1) Text book of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press.
2) Palaniswamy, “Environmental Studies”, Pearson education
3) S. Azeem Unnisa, “Environmental Studies” Academic Publishing Company

4) K. Raghavan Nambiar, “Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus”, Scitech Publications(India), Pvt. Ltd.

REFERENCES:

1) Deeksha Dave and E.Sai Baba Reddy, “Textbook of Environmental Science”, Cengage Publications.
2) M. Anji Reddy, “Text book of Environmental Sciences and Technology”, BS Publication.
3) J. P. Sharma, Comprehensive Environmental studies, Laxmi publications.
4) J. Glynn Henry and Gary W. Heinke, “Environmental Sciences and Engineering”, Prentice hall of India Private limited
5) G.R.Chatwal, “A Text Book of Environmental Studies” Himalaya Pubilishing House
6) Gilbert M. Masters and Wendell P. Ela, “Introduction to Environmental Engineering and Science, Prentice hall of India Private limited.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

1) Grasp multidisciplinary nature of environmental studies and various renewable and non-renewable resources.
2) Understand flow and bio-geo- chemical cycles and ecological pyramids.
3) Understand various causes of pollution and solid waste management and related preventive measures.
4) About the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.
5) Casus of population explosion, value education and welfare programmes.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CSE and ECE)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5601P	0	0	3	1.5	CIA	30 M
Course Title	:	APPLIED PHYSICS LAB					SEE	70 M

COURSE OBJECTIVES:

- Understands the concepts of interference, diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semiconductor.
- Illustrates the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

Note: In the following list, out of 15 experiments, any 10 experiments must be performed in a semester

List of Experiments:

1. Determine the thickness of the wire using wedge shape method

   Experimental outcomes:

   Operates optical instrument like travelling microscope. (L2)
   Estimate the thickness of the wire using wedge shape method (L2)
   Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)

2. Determination of the radius of curvature of the lens by Newton's ring method

   Experimental outcomes:

   Operates optical instrument like travelling microscope. (L2)
   Estimate the radius of curvature of the lens (L2)
   Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)
   Plots the square of the diameter of a ring with no. of rings (L3)

3. Determination of wavelength by plane diffraction grating method

   Experimental outcomes:

   Operates optical instrument like spectrometer. (L2)
   Estimate the wavelength of the given source (L2)
   Identifies the formation of grating spectrum due diffraction. (L2)

4. Determination of dispersive power of prism.

   Experimental outcomes:

   Operates optical instrument like spectrometer. (L2)
   Estimate the refractive index and dispersive power of the given prism (L2)
   Identifies the formation of spectrum due to dispersion. (L2)

5. Determination of wavelength of LASER light using diffraction grating.

   Experimental outcomes:

   Operates various instrument (L2)
   Estimate the wavelength of laser source (L2)
   Identifies the formation of grating spectrum due diffraction. (L2)

6. Determination of particle size using LASER.

   Experimental outcomes:

   Operates various instrument (L2)
   Estimate the Particles size using laser (L2)
   Identifies the application of laser (L2)

7. To determine the numerical aperture of a given optical fiber and hence to find its acceptance angle

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)
    Estimate the numerical aperture and acceptance angle of a given optical fiber. (L2)
    Identifies the significance of numerical aperture and acceptance angle of an optical fiber in various engineering applications. (L2)

8. Determination of dielectric constant by charging and discharging method.

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)
    Estimate the dielectric constant of the given substance. (L2)
    Identifies the significance of dielectric constant in various devices. (L2)

9. Determination of magnetic field along the axis of a circular coil carrying current by Stewart and Gee's method.

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)
    Estimate the magnetic field along the axis of a circular coil carrying current. (L2)
    Plots the intensity of the magnetic field of circular coil carrying current with distance (L3)

10. Measurement of magnetic susceptibility by Gouy's method

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)
    Estimate the magnetic susceptibility of the given material. (L2)
    Identifies the significance of magnetic susceptibility in various engineering applications. (L2)

11. To Study the variation of B versus H by magnetizing the magnetic material (B-H loop)

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)
    Estimate the hysteresis loss, coercivity and retentivity of the ferromagnetic material. (L2)
    Classifies the soft and hard magnetic material based on B-H curve. (L2)
    Plots the magnetic field H and flux density B (L3)

12. To determine the resistivity of semiconductor by Four probe method

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)
    Estimate the resistivity of a semiconductor. (L2)
    Identifies the importance of four probe method in finding the resistivity of semiconductor. (L3)

13. To determine the energy gap of a semiconductor

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)
    Estimate the energy gap of a semiconductor. (L2)
    Illustrates the engineering applications of energy gap. (L3)
    Plots 1/T with log R (L3)

14. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall Effect.

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)
    Estimate the charge carrier concentration and mobility in a semiconductor. (L2)
    Illustrates the applications of Hall Effect. (L3)
    Plots the voltage with current and voltage with magnetic field (L3)

15. Measurement of resistance with varying temperature.

    Experimental outcomes:

    Operates various instruments and connect them as per the circuit. (L2)
    Estimate the resistance with varying temperature. (L2)
    Plots resistance R with temperature T (L3)

Course Outcomes:

The students will be able to

1. **Operate** optical instruments like microscope and spectrometer (L2)
2. **Determine** thickness of a hair/paper with the concept of interference (L2)
3. **Estimate** the wavelength of different colors using diffraction grating and resolving power (L2)
4. **Plot** the intensity of the magnetic field of circular coil carrying current with distance (L3)
5. **Evaluate** the acceptance angle of an optical fiber and numerical aperture (L3)
6. **Determine** the resistivity of the given semiconductor using four probe method (L3)
7. **Identify** the type of semiconductor i.e., n-type or p-type using hall effect (L3)
8. **Calculate** the band gap of a given semiconductor (L3)

References:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0501P	0	0	3	1.5	CIE	30 M
Course Title	:	C PROGRAMMING & DATA STRUCTURES LAB					SEE	70 M

COURSE OBJECTIVES:

- To illustrate the concepts of C programming language
- To discuss the syntax and semantics of C programming language.
- To demonstrate using arrays, strings, pointers and structures.
- To illustrate the use of Stacks and Queues
- To teach different operations on linked lists.
- To demonstrate Binary search tree traversal techniques.

Week 1

For the first few weeks students have to do some practice programs to understand the concepts of the C programming language

Week 2

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program that uses functions to perform the following:
(i) Addition of Two Matrices (ii) Multiplication of Two Matrices

Week 3

a) Write a C program that uses functions to perform the following operations:
(i) To insert a sub-string in to a given main string from a given position.
(ii) To delete n characters from a given position in a given string.

Week 4

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn‘t contain T.
b) Write a C program to count the lines, words and characters in a given text.

Week 5

a) Write a C Program to perform various arithmetic operations on pointer variables.
b) Write a C Program to demonstrate the following parameter passing mechanisms:
(i) call-by-value (ii) call-by-reference

Week 6

Write a C program that uses functions to perform the following operations:
(i) Reading a complex number
(ii) Writing a complex number
(iii) Addition of two complex numbers
(iv) Multiplication of two complex numbers
(Note: represent complex number using a structure.)

Week 7

Write C programs that implement stack (its operations) using

(i) Arrays (ii) Pointers

Week 8

Write C programs that implement Queue (its operations) using

(i) Arrays (ii) Pointers

Week 9

Write a C program that uses Stack operations to perform the following:

(i) Converting infix expression into postfix expression

(ii) Evaluating the postfix expression

Week 10

Write a C program that uses functions to perform the following operations on singly linked list.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 11

Write a C program that uses functions to perform the following operations on Doubly linkedlist.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 12

Write a C program that uses functions to perform the following operations on circular linkedlist.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 13

Write a C program that uses functions to perform the following:

(i) Creating a Binary Tree of integers

(ii) Traversing the above binary tree in preorder, inorder and postorder.

Week 14

Write C programs that use both recursive and non-recursive functions

(i) To find the factorial of a given integer.

(ii) To find the GCD (greatest common divisor) of two given integers.

(iii) To solve Towers of Hanoi problem.

Week 14

Write C programs that use both recursive and non-recursive functions to perform the following searching operations for a key value in a given list of integers:

(i) Linear search (ii) Binary search

Week 15

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

(i) Bubble sort (ii) Selection sort (iii) Insertion sort

Week 16 Application development

College information system – The students in groups can collect the information about the college and design a project which automates the some of the tasks like Attendance calculation, Grade calculation, etc.

TEXT BOOKS:

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
2. B.A. Forouzon and R.F. Gilberg, "COMPUTER SCIENCE: A Structured Programming Approach Using C", Third edition, CENGAGE Learning, 2016.
3. Richard F. Gilberg & Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C", Second Edition, CENGAGE Learning, 2011.

REFERENCE BOOKS:

1. PradipDey and ManasGhosh, Programming in C, Oxford University Press, 2nd Edition 2011.
2. E.Balaguruswamy, "C and Data Structures", 4th Edition, Tata Mc Graw Hill.
3. A.K.Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press.
4. M.T.Somashekara, "Problem Solving Using C", PHI, 2nd Edition 2009.

COURSE OUTCOMES:

1. Demonstrate basic concepts of C programming language. (L2)
2. Develop C programs using functions, arrays, structures and pointers. (L6)
3. Illustrate the concepts Stacks and Queues. (L2)
4. Design operations on Linked lists. (L6)
5. Apply various Binary tree traversal techniques. (L3)
6. Develop searching and sorting methods. (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE STRUCTURE AND DETAILED SYLLABUS

REGULATION: RU20

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

RAYALASEEMA UNIVERSITY,

Pasupula, Kurnool District, Andhra Pradesh 518002

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

Course Structure & Syllabus for First Year Regular B.Tech. Degree Program
(Effective for the batches admitted from 2020-21 onwards)

MECHANICAL ENGINEERING

INDUCTION PROGRAM (3 weeks duration)

- Physical activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas
- Familiarization to Dept./Branch & Innovations

B. Tech – I Semester (Theory – 4, Lab – 5)

S.No	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
			THEORY							
1	BS	20ABS5401	Linear Algebra and Calculus	3	0	0	3	30	70	100
2	BS	20ABS5602T	Engineering Physics	3	0	0	3	30	70	100
3	ES	20AES0201T	Basic Electrical and Electronics Engineering	3	0	0	3	30	70	100
4	ES	20AES0501T	C-Programming & Data Structures	3	0	0	3	30	70	100
			PRACTICAL							
5	BS	20ABS5602P	Engineering Physics Lab	0	0	3	1.5	30	70	100
6	ES	20AES0201P	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5	30	70	100
7	ES	20AES0501P	C-Programming & Data Structures Lab	0	0	3	1.5	30	70	100
8	ES	20AES0302	Engineering Workshop	0	0	3	1.5	30	70	100
9	ES	20AES0502	IT Workshop	0	0	3	1.5	30	70	100
			TOTAL:	**12**	**00**	**15**	**19.5**	**270**	**630**	**900**

B. Tech – II Semester (Theory – 6, Lab – 4)

S.No	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
			THEORY							
1	BS	20ABS5402	Differential Equations and Vector Calculus	3	0	0	3	30	70	100
2	BS	20ABS5102T	Engineering Chemistry	3	0	0	3	30	70	100
3	HS	20AHS5201T	Communicative English	3	0	0	3	30	70	100
4	ES	20AES0301T	Engineering Drawing	1	0	2	2	30	70	100
5	ES	20AES0303T	Material Science & Engineering	3	0	0	3	30	70	100
6	MC	20AMC9902	Universal Human Values	3	0	0	0	30	-	30
			PRACTICAL							
7	BS	20ABS5102P	Engineering Chemistry Lab	0	0	3	1.5	30	70	100
8	HS	20AHS5201P	Communicative English Lab	0	0	3	1.5	30	70	100
9	ES	20AES0301P	Engineering Graphics Lab	0	0	2	1	30	70	100
10	ES	20AES0303P	Material Science & Engineering Lab	0	0	3	1.5	30	70	100
			TOTAL:	**16**	**00**	**13**	**19.5**	**300**	**630**	**930**

DETAILED SYLLABUS

B.TECH - I SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, CSE, ECE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5401	3	0	0	3	CIE	30 M
Course Title	:	LINEAR ALGEBRA AND CALCULUS					SEE	70 M

COURSE OBJECTIVES:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Bridge Course: Limits, continuity, Types of matrices

Unit I: Matrices **(10 hrs)**

Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homogeneous equations linear equations. Eigenvalues and Eigenvectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix.

Learning Outcomes:

At the end of this unit, the student will be able to

- Solving systems of linear equations, using technology to facilitate row reduction determine the rank, eigenvalues and eigenvectors (L3).
- Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics; (L3)

Unit II: Mean Value Theorems **(06 hrs)**

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), related problems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Translate the given function as series of Taylor's and Maclaurin's with remainders (L3)
- Analyze the behaviour of functions by using mean value theorems (L3)

Unit III: Multivariable calculus **(10 hrs)**

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. (L3)
- Acquire the Knowledge maxima and minima of functions of several variable (L1)
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables (L3)

Unit IV: Multiple Integrals **(10 hrs)**

Double integrals, change of order of integration, change of variables. Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates. Finding areas and volumes using double and triple integrals.

Learning Outcomes:

- At the end of this unit, the student will be able to
- Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates (L5)
- Apply double integration techniques in evaluating areas bounded by region (L4)
- Evaluate multiple integrals in Cartesian, cylindrical and spherical geometries (L5)

Unit V: Beta and Gamma functions **(06 hrs)**

Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand beta and gamma functions and its relations (L2)
- Conclude the use of special function in evaluating definite integrals (L4)

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 201.
4. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education

Course Outcomes:

At the end of the course, the student will be able to

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- Utilize mean value theorems to real life problems (L3)
- Familiarize with functions of several variables which is useful in optimization (L3)
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems (L5)
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5602T	3	0	0	3	CIA	30 M
Course Title	:	ENGINEERING PHYSICS					SEE	70 M

COURSE OBJECTIVES:

- To make a bridge between the physics in school and engineering courses.
- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications.
- To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibres along with engineering applications.
- To open new avenues of knowledge in dielectric and magnetic materials which find potential in the emerging micro device applications.
- Considering the significance of micro miniaturization of electronic devices and significance of low dimensional materials, the basic concepts of nano materials, their properties and applications in modern emerging technologies are elicited.
- To familiarize the concepts of theoretical acoustics to practical use in engineering field. To explain the significance of ultrasound and its application in NDT for diversified engineering application.
- To enlighten the periodic arrangement of atoms in crystals, Bragg's law and to provide fundamentals related to structural analysis through laue and powder diffraction methods.

UNIT I: Wave Optics **(12 hrs)**

Interference- Principle of superposition – Interference of light – Conditions for sustained interference - Interference in thin films (Reflection Geometry) – Colors in thin films – Newton's Rings – Determination of wavelength and refractive index.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Grating spectrum.

Polarization- Introduction – Types of polarization – Polarization by reflection, refraction and double refraction - Nicol's Prism - Half wave and Quarter wave plates with applications.

Learning Outcomes:

The students will be able to

1. **Explain** the need of coherent sources and the conditions for sustained interference (L2)
2. **Identify** engineering applications of interference (L3)
3. **Analyze** the differences between interference and diffraction with applications (L4)
4. **Illustrate** the concept of polarization of light and its applications (L2)
5. **Classify** ordinary polarized light and extraordinary polarized light (L2)

Unit II: Lasers and Fiber optics **(08 hrs)**

Lasers: Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Lasing action – Pumping mechanisms – Nd-YAG laser – He-Ne laser – Applications of lasers.

Fiber optics: Introduction – Principle of optical fiber – Acceptance Angle – Numerical Aperture – Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers – Propagation Losses (qualitative) – Applications.

Learning Outcomes:

The students will be able to

1. **Understand** the basic concepts of LASER light Sources (L2)
2. **Apply** the concepts to learn the types of lasers (L3)
3. **Identifies** the Engineering applications of lasers (L2)
4. **Explain** the working principle of optical fibers (L2)
5. **Classify** optical fibers based on refractive index profile and mode of propagation (L2)
6. **Identify** the applications of optical fibers in various fields (L2)

Unit III: Engineering Materials **(08 hrs)**

Dielectric Materials- Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – Types of polarizations: Electronic and Ionic, Orientation polarizations (Qualitative) – Lorentz internal field – Clausius-Mossotti equation-Dielectric loss.

Magnetic Materials- Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and Permeability – Origin of permanent magnetic moment – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism (Qualitative) – Hysteresis – Soft and Hard magnetic materials.

Nanomaterials- Introduction – Surface area and quantum confinement – Physical properties: electrical and magnetic properties – Synthesis of nanomaterials: Top-down: Ball Milling – Bottom-up: Chemical Vapour Deposition – Applications of nanomaterials.

Learning Outcomes:

The students will be able to

1. **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
2. **Summarize** various types of polarization of dielectrics (L2)
3. **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
4. **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2)
5. **Explain** the applications of dielectric and magnetic materials (L2)
6. **Apply** the concept of magnetism to magnetic devices (L3)
7. **Identify** the nano size dependent properties of nanomaterials (L2)
8. **Illustrate** the methods for the synthesis and characterization of nanomaterials (L2)
9. **Apply** the basic properties of nanomaterials in various Engineering branches (L3).

Unit IV: Acoustics and Ultrasonics **(10 hrs)**

Acoustics- Introduction – Requirements of acoustically good auditorium – Reverberation – Reverberation time – Sabine's formula (Derivation using growth and decay method) – Absorption coefficient and its determination – Factors affecting acoustics of buildings and their remedies.

Ultrasonics: Introduction – Properties – Production by magnetostriction and piezoelectric methods – Detection – Acoustic grating – Non Destructive Testing – Pulse echo system through transmission and reflection modes – Applications.

Learning Outcomes:
The students will be able to

1. **Explain** how sound is propagated in buildings (L2)
2. **Analyze** acoustic properties of typically used materials in buildings (L4)
3. **Recognize** sound level disruptors and their use in architectural acoustics (L2)
4. **Identify** the use of ultrasonics in different fields (L3)

Unit-V: Crystallography and X-ray diffraction **(08 hrs)**
Crystallography- Space lattice, Basis, unit cell and lattice parameters – Bravais Lattice – Crystal systems – Packing fraction – Coordination number – Packing fraction of SC, BCC & FCC – Miller indices – Separation between successive (hkl) planes.
X-Ray Diffraction- Bragg's law – Bragg's X-ray diffractometer – Crystal structure determination by Powder method.
Learning Outcomes:
The students will be able to

- **Classify** various crystal systems (L2)
- **Identify** different planes in the crystal structure (L3)
- **Analyze** the crystalline structure by Bragg's X-ray diffractometer (L4)
- **Apply** powder method to measure the crystallinity of a solid (L4)

Text books:

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, S. Chand and Company
2. Engineering physics – D.K. Battacharya and Poonam Tandon, Oxford University press.

Reference Books:

1. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press
2. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning
3. Engineering Physics – M.R. Srinivasan, New Age Publications
4. Engineering Physics – K. Thyagarajan, McGraw Hill Publishers

COURSE OUTCOMES:

1. **Explain** the need of coherent sources and the conditions for sustained interference (L2). **Identify** applications of interference in engineering (L3). **Analyze** the differences between interference and diffraction with applications (L4). **Illustrate** the concept of polarization of light and its applications (L2). **Classify** ordinary polarized light and extraordinary polarized light (L2) The different realms of physics and their applications in both scientific and technological systems are achieved through the study of wave optics.
2. **Explain** various types of emission of radiation (L2). **Identify** the role of laser in engineering applications (L3). **Describe** the construction and working principles of various types of lasers (L1). **Explain** the working principle of optical fibers (L2). **Classify** optical fibers based on refractive index profile and mode of propagation (L2). **Identify** the applications of optical fibers in medical, communication and other fields (L2). **Apply** the fiber optic concepts in various fields (L3).

3. **Explain** the concept of dielectric constant and polarization in dielectric materials (L2). **Summarize** various types of polarization of dielectrics (L2). **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics (L2). **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2). **Explain** the applications of dielectric and magnetic materials (L2). **Apply** the concept of magnetism to magnetic devices (L3)
4. **Explain** sound waves and its propagation /interaction with construction material in design of buildings (L2). **Analyze** acoustic parameters of typically used materials in buildings (L4). **Recognize** sound level disruptors and their application in architectural acoustics (L2). **Identify** the use of ultrasonics in diversified fields of engineering (L3).
5. **Interpret** various crystal systems (L2) and **Analyze** the characterization of materials by XRD (L4). **Identify** the important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction technique is focused (L3). **Explain** the structure of the crystals by Laue and Powder techniques (L2).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, CSE and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0201T	3	0	0	3	CIA	30 M
Course Title	:	BASIC ELECTRICAL & ELECTRONICS ENGG.					SEE	70 M

PART-A: BASIC ELECTRICAL ENGINEERING

COURSE OBJECTIVES:-

- To introduce basics of electric circuits.
- To teach DC and AC electrical circuit analysis.
- To explain working principles of transformers and electrical machines.
- To impart knowledge on Power system generation, transmission and distribution

UNIT I: DC & AC Circuits

Electrical circuit elements (R - L and C) - Kirchhoff laws - Series and parallel connection of resistances with DC excitation. Superposition Theorem - Representation of sinusoidal waveforms - peak and rms values - phasor representation - real power - reactive power - apparent power – power factor - Analysis of single-phase ac circuits consisting of RL - RC - RLC series circuits, Resonance.

Learning Outcomes

At the end of this unit, the student will be able to

- Recall Kirchoff laws
- Analyze simple electric circuits with DC excitation
- Apply network theorems to simple circuits
- Analyze single phase AC circuits consisting of series RL - RC - RLC combinations

UNIT II: DC & AC Machines:

Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator – principle and operation of DC Motor – Performance Characteristics of DC Motor - Speed control of DC Motor – Principle and operation of Single Phase Transformer - OC and SC tests on transformer - Principle and operation of 3-phase AC machines [Elementary treatment only]

Learning Outcomes

At the end of this unit, the student will be able to

- Explain principle and operation of DC Generator & Motor.
- Perform speed control of DC Motor
- Explain operation of transformer and induction motor.
- Explain construction & working of induction motor - DC motor

UNIT III: Basics of Power Systems

Layout & operation of Hydro, Thermal, Nuclear Stations - Solar & wind generating stations – Typical AC Power Supply scheme – Elements of Transmission line – Types of Distribution systems: Primary & Secondary distribution systems.

Learning Outcomes

At the end of this unit, the student will be able to

- Understand working operation of various generating stations
- Explain the types of Transmission and Distribution systems

Text Books:

1. D. P. Kothari and I. J. Nagrath - "Basic Electrical Engineering" - Tata McGraw Hill - 2010.
2. V.K. Mehta & Rohit Mehta, "Principles of Power System" – S.Chand – 2018.

References:

1. L. S. Bobrow - "Fundamentals of Electrical Engineering" - Oxford University Press - 2011.
2. E. Hughes - "Electrical and Electronics Technology" - Pearson - 2010.
3. C.L. Wadhwa – "Generation Distribution and Utilization of Electrical Energy", 3rd Edition, New Age International Publications.

Course Outcomes:

The student should be able to

- Apply concepts of KVL/KCL in solving DC circuits
- Understand and choose correct rating of a transformer for a specific application
- Illustrate working principles of DC Motor
- Identify t ype of electrical machine based on their operation
- Understand the basics of Power generation, Transmission and Distribution

PART-B: ELECTRONICS ENGINEERING

COURSE OBJECTIVES:-

- **Understand principles and terminology of electronics.**
- **Familiar with the theory, construction, and operation of electronic devices.**
- **Learn about biasing of BJTs and FETs.**
- **Design and construct amplifiers.**
- **Understand the concept & principles of logic devices.**

Unit I:

Diodes and Applications: Semiconductor Diode, Diode as a Switch& Rectifier, Half Wave and Full Wave Rectifiers with and without Filters; Operation and Applications of Zener Diode, LED, Photo Diode.

Transistor Characteristics: Bipolar Junction Transistor (BJT) – Construction, Operation, Amplifying Action, Common Base, Common Emitter and Common Collector Configurations, Operating Point, Biasing of Transistor Configuration; Field Effect Transistor (FET) – Construction, Characteristics of Junction FET, Concepts of Small Signal Amplifiers –CE & CC Amplifiers.

Learning outcomes:

1. Remember and understand the basic characteristics of semiconductor diode. (L1)
2. Understand principle of operation of Zener diode and other special semiconductor diodes. (L1)
3. Analyze BJT based biasing circuits. (L3)
4. Design an amplifier using BJT based on the given specifications. (L4)

Unit II:

Operational Amplifiers and Applications: Introduction to Op-Amp, Differential Amplifier Configurations, CMRR, PSRR, Slew Rate; Block Diagram, Pin Configuration of 741 Op-Amp, Characteristics of Ideal Op-Amp, Concept of Virtual Ground; Op-Amp Applications - Inverting, Non-Inverting, Summing and Difference Amplifiers, Voltage Follower, Comparator, Differentiator, Integrator.

Learning outcomes:

1. Describe operation of Op-Amp based linear application circuits, converters, amplifiers and non-linear circuits. (L2)
2. Analyze Op-Amp based comparator, differentiator and integrator circuits. (L3)

Unit III:

Digital Electronics: Logic Gates, Simple combinational circuits–Half and Full Adders, BCD Adder. Latches and Flip-Flops (S-R, JK and D), Shift Registers and Counters. Introduction to Microcontrollers and their applications (Block diagram approach only).

Learning outcomes:

1. Explain the functionality of logic gates. (L2)
2. Apply basic laws and De Morgan's theorems to simplify Boolean expressions. (L3)
3. Analyze standard combinational and sequential circuits. (L4)
4. Distinguish between 8085 & 8086 microprocessors also summarize features of a microprocessor. (L5)

Text Books:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices &Circuit Theory, Pearson Education,2007.
2. Ramakanth A. Gayakwad, Op-Amps & Linear ICs, 4thEdition, Pearson, 2017.
3. R. P. Jain, Modern Digital Electronics,3rd Edition, Tata Mcgraw Hill,2003.
4. Raj Kamal, Microcontrollers: Architecture, Programming, Interfacing and System Design, 2nd Edition, Pearson, 2012.

Reference Books:

1. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India,2002.
2. R. S. Sedha, A Text Book of Electronic Devices and Circuits, S.Chand& Co,2010.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

COURSE OUTCOMES:

After the completion of the course students will able to

CO1: Explain the theory, construction, and operation of electronic devices.

CO2: Apply the concept of science and mathematics to explain the working of diodes and its applications, working of transistor and its characteristics.

CO3: Design and analyze small signal amplifier circuits applying the biasing techniques.

CO4: Solve problems of various digital logic gates and circuits.

CO5: Correlate the fundamental concepts to various Real life applications of today.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0501T	3	0	0	3	CIE	30 M
Course Title	:	C PROGRAMMING & DATA STRUCTURES					SEE	70 M

COURSE OBJECTIVES:

- To illustrate the basic concepts of C programming language.
- To discuss the concepts of Functions, Arrays, Pointers and Structures of C Programming Language.
- To discuss the syntax and semantics of C Programming language
- To familiarize with Stack, Queue, Linked lists, Tree and graph data structures.
- To demonstrate programming by choosing appropriate Data Structures and Features of the C language.

Unit I:

Getting Started: What is C, The C Character Set, Constants, Variables and Keywords, Types of C Constants, Rules for Constructing Integer Constants, Rules for Constructing Real Constants, Rules for Constructing Character Constants, Types of C Variables, Rules for Constructing Variable Names, C Keywords, Form of a C Program, Comments in a C Program, What is main, Variables and their Usage, printf( ) and its Purpose, Compilation and Execution, Receiving Input.

Data Types Revisited: Integers, long and short, Integers, signed and unsigned, Chars, signed and unsigned, Floats and Doubles, A Few More Issues, Storage Classes in C-Automatic Storage Class, Register Storage Class, Static Storage Class, and External Storage Class.

C Instructions: Types of Instructions, Type Declaration Instruction, Arithmetic Instructions, Integer and Float Conversions, Type Conversion in Assignments, Hierarchy of Operations, Associativity of Operators, Control Instructions.

Decision Control Instruction: Decisions! Decisions, The if Statement, The Real Thing, Multiple Statements within if, The if-else Statement, Nested if-elses, Forms of if.

Learning Outcomes:

1. Understand the basic concepts of C language (L2)
2. Learn the functionality of operators and Control Statements of C (L2)
3. Use the if control structure of the C language (L3)

Unit II:

More Complex Decision Making: Use of Logical Operators, The else if Clause, The ! Operator, Hierarchy of Operators Revisited, a Word of Caution, the Conditional Operators.

Loop Control Instruction: Loops, the while Loop, Tips and Traps, More Operators.

More Complex Repetitions: The for Loop, Nesting of Loops, Multiple Initializations in the for Loop, The break Statement, The continue Statement, The do-while Loop, The Odd Loop.

Case Control Instruction: Decisions using switch, The Tips and Traps, switch versus if-else Ladder, The goto Keyword.

Functions: What is a Function?, Why use Functions?, Passing Values between Functions, Scope Rule of Functions, Order of Passing Arguments, Using Library Functions, One Dicey Issue, Return Type of Function.

Learning Outcomes:

1. Apply the concept of Loops in various applications. (L3)
2. Design programs using modular approach (L6)

Unit III:

Recursion: Recursion, Recursion and Stack

Pointers: Call by Value and Call by Reference, an Introduction to Pointers, Pointer Notation, Back to Function Calls.

The C Preprocessor: Features of C Preprocessor, Macro Expansion, Macros with Arguments, Macros versus Functions, File Inclusion.

Arrays: What are Arrays?, A Simple Program using Array, More on Arrays, Array Initialization Array Elements in Memory, Bounds Checking, Passing Array Elements to a Function, Pointers and Arrays, Passing an Entire Array to a Function, The Real Thing.

Multidimensional Arrays: Two-Dimensional Arrays, Initializing a Two-Dimensional Array, Memory Map of a Two-Dimensional Array, Pointers and Two-Dimensional Arrays, Pointer to an Array, Passing 2-D Array to a Function, Array of Pointers, Three-Dimensional Array.

Learning Outcomes:

1. Solve problems by using Recursion (L3)
2. Understand the concept of Array (L2)
3. Use pointers to efficiently use memory (L3)

Unit IV:

Strings: What are Strings, More about Strings, Pointers and Strings

Standard Library String Functions-strlen ( ), strcpy ( ), strcat ( ), strcmp ( ).

Handling Multiple Strings: Two-Dimensional Array of Characters, Array of Pointers to Strings, Limitation of Array of Pointers to Strings.

Structures: Why use Structures? Declaring a Structure, Accessing Structure Elements, How Structure Elements are Stored? Array of Structures, Additional Features of Structures, Uses of Structures.

Console Input/output: Types of I/O, **Console I/O Functions**-Formatted Console I/O Functions, sprintf ( ) and sscanf ( ) Functions Unformatted Console I/O Functions

File Input/output: Data Organization, **File Operations**-Opening a File, Reading from a File, Trouble in Opening a File, Closing the File, Counting Characters, Tabs, Spaces, **A File-Copy Program**-Writing to a File, File Opening Modes, **String (Line) I/O in Files**-The Awkward Newline, Record I/O in Files, Text Files and Binary Files, Record I/O Revisited, Database Management, **Low-Level File I/O** -A Low-Level File-Copy Program, I/O under Windows.

Learning Outcomes:

1. Understand the concept of Strings (L2)
2. Learn Structures and Unions (L2)
3. Operate Files through C Programs (L4)
4. Manipulate strings (L3)

Unit V:

Data Structures: Linked List-Single Linked List, Double Linked List, Circular Linked List. Stacks-Using Arrays and Linked List, Stack Applications.
Queue- Arrays and Linked List, Circular Queue, Priority Queue.
Trees-Binary Trees, Binary Search Tree.
Graphs-Graphs Implementation using Arrays and Linked List, Traversal of Graphs.

Learning Outcomes:

1. Implements basic data structures such as stacks, queues and trees.(L3)
2. Apply algorithms and data structures in solving problems. (L3)
3. Design indexing structures (L6)

Text Books:

1. Yashavant Kanetkar, “Let Us C”, Fourteenth Edition, BPB Publications.
2. K R Venugopal, Sudeep R Prasad, “Mastering C”, Mc GrawHill publications
3. Jeri R. hanly, Elliot B. Koffman, Ashok Kamthane, A. Ananda Rao, “Programming in C and Data Structures”, Pearson.

Reference Books:

1. Brian W Kernighan and Dennis M Ritchie, “The C Programming Language”, Second Edition, Prentice Hall Publication.
2. Ellis Horowitz, SartajSahni, Susan Anderson-Freed, “Fundamentals of Data Structures in C”, Computer Science Press.
3. Pradip Dey and Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition 2011.
4. Richard F. Gilberg & Behrouz A. Forouzan, “Data Structures: A Pseudocode Approach with C”, Second Edition, CENGAGE Learning, 2011.

Course Outcomes:

1. Learn the concepts of C Programming language. (L2)
2. Design applications in C, using functions, arrays, pointers and structures. (L6)
3. Apply the concepts of Stacks and Queues in solving the problems. (L3)
4. Explore various operations on Linked lists. (L5)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5602PL	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING PHYSICS LAB					SEE	70 M

COURSE OBJECTIVES:

- Understand the role of Optical fiber parameters in engineering applications.
- Recognize the significance of laser by studying its characteristics and its application in finding the particle size.
- Illustrates the magnetic and dielectric materials applications.
- Identifies the various sensor applications.

Note: - In the following list of experiments, out of 15 experiments any 10 experiments must be performed in a semester.

List of Engineering Physics Experiments

1. Determine the thickness of the wire using wedge shape method

   Experimental outcomes:

   Operates optical instrument like travelling microscope. (L2)
   Estimate the thickness of the wire using wedge shape method (L2)
   Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)

2. Determination of the radius of curvature of the lens by Newton's ring method

   Experimental outcomes:

   Operates optical instrument like travelling microscope. (L2)
   Estimate the radius of curvature of the lens (L2)
   Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)
   Plots the square of the diameter of a ring with no. of rings (L3)

3. Determination of wavelength by plane diffraction grating method

   Experimental outcomes:

   Operates optical instrument like spectrometer. (L2)
   Estimate the wavelength of the given source (L2)
   Identifies the formation of grating spectrum due diffraction. (L2)

4. Determination of dispersive power of prism.

   Experimental outcomes:

   Operates optical instrument like spectrometer. (L2)
   Estimate the refractive index and dispersive power of the given prism (L2)
   Identifies the formation of spectrum due to dispersion. (L2)

5. Determination of wavelength of LASER light using diffraction grating.

   Experimental outcomes:

   Operates various instrument (L2)
   Estimate the wavelength of laser source (L2)
   Identifies the formation of grating spectrum due diffraction. (L2)

6. Determination of particle size using LASER.

   Experimental outcomes:

   Operates various instrument (L2)

Estimate the Particles size using laser (L2)
Identifies the application of laser (L2)

7. To determine the numerical aperture of a given optical fiber and hence to find its acceptance angle
   Experimental outcomes:
   Operates various instruments and connect them as per the circuit. (L2)
   Estimate the numerical aperture and acceptance angle of a given optical fiber. (L2)
   Identifies the significance of numerical aperture and acceptance angle of an optical fiber in various engineering applications. (L2)
8. Determination of dielectric constant by charging and discharging method.
   Experimental outcomes:
   Operates various instruments and connect them as per the circuit. (L2)
   Estimate the dielectric constant of the given substance. (L2)
   Identifies the significance of dielectric constant in various devices. (L2)
9. To determine the magnetic field along the axis of a circular coil carrying current –Stewart Gee's method.
   Experimental outcomes:
   Operates various instruments and connect them as per the circuit. (L2)
   Estimate the magnetic field along the axis of a circular coil carrying current. (L2)
   Plots the intensity of the magnetic field of circular coil carrying current with distance (L3)
10. Measurement of magnetic susceptibility by Gouy's method
    Experimental outcomes:
    Operates various instruments and connect them as per the circuit. (L2)
    Estimate the magnetic susceptibility of the given material. (L2)
    Identifies the significance of magnetic susceptibility in various engineering applications. (L2)
11. To Study the variation of B versus H by magnetizing the magnetic material (B-H loop)
    Experimental outcomes:
    Operates various instruments and connect them as per the circuit. (L2)
    Estimate the hysteresis loss, coercivity and retentivity of the ferromagnetic material. (L2)
    Classifies the soft and hard magnetic material based on B-H curve. (L2)
    Plots the magnetic field H and flux density B (L3)
12. Determination of ultrasonic velocity in liquid (Acoustic grating)
    Experimental outcomes:
    Operates various instruments. (L2)
    Estimate the velocity of ultrasonic waves in liquids. (L2)
    Illustrates the basic applications of ultrasonics. (L3)
13. Determination of Rigidity modulus of material of a wire-dynamic method (Torsional pendulum)
    Experimental outcomes:
    Operates various instruments. (L2)
    Estimate the rigidity modules of a given wire (L2)
    Plots length of the pendulum (l) with time period T^2 (L3)
14. Sonometer: Verification of the three laws of stretched strings
    Experimental outcomes:
    Operates various instruments. (L2)
    Estimate the linear density of a given wire (L2)
    Identify the frequency of tuning fork (L3)
15. Determination of spring constant of springs using Coupled Oscillator
    Experimental outcomes:

Operates various instruments. (L2)
Estimate the coupling constant of a coupled oscillator (L2)
Plots the coupling distance (D) with coupling constant (C) (L3)
Apply the concept of oscillatory motion to molecules of a solid, multi vibrator etc.

Course Outcomes:

The students will be able to

1. **Operate** various optical instruments (L2)
2. **Estimate** wavelength of laser and particles size using laser(L2)
3. **Evaluate** the acceptance angle of an optical fiber and numerical aperture (L3)
4. **Estimate** the susceptibility and related magnetic parameters of magnetic materials (L2)
5. **Plot** the intensity of the magnetic field of circular coil carrying current with distance (L3)
6. **Determine** magnetic susceptibility of the material and its losses by B-H curve (L3)
7. **Apply** the concepts of ultrasonics by acoustic grating (L2)

References:

1. S. Balasubramanian, M.N. Srinivasan “A Text book of Practical Physics”- S Chand Publishers, 2017.
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, CSE and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0201P	3	0	0	3	CIA	30 M
Course Title	:	BASIC ELECTRICAL & ELECTRONICS ENGG. LAB					SEE	70 M

PART-A: BASIC ELECTRICAL ENGINEERING LAB

COURSE OBJECTIVES:-

- To Verify Kirchoff's laws and Superposition theorem
- To learn performance characteristics of DC Machines.
- To perform various tests on 1- Phase Transformer.
- To Study the I – V Characteristics of Solar PV Cell

LIST OF EXPERIMENTS: -

1. Verification of Kirchhoff laws.
2. Verification of Superposition Theorem.
3. Magnetization characteristics of a DC Shunt Generator.
4. Speed control of DC Shunt Motor.
5. OC & SC test of 1 – Phase Transformer.
6. Load test on 1-Phase Transformer.
7. I – V Characteristics of Solar PV cell
8. Brake test on DC Shunt Motor.

COURSE OUTCOMES:

After completing the course, the student will be able to

- Understand Kirchoff's Laws & Superposition theorem.
- Analyze the various characteristics on DC Machines by conducting various tests.
- Analyze I – V Characteristics of PV Cell
- Apply the knowledge to perform various tests on 1-phase transformer

PART-B: ELECTRONICS ENGINEERING LAB

COURSE OBJECTIVES:-

- To verify the theoretical concepts practically from all the experiments.
- To analyze the characteristics of Diodes, BJT, MOSFET, UJT.
- To design the amplifier circuits from the given specifications.
- Exposed to linear and digital integrated circuits.

LIST OF EXPERIMENTS: (**Execute Six experiments**).

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Full Wave Rectifier with & without filter.
4. Wave Shaping Circuits. (Clippers & Clampers)
5. Input & Output characteristics of Transistor in CB / CE configuration.
6. Frequency response of CE amplifier.
7. Inverting and Non-inverting amplifiers using Op-Amps.

8. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
9. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

COURSE OUTCOMES:

CO1: Learn the characteristics of basic electronic devices like PN junction diode, Zener diode & BJT.

CO2: Analyze the application of diode as rectifiers, clippers and clampers.

CO3: Learn the fundamental principles of amplifier circuits and need of Bias in Amplifier circuits.

CO4: Learn the basics of linear integrated circuits and understand characteristics of operational amplifier.

CO5: Learn about available digital ICs and verify truth tables of Logic gates and Flipflops.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0501P	0	0	3	1.5	CIE	30 M
Course Title	:	C PROGRAMMING & DATA STRUCTURES LAB					SEE	70 M

COURSE OBJECTIVES:

- To illustrate the concepts of C programming language
- To discuss the syntax and semantics of C programming language.
- To demonstrate using arrays, strings, pointers and structures.
- To illustrate the use of Stacks and Queues
- To teach different operations on linked lists.
- To demonstrate Binary search tree traversal techniques.

Week 1

For the first few weeks students have to do some practice programs to understand the concepts of the C programming language

Week 2

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program that uses functions to perform the following:
(i) Addition of Two Matrices (ii) Multiplication of Two Matrices

Week 3

a) Write a C program that uses functions to perform the following operations:
(i) To insert a sub-string in to a given main string from a given position.
(ii) To delete n characters from a given position in a given string.

Week 4

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn‘t contain T.
b) Write a C program to count the lines, words and characters in a given text.

Week 5

a) Write a C Program to perform various arithmetic operations on pointer variables.
b) Write a C Program to demonstrate the following parameter passing mechanisms:
(i) call-by-value (ii) call-by-reference

Week 6

Write a C program that uses functions to perform the following operations:
(i) Reading a complex number
(ii) Writing a complex number
(iii) Addition of two complex numbers
(iv) Multiplication of two complex numbers
(Note: represent complex number using a structure.)

Week 7

Write C programs that implement stack (its operations) using

(i) Arrays (ii) Pointers

Week 8

Write C programs that implement Queue (its operations) using

(i) Arrays (ii) Pointers

Week 9

Write a C program that uses Stack operations to perform the following:

(i) Converting infix expression into postfix expression

(ii) Evaluating the postfix expression

Week 10

Write a C program that uses functions to perform the following operations on singly linked list.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 11

Write a C program that uses functions to perform the following operations on Doubly linkedlist.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 12

Write a C program that uses functions to perform the following operations on circular linkedlist.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 13

Write a C program that uses functions to perform the following:

(i) Creating a Binary Tree of integers

(ii) Traversing the above binary tree in preorder, inorder and postorder.

Week 14

Write C programs that use both recursive and non-recursive functions

(i) To find the factorial of a given integer.

(ii) To find the GCD (greatest common divisor) of two given integers.

(iii) To solve Towers of Hanoi problem.

Week 14

Write C programs that use both recursive and non-recursive functions to perform the following searching operations for a key value in a given list of integers:

(i) Linear search (ii) Binary search

Week 15

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

(i) Bubble sort (ii) Selection sort (iii) Insertion sort

Week 16 Application development

College information system – The students in groups can collect the information about the college and design a project which automates the some of the tasks like Attendance calculation, Grade calculation, etc.

TEXT BOOKS:

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
2. B.A. Forouzon and R.F. Gilberg, “COMPUTER SCIENCE: A Structured Programming Approach Using C”, Third edition, CENGAGE Learning, 2016.
3. Richard F. Gilberg & Behrouz A. Forouzan, “Data Structures: A Pseudocode Approach with C”, Second Edition, CENGAGE Learning, 2011.

REFERENCE BOOKS:

1. PradipDey and ManasGhosh, Programming in C, Oxford University Press, 2nd Edition 2011.
2. E.Balaguruswamy, “C and Data Structures”, 4th Edition, Tata Mc Graw Hill.
3. A.K.Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press.
4. M.T.Somashekara, “Problem Solving Using C”, PHI, 2nd Edition 2009.

COURSE OUTCOMES:

1. Demonstrate basic concepts of C programming language. (L2)
2. Develop C programs using functions, arrays, structures and pointers. (L6)
3. Illustrate the concepts Stacks and Queues. (L2)
4. Design operations on Linked lists. (L6)
5. Apply various Binary tree traversal techniques. (L3)
6. Develop searching and sorting methods. (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0302	0	0	3	1.5	CIE	30 M
Course Title	:	ENGINEERING WORKSHOP					SEE	70 M

COURSE OBJECTIVES:

- To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills.

LIST OF EXPERIMENTS

Trade I: Wood Working

Familiarity with different types of woods and tools used in wood working and make following joints

(a) Half – Lap joint (b) Mortise and Tenon joint (c) Corner Dovetail joint or Bridle joint

Trade II: Sheet Metal Working

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets

(a) Tapered tray (b) Conical funnel (c) Elbow pipe (d) Brazing

Trade III: Fitting

Familiarity with different types of tools used in fitting and do the following fitting exercises.

(a) V-fit (b) Dovetail fit (c) Semi-circular fit

(d) Bicycle tyre puncture and change of two wheeler tyre.

Trade IV: Electrical Wiring

Familiarities with different types of basic electrical circuits and make the following connections

(a) Parallel and series (b) Two way switch (c) Godown lighting

(d) Tube light (e) Three phase motor (f) Soldering of wires

COURSE OUTCOMES:

After completion of this lab the student will be able to

- Apply wood working skills in real world applications. (l3)
- Build different objects with metal sheets in real world applications. (l3)
- Apply fitting operations in various applications. (l3)
- Apply different types of basic electric circuit connections. (l3)
- Use soldering and brazing techniques. (l2)

Note: In each section a minimum of three exercises are to be carried out.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0502	0	0	3	1.5	CIE	30 M
Course Title	:	IT WORKSHOP					SEE	70 M

COURSE OBJECTIVES:

- To make the students know about the internal parts of a computer, assembling and dissembling a computer from the parts, preparing a computer for use by installing the operating system
- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, and Presentations
- To demonstrate Networking of computers and use Internet facility for Browsing and Searching
- To illustrate the need for security while using applications and devices.

Preparing your Computer

Task 1:

Learn about Computer: Identify the internal parts of a computer, and its peripherals, Represent the same in the form of diagrams including Block diagram of a computer, Write specifications for each part of a computer including peripherals and specification of a Desktop computer.

Task 2:

Assembling a Computer: Disassemble and assemble the PC back to working condition, Trouble shoot the computer and identify working and non-working parts, Identify the problem correctly by various methods like beeps.

Task 3:

Install Operating system and Applications: Install Linux on the computer, Install another operating system and make the system dual boot or multi boot, Install operating systems using Virtual machine.
Access the computing resources like CD/DVD drives, Pen drives, Printers, Speakers, Microphone, etc.
Install device drivers and install application programs.

Networking and Internet

Task 4:

Networking: Connect two computers directly using a cable or wireless connectivity and share information, Connect two or more computers using switch/hub and share information, Phuscally connect computers using crimpling activity, logical configuration, etc.

Task 5:

Browsing Internet: Access the Internet for Browsing, Search the Internet for required information, Create e-mail account, send and receive email, Get acquaintance with applications like Facebook, skype, etc.

Task 6:

Antivirus: Download freely available Antivirus software, install it and use it to check for threats to the computer being used, Submit information about the features of the antivirus used, installation process, virus definitions, virus engine, etc. Configure the computer for high security.

Productivity tools

Task 7:

Word Processor: Create documents using the word processor tool, Inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc.
Prepare project cover pages, content sheet, and chapter pages.

Task 8:

Presentations: Creating, opening, saving, and running the presentations, selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show.

Task 9:

Spreadsheet: Create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells.

Applications

Task 10:

Database management system: Install a Database management system, configure users, do some administration tasks.

Task 11:

Language Translators

Install different Natural language translators in a Computer/Mobile. Use them to convert text between different languages.
Use Voice to access applications and make them perform different tasks like calling users, etc.

Task 12:

Sharing

Install applications github, dropbox, google forms, google docs and use them to share information and work on a common project. It is a Team task.

Task 13:

IDE

Install applications like Vscode, and Eclipse and use the integrated development environment of those applications and perform tasks like editing, compiling, executing, etc.

Task 14:

Cyber Security

Practice the following Cyber Security related tasks

- Cyber Hygiene Practices of Personal digital devices
- Cyber Hygiene Practices for Home
- Cyber Hygiene Practices for Remote working and Learning
  Websource: Cyber Hygiene Practices - ISEA (infosecawareness.in)

References:

1. Peter Norton , Introduction to Computers, McGraw Hill
2. Joan Lambert, Joyce Cox, MOS study guide for word, Excel, Powerpoint & Outlook Exams, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Rusen , Networking your computers and devices, PHI
5. Bigelows , Trouble shooting, Maintaining & Repairing PCs, TMH
6. Major reference is Websites like Google.com, dropbox.com, github.com and others.

Course Outcomes:

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use. (L6)
- Prepare the Documents using Word processors and Prepare spread sheets for calculations using excel. (L3)
- Design Slide presentations using the presentation tool. (L6)
- Interconnect two or more computers for information sharing. (L4)
- Access the Internet and Browse it to obtain the required information. (L4)
- Analyze the vulnerabilities of the devices, and apply security features (L4)

B.TECH - II SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CE, CSE, ECE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5402	3	0	0	3	CIE	30 M
Course Title	:	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS					SEE	70 M

COURSE OBJECTIVES:

1) To enlighten the learners in the concept of differential equations and multivariable calculus.
2) To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

UNIT I: Linear differential equations of higher order (Constant Coefficients) (10 hrs)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskean, method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Mass spring system.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify the essential characteristics of linear differential equations with constant coefficients (L3)
- Solve the linear differential equations with constant coefficients by appropriate method (L3)
- Classify and interpret the solutions of linear differential equations (L3)
- Formulate and solve the higher order differential equation by analyzing physical situations (L3)

UNIT II: Partial Differential Equations (08 hrs)

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order equations using Lagrange's method.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply a range of techniques to find solutions of standard PDEs (L3)
- Outline the basic properties of standard PDEs (L2)

UNIT III: Applications of Partial Differential Equations (10 hrs)

Classification of PDE, method of separation of variables for second order equations. Applications of Partial Differential Equations: One dimensional Wave equation, One dimensional Heat equation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Calcify the PDE (L3)
- Learn the applications of PDEs(L2)

UNIT IV: Vector differentiation (06 hrs)

Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions-Divergence and Curl, vector identities.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply del to Scalar and vector point functions (L3)
- Illustrate the physical interpretation of Gradient, Divergence and Curl (L3)

UNIT 5: Vector integration (08 hrs)

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Learning Outcomes:

At the end of this unit, the student will be able to

- find the work done in moving a particle along the path over a force field (L4)
- evaluate the rates of fluid flow along and across curves (L4)
- apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals (L3)

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

Reference Books:

1. George B.Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
2. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
4. S L Ross , Differential Equations ,Wiley India, year 2007 edition.

Course Outcomes:

At the end of the course, the student will be able to

- Solve the differential equations related to various engineering fields (L6)
- Identify solution methods for partial differential equations that model physical processes (L3)
- Interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
- Estimate the work done against a field, circulation and flux using vector calculus (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CE & ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5102T	3	0	0	3	CIE	30 M
Course Title	:	ENGINEERING CHEMISTRY					SEE	70 M

COURSE OBJECTIVES:

- To familiarize engineering chemistry and its applications
- To impart the concept of soft and hard waters, softening methods of hard water
- To train the students on the principles and applications of electrochemistry, polymers, surface chemistry, and cement.

Unit I: Water Technology: **(08 hrs)**

Introduction: Hardness of water and units, Estimation of hardness of water by EDTA Method - Estimation of dissolved oxygen by Winkler's method - Boiler troubles – Priming, foaming, scale and sludge, Caustic embrittlement, Municipal water treatment – specifications for drinking water, Bureau of Indian Standards (BIS) and World Health Organization (WHO) standards, ion-exchange processes – desalination of brackish water - Reverse Osmosis (RO) and electrodialysis.

Learning outcomes:

The student will be able to

- **List** the differences between temporary and permanent hardness of water (L1)
- **Explain** the principles of reverse osmosis and electrodialysis. (L2)
- **Compare** quality of drinking water with BIS and WHO standards. (L2)
- **Illustrate** problems associated with hard water - scale and sludge**.** (L2)
- **Explain** the working principles of different Industrial water treatment processes (L2)

Unit II: Electrochemistry and Applications: **(10 hrs)**

Electrodes – concepts, Electrochemical Cell, Nernst Equation, Cell Potential Calculations.

Primary cells – Zinc-air, Na-air batteries, Secondary cells – Nickel-Cadmium (Ni-Cd),and Lithium ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen, methanol fuel cells – working of the cells.

Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry corrosion, Pilling Bedworth rule and Factors affecting the corrosion**,** cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).

Learning Outcomes:

At the end of this unit, the students will be able to

- **Apply** Nernst equation for calculating electrode and cell potentials (L3)
- **Recall** working and importance of batteries(L1)
- **Apply** Pilling Bedworth rule for corrosion and corrosion prevention (L3)
- **Demonstrate** the corrosion prevention methods and factors affecting corrosion (L2)
- **Compare** primary and secondary batteries and their applications (L2)

Unit III: Polymers and Fuel Chemistry **(10 hrs)**

Polymers: Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth and coordination polymerization.

Plastics: Thermoplastics and Thermo-setting plastics - Preparation, properties and applications of poly styrene, PVC and Bakelite. Calculation of molecular Weight of polymer by weight average and number average methods, Poly Dispersity Index.

Elastomers: Preparation, properties and applications of Buna-S, Buna-N, Thiokol, Calculation of Molecular Wt of Polymer by Weight Average and Number Average methods, Poly Dispersity Index.

Fuels: Types of fuels, calorific value, numerical problems based on calorific value; Analysis of coal.

Liquid Fuels: Refining of Petroleum, fuels for IC engines, knocking and anti-knock agents, Octane and Cetane values, cracking of oils; alternative fuels- propane, methanol and ethanol, bio-fuels(Coal gas, Biogas).

Learning Outcomes:

At the end of this unit, the students will be able to

- **Explain** different types of polymers and their applications (L2)
- **Find** various alternate fuels and its importance(L1)
- **Solve** the numerical problems based on Calorific value(L3)
- **Select** suitable fuels for IC engines (L3)
- **Explain** calorific values, octane number, refining of petroleum and cracking of oils (L2)

Unit IV: Advanced Engineering Materials **(10 hrs)**

Composites: Definition, Constituents, Classification - Particle, Fibre and Structural reinforced composites, properties and Engineering applications.

Refractories: Classification, Properties, Factors affecting the refractory materials (Refractoriness, Refractory under load, Porosity, Refractive index, Dimensional stability) and Applications.

Lubricants: Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index, Flash point, Fire point, Cloud point, saponification and Applications.

Building materials: Portland Cement, Rapid Hardening Cement, Quick Setting Cement, Constituents, phases and reactivity of clinker, Setting and Hardening of cement.

Learning Outcomes:

At the end of this unit, the students will be able to

- **Explain** the constituents of Composites and its classification (L2)
- **Recall** properties of refractories and lubricants (L1)
- **Identify** the factors affecting the refractory material(L3)
- **Illustrate** the functions and properties of lubricants (L2)
- **Demonstrate** the phases and reactivity of concrete formation (L2)
- **Identify** the constituents of Portland cement (L3)
- **Enumerate** the reactions at setting and hardening of the cement (L3)

Unit V: Surface Chemistry and Applications **(10 hrs)**

Introduction to surface chemistry, colloids, micelle formation, synthesis of colloids (Chemical methods - double decomposition, reduction, hydrolysis and oxidation; electrical disintegration or Bredig's Arc method), chemical and electrochemical methods (sol-gel method, Thermally activated chemical vapor deposition method)of preparation of nano metals and metal oxides, stabilization of colloids and nano materials by stabilizing agents, solid-gas interface, solid-liquid interface, adsorption isotherm- Langmuir, Freundlich, BET equation (no derivation) applications of colloids and nano materials – catalysis, medicine, sensors.

Learning Outcomes:

At the end of this unit, the students will be able to

- **Summarize** the concepts of colloids, micelle and nanomaterials (L2)
- **Explain** the synthesis of colloids with examples (L2)
- **Select** suitable methods for synthesis of Nanometals (L1)
- **Outline** the preparation of nanomaterials and metal oxides (L2)
- **Identify** the application of colloids and nanomaterials in medicine, sensors and catalysis (L2)

Text books:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Arun Bahl, B.S. Bahl and G.D. Tuli, Essentials of Physical Chemistry, S.Chand Publication, New Delhi 2012.

Reference Books:

1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
4. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

COURSE OUTCOMES:

At the end of the course the students will be able to:

1. **Demonstrate** the corrosion prevention methods and factors affecting corrosion (L2)
2. **Explain** the preparation, properties, and applications of thermoplastics & thermosetting, elastomers & conducting polymers. (L2)
3. **Finding** important properties of various engineering materials, polymers, colloids and its applications(L1)
4. **Explain** calorific values, octane number, refining of petroleum and cracking of oils (L2)
5. **Explain** the setting and hardening of cement and concrete phase (L2)
6. **Summarize** the concepts of colloids, micelle and nano materials (L2).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE and ECE)
(Common to II Semester CSE and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AHS5201T	3	0	0	3	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH					SEE	70 M

INTRODUCTION:

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

COURSE OBJECTIVES:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Unit I: On the Conduct of Life: William Hazlitt

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph. **Grammar and Vocabulary:** Parts of Speech, Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Learning Outcomes

At the end of the module, the learners will be able to

1. understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
2. ask and answer general questions on familiar topics and introduce oneself/others
3. employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
4. recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs

5. form sentences using proper grammatical structures and correct word forms

Unit II: The Brook: Alfred Tennyson

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs/small groups on specific topics followed by short structured talks.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters.

Grammar and Vocabulary: Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Learning Outcomes

At the end of the module, the learners will be able to

1. comprehend short talks on general topics
2. participate in informal discussions and speak clearly on a specific topic using suitable discourse markers
3. understand the use of cohesive devices for better reading comprehension
4. write well structured paragraphs on specific topics
5. identify basic errors of grammar/ usage and make necessary corrections in short texts

Unit III: The Death Trap: Saki

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

Writing: Summarizing, Paragraph Writing.

Grammar and Vocabulary: Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Learning Outcomes

At the end of the module, the learners will be able to

1. Comprehend short talks and summarize the content with clarity and precision
2. Participate in informal discussions and report what is discussed
3. Infer meanings of unfamiliar words using contextual clues
4. Write summaries based on global comprehension of reading/listening texts
5. Use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing

Unit IV: Innovation: Muhammad Yunus

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.

Writing: Letter Writing: Official Letters/Report Writing.

Grammar and Vocabulary: Quantifying expressions - adjectives and adverbs; comparing and contrasting; Voice - Active & Passive Voice

Learning Outcomes

At the end of the module, the learners will be able to

1. Infer and predict about content of spoken discourse
2. Understand verbal and non-verbal features of communication and hold formal/informal conversations
3. Interpret graphic elements used in academic texts
4. Produce a coherent paragraph interpreting a figure/graph/chart/table
5. Use language appropriate for description and interpretation of graphical elements

Unit V: Politics and the English Language: George Orwell

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.

Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides.

Reading: Reading for comprehension.

Writing: Writing structured essays on specific topics using suitable claims and evidences.

Grammar and Vocabulary: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Learning Outcomes

At the end of the module, the learners will be able to

- ➢ take notes while listening to a talk/lecture and make use of them to answer questions
- ➢ make formal oral presentations using effective strategies
- ➢ comprehend, discuss and respond to academic texts orally and in writing
- ➢ produce a well-organized essay with adequate support and detail
- ➢ edit short texts by correcting common errors

Text Books:

1. **Language and Life: A Skills Approach- I Edition 2019, Orient Black Swan.**

Reference Books:

1. Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
2. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
3. Raymond Murphy's *English Grammar in Use* Fourth Edition (2012) E-book
4. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
5. Oxford Learners Dictionary, 12th Edition, 2011
6. Norman Lewis *Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary* (2014)
7. *Speed Reading with the Right Brain: Learn to Read Ideas Instead of Just Words* by David Butler.

Web links

- www.englishclub.com
- www.easyworldofenglish.com
- www.languageguide.org/english/
- www.bbc.co.uk/learningenglish
- www.eslpod.com/index.html

- www.myenglishpages.com

COURSE OUTCOMES

At the end of the course, the learners will be able to

1. **Understand** the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
2. **Apply** grammatical structures to formulate sentences and correct word forms
3. **Analyze** discourse markers to speak clearly on a specific topic in informal discussions
4. **Evaluate** reading/listening texts and to write summaries based on global comprehension of these texts.
5. **Create** a coherent paragraph interpreting a figure/graph/chart/table

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE & ECE and II Semester CSE & ME)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0301T	3	0	0	3	CIE	30 M
Course Title	:	ENGINEERING DRAWING					SEE	70 M

COURSE OBJECTIVES:

- Bring awareness that Engineering Drawing is the Language of Engineers.
- Familiarize how industry communicates technical information.
- Teach the practices for accuracy and clarity in presenting the technical information.
- Develop the engineering imagination essential for successful design.

Unit I:

Introduction to Engineering Drawing: Principles of Engineering Drawing and its significance - Conventions in drawing - lettering - BIS conventions.

(a) Conic sections including the rectangular hyperbola- general method only,
(b) Cycloid, epicycloids and hypocycloid c) Involutes

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the significance of engineering drawing
- Know the conventions used in the engineering drawing
- Identify the curves obtained in different conic sections
- Draw different curves such as cycloid, involute and hyperbola

Unit II:

Projection of points, lines and planes: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the meaning of projection
- Know how to draw the projections of points, lines
- Differentiate between projected length and true length
- Find the true length of the lines

Unit III:

Projections of solids: Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the procedure to draw projection of solids
- Differentiate between rotational method and auxillary view method.
- Draw the projection of solid inclined to one plain

- Draw the projection of solids inclined to both the plains

Unit IV:

Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone. True shapes of the sections.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand different sectional views of regular solids
- Obtain the true shapes of the sections of prism
- Draw the sectional views of prism, cylinder, pyramid and cone

Unit V:

Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the meaning of development of surfaces
- Draw the development of regular solids such as prism, cylinder, pyramid and cone
- Obtain the development of sectional parts of regular shapes

Text Books:

1) K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
2) N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.

Reference Books:

1) Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009
2) Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000
3) Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009
4) K.C.John, Engineering Graphics, 2/e, PHI, 2013
5) Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Course Outcomes:

After completing the course, the student will be able to

- Draw various curves applied in engineering. (l2)
- Show projections of solids and sections graphically. (l2)
- Draw the development of surfaces of solids. (l3)

Additional Sources

Youtube: http-sewor,Carleton.cag,kardos/88403/drawings.html conic sections-online, red woods.edu

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(II Semester Mechanical Engineering)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0303T	3	0	0	3	CIE	30 M
Course Title	:	MATERIAL SCIENCE & ENGINEERING					SEE	70 M

COURSE OBJECTIVES:

- To teach the principles of physical metallurgy, i.e. crystallography of metals, constitution of alloys, phase diagrams.
- Expose commercially important metals and alloys (both ferrous and non ferrous) with engineering constraints.
- Explain the methods to change the properties of materials through heat treatment processes
- Familiarize properties and applications of ceramics, polymers and composite materials.
- Demonstrate the fundamental properties of nano-materials and their applications.

UNIT I:

Structure of Metals: Crystal Structures: Unit cells, Metallic crystal structures, Imperfection in solids: Point, Line, interstitial and volume defects; dislocation strengthening mechanisms and slip systems, critically resolved shear stress.

Constitution of Alloys: Necessity of Alloying, substitutional and interstitial solid solutions- Phase diagrams: Interpretation of binary phase diagrams and microstructure development; eutectic, peritectic, peritectoid and monotectic reactions. Iron-Iron-carbide diagram and microstructural aspects of ferrite, cementite, austenite, ledeburite, and cast iron.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the importance of material science in engineering.(l2)
- Recall the definitions and terminology of crystallography. (l1)
- Distinguish metals and alloys. (l4)
- Make use of the principles of construction of binary phase diagrams. (l3)
- Identify various invariant reactions in binary phase diagrams. (l3)
- Know the concept of metallography in studying the microstructures of metals and alloys. (l2)

UNIT II

Steels: Extraction of Steels, Plain carbon steels, use and limitations of plain carbon steels. AISI& BIS classification of steels.

Classification of alloys steels. Microstructure, properties and applications of alloy steels-stainless steels and tool steels.

Cast irons: Microstructure, properties and applications of white cast iron, malleable cast iron, grey cast iron, nodular cast iron and alloy cast irons.

Learning Outcomes: At the end of this unit the student will be able to

- Classify various types of steels, their properties and applications. (l2)
- Identify various types of cast irons, their properties and applications. (l3)
- Compare steels and cast irons and their limitations in applications. (l3)

UNIT III:

Heat Treatment of Steels: Annealing, tempering, normalizing and hardening, isothermal transformation diagrams for Fe-Fe_3C alloys and microstructure development. Continuous cooling curves and interpretation of final microstructures and properties- austempering, martempering, case hardening - carburizing, nitriding, cyaniding, carbo-nitriding, flame and induction hardening, and vacuum and plasma hardening

Learning Outcomes: At the end of this unit the student will be able to

- Understand the importance of iron - iron carbide phase diagram. (l2)
- Know the influence of heat treatment in modification of properties of steels. (l2)
- Develop a heat treatment cycle based on properties required. (l3)
- Comprehend the principles of surface hardening methods. (l2)

UNIT IV:

Non-ferrous Metals and Alloys: Microstructure, properties and applications of copper, aluminium, titanium, nickel and their alloys. Study of Al-Cu phase diagram

Learning Outcomes: At the end of this unit the student will be able to

- Understand the importance of non-ferrous metals and alloys in engineering applications. (l2)
- Demonstrate various properties and applications of non-ferrous alloys. (l4)
- Differentiate between hardening of ferrous and non-ferrous alloys. (l4)

UNIT V:

Ceramics, Polymers and Composites: Structure, properties and applications of ceramics, polymers and composites. Introduction to super alloys and nanomaterials, Smart materials, Recyclable Materials.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the properties of ceramics and their applications. (l2)
- Summarize the properties of polymers and composites and their use. (l2)
- Interpret the properties of nano materials and their applications. (l2)
- Identify the difference between the micro and nano scale materials and their uses. (L3)

Text Book(s)

1. V. Raghavan, Material Science and Engineering, 5/e, Prentice Hall of India, 2004.
2. R. Balasubramaniam, Callister's Material Science and Engineering, 2/e, Wiley India, 2014.

References

1. Y. Lakhtin, Engineering Physical Metallurgy, University Press of the Pacific, 2000.
2. S.H.Avner, Introduction to Physical Metallurgy, 2/e, Tata McGraw- Hill, 1997.
3. L.H.Van Vlack, Elements of Material Science and Engineering, 6/e, Pearson Education, 2008.
4. George E.Dieter, Mechanical Metallurgy, 3/e, McGraw-Hill, 2013.

COURSE OUTCOMES:

After completing the course, the student will be able to

- Explain the principles of binary phases. (l2)

- Select steels and cast irons for a given application. (l3)
- Apply heat treatment to different applications. (l3)
- Utilize nonferrous metals and alloys in engineering. (l3)
- Choose composites for various applications. (l3)
- Assess the properties of nano-scale materials and their applications. (l2)
- Differentiate between hardening of ferrous and non-ferrous alloys. (L4)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CSE and ME)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	20AMC9902	3	0	0	0	CIA	30 M
Course Title	:	UNIVERSAL HUMAN VALUES					SEE	--

INTRODUCTION

This course discusses the role of human values in one's family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course names as Universal Human Values is designed which, may be covered in their I-I or I-II Semester.

In the Induction Program, students would get an initial exposure to human values through Universal Human Values-I. This exposure is to be augmented by this compulsory full semester foundation course.

COURSE OBJECTIVES

1. Exposure to the value of life, society and harmony
2. Leading towards holistic perspective based on self-exploration about themselves (human being), family, and society and nature/existence.
3. Bringing transition from the present state to Universal Human Order
4. Instill commitment and courage to act.
5. Know about appropriate technologies and management patterns

UNIT I: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Universal Human Values-I - Self-Exploration - content and process; 'Natural Acceptance' and Experiential Validation - self-exploration - Continuous Happiness and Prosperity - Human Aspirations - current scenario - Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT II: Understanding Harmony in the Human Being - Harmony in Myself!

Human being as a co-existence of the sentient 'I' and the material 'Body' - the needs - happiness and physical facility -the Body as an instrument of 'I' - the characteristics and activities of 'I' and harmony in 'I' - the harmony of I with the Body

UNIT III: Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship

Values in human relationship; meaning of Justice; Trust and Respect; Difference between intention and competence; the other salient values in relationship - the harmony in the society: Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals - Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

UNIT IV: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

The harmony in the Nature - Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature - Understanding Existence as Co-existence of mutually interacting units in all- pervasive space - Holistic perception of harmony at all levels of existence.

UNIT V: Implications of the above Holistic Understanding of Harmony on Professional Ethics

Humanistic Education - Competence in professional ethics: professional competence - people friendly and eco-friendly production systems - appropriate technologies and management patterns for above production systems. Individuals as socially and ecologically responsible engineers, technologists and managers

TEXT BOOKS:

1. *A Foundation Course in Human Values and Professional Ethics*, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2. Teachers' Manual for *A Foundation Course in Human Values and Professional Ethics*, R.R. Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

REFERENCE BOOKS:

1. JeevanVidya: EkParichaya, ANagaraj, JeevanVidyaPrakashan, Amarkantak, 1999
2. HumanValues, A.N.Tripathi, New Age Intl.Publishers, NewDelhi,2004.
3. The Story of Stuff (Book).
4. Economy of Permanence - J C Kumarappa 8. Bharat Mein Angreji Raj – Pandit Sunderlal 9. Rediscovering India – by Dharampal
5. Hind Swaraj or Indian Home Rule - by Mohandas K.Gandhi
6. India Wins Freedom - Maulana Abdul Kalam Azad 12. Vivekananda - Romain Rolland(English)

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

COURSE OUTCOMES:

By the end of the course the student will be able to:

1. Define terms like Natural Acceptance, Happiness and Prosperity
2. Understand awareness of oneself, and ones surroundings (family, society, Nature)
3. Apply what they have learnt to their own self in different day-to-day Settings in real life
4. Relate human values with human relationship and human society.
5. Justify the need for universal human values and harmonious existence.
6. Develop as socially and ecologically responsible engineers.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CE & ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5102P	0	0	3	1.5	CIE	30 M
Course Title	:	ENGINEERING CHEMISTRY LAB					SEE	70 M

COURSE OBJECTIVES:

1. To Verify the fundamental concepts with experiments

List of Experiments:

1. Determination of Hardness of a groundwater sample.
2. Estimation of dissolved oxygen by Winklers method.
3. Estimation of Copper by EDTA method.
4. Determination of Strength of an acid in Pb-Acid battery.
5. Estimation of Ferrous Iron by Potassium dichromate.
6. Preparation of a polymer- Bakelite.
7. Determination of percentage of Iron in Cement sample by colorimetry.
8. Estimation of Calcium in port land Cement.
9. Preparation of nano materials by precipitation.
10. Adsorption of acetic acid by charcoal.
11. Determination of percentage moisture content in a coal sample.
12. Determination of Viscosity of lubricating oil by Redwood Viscometer 1.
13. Determination of Viscosity of lubricating oil by Redwood Viscometer 2.
14. Determination of Calorific value of gases by Junker's gas Calorimeter.

Course Outcomes:

At the end of the course, the students will be able to:

1. **Determine** the cell constant and conductance of solutions (L3)
2. **Prepare** advanced polymer materials (L2)
3. **Determine** the physical properties like surface tension, adsorption and viscosity (L3)
4. **Estimate** the Iron and Calcium in cement (L3)
5. **Calculate** the hardness of water (L4)
6. **Find** calorific values of various fuels, hardness of water samples (L1)

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RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE and ECE)

(Common to II Semester CSE and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AHS5201P	0	0	3	1.5	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH LAB					SEE	70 M

COURSE OBJECTIVES:

- Students will be exposed to a variety of self instructional, learner friendly modes of language learning
- Students will learn better pronunciation through stress, intonation and rhythm
- Students will be trained to use language effectively to face interviews, group discussions, public speaking
- Students will be initiated into greater use of the computer in resume preparation, report writing, format making etc

LIST OF TOPICS

1. Phonetics
2. Reading comprehension
3. Describing objects/places/persons
4. Role Play or Conversational Practice
5. Just-A-Minute (JAM)
6. Etiquettes of Telephonic Communication
7. Information Transfer
8. Note Making and Note Taking
9. E-mail Writing
10. Group Discussions
11. Resume Writing
12. Debates
13. Oral Presentations
14. Poster Presentation
15. Interviews Skills

Suggested Software

- Orell
- Walden Infotech
- Young India Films

Reference Books

1. Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
2. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
5. A Textbook of English Phonetics for Indian Students by T.Balasubramanyam

Web Links

- **www.esl-lab.com**
- **www.englishmedialab.com**
- **www.englishinteractive.net**

Course Outcomes

1. Listening and repeating the sounds of English Language
2. Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
3. Apply communication skills through various language learning activities.
4. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
5. Evaluate and exhibit acceptable etiquette essential in social and professional settings
6. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE & ECE and II Semester CSE & ME)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0301P	3	0	0	3	CIE	30 M
Course Title	:	ENGINEERING GRAPHICS LAB					SEE	70 M

COURSE OBJECTIVES:

- Instruct the utility of drafting & modeling packages in orthographic and isometric drawings.
- Train the usage of 2D and 3D modeling.
- Instruct graphical representation of machine components.

Computer Aided Drafting:

Introduction to AutoCAD: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, stretching, fillets, arrays, dimensions.
Dimensioning principles and conventional representations.

Orthographic Projections: Systems of projections, conventions and application to orthographic projections - simple objects.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

TEXT BOOKS:

1) K. Venugopal, V.Prabhu Raja, Engineering Drawing + Auto Cad, New Age International Publishers.
2) Kulkarni D.M, AP Rastogi and AK Sarkar, Engineering Graphics with Auto Cad, PHI Learning, Eastern Economy editions.

REFERENCE BOOKS:

1) T. Jayapoovan, Engineering Graphics using Auto Cad, Vikas Publishing House
2) K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
3) Linkan Sagar, BPB Publications, Auto Cad 2018 Training Guide.
4) K.C.John, Engineering Graphics, 2/e, PHI, 2013
5) Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

COURSE OUTCOMES:

After completing the course, the student will be able to

- Use computers as a drafting tool. (L2)
- Draw isometric and orthographic drawings using CAD packages. (L3)

ADDITIONAL SOURCES

Youtube: http-sewor,Carleton.cag, kardos/88403/drawings.html conic sections-online, red woods.edu

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(II Semester Mechanical Engineering)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0303P	0	0	3	1.5	CIE	30 M
Course Title	:	MATERIAL SCIENCE & ENGINEERING LAB					SEE	70 M

COURSE OBJECTIVES:

- To understand the microstructure and hardness of engineering materials.
- To explain grain boundaries and grain sizes of different engineering materials.

LIST OF EXPERIMENTS:

1. Metallography sample preparation
2. Microstructure of pure metals – Iron, copper and aluminum as per ASTM standards
3. Microstructure of low carbon steel, mild steel and high carbon microstructure of cast irons.
4. Microstructure of non-ferrous alloys – aluminum, copper, titanium, nickel and their alloys.
5. Hardenability of steels by Jominy End Quench Test.
6. Microstructure of heat treated steels.
7. Hardness of various untreated and treated steels.
8. Microstructure of ceramics, polymeric materials.
9. Microstructure of super alloy and nano-materials.
10. Hardness of ceramics, super alloys, nano-materials and polymeric materials (one sample on each)

COURSE OUTCOMES:

The student is able to

- Differentiate various microstructures of ferrous and non-ferrous metals and alloys. (l4)
- Visualize grains and grain boundaries. (l3)
- Importance of hardening of steels. (l2)
- Evaluate hardness of treated and untreated steels. (l4)
- Differentiate hardness of super alloys, ceramics and polymeric materials.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING,

KURNOOL

DEPARTMENT OF CIVIL ENGINEERING

COURSE STRUCTURE AND DETAILED SYLLABUS

REGULATION: RU20

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

RAYALASEEMA UNIVERSITY,

Pasupula, Kurnool District, Andhra Pradesh 518002

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

Course Structure & Syllabus for First Year Regular B.Tech. Degree Program

(Effective for the batches admitted from 2020-21 onwards)

CIVIL ENGINEERING

INDUCTION PROGRAM (3 weeks duration)

- ❖ Physical activity
- ❖ Creative Arts
- ❖ Universal Human Values
- ❖ Literary
- ❖ Proficiency Modules
- ❖ Lectures by Eminent People
- ❖ Visits to local Areas
- ❖ Familiarization to Dept./Branch & Innovations

B. Tech – I Semester (Theory – 5, Lab – 4)

S.No	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
			THEORY							
1	BS	20ABS5401	Linear Algebra and Calculus	3	0	0	3	30	70	100
2	BS	20ABS5602T	Engineering Physics	3	0	0	3	30	70	100
3	HS	20AHS5201T	Communicative English	3	0	0	3	30	70	100
4	ES	20AES0201T	Basic Electrical & Electronics Engineering	3	0	0	3	30	70	100
5	ES	20AES0301T	Engineering Drawing	1	0	2	2	30	70	100
			PRACTICAL							
6	BS	20ABS5602P	Engineering Physics Lab	0	0	3	1.5	30	70	100
7	HS	20AHS5201P	Communicative English Lab	0	0	3	1.5	30	70	100
8	ES	20AES0201T	Basic Electrical & Electronics Engineering Lab	0	0	3	1.5	30	70	100
9	ES	20AES0301P	Engineering Graphics Lab	0	0	2	1	30	70	100
			TOTAL:	**13**	**00**	**13**	**19.5**	**270**	**630**	**900**

B. Tech – II Semester (Theory – 5, Lab – 5)

S.No	Course Category	Course Code	Course Title	Instruction Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
			THEORY							
1	BS	20ABS5402	Differential Equations and Vector Calculus	3	0	0	3	30	70	100
2	BS	20ABS5102T	Engineering Chemistry	3	0	0	3	30	70	100
3	ES	20AES0501T	C-Programming & Data Structures	3	0	0	3	30	70	100
4	ES	20AES0101T	Strength of Materials	3	0	0	3	30	70	100
5	MC	20AMC9901	Environmental Science	3	0	0	0	30	-	30
			PRACTICAL							
6	BS	20ABS5102P	Engineering Chemistry Lab	0	0	3	1.5	30	70	100
7	ES	20AES0501P	C-Programming & Data Structures Lab	0	0	3	1.5	30	70	100
8	ES	20AES0101P	Strength of Materials Lab	0	0	3	1.5	30	70	100
9	ES	20AES0302	Engineering Workshop	0	0	3	1.5	30	70	100
10	ES	20AES0502	IT Workshop	0	0	3	1.5	30	70	100
			TOTAL:	**15**	**00**	**15**	**19.5**	**300**	**630**	**930**

DETAILED SYLLABUS

B.TECH - I SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, CSE, ECE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5401	3	0	0	3	CIE	30 M
Course Title	:	LINEAR ALGEBRA AND CALCULUS					SEE	70 M

COURSE OBJECTIVES:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Bridge Course: Limits, continuity, Types of matrices

Unit I: Matrices **(10 hrs)**

Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homogeneous equations linear equations. Eigenvalues and Eigenvectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix.

Learning Outcomes:

At the end of this unit, the student will be able to

- Solving systems of linear equations, using technology to facilitate row reduction determine the rank, eigenvalues and eigenvectors (L3).
- Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics; (L3)

Unit II: Mean Value Theorems **(06 hrs)**

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), related problems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Translate the given function as series of Taylor's and Maclaurin's with remainders (L3)
- Analyze the behaviour of functions by using mean value theorems (L3)

Unit III: Multivariable calculus **(10 hrs)**

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. (L3)
- Acquire the Knowledge maxima and minima of functions of several variable (L1)
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables (L3)

Unit IV: Multiple Integrals **(10 hrs)**

Double integrals, change of order of integration, change of variables. Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates. Finding areas and volumes using double and triple integrals.

Learning Outcomes:

- At the end of this unit, the student will be able to
- Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates (L5)
- Apply double integration techniques in evaluating areas bounded by region (L4)
- Evaluate multiple integrals in Cartesian, cylindrical and spherical geometries (L5)

Unit V: Beta and Gamma functions **(06 hrs)**

Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand beta and gamma functions and its relations (L2)
- Conclude the use of special function in evaluating definite integrals (L4)

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 201.
4. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education

Course Outcomes:

At the end of the course, the student will be able to

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- Utilize mean value theorems to real life problems (L3)
- Familiarize with functions of several variables which is useful in optimization (L3)
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems (L5)
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CE and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5602T	3	0	0	3	CIA	30 M
Course Title	:	ENGINEERING PHYSICS					SEE	70 M

COURSE OBJECTIVES:

- To make a bridge between the physics in school and engineering courses.
- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications.
- To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibres along with engineering applications.
- To open new avenues of knowledge in dielectric and magnetic materials which find potential in the emerging micro device applications.
- Considering the significance of micro miniaturization of electronic devices and significance of low dimensional materials, the basic concepts of nano materials, their properties and applications in modern emerging technologies are elicited.
- To familiarize the concepts of theoretical acoustics to practical use in engineering field. To explain the significance of ultrasound and its application in NDT for diversified engineering application.
- To enlighten the periodic arrangement of atoms in crystals, Bragg's law and to provide fundamentals related to structural analysis through laue and powder diffraction methods.

UNIT I: Wave Optics (12 hrs)

Interference- Principle of superposition – Interference of light – Conditions for sustained interference - Interference in thin films (Reflection Geometry) – Colors in thin films – Newton's Rings – Determination of wavelength and refractive index.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Grating spectrum.

Polarization- Introduction – Types of polarization – Polarization by reflection, refraction and double refraction - Nicol's Prism - Half wave and Quarter wave plates with applications.

Learning Outcomes:

The students will be able to

1. **Explain** the need of coherent sources and the conditions for sustained interference (L2)
2. **Identify** engineering applications of interference (L3)
3. **Analyze** the differences between interference and diffraction with applications (L4)
4. **Illustrate** the concept of polarization of light and its applications (L2)
5. **Classify** ordinary polarized light and extraordinary polarized light (L2)

Unit II: Lasers and Fiber optics (08 hrs)

Lasers: Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Lasing action – Pumping mechanisms – Nd-YAG laser – He-Ne laser – Applications of lasers.

Fiber optics: Introduction – Principle of optical fiber – Acceptance Angle – Numerical Aperture – Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers – Propagation Losses (qualitative) – Applications.

Learning Outcomes:
The students will be able to

1. **Understand** the basic concepts of LASER light Sources (L2)
2. **Apply** the concepts to learn the types of lasers (L3)
3. **Identifies** the Engineering applications of lasers (L2)
4. **Explain** the working principle of optical fibers (L2)
5. **Classify** optical fibers based on refractive index profile and mode of propagation (L2)
6. **Identify** the applications of optical fibers in various fields (L2)

Unit III: Engineering Materials (08 hrs)
Dielectric Materials- Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – Types of polarizations: Electronic and Ionic, Orientation polarizations (Qualitative) – Lorentz internal field – Clausius-Mossotti equation-Dielectric loss.

Magnetic Materials- Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and Permeability – Origin of permanent magnetic moment – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism (Qualitative) – Hysteresis – Soft and Hard magnetic materials.

Nanomaterials- Introduction – Surface area and quantum confinement – Physical properties: electrical and magnetic properties – Synthesis of nanomaterials: Top-down: Ball Milling – Bottom-up: Chemical Vapour Deposition – Applications of nanomaterials.
Learning Outcomes:
The students will be able to

1. **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
2. **Summarize** various types of polarization of dielectrics (L2)
3. **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
4. **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2)
5. **Explain** the applications of dielectric and magnetic materials (L2)
6. **Apply** the concept of magnetism to magnetic devices (L3)
7. **Identify** the nano size dependent properties of nanomaterials (L2)
8. **Illustrate** the methods for the synthesis and characterization of nanomaterials (L2)
9. **Apply** the basic properties of nanomaterials in various Engineering branches (L3).

Unit IV: Acoustics and Ultrasonics (10 hrs)
Acoustics- Introduction – Requirements of acoustically good auditorium – Reverberation – Reverberation time – Sabine's formula (Derivation using growth and decay method) – Absorption coefficient and its determination – Factors affecting acoustics of buildings and their remedies.

Ultrasonics: Introduction – Properties – Production by magnetostriction and piezoelectric methods – Detection – Acoustic grating – Non Destructive Testing – Pulse echo system through transmission and reflection modes – Applications.

Learning Outcomes:
The students will be able to

1. **Explain** how sound is propagated in buildings (L2)
2. **Analyze** acoustic properties of typically used materials in buildings (L4)
3. **Recognize** sound level disruptors and their use in architectural acoustics (L2)
4. **Identify** the use of ultrasonics in different fields (L3)

Unit-V: Crystallography and X-ray diffraction (08 hrs)

Crystallography- Space lattice, Basis, unit cell and lattice parameters – Bravais Lattice – Crystal systems – Packing fraction – Coordination number – Packing fraction of SC, BCC & FCC – Miller indices – Separation between successive (hkl) planes.

X-Ray Diffraction- Bragg's law – Bragg's X-ray diffractometer – Crystal structure determination by Powder method.

Learning Outcomes:
The students will be able to

- **Classify** various crystal systems (L2)
- **Identify** different planes in the crystal structure (L3)
- **Analyze** the crystalline structure by Bragg's X-ray diffractometer (L4)
- **Apply** powder method to measure the crystallinity of a solid (L4)

Text books:

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, S. Chand and Company
2. Engineering physics – D.K. Battacharya and Poonam Tandon, Oxford University press.

Reference Books:

1. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press
2. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning
3. Engineering Physics – M.R. Srinivasan, New Age Publications
4. Engineering Physics – K. Thyagarajan, McGraw Hill Publishers

COURSE OUTCOMES:

1. **Explain** the need of coherent sources and the conditions for sustained interference (L2). **Identify** applications of interference in engineering (L3). **Analyze** the differences between interference and diffraction with applications (L4). **Illustrate** the concept of polarization of light and its applications (L2). **Classify** ordinary polarized light and extraordinary polarized light (L2) The different realms of physics and their applications in both scientific and technological systems are achieved through the study of wave optics.
2. **Explain** various types of emission of radiation (L2). **Identify** the role of laser in engineering applications (L3). **Describe** the construction and working principles of various types of lasers (L1). **Explain** the working principle of optical fibers (L2). **Classify** optical fibers based on refractive index profile and mode of propagation (L2). **Identify** the applications of optical fibers in medical, communication and other fields (L2). **Apply** the fiber optic concepts in various fields (L3).

3. **Explain** the concept of dielectric constant and polarization in dielectric materials (L2). **Summarize** various types of polarization of dielectrics (L2). **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics (L2). **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2). **Explain** the applications of dielectric and magnetic materials (L2). **Apply** the concept of magnetism to magnetic devices (L3)
4. **Explain** sound waves and its propagation /interaction with construction material in design of buildings (L2). **Analyze** acoustic parameters of typically used materials in buildings (L4). **Recognize** sound level disruptors and their application in architectural acoustics (L2). **Identify** the use of ultrasonics in diversified fields of engineering (L3).
5. **Interpret** various crystal systems (L2) and **Analyze** the characterization of materials by XRD (L4). **Identify** the important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction technique is focused (L3). **Explain** the structure of the crystals by Laue and Powder techniques (L2).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CE and ECE)
(Common to II Semester CSE and ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AHS5201T	3	0	0	3	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH					SEE	70 M

INTRODUCTION:
The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

COURSE OBJECTIVES:
- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Unit I: On the Conduct of Life: William Hazlitt
Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.
Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph. **Grammar and Vocabulary:** Parts of Speech, Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Learning Outcomes
At the end of the module, the learners will be able to
1. understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
2. ask and answer general questions on familiar topics and introduce oneself/others
3. employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information

4. recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
5. form sentences using proper grammatical structures and correct word forms

Unit II: The Brook: Alfred Tennyson

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs/small groups on specific topics followed by short structured talks.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters.

Grammar and Vocabulary: Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Learning Outcomes

At the end of the module, the learners will be able to

1. comprehend short talks on general topics
2. participate in informal discussions and speak clearly on a specific topic using suitable discourse markers
3. understand the use of cohesive devices for better reading comprehension
4. write well structured paragraphs on specific topics
5. identify basic errors of grammar/ usage and make necessary corrections in short texts

Unit III: The Death Trap: Saki

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

Writing: Summarizing, Paragraph Writing.

Grammar and Vocabulary: Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Learning Outcomes

At the end of the module, the learners will be able to

1. Comprehend short talks and summarize the content with clarity and precision
2. Participate in informal discussions and report what is discussed
3. Infer meanings of unfamiliar words using contextual clues
4. Write summaries based on global comprehension of reading/listening texts
5. Use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing

Unit IV: Innovation: Muhammad Yunus

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters/Report Writing.
Grammar and Vocabulary: Quantifying expressions - adjectives and adverbs; comparing and contrasting; Voice - Active & Passive Voice

Learning Outcomes
At the end of the module, the learners will be able to

1. Infer and predict about content of spoken discourse
2. Understand verbal and non-verbal features of communication and hold formal/informal conversations
3. Interpret graphic elements used in academic texts
4. Produce a coherent paragraph interpreting a figure/graph/chart/table
5. Use language appropriate for description and interpretation of graphical elements

Unit V: Politics and the English Language: George Orwell
Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides.
Reading: Reading for comprehension.
Writing: Writing structured essays on specific topics using suitable claims and evidences.
Grammar and Vocabulary: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Learning Outcomes
At the end of the module, the learners will be able to

- take notes while listening to a talk/lecture and make use of them to answer questions
- make formal oral presentations using effective strategies
- comprehend, discuss and respond to academic texts orally and in writing
- produce a well-organized essay with adequate support and detail
- edit short texts by correcting common errors

Text Books:

1. **Language and Life: A Skills Approach- I Edition 2019, Orient Black Swan.**

Reference Books:

1. Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
2. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
3. Raymond Murphy's *English Grammar in Use* Fourth Edition (2012) E-book
4. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
5. Oxford Learners Dictionary, 12th Edition, 2011
6. Norman Lewis *Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary* (2014)
7. *Speed Reading with the Right Brain: Learn to Read Ideas Instead of Just Words* by David Butler.

Web links

- www.englishclub.com
- www.easyworldofenglish.com
- www.languageguide.org/english/
- www.bbc.co.uk/learningenglish
- www.eslpod.com/index.html
- www.myenglishpages.com

COURSE OUTCOMES

At the end of the course, the learners will be able to

1. **Understand** the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
2. **Apply** grammatical structures to formulate sentences and correct word forms
3. **Analyze** discourse markers to speak clearly on a specific topic in informal discussions
4. **Evaluate** reading/listening texts and to write summaries based on global comprehension of these texts.
5. **Create** a coherent paragraph interpreting a figure/graph/chart/table

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CE, CSE and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0201T	3	0	0	3	CIA	30 M
Course Title	:	BASIC ELECTRICAL & ELECTRONICS ENGG.					SEE	70 M

PART-A: <u>BASIC ELECTRICAL ENGINEERING</u>
COURSE OBJECTIVES:-

- To introduce basics of electric circuits.
- To teach DC and AC electrical circuit analysis.
- To explain working principles of transformers and electrical machines.
- To impart knowledge on Power system generation, transmission and distribution

UNIT I: DC & AC Circuits
Electrical circuit elements (R - L and C) - Kirchhoff laws - Series and parallel connection of resistances with DC excitation. Superposition Theorem - Representation of sinusoidal waveforms - peak and rms values - phasor representation - real power - reactive power - apparent power – power factor - Analysis of single-phase ac circuits consisting of RL - RC - RLC series circuits, Resonance.

Learning Outcomes
At the end of this unit, the student will be able to

- Recall Kirchoff laws
- Analyze simple electric circuits with DC excitation
- Apply network theorems to simple circuits
- Analyze single phase AC circuits consisting of series RL - RC - RLC combinations

UNIT II: DC & AC Machines:
Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator – principle and operation of DC Motor – Performance Characteristics of DC Motor - Speed control of DC Motor – Principle and operation of Single Phase Transformer - OC and SC tests on transformer - Principle and operation of 3-phase AC machines [Elementary treatment only]

Learning Outcomes
At the end of this unit, the student will be able to

- Explain principle and operation of DC Generator & Motor.
- Perform speed control of DC Motor
- Explain operation of transformer and induction motor.
- Explain construction & working of induction motor - DC motor

UNIT III: Basics of Power Systems
Layout & operation of Hydro, Thermal, Nuclear Stations - Solar & wind generating stations – Typical AC Power Supply scheme – Elements of Transmission line – Types of Distribution systems: Primary & Secondary distribution systems.

Learning Outcomes

At the end of this unit, the student will be able to

- Understand working operation of various generating stations
- Explain the types of Transmission and Distribution systems

Text Books:

1. D. P. Kothari and I. J. Nagrath - “Basic Electrical Engineering” - Tata McGraw Hill - 2010.
2. V.K. Mehta & Rohit Mehta, “Principles of Power System” – S.Chand – 2018.

References:

1. L. S. Bobrow - “Fundamentals of Electrical Engineering” - Oxford University Press - 2011.
2. E. Hughes - “Electrical and Electronics Technology” - Pearson - 2010.
3. C.L. Wadhwa – “Generation Distribution and Utilization of Electrical Energy”, 3rd Edition, New Age International Publications.

Course Outcomes:

The student should be able to

- Apply concepts of KVL/KCL in solving DC circuits
- Understand and choose correct rating of a transformer for a specific application
- Illustrate working principles of DC Motor
- Identify t ype of electrical machine based on their operation
- Understand the basics of Power generation, Transmission and Distribution

PART-B: <u>ELECTRONICS ENGINEERING</u>

COURSE OBJECTIVES:-

- **Understand principles and terminology of electronics.**
- **Familiar with the theory, construction, and operation of electronic devices.**
- **Learn about biasing of BJTs and FETs.**
- **Design and construct amplifiers.**
- **Understand the concept & principles of logic devices.**

Unit I:

Diodes and Applications: Semiconductor Diode, Diode as a Switch& Rectifier, Half Wave and Full Wave Rectifiers with and without Filters; Operation and Applications of Zener Diode, LED, Photo Diode.

Transistor Characteristics: Bipolar Junction Transistor (BJT) – Construction, Operation, Amplifying Action, Common Base, Common Emitter and Common Collector Configurations, Operating Point, Biasing of Transistor Configuration; Field Effect Transistor (FET) – Construction, Characteristics of Junction FET, Concepts of Small Signal Amplifiers –CE & CC Amplifiers.

Learning outcomes:

1. Remember and understand the basic characteristics of semiconductor diode. (L1)
2. Understand principle of operation of Zener diode and other special semiconductor diodes. (L1)
3. Analyze BJT based biasing circuits. (L3)
4. Design an amplifier using BJT based on the given specifications. (L4)

Unit II:

Operational Amplifiers and Applications: Introduction to Op-Amp, Differential Amplifier Configurations, CMRR, PSRR, Slew Rate; Block Diagram, Pin Configuration of 741 Op-Amp, Characteristics of Ideal Op-Amp, Concept of Virtual Ground; Op-Amp Applications - Inverting, Non-Inverting, Summing and Difference Amplifiers, Voltage Follower, Comparator, Differentiator, Integrator.

Learning outcomes:

1. Describe operation of Op-Amp based linear application circuits, converters, amplifiers and non-linear circuits. (L2)
2. Analyze Op-Amp based comparator, differentiator and integrator circuits. (L3)

Unit III:

Digital Electronics: Logic Gates, Simple combinational circuits–Half and Full Adders, BCD Adder. Latches and Flip-Flops (S-R, JK and D), Shift Registers and Counters. Introduction to Microcontrollers and their applications (Block diagram approach only).

Learning outcomes:

1. Explain the functionality of logic gates. (L2)
2. Apply basic laws and De Morgan's theorems to simplify Boolean expressions. (L3)
3. Analyze standard combinational and sequential circuits. (L4)
4. Distinguish between 8085 & 8086 microprocessors also summarize features of a microprocessor. (L5)

Text Books:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices &Circuit Theory, Pearson Education,2007.
2. Ramakanth A. Gayakwad, Op-Amps & Linear ICs, 4thEdition, Pearson, 2017.
3. R. P. Jain, Modern Digital Electronics,3rd Edition, Tata Mcgraw Hill,2003.
4. Raj Kamal, Microcontrollers: Architecture, Programming, Interfacing and System Design, 2nd Edition, Pearson, 2012.

Reference Books:

1. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India,2002.
2. R. S. Sedha, A Text Book of Electronic Devices and Circuits, S.Chand& Co,2010.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

COURSE OUTCOMES:

After the completion of the course students will able to

CO1: Explain the theory, construction, and operation of electronic devices.

CO2: Apply the concept of science and mathematics to explain the working of diodes and its applications, working of transistor and its characteristics.

CO3: Design and analyze small signal amplifier circuits applying the biasing techniques.

CO4: Solve problems of various digital logic gates and circuits.

CO5: Correlate the fundamental concepts to various Real life applications of today.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CE & ECE and II Semester CSE & ME)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0301T	3	0	0	3	CIE	30 M
Course Title	:	ENGINEERING DRAWING					SEE	70 M

COURSE OBJECTIVES:

- Bring awareness that Engineering Drawing is the Language of Engineers.
- Familiarize how industry communicates technical information.
- Teach the practices for accuracy and clarity in presenting the technical information.
- Develop the engineering imagination essential for successful design.

Unit I:

Introduction to Engineering Drawing: Principles of Engineering Drawing and its significance - Conventions in drawing - lettering - BIS conventions.

(a) Conic sections including the rectangular hyperbola- general method only,
(b) Cycloid, epicycloids and hypocycloid c) Involutes

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the significance of engineering drawing
- Know the conventions used in the engineering drawing
- Identify the curves obtained in different conic sections
- Draw different curves such as cycloid, involute and hyperbola

Unit II:

Projection of points, lines and planes: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the meaning of projection
- Know how to draw the projections of points, lines
- Differentiate between projected length and true length
- Find the true length of the lines

Unit III:

Projections of solids: Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the procedure to draw projection of solids
- Differentiate between rotational method and auxillary view method.
- Draw the projection of solid inclined to one plain
- Draw the projection of solids inclined to both the plains

Unit IV:

Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone. True shapes of the sections.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand different sectional views of regular solids
- Obtain the true shapes of the sections of prism
- Draw the sectional views of prism, cylinder, pyramid and cone

Unit V:

Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the meaning of development of surfaces
- Draw the development of regular solids such as prism, cylinder, pyramid and cone
- Obtain the development of sectional parts of regular shapes

Text Books:

1) K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
2) N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.

Reference Books:

1) Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009
2) Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000
3) Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009
4) K.C.John, Engineering Graphics, 2/e, PHI, 2013
5) Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Course Outcomes:

After completing the course, the student will be able to

- Draw various curves applied in engineering. (l2)
- Show projections of solids and sections graphically. (l2)
- Draw the development of surfaces of solids. (l3)

Additional Sources

Youtube: http-sewor,Carleton.cag,kardos/88403/drawings.html conic sections-online, red woods.edu

(Common to I Semester CE and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5602PL	0	0	3	1.5	CIA	30 M
Course Title	:	ENGINEERING PHYSICS LAB					SEE	70 M

COURSE OBJECTIVES:

- Understand the role of Optical fiber parameters in engineering applications.
- Recognize the significance of laser by studying its characteristics and its application in finding the particle size.
- Illustrates the magnetic and dielectric materials applications.
- Identifies the various sensor applications.

Note: - In the following list of experiments, out of 15 experiments any 10 experiments must be performed in a semester.

<u>List of Engineering Physics Experiments</u>

1. Determine the thickness of the wire using wedge shape method

Experimental outcomes:
Operates optical instrument like travelling microscope. (L2)
Estimate the thickness of the wire using wedge shape method (L2)
Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)

2. Determination of the radius of curvature of the lens by Newton's ring method

Experimental outcomes:
Operates optical instrument like travelling microscope. (L2)
Estimate the radius of curvature of the lens (L2)
Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)
Plots the square of the diameter of a ring with no. of rings (L3)

3. Determination of wavelength by plane diffraction grating method

Experimental outcomes:
Operates optical instrument like spectrometer. (L2)
Estimate the wavelength of the given source (L2)
Identifies the formation of grating spectrum due diffraction. (L2)

4. Determination of dispersive power of prism.

Experimental outcomes:
Operates optical instrument like spectrometer. (L2)
Estimate the refractive index and dispersive power of the given prism (L2)
Identifies the formation of spectrum due to dispersion. (L2)

5. Determination of wavelength of LASER light using diffraction grating.

Experimental outcomes:
Operates various instrument (L2)
Estimate the wavelength of laser source (L2)
Identifies the formation of grating spectrum due diffraction. (L2)

6. Determination of particle size using LASER.

Experimental outcomes:
Operates various instrument (L2)
Estimate the Particles size using laser (L2)
Identifies the application of laser (L2)

7. To determine the numerical aperture of a given optical fiber and hence to find its acceptance angle

Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the numerical aperture and acceptance angle of a given optical fiber. (L2)
Identifies the significance of numerical aperture and acceptance angle of an optical fiber in various engineering applications. (L2)

8. Determination of dielectric constant by charging and discharging method.

Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the dielectric constant of the given substance. (L2)
Identifies the significance of dielectric constant in various devices. (L2)

9. To determine the magnetic field along the axis of a circular coil carrying current –Stewart Gee's method.

Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the magnetic field along the axis of a circular coil carrying current. (L2)
Plots the intensity of the magnetic field of circular coil carrying current with distance (L3)

10. Measurement of magnetic susceptibility by Gouy's method

Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the magnetic susceptibility of the given material. (L2)
Identifies the significance of magnetic susceptibility in various engineering applications. (L2)

11. To Study the variation of B versus H by magnetizing the magnetic material (B-H loop)

Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the hysteresis loss, coercivity and retentivity of the ferromagnetic material. (L2)
Classifies the soft and hard magnetic material based on B-H curve. (L2)
Plots the magnetic field H and flux density B (L3)

12. Determination of ultrasonic velocity in liquid (Acoustic grating)

Experimental outcomes:
Operates various instruments. (L2)
Estimate the velocity of ultrasonic waves in liquids. (L2)
Illustrates the basic applications of ultrasonics. (L3)

13. Determination of Rigidity modulus of material of a wire-dynamic method (Torsional pendulum)

Experimental outcomes:
Operates various instruments. (L2)
Estimate the rigidity modules of a given wire (L2)
Plots length of the pendulum (l) with time period T^2 (L3)

14. Sonometer: Verification of the three laws of stretched strings

Experimental outcomes:
Operates various instruments. (L2)
Estimate the linear density of a given wire (L2)
Identify the frequency of tuning fork (L3)

15. Determination of spring constant of springs using Coupled Oscillator

Experimental outcomes:
Operates various instruments. (L2)

Estimate the coupling constant of a coupled oscillator (L2)
Plots the coupling distance (D) with coupling constant (C) (L3)
Apply the concept of oscillatory motion to molecules of a solid, multi vibrator etc.

Course Outcomes:

The students will be able to

1. **Operate** various optical instruments (L2)
2. **Estimate** wavelength of laser and particles size using laser(L2)
3. **Evaluate** the acceptance angle of an optical fiber and numerical aperture (L3)
4. **Estimate** the susceptibility and related magnetic parameters of magnetic materials (L2)
5. **Plot** the intensity of the magnetic field of circular coil carrying current with distance (L3)
6. **Determine** magnetic susceptibility of the material and its losses by B-H curve (L3)
7. **Apply** the concepts of ultrasonics by acoustic grating (L2)

References:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University.

(Common to I Semester CE & ECE and II Semester CSE & ME)

Course Category	:	Humanities & Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AHS5201P	0	0	3	1.5	CIA	30 M
Course Title	:	COMMUNICATIVE ENGLISH LAB					SEE	70 M

COURSE OBJECTIVES:

- Students will be exposed to a variety of self instructional, learner friendly modes of language learning
- Students will learn better pronunciation through stress, intonation and rhythm
- Students will be trained to use language effectively to face interviews, group discussions, public speaking
- Students will be initiated into greater use of the computer in resume preparation, report writing, format making etc

LIST OF TOPICS

1. Phonetics
2. Reading comprehension
3. Describing objects/places/persons
4. Role Play or Conversational Practice
5. Just-A-Minute (JAM)
6. Etiquettes of Telephonic Communication
7. Information Transfer
8. Note Making and Note Taking
9. E-mail Writing
10. Group Discussions
11. Resume Writing
12. Debates
13. Oral Presentations
14. Poster Presentation
15. Interviews Skills

Suggested Software

- Orell
- Walden Infotech
- Young India Films

Reference Books

8. Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
9. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
10. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
11. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
12. A Textbook of English Phonetics for Indian Students by T.Balasubramanyam

Web Links

- www.esl-lab.com
- www.englishmedialab.com
- www.englishinteractive.net

Course Outcomes

1. Listening and repeating the sounds of English Language
2. Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
3. Apply communication skills through various language learning activities.
4. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
5. Evaluate and exhibit acceptable etiquette essential in social and professional settings
6. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CE, CSE and ME)

Course Category	:	Engineering Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0201P	3	0	0	3	CIA	30 M
Course Title	:	BASIC ELECTRICAL & ELECTRONICS ENGG. LAB					SEE	70 M

PART-A: BASIC ELECTRICAL ENGINEERING LAB
COURSE OBJECTIVES:-
- To Verify Kirchoff's laws and Superposition theorem
- To learn performance characteristics of DC Machines.
- To perform various tests on 1- Phase Transformer.
- To Study the I – V Characteristics of Solar PV Cell

LIST OF EXPERIMENTS: -
1. Verification of Kirchhoff laws.
2. Verification of Superposition Theorem.
3. Magnetization characteristics of a DC Shunt Generator.
4. Speed control of DC Shunt Motor.
5. OC & SC test of 1 – Phase Transformer.
6. Load test on 1-Phase Transformer.
7. I – V Characteristics of Solar PV cell
8. Brake test on DC Shunt Motor.

COURSE OUTCOMES:
After completing the course, the student will be able to
- Understand Kirchoff's Laws & Superposition theorem.
- Analyze the various characteristics on DC Machines by conducting various tests.
- Analyze I – V Characteristics of PV Cell
- Apply the knowledge to perform various tests on 1-phase transformer

PART-B: ELECTRONICS ENGINEERING LAB
COURSE OBJECTIVES:-
- To verify the theoretical concepts practically from all the experiments.
- To analyze the characteristics of Diodes, BJT, MOSFET, UJT.
- To design the amplifier circuits from the given specifications.
- Exposed to linear and digital integrated circuits.

LIST OF EXPERIMENTS: (**Execute Six experiments**).
1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Full Wave Rectifier with & without filter.
4. Wave Shaping Circuits. (Clippers & Clampers)
5. Input & Output characteristics of Transistor in CB / CE configuration.
6. Frequency response of CE amplifier.
7. Inverting and Non-inverting amplifiers using Op-Amps.
8. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.

9. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

COURSE OUTCOMES:

CO1: Learn the characteristics of basic electronic devices like PN junction diode, Zener diode & BJT.

CO2: Analyze the application of diode as rectifiers, clippers and clampers.

CO3: Learn the fundamental principles of amplifier circuits and need of Bias in Amplifier circuits.

CO4: Learn the basics of linear integrated circuits and understand characteristics of operational amplifier.

CO5: Learn about available digital ICs and verify truth tables of Logic gates and Flipflops.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL
(Common to I Semester CE & ECE and II Semester CSE & ME)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0301P	3	0	0	3	CIE	30 M
Course Title	:	ENGINEERING GRAPHICS LAB					SEE	70 M

COURSE OBJECTIVES:
- Instruct the utility of drafting & modeling packages in orthographic and isometric drawings.
- Train the usage of 2D and 3D modeling.
- Instruct graphical representation of machine components.

Computer Aided Drafting:
Introduction to AutoCAD: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, stretching, fillets, arrays, dimensions.
Dimensioning principles and conventional representations.

Orthographic Projections: Systems of projections, conventions and application to orthographic projections - simple objects.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

TEXT BOOKS:
1) K. Venugopal, V.Prabhu Raja, Engineering Drawing + Auto Cad, New Age International Publishers.
2) Kulkarni D.M, AP Rastogi and AK Sarkar, Engineering Graphics with Auto Cad, PHI Learning, Eastern Economy editions.

REFERENCE BOOKS:
1) T. Jayapoovan, Engineering Graphics using Auto Cad, Vikas Publishing House
2) K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
3) Linkan Sagar, BPB Publications, Auto Cad 2018 Training Guide.
4) K.C.John, Engineering Graphics, 2/e, PHI, 2013
5) Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

COURSE OUTCOMES:
After completing the course, the student will be able to
- Use computers as a drafting tool. (L2)
- Draw isometric and orthographic drawings using CAD packages. (L3)

ADDITIONAL SOURCES
Youtube: http-sewor,Carleton.cag, kardos/88403/drawings.html conic sections-online, red woods.edu

B.TECH - II SEMESTER

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CE, CSE, ECE, and ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5402	3	0	0	3	CIE	30 M
Course Title	:	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**					SEE	70 M

COURSE OBJECTIVES:

1) To enlighten the learners in the concept of differential equations and multivariable calculus.
2) To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

UNIT I: Linear differential equations of higher order (Constant Coefficients) (10 hrs)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskean, method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Mass spring system.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify the essential characteristics of linear differential equations with constant coefficients (L3)
- Solve the linear differential equations with constant coefficients by appropriate method (L3)
- Classify and interpret the solutions of linear differential equations (L3)
- Formulate and solve the higher order differential equation by analyzing physical situations (L3)

UNIT II: Partial Differential Equations (08 hrs)

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order equations using Lagrange's method.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply a range of techniques to find solutions of standard PDEs (L3)
- Outline the basic properties of standard PDEs (L2)

UNIT III: Applications of Partial Differential Equations (10 hrs)

Classification of PDE, method of separation of variables for second order equations. Applications of Partial Differential Equations: One dimensional Wave equation, One dimensional Heat equation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Calcify the PDE (L3)
- Learn the applications of PDEs(L2)

UNIT IV: Vector differentiation (06 hrs)

Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions-Divergence and Curl, vector identities.

Learning Outcomes:
At the end of this unit, the student will be able to

- Apply del to Scalar and vector point functions (L3)
- Illustrate the physical interpretation of Gradient, Divergence and Curl (L3)

UNIT V: Vector integration **(08 hrs)**
Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Learning Outcomes:
At the end of this unit, the student will be able to

- find the work done in moving a particle along the path over a force field (L4)
- evaluate the rates of fluid flow along and across curves (L4)
- apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals (L3)

TEXT BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

REFERENCE BOOKS:

1. George B.Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
2. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
4. S L Ross , Differential Equations ,Wiley India, year 2007 edition.

COURSE OUTCOMES:
At the end of the course, the student will be able to

- Solve the differential equations related to various engineering fields (L6)
- Identify solution methods for partial differential equations that model physical processes (L3)
- Interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
- Estimate the work done against a field, circulation and flux using vector calculus (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CE & ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5102T	3	0	0	3	CIE	30 M
Course Title	:	ENGINEERING CHEMISTRY					SEE	70 M

COURSE OBJECTIVES:

- To familiarize engineering chemistry and its applications
- To impart the concept of soft and hard waters, softening methods of hard water
- To train the students on the principles and applications of electrochemistry, polymers, surface chemistry, and cement.

Unit I: Water Technology: (08 hrs)

Introduction: Hardness of water and units, Estimation of hardness of water by EDTA Method - Estimation of dissolved oxygen by Winkler's method - Boiler troubles – Priming, foaming, scale and sludge, Caustic embrittlement, Municipal water treatment – specifications for drinking water, Bureau of Indian Standards (BIS) and World Health Organization (WHO) standards, ion-exchange processes – desalination of brackish water - Reverse Osmosis (RO) and electrodialysis.

Learning outcomes:

The student will be able to

- **List** the differences between temporary and permanent hardness of water (L1)
- **Explain** the principles of reverse osmosis and electrodialysis. (L2)
- **Compare** quality of drinking water with BIS and WHO standards. (L2)
- **Illustrate** problems associated with hard water - scale and sludge**.** (L2)
- **Explain** the working principles of different Industrial water treatment processes (L2)

Unit II: Electrochemistry and Applications: (10 hrs)

Electrodes – concepts, Electrochemical Cell, Nernst Equation, Cell Potential Calculations.

Primary cells – Zinc-air, Na-air batteries, Secondary cells – Nickel-Cadmium (Ni-Cd),and Lithium ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen, methanol fuel cells – working of the cells.

Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry corrosion, Pilling Bedworth rule and Factors affecting the corrosion**,** cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).

Learning Outcomes:

At the end of this unit, the students will be able to

- **Apply** Nernst equation for calculating electrode and cell potentials (L3)
- **Recall** working and importance of batteries(L1)
- **Apply** Pilling Bedworth rule for corrosion and corrosion prevention (L3)
- **Demonstrate** the corrosion prevention methods and factors affecting corrosion (L2)
- **Compare** primary and secondary batteries and their applications (L2)

Unit III: Polymers and Fuel Chemistry **(10 hrs)**

Polymers: Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth and coordination polymerization.

Plastics: Thermoplastics and Thermo-setting plastics - Preparation, properties and applications of poly styrene, PVC and Bakelite. Calculation of molecular Weight of polymer by weight average and number average methods, Poly Dispersity Index.

Elastomers: Preparation, properties and applications of Buna-S, Buna-N, Thiokol, Calculation of Molecular Wt of Polymer by Weight Average and Number Average methods, Poly Dispersity Index.

Fuels: Types of fuels, calorific value, numerical problems based on calorific value; Analysis of coal.

Liquid Fuels: Refining of Petroleum, fuels for IC engines, knocking and anti-knock agents, Octane and Cetane values, cracking of oils; alternative fuels- propane, methanol and ethanol, bio-fuels(Coal gas, Biogas).

Learning Outcomes:

At the end of this unit, the students will be able to

- **Explain** different types of polymers and their applications (L2)
- **Find** various alternate fuels and its importance(L1)
- **Solve** the numerical problems based on Calorific value(L3)
- **Select** suitable fuels for IC engines (L3)
- **Explain** calorific values, octane number, refining of petroleum and cracking of oils (L2)

Unit IV: Advanced Engineering Materials **(10 hrs)**

Composites: Definition, Constituents, Classification - Particle, Fibre and Structural reinforced composites, properties and Engineering applications.

Refractories: Classification, Properties, Factors affecting the refractory materials (Refractoriness, Refractory under load, Porosity, Refractive index, Dimensional stability) and Applications.

Lubricants: Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index, Flash point, Fire point, Cloud point, saponification and Applications.

Building materials: Portland Cement, Rapid Hardening Cement, Quick Setting Cement, Constituents, phases and reactivity of clinker, Setting and Hardening of cement.

Learning Outcomes:

At the end of this unit, the students will be able to

- **Explain** the constituents of Composites and its classification (L2)
- **Recall** properties of refractories and lubricants (L1)
- **Identify** the factors affecting the refractory material(L3)
- **Illustrate** the functions and properties of lubricants (L2)
- **Demonstrate** the phases and reactivity of concrete formation (L2)
- **Identify** the constituents of Portland cement (L3)
- **Enumerate** the reactions at setting and hardening of the cement (L3)

Unit V: Surface Chemistry and Applications **(10 hrs)**

Introduction to surface chemistry, colloids, micelle formation, synthesis of colloids (Chemical methods - double decomposition, reduction, hydrolysis and oxidation; electrical disintegration or Bredig’s Arc method), chemical and electrochemical methods (sol-gel method, Thermally activated chemical vapor deposition method)of preparation of nano metals and metal oxides, stabilization of colloids and nano materials by stabilizing agents, solid-gas interface, solid-liquid interface, adsorption isotherm- Langmuir, Freundlich, BET equation (no derivation) applications of colloids and nano materials – catalysis, medicine, sensors.

Learning Outcomes:

At the end of this unit, the students will be able to

- **Summarize** the concepts of colloids, micelle and nanomaterials (L2)
- **Explain** the synthesis of colloids with examples (L2)
- **Select** suitable methods for synthesis of Nanometals (L1)
- **Outline** the preparation of nanomaterials and metal oxides (L2)
- **Identify** the application of colloids and nanomaterials in medicine, sensors and catalysis (L2)

Text books:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Arun Bahl, B.S. Bahl and G.D. Tuli, Essentials of Physical Chemistry, S.Chand Publication, New Delhi 2012.

Reference Books:

1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
4. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

COURSE OUTCOMES:

At the end of the course the students will be able to:

1. **Demonstrate** the corrosion prevention methods and factors affecting corrosion (L2)
2. **Explain** the preparation, properties, and applications of thermoplastics & thermosetting, elastomers & conducting polymers. (L2)
3. **Finding** important properties of various engineering materials, polymers, colloids and its applications(L1)
4. **Explain** calorific values, octane number, refining of petroleum and cracking of oils (L2)
5. **Explain** the setting and hardening of cement and concrete phase (L2)
6. **Summarize** the concepts of colloids, micelle and nano materials (L2).

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0501T	3	0	0	3	CIE	30 M
Course Title	:	C PROGRAMMING & DATA STRUCTURES					SEE	70 M

COURSE OBJECTIVES:

- To illustrate the basic concepts of C programming language.
- To discuss the concepts of Functions, Arrays, Pointers and Structures of C Programming Language.
- To discuss the syntax and semantics of C Programming language
- To familiarize with Stack, Queue, Linked lists, Tree and graph data structures.
- To demonstrate programming by choosing appropriate Data Structures and Features of the C language.

Unit I:

Getting Started: What is C, The C Character Set, Constants, Variables and Keywords, Types of C Constants, Rules for Constructing Integer Constants, Rules for Constructing Real Constants, Rules for Constructing Character Constants, Types of C Variables, Rules for Constructing Variable Names, C Keywords, Form of a C Program, Comments in a C Program, What is main, Variables and their Usage, printf( ) and its Purpose, Compilation and Execution, Receiving Input.

Data Types Revisited: Integers, long and short, Integers, signed and unsigned, Chars, signed and unsigned, Floats and Doubles, A Few More Issues, Storage Classes in C-Automatic Storage Class, Register Storage Class, Static Storage Class, and External Storage Class.

C Instructions: Types of Instructions, Type Declaration Instruction, Arithmetic Instructions, Integer and Float Conversions, Type Conversion in Assignments, Hierarchy of Operations, Associativity of Operators, Control Instructions.

Decision Control Instruction: Decisions! Decisions, The if Statement, The Real Thing, Multiple Statements within if, The if-else Statement, Nested if-elses, Forms of if.

Learning Outcomes:

1. Understand the basic concepts of C language (L2)
2. Learn the functionality of operators and Control Statements of C (L2)
3. Use the if control structure of the C language (L3)

Unit II:

More Complex Decision Making: Use of Logical Operators, The else if Clause, The ! Operator, Hierarchy of Operators Revisited, a Word of Caution, the Conditional Operators.

Loop Control Instruction: Loops, the while Loop, Tips and Traps, More Operators.

More Complex Repetitions: The for Loop, Nesting of Loops, Multiple Initializations in the for Loop, The break Statement, The continue Statement, The do-while Loop, The Odd Loop.

Case Control Instruction: Decisions using switch, The Tips and Traps, switch versus if-else Ladder, The goto Keyword.

Functions: What is a Function?, Why use Functions?, Passing Values between Functions, Scope Rule of Functions, Order of Passing Arguments, Using Library Functions, One Dicey Issue, Return Type of Function.

Learning Outcomes:

1. Apply the concept of Loops in various applications. (L3)
2. Design programs using modular approach (L6)

Unit III:

Recursion: Recursion, Recursion and Stack

Pointers: Call by Value and Call by Reference, an Introduction to Pointers, Pointer Notation, Back to Function Calls.

The C Preprocessor: Features of C Preprocessor, Macro Expansion, Macros with Arguments, Macros versus Functions, File Inclusion.

Arrays: What are Arrays?, A Simple Program using Array, More on Arrays, Array Initialization Array Elements in Memory, Bounds Checking, Passing Array Elements to a Function, Pointers and Arrays, Passing an Entire Array to a Function, The Real Thing.

Multidimensional Arrays: Two-Dimensional Arrays, Initializing a Two-Dimensional Array, Memory Map of a Two-Dimensional Array, Pointers and Two-Dimensional Arrays, Pointer to an Array, Passing 2-D Array to a Function, Array of Pointers, Three-Dimensional Array.

Learning Outcomes:

1. Solve problems by using Recursion (L3)
2. Understand the concept of Array (L2)
3. Use pointers to efficiently use memory (L3)

Unit IV:

Strings: What are Strings, More about Strings, Pointers and Strings

Standard Library String Functions-strlen ( ), strcpy ( ), strcat ( ), strcmp ( ).

Handling Multiple Strings: Two-Dimensional Array of Characters, Array of Pointers to Strings, Limitation of Array of Pointers to Strings.

Structures: Why use Structures? Declaring a Structure, Accessing Structure Elements, How Structure Elements are Stored? Array of Structures, Additional Features of Structures, Uses of Structures.

Console Input/output: Types of I/O, **Console I/O Functions**-Formatted Console I/O Functions, sprintf ( ) and sscanf ( ) Functions Unformatted Console I/O Functions

File Input/output: Data Organization, **File Operations**-Opening a File, Reading from a File, Trouble in Opening a File, Closing the File, Counting Characters, Tabs, Spaces, **A File-Copy Program**-Writing to a File, File Opening Modes, **String (Line) I/O in Files**-The Awkward Newline, Record I/O in Files, Text Files and Binary Files, Record I/O Revisited, Database Management, **Low-Level File I/O** -A Low-Level File-Copy Program, I/O under Windows.

Learning Outcomes:

1. Understand the concept of Strings (L2)
2. Learn Structures and Unions (L2)
3. Operate Files through C Programs (L4)
4. Manipulate strings (L3)

Unit V:

Data Structures: Linked List-Single Linked List, Double Linked List, Circular Linked List. Stacks-Using Arrays and Linked List, Stack Applications.

Queue- Arrays and Linked List, Circular Queue, Priority Queue.

Trees-Binary Trees, Binary Search Tree.

Graphs-Graphs Implementation using Arrays and Linked List, Traversal of Graphs.

Learning Outcomes:

1. Implements basic data structures such as stacks, queues and trees.(L3)
2. Apply algorithms and data structures in solving problems. (L3)
3. Design indexing structures (L6)

Text Books:

1. Yashavant Kanetkar, “Let Us C”, Fourteenth Edition, BPB Publications.
2. K R Venugopal, Sudeep R Prasad, “Mastering C”, Mc GrawHill publications
3. Jeri R. hanly, Elliot B. Koffman, Ashok Kamthane, A. Ananda Rao, “Programming in C and Data Structures”, Pearson.

Reference Books:

1. Brian W Kernighan and Dennis M Ritchie, “The C Programming Language”, Second Edition, Prentice Hall Publication.
2. Ellis Horowitz, SartajSahni, Susan Anderson-Freed, “Fundamentals of Data Structures in C”, Computer Science Press.
3. Pradip Dey and Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition 2011.
4. Richard F. Gilberg & Behrouz A. Forouzan, “Data Structures: A Pseudocode Approach with C”, Second Edition, CENGAGE Learning, 2011.

Course Outcomes:

1. Learn the concepts of C Programming language. (L2)
2. Design applications in C, using functions, arrays, pointers and structures. (L6)
3. Apply the concepts of Stacks and Queues in solving the problems. (L3)
4. Explore various operations on Linked lists. (L5)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(II Semester CE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0101T	3	0	0	3	CIE	30 M
Course Title	:	STRENGTH OF MATERIALS					SEE	70 M

COURSE OBJECTIVES:

- To make the student understand how to resolve forces and moments in a given system
- To demonstrate the student to determine the centroid and second moment of area
- To impart procedure for drawing shear force and bending moment diagrams for beams.
- To make the student able to analyze flexural stresses in beams due to different loads.
- To enable the student to apply the concepts of strength of materials in engineering applications and design problems.

UNIT I: Introduction to Mechanics

Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space Resultant - Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial systems- **Center of Gravity and moment of inertia**: Introduction – Centroids of rectangular, circular, I, L and T sections - Centroids of built up sections. **Area moment of Inertia**: Introduction – Definition of Moment of Inertia of rectangular, circular, I, L and T sections - Radius of gyration. Moments of Inertia of Composite sections.

Learning Outcomes:

- Explain the basic concepts of forces
- Draw Free body Diagrams for forces
- Determine the centroid and moment of inertia for different cross section areas

UNIT II: Simple Stresses and Strains

Types of stresses and strains – Hooke‘s law – Stress – strain diagram for mild steel – working stress – Factor of safety – lateral strain, Poisson‘s ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of Varying section – Composite bars – Temperature stresses. Strain energy – Resilience – Gradual, Sudden, impact and shock loadings – simple applications.

Learning Outcomes

- List out the concepts of stresses, strains, elastic moduli and strain energy.
- Evaluate relations between different moduli
- Explain different type’s loadings

UNIT III: Shear Force and Bending Moment

Definition of beam – types of beams – Concept of Shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and over hanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – point of contra flexure – Relation between S.F, B.M and rate of loading at section of a beam.

Learning Outcomes:

- Draw the shear force and bending moment diagrams for cantilevers, simply supported beams and Overhanging beams with different loads
- Explain the relationship between shear force and bending moments

UNIT IV: Flexural Stresses

Theory of simple bending – Assumptions – Derivation of bending equation– Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel Sections – Design of simple beam sections.

Learning Outcomes:

- Derive bending equations
- Compute the flexural stresses for different cross sections.
- Design beam sections for flexure

UNIT V:

Shear Stresses: Derivation of formula-Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T and angle sections. Combined bending and shear.

Analysis of trusses by Method of Joints & Sections.

Learning Outcomes:

- Determine shear stresses for different shapes.
- Evaluate effect of combined bending and shear on sections

Course Outcomes:

On completion of the course, the student will be able to:

1) Explain the different types of couples and force systems
2) Determine the centroid and moment of inertia for different cross-sections
3) List out the concepts of stress, strain, generalized Hooke's law, elastic moduli and strain energy.
4) Develop shear force and bending moment diagrams for different load cases.
5) Compute the flexural stresses and shear stresses for different loading cases and different cross-sections.

TEXT BOOKS:

1) S. Timoshenko, D.H. Young and J.V. Rao, "Engineering Mechanics", Tata McGraw-Hill Company.
2) Sadhu Singh, "Strength of Materials", 11th edition 2015, Khanna Publishers.

REFERENCES:

1. S.S.Bhavikatti, "Strength of materials", Vikas publishing house Pvt. Ltd.
2. R. Subramanian, "Strength of Materials", Oxford University Press.
3. R. K. Bansal, "Strength of Materials", Lakshmi Publications House Pvt. Ltd.
4. Advanced Mechanics of Materials – Seely F.B and Smith J.O. John wiley & Sons inc., New York.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CE & ECE)

Course Category	:	Mandatory Course	L	T	P	C	Exam	3 Hrs
Course Code	:	20AMC9901	3	0	0	0	CIA	30 M
Course Title	:	ENVIRONMENTAL SCIENCES					SEE	--

COURSE OBJECTIVES

- To make the students to get awareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life.
- To save earth from the inventions by the engineers.

UNIT I:

Multidisciplinary Nature Of Environmental Studies: – Definition, Scope and Importance – Need for Public Awareness.

Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

Learning Outcomes:

- To know the importance of public awareness.
- To know about the various resources.

UNIT II:

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

(a) Forest ecosystem.
(b) Grass land ecosystem
(c) Desert ecosystem
(d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its Conservation : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Learning Outcomes:

- To know about various echo systems and their characteristics
- To know about the biodiversity and its conservation

UNIT III:

Environmental Pollution: Definition, Cause, effects and control measures of:

(a) Air Pollution.
(b) Water pollution
(c) Soil pollution
(d) Marine pollution
(e) Noise pollution
(f) Thermal pollution
(g) Nuclear hazards

Solid Waste Management: Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

Learning Outcomes:

- To know about the various sources of pollution.
- To know about the various sources of solid waste and preventive measures.
- To know about the different types of disasters and their managerial measures**.**

UNIT IV:

Social issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

Learning Outcomes:

- To know about the social issues related to environment and their protection acts.
- To know about the various sources of conservation of natural resources.
- To know about the wild life protection and forest conservation acts.

UNIT V:

Human Population And The Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc..

Learning Outcomes:

- To know about the population explosion and family welfareprogrammes.

- To identify the natural assets and related casestudies.

TEXT BOOKS:

1) Text book of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press.
2) Palaniswamy, “Environmental Studies”, Pearson education
3) S. Azeem Unnisa, “Environmental Studies” Academic Publishing Company
4) K. Raghavan Nambiar, “Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus”, Scitech Publications(India), Pvt. Ltd.

REFERENCES:

1) Deeksha Dave and E.Sai Baba Reddy, “Textbook of Environmental Science”, Cengage Publications.
2) M. Anji Reddy, “Text book of Environmental Sciences and Technology”, BS Publication.
3) J. P. Sharma, Comprehensive Environmental studies, Laxmi publications.
4) J. Glynn Henry and Gary W. Heinke, “Environmental Sciences and Engineering”, Prentice hall of India Private limited
5) G.R.Chatwal, “A Text Book of Environmental Studies” Himalaya Pubilishing House
6) Gilbert M. Masters and Wendell P. Ela, “Introduction to Environmental Engineering and Science, Prentice hall of India Private limited.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

1) Grasp multidisciplinary nature of environmental studies and various renewable and non-renewable resources.
2) Understand flow and bio-geo- chemical cycles and ecological pyramids.
3) Understand various causes of pollution and solid waste management and related preventive measures.
4) About the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.
5) Casus of population explosion, value education and welfare programmes.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to II Semester CE & ME)

Course Category	:	Basic Sciences	L	T	P	C	Exam	3 Hrs
Course Code	:	20ABS5102P	0	0	3	1.5	CIE	30 M
Course Title	:	ENGINEERING CHEMISTRY LAB					SEE	70 M

COURSE OBJECTIVES:

1. To Verify the fundamental concepts with experiments

List of Experiments:

1. Determination of Hardness of a groundwater sample.
2. Estimation of dissolved oxygen by Winklers method.
3. Estimation of Copper by EDTA method.
4. Determination of Strength of an acid in Pb-Acid battery.
5. Estimation of Ferrous Iron by Potassium dichromate.
6. Preparation of a polymer- Bakelite.
7. Determination of percentage of Iron in Cement sample by colorimetry.
8. Estimation of Calcium in port land Cement.
9. Preparation of nano materials by precipitation.
10. Adsorption of acetic acid by charcoal.
11. Determination of percentage moisture content in a coal sample.
12. Determination of Viscosity of lubricating oil by Redwood Viscometer 1.
13. Determination of Viscosity of lubricating oil by Redwood Viscometer 2.
14. Determination of Calorific value of gases by Junker's gas Calorimeter.

Course Outcomes:

At the end of the course, the students will be able to:

1. **Determine** the cell constant and conductance of solutions (L3)
2. **Prepare** advanced polymer materials (L2)
3. **Determine** the physical properties like surface tension, adsorption and viscosity (L3)
4. **Estimate** the Iron and Calcium in cement (L3)
5. **Calculate** the hardness of water (L4)
6. **Find** calorific values of various fuels, hardness of water samples (L1)

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RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0501P	0	0	3	1.5	CIE	30 M
Course Title	:	C PROGRAMMING & DATA STRUCTURES LAB					SEE	70 M

COURSE OBJECTIVES:

- To illustrate the concepts of C programming language
- To discuss the syntax and semantics of C programming language.
- To demonstrate using arrays, strings, pointers and structures.
- To illustrate the use of Stacks and Queues
- To teach different operations on linked lists.
- To demonstrate Binary search tree traversal techniques.

Week 1

For the first few weeks students have to do some practice programs to understand the concepts of the C programming language

Week 2

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program that uses functions to perform the following:
(i) Addition of Two Matrices (ii) Multiplication of Two Matrices

Week 3

a) Write a C program that uses functions to perform the following operations:
(i) To insert a sub-string in to a given main string from a given position.
(ii) To delete n characters from a given position in a given string.

Week 4

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn‘t contain T.
b) Write a C program to count the lines, words and characters in a given text.

Week 5

a) Write a C Program to perform various arithmetic operations on pointer variables.
b) Write a C Program to demonstrate the following parameter passing mechanisms:
(i) call-by-value (ii) call-by-reference

Week 6

Write a C program that uses functions to perform the following operations:

(i) Reading a complex number
(ii) Writing a complex number
(iii) Addition of two complex numbers
(iv) Multiplication of two complex numbers
(Note: represent complex number using a structure.)

Week 7

Write C programs that implement stack (its operations) using

(i) Arrays (ii) Pointers

Week 8

Write C programs that implement Queue (its operations) using

(i) Arrays (ii) Pointers

Week 9

Write a C program that uses Stack operations to perform the following:

(i) Converting infix expression into postfix expression

(ii) Evaluating the postfix expression

Week 10

Write a C program that uses functions to perform the following operations on singly linked list.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 11

Write a C program that uses functions to perform the following operations on Doubly linkedlist.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 12

Write a C program that uses functions to perform the following operations on circular linkedlist.

(i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

Week 13

Write a C program that uses functions to perform the following:

(i) Creating a Binary Tree of integers

(ii) Traversing the above binary tree in preorder, inorder and postorder.

Week 14

Write C programs that use both recursive and non-recursive functions

(i) To find the factorial of a given integer.

(ii) To find the GCD (greatest common divisor) of two given integers.

(iii) To solve Towers of Hanoi problem.

Week 14

Write C programs that use both recursive and non-recursive functions to perform the following searching operations for a key value in a given list of integers:

(i) Linear search (ii) Binary search

Week 15

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

(i) Bubble sort (ii) Selection sort (iii) Insertion sort

Week 16 Application development

College information system – The students in groups can collect the information about the college and design a project which automates the some of the tasks like Attendance calculation, Grade calculation, etc.

TEXT BOOKS:

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
2. B.A. Forouzon and R.F. Gilberg, "COMPUTER SCIENCE: A Structured Programming Approach Using C", Third edition, CENGAGE Learning, 2016.
3. Richard F. Gilberg & Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C", Second Edition, CENGAGE Learning, 2011.

REFERENCE BOOKS:

1. PradipDey and ManasGhosh, Programming in C, Oxford University Press, 2nd Edition 2011.
2. E.Balaguruswamy, "C and Data Structures", 4th Edition, Tata Mc Graw Hill.
3. A.K.Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press.
4. M.T.Somashekara, "Problem Solving Using C", PHI, 2nd Edition 2009.

COURSE OUTCOMES:

1. Demonstrate basic concepts of C programming language. (L2)
2. Develop C programs using functions, arrays, structures and pointers. (L6)
3. Illustrate the concepts Stacks and Queues. (L2)
4. Design operations on Linked lists. (L6)
5. Apply various Binary tree traversal techniques. (L3)
6. Develop searching and sorting methods. (L6)

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(II Semester CE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0101P	3	0	0	3	CIE	30 M
Course Title	:	STRENGTH OF MATERIALS LAB					SEE	70 M

COURSE OBJECTIVES:

- By performing this laboratory, the student will be able to know the structural behavior of various materials.

LIST OF EXPERIMENTS

1. Tension test.
2. Bending test on (Steel/Wood) Cantilever beam.
3. Bending test on simply supported beam.
4. Torsion test.
5. Hardness test.
6. Compression test on Open coiled springs
7. Tension test on Closely coiled springs
8. Compression test on wood/ concrete
9. Izod / Charpy Impact test on metals
10. Shear test on metals
11. Use of electrical resistance strain gauges.
12. Continuous beam – deflection test.

COURSE OUTCOMES:

By performing the various tests in this laboratory the student will be able to know the structural behavior various structural elements when subjected to external loads

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE & ECE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0302	0	0	3	1.5	CIE	30 M
Course Title	:	ENGINEERING WORKSHOP					SEE	70 M

COURSE OBJECTIVES:

- To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills.

LIST OF EXPERIMENTS

Trade I: Wood Working
Familiarity with different types of woods and tools used in wood working and make following joints
(a) Half – Lap joint (b) Mortise and Tenon joint (c) Corner Dovetail joint or Bridle joint

Trade II: Sheet Metal Working
Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets
(a) Tapered tray (b) Conical funnel (c) Elbow pipe (d) Brazing

Trade III: Fitting
Familiarity with different types of tools used in fitting and do the following fitting exercises.
(a) V-fit (b) Dovetail fit (c) Semi-circular fit
(d) Bicycle tyre puncture and change of two wheeler tyre.

Trade IV: Electrical Wiring
Familiarities with different types of basic electrical circuits and make the following connections
(a) Parallel and series (b) Two way switch (c) Godown lighting
(d) Tube light (e) Three phase motor (f) Soldering of wires

COURSE OUTCOMES:
After completion of this lab the student will be able to

- Apply wood working skills in real world applications. (l3)
- Build different objects with metal sheets in real world applications. (l3)
- Apply fitting operations in various applications. (l3)
- Apply different types of basic electric circuit connections. (l3)
- Use soldering and brazing techniques. (l2)

Note: In each section a minimum of three exercises are to be carried out.

RAYALASEEMA UNIVERSITY COLLEGE OF ENGINEERING, KURNOOL

(Common to I Semester CSE & ME and II Semester CE)

Course Category	:	Engineering Science	L	T	P	C	Exam	3 Hrs
Course Code	:	20AES0502	0	0	3	1.5	CIE	30 M
Course Title	:	IT WORKSHOP					SEE	70 M

COURSE OBJECTIVES:

- To make the students know about the internal parts of a computer, assembling and dissembling a computer from the parts, preparing a computer for use by installing the operating system
- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, and Presentations
- To demonstrate Networking of computers and use Internet facility for Browsing and Searching
- To illustrate the need for security while using applications and devices.

Preparing your Computer

Task 1:

Learn about Computer: Identify the internal parts of a computer, and its peripherals, Represent the same in the form of diagrams including Block diagram of a computer, Write specifications for each part of a computer including peripherals and specification of a Desktop computer.

Task 2:

Assembling a Computer: Disassemble and assemble the PC back to working condition, Trouble shoot the computer and identify working and non-working parts, Identify the problem correctly by various methods like beeps.

Task 3:

Install Operating system and Applications: Install Linux on the computer, Install another operating system and make the system dual boot or multi boot, Install operating systems using Virtual machine. Access the computing resources like CD/DVD drives, Pen drives, Printers, Speakers, Microphone, etc. Install device drivers and install application programs.

Networking and Internet

Task 4:

Networking: Connect two computers directly using a cable or wireless connectivity and share information, Connect two or more computers using switch/hub and share information, Phuscally connect computers using crimpling activity, logical configuration, etc.

Task 5:

Browsing Internet: Access the Internet for Browsing, Search the Internet for required information, Create e-mail account, send and receive email, Get acquaintance with applications like Facebook, skype, etc.

Task 6:

Antivirus: Download freely available Antivirus software, install it and use it to check for threats to the computer being used, Submit information about the features of the antivirus used, installation process, virus definitions, virus engine, etc. Configure the computer for high security.

Productivity tools

Task 7:

Word Processor: Create documents using the word processor tool, Inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc.

Prepare project cover pages, content sheet, and chapter pages.

Task 8:

Presentations: Creating, opening, saving, and running the presentations, selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show.

Task 9:

Spreadsheet: Create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells.

Applications

Task 10:

Database management system: Install a Database management system, configure users, do some administration tasks.

Task 11:

Language Translators

Install different Natural language translators in a Computer/Mobile. Use them to convert text between different languages.

Use Voice to access applications and make them perform different tasks like calling users, etc.

Task 12:

Sharing

Install applications github, dropbox, google forms, google docs and use them to share information and work on a common project. It is a Team task.

Task 13:

IDE

Install applications like Vscode, and Eclipse and use the integrated development environment of those applications and perform tasks like editing, compiling, executing, etc.

Task 14:

Cyber Security

Practice the following Cyber Security related tasks

- Cyber Hygiene Practices of Personal digital devices
- Cyber Hygiene Practices for Home
- Cyber Hygiene Practices for Remote working and Learning
  Web source: Cyber Hygiene Practices - ISEA (infosecawareness.in)

References:

1. Peter Norton , Introduction to Computers, McGraw Hill
2. Joan Lambert, Joyce Cox, MOS study guide for word, Excel, Powerpoint & Outlook Exams, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Rusen , Networking your computers and devices, PHI
5. Bigelows , Trouble shooting, Maintaining & Repairing PCs, TMH
6. Major reference is Websites like Google.com, dropbox.com, github.com and others.

Course Outcomes:

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use. (L6)
- Prepare the Documents using Word processors and Prepare spread sheets for calculations using excel. (L3)
- Design Slide presentations using the presentation tool. (L6)
- Interconnect two or more computers for information sharing. (L4)
- Access the Internet and Browse it to obtain the required information. (L4)
- Analyze the vulnerabilities of the devices, and apply security features (L4)