B.Tech. – I Year II Semester (for Group-A Branches) CE, mech, Pet & chem

S.No.	Category	Title	L/D	T	P	Credits
1	BS&H	Engineering Physics	3	0	0	3
2	BS & H	Differential Equations & Vector Calculus	3	0	0	3
3	Engineering Science	Basic Electrical and Electronics Engineering	3	0	0	3
4	Engineering Science	Engineering Graphics	1	0	4	3
5	Engineering Science	IT Workshop	0	0	2	1
6	Professional Core	Data Structures / Electrical Circuit Analysis – I (Branch specific)	3	0	0	3
7	BS&H	Engineering Physics Lab	0	0	2	1
8	Engineering Science	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	Professional Core	Data Structures Lab / Electrical Circuit Analysis – I Lab	0	0	3	1.5
10		NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
Total			13	00	15	20.5

University College of Engineering Kakinada
Jawaharlal Nehru Technological University Kakinada
B. Tech. I Year Syllabus
Engineering Physics
(Common for all branches)
(R23 Regulation)

L	T	P	C
3	0	0	3

PREAMBLE

There has been an exponential growth of knowledge base requirement in the recent past to open up new areas of challenges in understanding the basic laws of nature. This helped to the discovery of new phenomena in macro, micro and nano scale regime device technologies. The laws of Physics play a key role in the development of science, engineering and technology. Systematic knowledge of physical principles is of paramount importance in understanding new discoveries, recent trends and latest developments for their adoption in the field of engineering.

To keep in pace with the recent scientific advancements in the areas of emerging technologies, the syllabi of Engineering physics has been thoroughly revised keeping in view of the basic needs of all branches of Engineering by including the advanced topics of Physical Optics, Dielectric and Magnetic materials, Crystallography and X-ray Diffraction, Quantum Mechanics, Free Electron Theory and Semiconductors.

COURSE OBJECTIVES	
1	Bridging the gap between the Physics in school at 10+2 level and UG level engineering courses.
2	To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
3	Enlighten the periodic arrangement of atoms in Crystalline solids by Bragg's law – Learning the structural analysis through X-ray diffraction techniques.
4	To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
5	Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of de Broglie matter waves, quantum mechanical wave equation and its application, the importance of free electron theory for metals.
6.	To Understand the Physics of Semiconductors and their working mechanism, Concepts utilization of transport phenomenon of charge carriers in semiconductors.

COURSE OUTCOMES	
CO1	**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 refracted light and extraordinary refracted rays by their states of polarization (L2)
CO2	**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 (L3). **Analysis** of structure of the crystals by Laue's and Powder techniques (L2).
CO3	**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).
CO4	**Describe** the dual nature of matter (L1). **Explain** 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).
CO5	**Classify** the crystalline solids (L2).**Outline** the properties of charge carriers in semiconductors (L2). **Identify** the type of semiconductor using Hall effect (L2). **Apply** the concept of effective mass of electron (L3).

Engineering Physics

(Common for all branches)

(R23 Regulation)

L	T	P	C
3	0	0	3

Unit-I: Wave Optics **12hrs**

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colors in thin films- Newton's Rings- Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

Unit II: Crystallography and X-ray diffraction **8hrs**

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.

X-ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods.

Unit-III: Dielectric and Magnetic Materials **8hrs**

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius-Mossotti equation .

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

Unit-IV: Quantum Mechanics and Free electron theory **10hrs**

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Fermi-Dirac distribution - Density of states - Fermi energy - Quantum free electron theory – electrical conductivity based on quantum free electron theory .

Unit – V: Semiconductors **10hrs**

Semiconductors: Formation of energy bands – classification of crystalline solids - 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 - Hall effect and its Applications.

Text books:

1. "A Text book of Engineering Physics" - M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S.Chand Publications, 11th Edition 2019.
2. "Engineering Physics" - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).
3. "Engineering Physics" - P.K.Palanisamy SciTech publications.

Reference Books:

1. "University Physics with Modern Physics" - Young Hugh D. and Freedman Roger .A Pearson Education, 2014
2. "Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.
3. "Engineering Physics" - B.K. Pandey and S. Chaturvedi, Cengage Learning
4. "Engineering Physics" - M.R. Srinivasan, New Age international publishers (2009).

Designation	Name	Organization	Signature
Chairperson	Dr. G. Padmaja Rani	JNTUK	
Internal member	Dr. P.Dakshina Murthy	JNTUK	
External member	Dr. V.R.K. Murthy	IITMadras	AttendedVirtually
External member	Dr. D. Haranath	NIT-Warangal	Attended Virtually
External member	Dr. K. Venkateswara Rao	JNTUH	AttendedVirtually

University College of Engineering Kakinada
Jawaharlal Nehru Technological University Kakinada

B.Tech. I Year Syllabus

Engineering Physics Laboratory

(Common for all Branches)

(R23 Regulation)

Course Objectives:

To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes: The students will enabled to

CO1: Acquire a comhrensive idea for the concepts of wave optics phenomena for their utility to design an instrument with enhanced accuracy

CO2: Understand the influence of electric and magnetic fields as response parameters for their device utility

CO3: Analyze the gravitational fields, resonance and wave propagation in stretched strings

CO4: Understand the ideological utility perspectives of quantum mechanics for its domain of viability in human life, for the device perspective of semiconductor materials as sensors etc.,

CO6: Utilize the knowledge regarding the impact of doping in extrinsic semiconductor to realise tunable Conductivity, i.e., both in realistic and virtual modes.

University College of Engineering Kakinada
Jawaharlal Nehru Technological University Kakinada

B.Tech. I Year Syllabus

Engineering Physics Laboratory

(Common for all Branches)

(R23 Regulation)

L	T	P	C
0	0	2	1

(Any **TEN** of the following listed experiments)

(Out of which any **TWO** experiments may be conducted in virtual mode)

List of Engineering Physics Experiments

1. Determination of radius of curvature of a given plano convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductor by four probe method.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart & Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
14. Determination of magnetic susptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by non-uniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

References:

1. "A Text Book of Practical Physics" - S. Balasubramanian, M.N. Srinivasan, S. Chand Publishers, 2017.
2. "Practical physics" by G.L.Squire, Cambridge University press, Fourth edition,2001

URL:www.vlab.co.in

R23

University Engineering College(A): J N T University Kakinada

Department of Mathematics

I Year II Semester

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to all branches)

COURSE OBJECTIVES
This course is aimed to provide the learner with several of methods of solving differential equations and partial differential equations. To prepare the student to calculate gradient, surface and volume integrals by applying standard theorems.

COURSE OUTCOMES		
Upon successful completion of the course, the student will be able to:		**Cognitive Level**
CO1	Model simple physical problems involving rate as first order differential equations and solve the resulting equation.	K2 or K3
CO2	Model electrical circuits problems or vibrating systems problems as linear higher order ordinary differential equations and solve.	K2 or K3
CO3	Solve partial differential equations that model physical processes.	K2 or K3
CO4	Apply the knowledge of gradient, divergence and curl and interpret the physical meaning of different operators.	K2 or K3
CO5	Compute the work done against a field, circulation and flux using vector calculus methods.	K2 or K3

K1- Remembering, K2- Understanding, K3-Applying, K4- Analyzing, K5- Evaluating, K6- Creating

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	-

Members of BoS:

Dr. V.Ravindranath (Chairman)	Dr. T.V.S. Sekhar (Member)	Dr. Ch. Ramireddy (Member)	Dr. T. Hymavathi (Member)	Dr.G.V.S.R. Deekshitulu (Member)	Dr. S.K.Vali (Member)	Dr.K.Sobhan Babu (Member)

R23

R23

University Engineering College(A): J N T University Kakinada

Department of Mathematics

SYLLABUS

UNIT I

Differential equations of first order and first degree:

Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling - Law of natural growth and decay- Electrical circuits.

UNIT II

Linear differential equations of higher order (Constant Coefficients):

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT III

Partial Differential Equations:

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients

UNIT IV

Vector differentiation:

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions- Gradient and applications, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT V

Vector integration:

Line integral-circulation-work done by the force, Scalar potential, surface integral-flux, Green's theorem in a plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

TEXT BOOKS

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

REFERENCE BOOKS

1. ThomasCalculus,GeorgeB.Thomas,MauriceD.WeirandJoelHass,PearsonPublishers,2018, 14th Edition.
2. AdvancedEngineeringMathematics,DennisG.ZillandWarrenS.Wright,JonesandBartlett,2018.
3. AdvancedModernEngineeringMathematics,GlynJames,Pearsonpublishers,2018,5th Edition.
4. AdvancedEngineeringMathematics,R.K.JainandS.R.K.Iyengar,AlphaScienceInternationalLtd.,

Members of BoS:

Dr. V.Ravindranath (Chairman)	Dr. T.V.S. Sekhar (Member)	Dr. Ch. Ramireddy (Member)	Dr. T. Hymavathi (Member)	Dr.G.V.S.R. Deekshitulu (Member)	Dr. S.K.Vali (Member)	Dr.K.Sobhan Babu (Member)

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA (AUTONOMOUS) :: JNTUK,KAKINADA
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

I B.Tech

COURSE CODE – R2011XXYY	BASIC ELECTRICAL & ELECTRONICS ENGINEERING (Common to CE, ME, ECE CSE, AIML PE, CHE (Except EEE))	CATEGORY Engineering Science	L-T-P 3-0-0	CREDITS 3

Course Outcomes: At the end of the course, student will be able to

		Knowledge Level (K)#
CO1	Apply basic concepts of electrical circuits to solve the different electrical network problems	3
CO2	Explain the operation of different electrical machines	2
CO3	Compute electricity bill for domestic consumers using tariff methods and understand safety measures	3
CO4	Collect COs from the ECE department	
CO5		
CO6		

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															

(Please fill the above with Levels of Correlation, viz., L, M, H)

Note: Only elementary concepts of the topics are to be considered for the preparation of question paper.

UNIT	CONTENTS	Contact Hours
	PART A: BASIC ELECTRICAL ENGINEERING	
UNIT - 1	**DC & AC Circuits** **DC Circuits:** Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL &KVL, series, parallel, series-parallel circuits. **AC Circuits:** A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period,frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits,	10

Dr. R. Srinivasa Rao (Member)	Dr. K. Venkata Reddy (Member)	Dr. M. Nageswara Rao (Member)	Dr. Ch.V.V.S. Bhaskar Reddy (Member)	Dr. K. Ravindra (Chairman)
			Attended online	

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA (AUTONOMOUS) :: JNTUK,KAKINADA
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

	Concept of reactance and Impedance, Concept of power factor, Active power, reactive power and apparent power. (Simple numerical problems)	
UNIT - 2	**Machines** Principle of operation of DC Generator, EMF Equation, Types of Field Excitation, Open Circuit Characteristics of DC generator, Principle of operation of Three Phase Induction Motor, Single Phase Transformer. (Simple numerical problems on DC Generator.)	8
UNIT - 3	**Electricity Bill & Equipment Safety Measures** **Electricity Bill:** Power rating of household appliances including air conditioners, PCs, Laptops,Printers, etc. Types of Tariff, Calculation of electricity bill for domestic consumers. **Equipment Safety Measures:** Working principle of Fuse and Miniature Circuit Breaker(MCB). Electric Shock,Safety Precautions to avoid shock, concept of Earthing	6
	PART B: BASIC ELECTRONICS ENGINEERING	
UNIT - 4	**Collect syllabus from the ECE department**	
UNIT - 5		
UNIT-6		
	Total	

Part A:

Textbooks:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition.
2. Principles of Electrical Engineering and Electronics by Mehta V.K. & Mehta Rohit, S. Chand Limited 2006.
3. A Textbook of Electrical Technology – Volume I by B. L. Theraja, A. K. Theraja, S. Chand Limited· 2005.
4. A Textbook of Electrical Technology - Volume II by B. L. Theraja, A. K. Theraja S. Chand Limited 2005.
5. Electrical wiring, estimation & costing by Uppal S.L. Khanna Publishers 1987.

Reference Books:

1. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017
2. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Pearson Publications, 2018, Second Edition.
3. Principles of Power By V. K. Mehta, Rohit Mehta · S. Chand 2005

Part B:

Textbooks:

Reference Books:

Dr. R. Srinivasa Rao (Member)	Dr. K. Venkata Reddy (Member)	Dr. M. Nageswara Rao (Member)	Dr. Ch.V.V.S. Bhaskar Reddy (Member)	Dr. K. Ravindra (Chairman)
			Attended online	

PART B: BASIC ELECTRONICS ENGINEERING

Course Objectives: To teach the fundamentals of semiconductor devices and its applications, principles of digital electronics.

Course Outcomes: At the end of the course, the student will be able to

CO1: Apply the basic concepts of semiconductor devices
CO2: Illustrate the formation of p-n junction and how it can be used in diodes,Transistors in different modes of operation.
CO3: Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons..
CO4: Classify different number systems and apply to generate various codes. Design different types of combinational logic circuits.

UNIT I SEMICONDUCTOR DEVICES

Introduction - Evolution of Electronics , Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics.

UNIT II BASIC ELECTRONIC CIRCUITS AND INSTRUMENTATION

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a Full wave bridge rectifier, Capacitor filter (no analysis), working of simple zener voltage regulator. Electronic Instrumentation: Block diagram of an Electronic Instrumentation system.

UNIT III DIGITAL ELECTRONICS

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders, Comparators, Code converters

Textbooks:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021. 2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

Reference Books:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010. 2. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002. 3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

HEAD OF THE DEPARTMENT
DEPARTMENT OF ECE
UCEK JNTUK, KAKINADA.

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives:

- To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

Course Outcomes: At the end of the course, the student will be able to

CO1: Identify & testing of various electronic components.

CO2: Understand the usage of electronic measuring instruments.

CO3: Plot and discuss the characteristics of various electron devices.

CO4: Explain the operation of a digital circuit.

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. 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.

References:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021. 2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009 3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

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L: 2. T: 0 P/D: 4

ENGINEERING GRAPHICS

(Common to All branches of Engineering)

Course Objectives:

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes:

CO1: Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
CO2: Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
CO3: Draw projection of solids in various positions in first quadrant.
CO4: Explain principles behind development of surfaces.
CO5: Prepare isometric and perspective sections of simple solids.

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and vernier scales.
Practicing on a sketching book for few examples (*Not for end examination*).

UNIT II

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadranis.
Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

HM CD

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.
Practicing on a sketching book for few examples(*Not for end examination*)..

UNIT III

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.
Practicing on a sketching book for few examples(*Not for end examination*)..

UNIT IV

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.
Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.
Practicing on a sketching book for few examples(*Not for end examination*)..

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.
Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD (*Not for end examination*).
Practicing on a sketching book for few examples (*Not for end examination*)..

Textbook:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.
4. Engineering Design and Visualization, Jon M. Duff and William A. Ross, CENGAGE Learning, India edition, 2009.

I Year - I Semester	IT Workshop (Common to all branches of Engineering)	L	T	P	C
		0	0	2	1

Course Objectives:

The main objectives of the course are to

- Introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
- Demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
- Teach basic command line interface commands on Linux.
- Teach the usage of Internet for productivity and self-paced life-long learning
- Introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

Course Outcomes:

A student after completion of the course will be able to

CO1: Perform Hardware troubleshooting.
CO2: Understand Hardware components and inter dependencies.
CO3: Safeguard computer systems from viruses/worms.
CO4: Document/ Presentation preparation.
CO5: Perform calculations using spreadsheets.

PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Installation of MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Installation of Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Installation of BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there isno internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Asha 15/11/2023

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 : Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std.

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

18/11/2023

POWER POINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.
Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas
Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.
Ex:Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Reference Books:

1. Comdex Information Technology Course Tool Kit, Vikas Gupta, WILEY Dream Tech, 2003
2. The Complete Computer Upgrade and Repair Book, Cheryl A Schmidt, WILEY Dream Tech, 2013, 3rd edition
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
4. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide, David Anfinson and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
7. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition

18/11/2023

ENGINEERING MECHANICS

(Common to Civil, Mechanical Engineering & Allied branches)

Course Objectives:

- To get familiarized with different types of force systems.
- To draw accurate free body diagrams representing forces and moments acting on a body to analyze the equilibrium of system of forces.
- To teach the basic principles of center of gravity, centroid and moment of inertia and determine them for different simple and composite bodies.
- To apply the Work-Energy method to particle motion.
- To understand the kinematics and kinetics of translational and rotational motion of rigid bodies.

Course Outcomes: On Completion of the course, the student should be able to

CO1: Understand the fundamental concepts in mechanics and determine the frictional forces for bodies in contact.

CO2: Analyze different force systems such as concurrent, coplanar and spatial systems and calculate their resultant forces and moments.

CO3: Calculate the centroids, center of gravity and moment of inertia of different geometrical shapes.

CO4: Apply the principles of work-energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a particle.

CO5: Solve the problems involving the translational and rotational motion of rigid bodies.

UNIT I

Introduction to Engineering Mechanics– Basic Concepts. Scope and Applications

Systems of Forces: Coplanar Concurrent Forces– Components in Space–Resultant–Moment of Force and its Application –Couples and Resultant of Force Systems.

Friction: Introduction, limiting friction and impending motion, Coulomb'slaws of dryfriction, coefficient of friction, Cone of Static friction.

UNIT II

Equilibrium of Systems of Forces: Free Body Diagrams, Lami's Theorm, Equations of Equilibrium of Coplanar Systems, Graphical method for the equilibrium, Triangle law of forces, converse of the law of polygon of forces condition of equilibrium, Equations of Equilibrium for Spatial System of forces, Numerical examples on spatial system of forces using vector approach, Analysis of plane trusses.

Principle of virtual work with simple examples

UNIT III

Centroid: Centroids of simple figures (from basic principles)–Centroids of Composite Figures.

Centre of Gravity: Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.

Area Moments of Inertia: Definition– Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.
Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, Mass Moment of Inertia of composite bodies.

UNIT IV

Rectilinear and Curvilinear motion of a particle: Kinematics and Kinetics –D'Alembert's Principle - Work Energy method and applications to particle motion-Impulse Momentum method.

UNIT V

Rigid body Motion: Kinematics and Kinetics of translation, Rotation about fixed axis and plane motion, Work Energy method and Impulse Momentum method.

Textbooks:

1. Engineering Mechanics, S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., , McGraw Hill Education 2017. 5th Edition.
2. Engineering Mechanics, P.C.Dumir- S.Sengupta and Srinivas V veeravalli , University press. 2020. First Edition.
3. A Textbook of Engineering Mechanics, S.S Bhavikatti. New age international publications 2018. 4th Edition.

Reference Books:

1. Engineering Mechanics, Statics and Dynamics, Rogers and M A. Nelson., McGraw Hill Education. 2017. First Edition.
2. Engineering Mechanics, Statics and Dynamics, I.H. Shames., PHI, 2002. 4th Edition.
3. Engineering Mechanics, Volume-I: Statics, Volume-II: Dynamics, J. L. Meriam and L. G. Kraige., John Wiley, 2008. 6th Edition.
4. Introduction to Statics and Dynamics, Basudev Battachatia, Oxford University Press, 2014. Second Edition
5. Engineering Mechanics: Statics and Dynamics, Hibbeler R.C., Pearson Education, Inc., New Delhi, 2022, 14th Edition

ENGINEERING MECHANICS LAB

(Mechanical Engineering & allied branches)

Course Objectives: The students completing the course are expected to:

- Verify the Law of Parallelogram and Triangle of Forces.
- Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
- Analyse the system of Pulleys and Moment of Inertia of Compound Pendulum and Flywheel.

Course Outcomes:

CO1: Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.
CO2: Verify Law of Polygon of forces and Law of Moment using force polygon and bell crank lever.
CO3: Determine the Centre of gravity and Moment of Inertia of different configurations.
CO4: Verify the equilibrium conditions of a rigid body under the action of different force systems.

Students have to perform any 10 of the following Experiments:

List of Experiments:

1. Verification of Law of Parallelogram of Forces.
2. Verification of Law of Triangle of Forces.
3. Verification of the Law of polygon for coplanar-concurrent forces acting on a particle in equilibrium and to find the value of unknown forces considering particle to be in equilibrium using universal force table.
4. Determination of coefficient of Static and Rolling Frictions
5. Determination of Centre of Gravity of different shaped Plane Lamina.
6. Verification of the conditions of equilibrium of a rigid body under the action of coplanar non-concurrent, parallel force system with the help of a simply supported beam.
7. Study of the systems of pulleys and draw the free body diagram of the system.
8. Determine the acceleration due to gravity using a compound pendulum.
9. Determine the Moment of Inertia of the compound pendulum about an axis perpendicular to the plane of oscillation and passing through its centre of mass.
10. Determine the Moment of Inertia of a Flywheel.
11. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever.

References:

1. S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., Engineering Mechanics, 5th Edition, McGraw Hill Education.
2. Hibbeler R.C., Engineering Mechanics: Statics and Dynamics, 14th Edition, Pearson Education, Inc., New Delhi, 2022

University College of Engineering Kakinada
Department of Petroleum Engineering & Petrochemical Engineering
R23 Course Structure
B.TECH. CHEMICAL ENGINEERING

BOS file VL 4/11/23

B.Tech. – I Year I Semester (for Group-A Branches)

S.No.	Category	Title	L/D	T	P	Credits
1	BS&H	Communicative English	2	0	0	2
2	BS&H	Engineering Chemistry	3	0	0	3
3	BS&H	Linear Algebra & Calculus	3	0	0	3
4	Engineering Science	Basic Civil & Mechanical Engineering	3	0	0	3
5	Engineering Science	Introduction to Programming	3	0	0	3
6	BS&H	Communicative English Lab	0	0	2	1
7	BS&H	Engineering Chemistry Lab	0	0	2	1
8	Engineering Science	Engineering Workshop	0	0	3	1.5
9	Engineering Science	Computer Programming Lab	0	0	3	1.5
10	BS&H	Health and wellness, Yoga and Sports	-	-	1	0.5
		Total	**14**	**00**	**11**	**19.5**

B.Tech. – I Year II Semester (for Group-A Branches)

S.No.	Category	Title	L/D	T	P	Credits
1	BS&H	Engineering Physics	3	0	0	3
2	BS&H	Differential Equations & Vector Calculus	3	0	0	3
3	Engineering Science	Basic Electrical and Electronics Engineering	3	0	0	3
4	Engineering Science	Engineering Graphics	1	0	4	3
5	Engineering Science	IT Workshop	0	0	2	1
6	Professional Core	Mechanical Unit Operations	3	0	0	3
7	BS&H	Engineering Physics Lab	0	0	2	1
8	Engineering Science	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	Professional Core	Mechanical Unit Operations – Laboratory	0	0	3	1.5
10		NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
		Total	**13**	**00**	**15**	**20.5**

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Chairman

KVR
Prof. K. V. Rao
Member

Prof. Pulipati King
Member

I Year- II Semester

L	T	P	C
3	0	0	3

MECHANICAL UNIT OPERATIONS

Learning Objectives:

The students will be able to learn:

- The fundamentals associated with liquid agitation and mixing.
- The principles of particle size, shape and specific surface estimation.
- About particulate solids handling and mixing
- The principles of size reduction and screening
- The concept of filtration
- The functioning of various prominent solid fluid contacting equipment namely gravity settlers, thickeners, classifiers, clarifiers, sedimenters and cyclones.

UNIT-I:

Properties, handling and mixing of particulate solids: Solid particles, properties estimation, storage of solids and mixing of solids, types of mixers, mixers for non-cohesive solids and cohesive solids.

UNIT-II:

Size reduction: Principles, criteria for comminution, characteristics of comminution, size reduction equipment-crushers, grinders, ultra-fine grinders, cutting machines, Equipment operation.

Screening: Screening, Industrial screening equipment, general factors in selecting a screening equipment, comparison of ideal and actual screens, material balance over a screen and screening efficiency. Capacity and effectiveness of screens: factors influencing.

UNIT-III:

Separations based on motion of particles through fluids: Gravity sedimentation process: gravity classifiers, sorting classifiers, clarifiers and thickeners, Equipment for sedimentation.

Centrifugal settling process: Separations of solids from gases: Cyclones; Separations of solids from liquids: Hydro-cyclones, principles of centrifugal sedimentation, centrifugal classifiers.

UNIT-IV:

Classification of filtration in terms of pressure, solid removal mode and amount of solids.

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Filtration: Cake filters, centrifugal filters, filter aids, clarifying filters, liquid clarification, and gas cleaning. Principles of cake filtration, clarification and centrifugal filtration. Filtration efficiency.

UNIT-V:

Agitation and mixing of liquids: circulation velocities, power consumption in agitated vessels, types of impellers,
Standard Turbine Design, Blending of liquids, suspension of solid particles, dispersion operations.

Outcomes:

The students are able to:

- Apply the fundamentals associated with liquid agitation and mixing.
- Emphasize the size reduction and screening operations.
- Estimate the particle size, shape and specific surface.
- Apply principles of particulate solids handling and mixing in different process industries.
- Calculate rate of filtration.
- Design various solid fluid contacting equipment such as: gravity settlers, thickeners, classifiers, clarifiers, sedimenters and cyclones.

Text Book:

1. Unit Operations in Chemical Engineering, McCabe, W.L., J. C. Smith and Peter Harriott, McGraw Hill, 7th Edition. 2001.

Reference Books:

1. Unit Operations, Brown, G.G., CBS Publishers, 1995.
2. Introduction to Chemical Engineering, Badger, W.L. and J.T. Banchero, Tata McGraw-Hill, International Edition, 1997.
3. Mechanical Operations for Chemical Engineers, Narayanan, C.M., and Bhattacharya, Khanna Publishers, 1990.

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Chairperson

KVL
Prof. K. V. Rao
Member

Prof. Pulipati King
Member

I Year- II Semester

L	T	P	C
0	0	3	1.5

MECHANICAL UNIT OPERATIONS – LABORATORY

Learning Objectives:

The course will equip students with the practical knowledge of different mechanical unit operations & operational conditions of different equipment.

List of Experiments:

1. Screen Analysis
2. Ball mill
3. Cyclone separator.
4. Jaw-crusher
5. Gyratory Sieve-Shaker
6. Plate and frame filter press
7. Trommel screen.
8. Mineral Jig
9. Sedimentation apparatus
10. Froth floatation

Outcomes:

The students are able to:

- Develop knowledge on various mechanical separation operations used in a chemical and mineral process industries.
- Develop knowledge on estimation of particle size, power requirement and surface area for solid particles like coal etc.,
- Understand the processes of froth floatation and sedimentation.
- Study and verification of crushing and grinding laws.
- Design batch and continuous filters.
- Calculate and verify the efficiency, settling velocity, and average particle size of cyclone separator.

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Member

Prof. Pulipati King
Member

University College of Engineering Kakinada
Department of Petroleum Engineering & Petrochemical Engineering
R23 Course Structure

B.TECH. PETROLEUM ENGINEERING

B.Tech. – I Year I Semester (for Group-A Branches)

S.No.	Category	Title	L/D	T	P	Credits
1	BS&H	Communicative English	2	0	0	2
2	BS&H	Engineering Chemistry	3	0	0	3
3	BS&H	Linear Algebra & Calculus	3	0	0	3
4	Engineering Science	Basic Civil & Mechanical Engineering	3	0	0	3
5	Engineering Science	Introduction to Programming	3	0	0	3
6	BS&H	Communicative English Lab	0	0	2	1
7	BS&H	Engineering Chemistry Lab	0	0	2	1
8	Engineering Science	Engineering Workshop	0	0	3	1.5
9	Engineering Science	Computer Programming Lab	0	0	3	1.5
10	BS&H	Health and wellness, Yoga and Sports	-	-	1	0.5
		Total	**14**	**00**	**11**	**19.5**

B.Tech. – I Year II Semester (for Group-A Branches)

S.No.	Category	Title	L/D	T	P	Credits
1	BS&H	Engineering Physics	3	0	0	3
2	BS&H	Differential Equations & Vector Calculus	3	0	0	3
3	Engineering Science	Basic Electrical and Electronics Engineering	3	0	0	3
4	Engineering Science	Engineering Graphics	1	0	4	3
5	Engineering Science	IT Workshop	0	0	2	1
6	Professional Core	Petroleum Geology	3	0	0	3
7	BS&H	Engineering Physics Lab	0	0	2	1
8	Engineering Science	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	Professional Core	Petroleum Geology - Laboratory	0	0	3	1.5
10		NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
		Total	**13**	**00**	**15**	**20.5**

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Chairman

Prof. K. V. Rao
Member

Shri P. V. N. Rao
Member

University College of Engineering Kakinada
Department of Petroleum Engineering & Petrochemical Engineering
B. Tech. Petroleum Engineering Syllabus, R23 – Regulation

	L	T	P	C
I Year- II Semester	3	0	0	3

PETROLEUM GEOLOGY

Learning Objectives:
The students will be able to:

- Understand the basics of geology like Aging, formation of earth, layers of earth and different types of rocks, formation of various types of sedimentary basins for oil and gas accumulation.
- Learn the different geological environments relates to petroleum industry.
- Understand the different sources for hydrocarbons, reservoir and cap-rocks, characterization of reservoir rocks.
- Learn the classification of reservoir pore space, permeability, migration and entrapment, temperature-pressure conditions for the generation of oil and gas from sediments.

UNIT-I:
Origin of the earth and envelops of the earth: Different ages, crust, mantle, core-internal dynamics process-plate tectonics- continental drift, external dynamic process- weathering, erosion and deposition. Identification of different structural features encountered in oil exploration like joints, faults, folds, unconformities. Origin of igneous, sedimentary and metamorphic rocks. Structures and textures-petrographic character of conglomerate, sandstone, shale, limestone and dolomite.

UNIT-II:
Source rocks- Definition of source rocks, organic source rocks, nature and types of source rocks.
The process of diagenesis, catagenesis and metagenesis in the formation of source rocks, Kerogen- types, thermal maturation, sub-surface pressure temperature conditions for the generation of oil and gas from the source sediments – oil window.

UNIT-III:
Characteristics of Reservoir rocks: Classification and nomenclature: Clastic Reservoir Rocks, Carbonate Reservoir Rocks, Unconventional, Fractured and Miscellaneous reservoir rocks, Marine and non-marine reservoir rocks, Concept of Shale oil.
Reservoir Properties and Cap Rocks: Reservoir pore space, porosity- primary and secondary porosity, effective porosity, fracture porosity – permeability, saturation-effective and relative permeability relationship between porosity, permeability. Cap rocks: Definition and characteristics of cap rocks.

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UNIT-IV:

Hydrocarbon migration: Geological framework of migration and accumulation, the concept of hydrocarbon migration from source beds to the carrier beds, carrier beds to the reservoir.

Free path ways for migration: Short distance and long distance migration, Evidence for migration, Oil and gas seepages.

UNIT-V:

Entrapment and accumulation of hydrocarbons: Classification and types of traps, Structural, stratigraphic and combination type of traps, Traps associated with salt domes.

Sedimentary Basins: Introduction to sedimentary basins and deltaic systems, Sedimentary basins -origin and classification, Types of basins and their relationship to hydrocarbon prospects,

Tectonic classification, stratigraphic evolution and hydrocarbon accumulations of the following basins: Krishna-Godavari basin, Assam Arakan basin, Cambay basin and Mumbai off-shore.

Outcomes:

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

- Discern the dimension of the earth structure, composition, origin of the earth. It deals essence of scientific studies dealing with the origin, age, structure of the earth and with the evolution, modification, and extinction of various surface and subsurface physical features.
- Apply the concepts of igneous, sedimentary, metamorphic rocks to evaluate drilling operations.
- Identify different source rocks from which hydrocarbons are generated.
- Apply the concepts of formation of source rocks to identify the migration characteristics of hydrocarbons.
- Classify the sources of reservoir rocks, pore space, porosity and permeability.
- Gain knowledge of fluid hydrocarbons migration.
- Classify and evaluate the sedimentary basins in India.
- Evaluate and solve technical problems related to the exploration and production of hydrocarbon reservoirs.

Text Book:

1. Geology of Petroleum, A.I. Levorsen, 2nd Edition. CBS, Publishers, 2006.

Reference Books:

1. Elements of Petroleum Geology, Richard, C. Selley, Elsevier, 1997.
2. Sedimentary basins of India- ONGC bulletin.
3. Unconventional Petroleum Geology, Caineng Zou et al., Elsevier, 2013.

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I Year- II Semester	L	T	P	C
	0	0	3	1.5

PETROLEUM GEOLOGY – LABORATORY

Learning Objectives:

The students will be able to:

- Distinguish between sandstone, carbonate and shale rocks.
- Differentiate source rocks and the reservoir rocks.
- Identify location of outcrop on the topo-sheet.
- Learn the locational geological mapping and traversing.
- Measure strike and dip.
- Learn the importance of litho-stratigraphic columns and plotting geological cross sections.
- Determine the location of gas-oil-water contacts in the reservoir.

List of Experiments:

1. Identifying the distinction between different rocks: sandstone, carbonate and shale rocks.
2. Rock sampling (Field/lab visits)
3. Location of observed outcrop on the Topo-sheet. Locational Geological mapping and traversing.
4. Measurement of the strike, dip along for the calculation of apparent and true thickness of outcrops.
5. Preparation of correlations for litho stratigraphic columns and estimation of geological cross section.
6. Preparation of structural contour map and location of gas-oil-water contacts.
7. Identification of various hydrocarbon traps.
8. Mapping of contour lines/ iso-lines for different geological structures.
9. Correlation of SP and ɣ- ray data for well lithology.
10. Mapping of the petroleum migration system.
11. Identifying source rock parameters.

Outcomes:

The students will be able to:

- Assess the differences between various rocks.
- Identify the various hydrocarbon traps.
- Plot the litho stratigraphic column graphically and estimate the geological cross-section.
- Correlate the SP and Gamma ray data for well mapping.

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Chairman	Member	Member

- Plot contour lines for interpretation of a geological structure.
- Calculate the source rock parameters.
- Map the petroleum migration systems.
- Confirm the thickness of the oil/gas zone.
- Use the maps to estimate reservoir area and thickness.

Text Book:

1. Geology of Petroleum, A.I. Levorsen, 2nd Edition. CBS; Publishers, 2006.

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UNIVERSITY COLLEGE OF ENGINEERING KAKINADA (AUTONOMOUS) :: JNTUK,KAKINADA
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

I B.Tech

COURSE CODE – R2011XXYY	ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP (Common to CE, ME, ECE CSE, AIML PE, CHE (Except EEE))	CATEGORY BSC	L-T-P 0-0-3	CREDITS 1.5

Course Outcomes: At the end of the course, student will be able to

		Knowledge Level (K)#
CO1	Measure and verify voltage, current and power in an electric circuit	2
CO2	Illustrate the Open Circuit Characteristics of DC generator.	3
CO3	Choose and assemble various wiring schemes, calculate electrical energy and measure earth resistance for domestic premises	3
CO4	**Collect from the ECE department**	
CO5	**Collect from the ECE department**	

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

(Please fill the above with Levels of Correlation, viz., L, M, H)

Note: Minimum Six Experiments to be performed from each part

PART A: ELECTRICAL ENGINEERING LAB

S. No.	List of Experiments	Contact Hours
1.	Verification of KCL and KVL	
2.	Measurement of voltage, current, power in DC circuit	
3.	Measurement of voltage, current, power, power factor in AC circuit	
4.	Open Circuit Characteristics of DC generator	
5.	Measurement of earth resistance	
6.	Calculation of Electrical Energy for Domestic Premises	
7.	Hospital wiring	
8.	Wiring of backup power supply for domestic installations including inverter, battery and load.	

Dr. R. Srinivasa Rao (Member)	Dr. K. Venkata Reddy (Member)	Dr. M. Nageswara Rao (Member)	Dr. Ch.V.V.S. Bhaskar Reddy (Member)	Dr. K. Ravindra (Chairman)
			Attended Online	

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PART B: ELECTRONICS ENGINEERING LAB

Collect syllabus from the ECE department

S. No.	List of Experiments	Contact Hours
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Dr. R. Srinivasa Rao (Member)	Dr. K. Venkata Reddy (Member)	Dr. M. Nageswara Rao (Member)	Dr. Ch.V.V.S. Bhaskar Reddy (Member)	Dr. K. Ravindra (Chairman)
			Attended online.	