JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India
SYLLABUS R13
ELECTRICAL & ELECTRONICS ENGINEERING

I Year – I SEMESTER

T	P	C
3+1	0	3

ENGLISH –I

DETAILED TEXT-I English Essentials : Recommended Topics :

1. **IN LONDON: M.K.GANDHI**
   OBJECTIVE: To apprise the learner how Gandhi spent a period of three years in London as a student.
   OUTCOME: The learner will understand how Gandhi grew in introspection and maturity.

2. **THE KNOWLEDGE SOCIETY- APJ KALAM**
   OBJECTIVE: To make the learners rediscover India as a land of Knowledge.
   OUTCOME: The learners will achieve a higher quality of life, strength and sovereignty of a developed nation.

3. **THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE**
   OBJECTIVE: This essay discusses how scientific point of view seeks to arrive at the truth without being biased by emotion.
   OUTCOME: This develops in the student the scientific attitude to solve many problems which we find difficult to tackle.

4. **PRINCIPLES OF GOOD WRITING:**
   OBJECTIVE: To inform the learners how to write clearly and logically.
   OUTCOME: The learner will be able to think clearly and logically and write clearly and logically.

5. **MAN'S PERIL**
   OBJECTIVE: To inform the learner that all men are in peril.
   OUTCOME: The learner will understand that all men can come together and avert the peril.

6. **THE DYING SUN—SIR JAMES JEANS**
   OBJECTIVE: This excerpt from the book "The Mysterious Universe" presents the mysterious nature of the Universe and the stars which present numerous problems to the scientific mind. Sir James Jeans uses a poetic approach to discuss the scientific phenomena.
   OUTCOME: This provides the students to think about the scientific phenomena from a different angle and also exposes the readers to poetic expressions.

7. **LUCK—MARK TWAIN**
   OBJECTIVE: This is a short story about a man's public image and his true nature. The theme of the story is that luck can be a factor of life, so that even if one is incompetent but lucky, one can still succeed.
   OUTCOME: The story is humourous in that it contains a lot of irony. Thus this develops in the learner understand humourous texts and use of words for irony.

Text Book : 'English Essentials' by Ravindra Publications

NON-DETAILED TEXT:

(From Modern Trailblazers of Orient Blackswan)
(Common single Text book for two semesters)
(Semester I (1 to 4 lessons)/ Semester II (5 to 8 lessons)

1. **G.D.Naidu**
   OBJECTIVE: To inspire the learners by G.D.Naidu's example of inventions and contributions.
   OUTCOME: The learner will be in a position to emulate G.D.Naidu and take to practical applications.

2. **G.R.Gopinath**
   OBJECTIVE: To inspire the learners by his example of inventions.
   OUTCOME: Like G.R.Gopinath, the learners will be able to achieve much at a low cost and help the common man.

3. **Sudhamurthy**
   OBJECTIVE: To inspire the learners by the unique interests and contributions of Sudha Murthy.
   OUTCOME: The learner will take interest in multiple fields of knowledge and make life worthwhile through social service.

4. **Vijay Bhatkar**
   OBJECTIVE: To inspire the learner by his work and studies in different fields of engineering and science.
   OUTCOME: The learner will emulate him and produce memorable things.

Text Book : 'Trail Blazers' by Orient Black Swan Pvt. Ltd. Publishers

I Year – I SEMESTER

T	P	C
3+1	0	3

MATHEMATICS – I (DIFFERENTIAL EQUATIONS)

UNIT I: Differential equations of first order and first degree:
Linear-Bernoulli-Exact-Reducible to exact.
Applications : Newton's Law of cooling-Law of natural growth and decay-orthogonal trajectories.
Subject Category
ABET Learning Objectives   a d e
ABET internal assessments   1 2 6
JNTUK External Evaluation   A B E

UNIT II: Linear differential equations of higher order:
Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e^{ax}, Sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x).
Applications: LCR circuit, Simple Harmonic motion
Subject Category
ABET Learning Objectives   a d e
ABET internal assessments   1 2 6
JNTUK External Evaluation   A B E

UNIT III Laplace transforms:
Laplace transforms of standard functions-ShiftingTheorems, Transforms of derivatives and integrals – Unit step function –Dirac's delta function- Inverse Laplace transforms– Convolution theorem (with out proof).
Application: Solutions of ordinary differential equations using Laplace transforms.
Subject Category
ABET Learning Objectives   a e
ABET internal assessments   1 2 6
JNTUK External Evaluation   A B E

UNIT IV Partial differentiation:
Introduction- Total derivative-Chain rule-Generalized Mean Value theorem for single variable (without proof)-Taylors and Mc Laurent's series for two variables– Functional dependence-Jacobian.
Applications: Maxima and Minima of functions of two variables with constraints and without constraints.
Subject Category
ABET Learning Objectives   a c e
ABET internal assessments   1 2 6
JNTUK External Evaluation   A B E

UNIT V First order Partial differential equations:
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations
Subject Category
ABET Learning Objectives   a e

ABET internal assessments   1 2 6
JNTUK External Evaluation A B E

UNIT VI Higher order Partial differential equations:
Solutions of Linear Partial differential equations with constant coefficients- Method of separation of Variables
Applications: One- dimensional Wave, Heat equations - two-dimensional Laplace Equation.
Subject Category
ABET Learning Objectives   a e
ABET internal assessments   1 2 6
JNTUK External Evaluation B E

Books:
1. **B.S.GREWAL,** Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India
3. **GREENBERG,** Advanced Engineering Mathematics, 2nd edition, Pearson edn
4. **DEAN G. DUFFY,** Advanced engineering mathematics with MATLAB, CRC Press
5. **PETER O'NEIL,** advanced Engineering Mathematics, Cengage Learning.

Subject Category	ABET Learning Objectives	ABET Internal Assessments	JNTUK External Evaluation	Remarks
Theory Design Analysis Algorithms Drawing Others	a) Apply knowledge of math, science, & engineering b) Design & conduct experiments, analyze & interpret data c) Design a system/process to meet desired needs within economic, social, political, ethical, health/safety, manufacturability, & sustainability constraints d) Function on multidisciplinary teams e) Identify, formulate, & solve engineering problems f) Understand professional & ethical responsibilities g) Communicate effectively h) Understand impact of engineering solutions in global, economic, environmental, & societal context i) Recognize need for & be able to engage in lifelong learning j) Know contemporary issues k) Use techniques, skills, modern tools for engineering practices	1. Objective tests 2. Essay questions tests 3. Peer tutoring based 4. Simulation based 5. Design oriented 6. Problem based 7. Experiential (project based) based 8. Lab work or field work based 9. Presentation based 10. Case Studies based 11. Role-play based 12. Portfolio based	a. Questions should have: b. Definitions, Principle of operation or philosophy of concept. c. Mathematical treatment, derivations, analysis, synthesis, numerical problems with inference. d. Design oriented problems e. Trouble shooting type of questions f. Applications related questions g. Brain storming questions	

I Year – II SEMESTER

T	P	C
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MATHEMATICS – II (LINEAR ALGEBRA & VECTOR CALCULUS)

UNIT I Linear systems of equations:
Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- Gauss Elimination - Gauss Jordon and Gauss Seidal Methods.
Application: Finding the current in a electrical circuit.
Subject Category
ABET Learning Objectives   a e k
ABET internal assessments   1 2 6 4
JNTUK External Evaluation A B E

UNIT II Eigen values - Eigen vectors and Quadratic forms:
Eigen values - Eigen vectors– Properties – Cayley-Hamilton Theorem - Inverse and powers of a matrix by using Cayley-Hamilton theorem- Quadratic forms- Reduction of quadratic form to canonical form – Rank - Positive, negative definite - semi definite - index – signature.
Application: Free vibration of a two-mass system.
Subject Category
ABET Learning Objectives   a d e k
ABET internal assessments   1 2 4 6
JNTUK External Evaluation A B E

UNIT III Multiple integrals:
Review concepts of Curve tracing (Cartesian - Polar and Parametric curves)-
Applications of Integration to Lengths, Volumes and Surface areas of revolution in Cartesian and Polar Coordinates.
Multiple integrals - double and triple integrals – change of variables – Change of order of Integration
Application: Moments of inertia
Subject Category
ABET Learning Objectives   a e d
ABET internal assessments   1 2 6
JNTUK External Evaluation A B E

UNIT IV Special functions:
Beta and Gamma functions- Properties - Relation between Beta and Gamma functions- Evaluation of improper integrals
Application: Evaluation of integrals
Subject Category
ABET Learning Objectives   a e
ABET internal assessments   1 2 6
JNTUK External Evaluation A B E

UNIT V Vector Differentiation:
Gradient- Divergence- Curl - Laplacian and second order operators -Vector identities
Application: Equation of continuity, potential surfaces
Subject Category

ABET Learning Objectives   a e
ABET internal assessments   1 2 6
JNTUK External Evaluation A B E
UNIT VI Vector Integration:
Line integral – work done – Potential function – area- surface and volume integrals Vector integral trheorems: Greens, Stokes and Gauss Divergence Theorems (Without proof) and related problems.
application: work done, Force
Subject Category
ABET Learning Objectives   a e
ABET internal assessments   1 2 6
JNTUK External Evaluation A B E
BOOKS:
1. **GREENBERG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India
2. **B.V. RAMANA,** Higher Engineering Mathematics, Tata McGrawhill
3. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India
4. **PETER O'NEIL,** Advanced Engineering Mathematics, Cengage Learning
5. **D.W. JORDAN AND T. SMITH,** Mathematical Techniques, Oxford University Press

Subject Category	ABET Learning Objectives	ABET Internal Assessments	JNTUK External Evaluation	Remarks
Theory Design Analysis Algorithms Drawing Others	l) Apply knowledge of math, science, & engineering m) Design & conduct experiments, analyze & interpret data n) Design a system/process to meet desired needs within economic, social, political, ethical, health/safety, manufacturability, & sustainability constraints o) Function on multidisciplinary teams p) Identify, formulate, & solve engineering problems q) Understand professional & ethical responsibilities r) Communicate effectively s) Understand impact of engineering solutions in global, economic, environmental, & societal context t) Recognize need for & be able to engage in lifelong learning u) Know contemporary issues v) Use techniques, skills, modern tools for engineering practices	13. Objective tests 14. Essay questions tests 15. Peer tutoring based 16. Simulation based 17. Design oriented 18. Problem based 19. Experiential (project based) based 20. Lab work or field work based 21. Presentation based 22. Case Studies based 23. Role-play based 24. Portfolio based	h. Questions should have: i. Definitions, Principle of operation or philosophy of concept. j. Mathematical treatment, derivations, analysis, synthesis, numerical problems with inference. k. Design oriented problems l. Trouble shooting type of questions m. Applications related questions n. Brain storming questions	

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ENGINEERING PHYSICS

UNIT-1
PHYSICAL OPTICS FOR INSTRUMENTS
"Objective Designing an instrument and enhancing the resolution for its operation would be effect as achieved through study of applicational aspects of physical Optics"

INTERFACE : Introduction – Interference in thin films by reflection – Newton's rings.
DIFFRECTION : Introduction – Fraunhofer diffraction - Fraunhofer diffraction at double slit (qualitative) – Diffraction grating – Grating spectrum – Resolving power of a grating – Rayleigh's criterion for resolving power.
POLARIZATION : Introduction – Types of Polarization – Double refraction – Quarter wave plate ad Half Wave plate.

UNIT-II
COHERENT OPTICS – COMMUNICATIONS AND STRUCTURE OF MATERIALS
Objectives while lasers are trusted Non-linear coherent sources establishing for the fitness of instrumentation, establishing a structure property relationship for materials requires allotment of an equivalent footing in convening the physics knowledge base.
LASERS: Introduction – coherent sources – Characteristics of lasers – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Three and Four level pumping schemes – Ruby laser – Helium Neon laser.
CRYSTALLOGRAPHY : Introduction – Space lattice – Basis – Unit Cell – Lattice parameters – Bravais lattices – Crystal systems – Structures and packing fractions of SC,BCC and FCC
X-RAY DIFRACTION TECHNIQUES : Directions and planes in crystals – Miller indices – Separation between successive (h k l) planes – Bragg's law.

UNIT-III
MAGNETIC, ELECTRIC FIELD RESPONSE OF MATERIALS & SUPERCONDUCTIVITY
"Objective many of the Electrical or Electronic gadgets are designed basing on the response of naturally abundant and artificially made materials, while their response to E- or H- fields controls their performance.
MAGNETIC PROPERTIES : Magnetic permeability – Magnetization – Organ or magnetic moment – Classification of Magnetic materials – Dir, para, Ferro, anti feffo and ferri-magnetism – Hysteresis curve
DIELECTRIC PROPERTIES : Introduction – Dielectric constant – Electronic, ionic and orientational polarization – internal fields – Clausius – Mossotti equation – Dielectric loss, Breakdown and Strength.
SUPERCONDUCTIVITY : General properties – Meissner effect – Type I and Type II superconductors – BCS Theory Flux quantization London's equations – Penetration depth – DC and AC Josephson effects – SQUIDS.

UNIT – IV
ACQUSTICS AND EM – FIELDS:
Objective: The utility and nuances of ever pervading SHM and its consequences would be the first hand-on to as it clearly conveyed through the detailed studies of Acoustics of Buildings, while vectorial concepts of EM fields paves the student to gear – up for a deeper understanding.
ACQUSTICS: Sound absorption, absorption coefficient and its measurements, Reverberations time – Sabine's formula, Eyring's formula.

ELECTRO-MAGENTIC FIELDS: Gauss and stokes theorems (qualitative) – Fundamental laws of electromagnetism – Maxwell's Electromagnetic Equations (Calculus approach).

UNIT – V
QUANTUM MECHANICS FOR ELECTRONIC TRANSPORT
Objective: The discrepancy between classical estimates and laboratory observations of physical properties exhibited by materials would be lifted out through the understanding quantum picture of sub-atomic world dominated by electron and its presence.
QUANTUM MECHANICS: Introduction to matter waves – Schrodinger Time Independent and Time Dependent wave equations – Particle in a box.
FREE ELECTRON THEORY: Classical free electron theory – electrical conductivity – Mean free path – Relaxation time and drifty velocity – Quantum free electron theory – Fermi – Dirac (analytical) and its dependence on temperature – Fermi energy – density of states – derivations for current density.
BAND THEORY OF SOLIDS: Bloch theorem (qualitative) – Kronig – Penney model – Origin of energy band formation in solids – Classification of materials into conductors, semi – conductors & insulators – Concepts of effective mass of electron - concept of hole.

UNIT – VI
SEMICONDUCTOR PHYSICS:
Objective: In the wake of ever increasing demand for the space and power the watch word "small is beautiful", understanding the physics of electronic transport as underlying mechanism for appliances would provide a knowledge base.
Introduction – Intrinsic semiconductor and carrier concentration – Equation for conductivity – Extrinsic semiconductor and carrier concentration – Drift and diffusion – Einstein's equation – Hall Effect – direct & indirect band gap semiconductors – Electronic transport Mechanism for LEDs, Photo conductors and solar cells.

TEXT BOOKS
1. Solid state Physics by A.J. Dekker (Mc Millan India Ltd)
2. A text book of Engineering Physics by M.N. Avadhanulu & P.G. Kshirasagar (S. Chand publications)
3. Engineering Physics b;y M.R. Srinivasan (New Age international publishers)

REFERENCE BOOKS
1. 'Introduction to solid state physics' by Charles Kittle (Willey India Pvt.Ltd)
2. 'Applied Physics' by T. Bhimasenkaram (BSP BH Publications)
3. 'Applied Physics' by M.Arumugam (Anuradha Agencies)
4. 'Engineering Physics' by Palanisamy (Scitech   Publishers)
5. 'Engineering Physics' by D.K.Bhattacharya (Oxford University press)
6. 'Engineering Physics' by Mani Naidu S (Pearson Publications)
7. 'Engineering Physics' by Sanjay D Jain and Girish G Sahasrabudhe (University Press)
8. 'Engineering Physics' by B.K.Pandey & S. Chaturvedi (Cengage Learning)

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Professional Ethics and Human Values

UNIT I : Human Values:
Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty –Courage – Value time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT II : Engineering Ethics:
The History of Ethics-Purposes for Engineering Ethics-Engineering Ethics-Consensus and Controversy –Professional and Professionalism –Professional Roles to be played by an Engineer –Self Interest, Customs and Religion-Uses of Ethical Theories-Professional Ethics-Types of Inquiry – Engineering and Ethics-Kohlberg's Theory – Gilligan's Argument –Heinz's Dilemma.

UNIT III : Engineering as Social Experimentation:
Comparison with Standard Experiments – Knowledge gained – Conscientiousness – Relevant Information – Learning from the Past – Engineers as Managers, Consultants, and Leaders – Accountability – Role of Codes – Codes and Experimental Nature of Engineering.

UNIT IV : Engineers' Responsibility for Safety and Risk:
Safety and Risk, Concept of Safety – Types of Risks – Voluntary v/s Involuntary Risk- Short term v/s Long term Consequences- Expected Probability- Reversible Effects- Threshold Levels for Risk- Delayed v/s Immediate Risk- Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT V : Engineers' Responsibilities and Rights:
Collegiality-Techniques for Achieving Collegiality –Two Senses of Loyalty-obligations of Loyalty-misguided Loyalty – professionalism and Loyalty- Professional Rights –Professional Responsibilities – confidential and proprietary information-Conflict of Interest-solving conflict problems – Self-interest, Customs and Religion- Ethical egoism-Collective bargaining-Confidentiality-Acceptance of Bribes/Gifts-when is a Gift and a Bribe-examples of Gifts v/s Bribes-problem solving-interests in other companies-Occupational Crimes-industrial espionage-price fixing-endangering lives- Whistle Blowing-types of whistle blowing-when should it be attempted-preventing whistle blowing.

UNIT VI : Global Issues:
Globalization- Cross-culture Issues-Environmental Ethics-Computer Ethics-computers as the instrument of Unethical behaviour-computers as the object of Unethical Acts-autonomous computers-computer codes of Ethics-Weapons Development-Ethics and Research-Analysing Ethical Problems in Research-Intellectual Property Rights.

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Text Books:

1. "Engineering Ethics includes Human Values" by M.Govindarajan,   S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009

2. "Professional Ethics and Morals" by Prof.A.R.Aryasri, Dharanikota Suyodhana-Maruthi Publications

3. "Professional Ethics and Human Values" by A.Alavudeen, R.Kalil Rahman and M.Jayakumaran- Laxmi Publications

4. "Professional Ethics and Human Values" by Prof.D.R.Kiran-

5. "Indian Culture, Values and Professional Ethics" by PSR Murthy-BS Publication

6. "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger – Tata McGraw-Hill – 2003.

7. "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.

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ENIGINEERING DRAWING

Objective: Engineering drawing being the principle method of communication for engineers, the objective to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

UNIT I
Objective: The objective is to introduce the use and the application of drawing instruments and to make the students construct the polygons, curves and various types of scales. The student will be able to understand the need to enlarge or reduce the size of objects in representing them.
Polygons, Construction of regular polygons using given length of a side; Ellipse, arcs of circles and Oblong methods; Scales – Vernier and Diagonal scales.

UNIT II
Objective: The objective is to introduce orthographic projections and to project the points and lines parallel to one plane and inclined to other.
Introduction to orthographic projections; projections of points; projections of straight lines parallel to both the planes; projections of straight lines – parallel to one plane and inclined to the other plane.

UNIT III
Objective: The objective is to make the students draw the projections of the lines inclined to both the planes.
Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

UNIT IV
Objective: The objective is to make the students draw the projections of the plane inclined to both the planes.
Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT V
Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.
Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT VI
Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

TEXT BOOKS:
1. Engineering Drawing by N.D. Butt, Chariot Publications
2. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers.
3. Engineering Graphics by PI Varghese, McGrawHill Publishers

REFERENCE BOOKS:
1. Engineering Graphics for Degree by K.C. John, PHI Publishers
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers
3. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

LEARNING ASSESSMENT
Distribution and weightage of Marks for all Design / Drawing subjects:
The Assessment of a student's performance shall be evaluated as suggested below:
For the subject having design and / or drawing, (such as Engineering Drawing, Machine Drawing), the distribution shall be 30 marks for internal evaluation and 70 marks for end semester examination. There shall be two internal tests in a Semester and the best of the two shall be considered for the award of marks for internal tests.
1. Out of 30 internal marks, the marks shall be awarded as follows:
   - Day to day work 20
   - 10 marks to be awarded by conducting an internal mid examination.
2. The external examination shall be conducted for 70 marks.
   a) For subject like engineering drawing   the pattern of external examination shall be similar to theory examination.
   b) For subjects like Machine Drawing, external examination pattern shall be as mentioned below:
      - Part-I: Should contain 3 questions out of which 2 must be answered for 20 marks.
      - Part-II: Assembly drawing should contain 50 marks which is compulsory.

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T	P	C
0	3	2

ENGLISH – COMMUNICATION SKILLS LAB – I

Suggested Lab Manuals:

OBJECTIVE: To impart to the learner the skills of grammar as well as communication through listening, speaking, reading, and writing including soft, that is life skills.

BASIC COMMUNICATION SKILLS

UNIT 1   A. Greeting and Introductions
            B. Pure Vowels
UNIT 2   A. Asking for information and Requests
            B. Diphthongs
UNIT 3   A. Invitations
            B. Consonants
UNIT 4   A. Commands and Instructions
            B. Accent and Rhythm
UNIT 5   A. Suggestions and Opinions
            B. Intonation

Text Book:

'Strengthen your Communication Skills'   Part-A by Maruthi Publications

Reference Books:

1. INFOTECH English (Maruthi Publications)
2. Personality Development and Soft Skills (Oxford University Press, New Delhi)

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ENGINEERING PHYSICS LAB

List of Experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence
2. Newton's rings –Radius of Curvature of Plano_Convex Lens.
3. Determination of thickness of a thin object using parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of stretched string – Sonometer.
8. Determination of velocity of sound – Volume resonator.
9. L C R Senes Resonance Circuit
10. Study of I/V Characteristics of Semiconductor diode
11. I/V characteristics of Zener diode
12. Thermistor characteristics – Temperature Coefficient
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
14. Energy Band gap of a Semiconductor p.n junction.
15. Hall Effect for semiconductor.

REFERENCE:
1. Engineering Physics Lab Manual by Dr.Y. Aparna & Dr.K.Venkateswarao (V.G.S.Book links)
2. Physics Practical Manual, Lorven Publication

I Year – I SEMESTER

T	P	C
0	3	2

ENIGINEERING WORKSHOP & IT WORKSHOP

ENIGINEERING WORKSHOP:
Course Objective: To impart hands-on practice on basic engineering trades and skills.
Note: At least two exercises to be done from each trade.

Trade:

Carpentry	1. T-Lap Joint
	2. Cross Lap Joint
	3. Dovetail Joint
	4. Mortise and Tennon Joint
Fitting	1. Vee Fit
	2. Square Fit
	3. Half Round Fit
	4. Dovetail Fit
Black Smithy	1. Round rod to Square
	2. S-Hook
	3. Round Rod to Flat Ring
	4. Round Rod to Square headed bolt
House Wiring	1. Parallel / Series Connection of three bulbs
	2. Stair Case wiring
	3. Florescent Lamp Fitting
	4. Measurement of Earth Resistance
Tin Smithy	1. Taper Tray
	2. Square Box without lid
	3. Open Scoop
	4. Funnel

LEARNING ASSESSMENT
Distribution and weightage of Marks for all Practical Subjects:
The Assessment of a student's performance shall be evaluated as suggested below:
For practical subjects there shall be continuous evaluation during the semester for 25 internal marks and 50 marks for end semester examination.
1. Out of 25 internal marks, 15 marks shall be awarded as follows:
   - Day to day work 10
   - Record-5 and
   - 10 marks to be awarded by conducting an internal laboratory test
2. The external examination shall be conducted for 50 marks and shall be   awarded as follows:
   - Procedure for conducting the experiment – 10 marks
   - Viva-voce – 10 marks
   - Calculation and result – 30 marks

IT WORKSHOP:

Objectives: Enabling the student to understand basic hardware and software tools through practical exposure

PC Hardware:
Identification of basic peripherals, assembling a PC, installation of system software like MS Windows, device drivers. Troubleshooting Hardware and software _ some tips and tricks.

Internet & World Wide Web:
Different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet, web browsers, email, newsgroups and discussion forums .Awareness of cyber hygiene(protecting the personal computer from getting infected with the viruses), worms and other cyber attacks .

Productivity tools Crafting professional word documents; excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools

(Note: Student should be thoroughly exposed to minimum of 12 Tasks)

PC Hardware

Task 1: Identification of the peripherals of a computer.
To prepare a report containing the block diagram of the CPU along with the configuration of each peripheral and its functions. Description of various I/O Devices

Task 2(Optional) : A practice on disassembling the components of a PC and assembling them to back to working condition.

Task 3: Examples of Operating systems- DOS, MS Windows, Installation of MS windows on a PC.

Task 4: Introduction to Memory and Storage Devices , I/O Port, Device Drivers, Assemblers, Compilers, Interpreters , Linkers, Loaders.

Task 5:

Hardware Troubleshooting (Demonstration):
Identification of a problem and fixing a defective PC(improper assembly or defective peripherals).

Software Troubleshooting (Demonstration):. Identification of a problem and fixing the PC for any software issues

Internet & Networking Infrastructure

Task 6: Demonstrating Importance of Networking, Transmission Media, Networking Devices- Gateway, Routers, Hub, Bridge, NIC ,Bluetooth Technology, Wireless Technology, Modem, DSL, Dialup Connection.

Orientation & Connectivity Boot Camp and web browsing: Students are trained to configure the network settings to connect to the Internet. They are trained to demonstrate the same through web browsing (including all tool bar options) and email access.

Task 7: **Search Engines & Netiquette:**

Students are enabled to use search engines for simple search, academic search and any other context based search (Bing, Google etc). Students are acquainted to the principles of micro-blogging, wiki, collaboration using social networks, participating in online technology forums
Task 8: Cyber Hygiene (Demonstration): Awareness of various threats on the internet. Importance of security patch updates and anti-virus solutions. Ethical Hacking, Firewalls, Multi-factor authentication techniques including Smartcard, Biometrics are also practiced

Word

Task 9 : MS Word Orientation:
 Accessing, overview of toolbars, saving files, Using help and resources, rulers, formatting ,Drop Cap , Applying Text effects, Using Character Spacing, OLE in Word, using templates, Borders and Colors, Inserting Header and Footer, Using Date and Time option, security features in word, converting documents while saving
Task 10: 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, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.

Excel

Task 11: Using spread sheet features of EXCEL including the macros, formulae, pivot tables, graphical representations
Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

LOOKUP/VLOOKUP

Task 12: Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

Power Point

Task 13: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting –Images, Clip Art, Tables and Charts in Powerpoint.

Task 14: Focusing on the power and potential of Microsoft power point. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides, OLE in PPT.

TEXT BOOK:

Faculty to consolidate the workshop manuals using the following references
1. Computer Fundamentals, Anita Goel, Pearson
2. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson,2008
3. Information Technology Workshop,3e, G Praveen Babu, M V Narayana BS Publications.
4. Comdex Information Technology , Vikas Gupta, dreamtech.

REFERENCE BOOK:
1. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N.B. Venkateswarlu

I Year – II SEMESTER

T	P	C
3+1	0	3

ENGLISH –II

DETAILED TEXT-II : Sure Outcomes: English for Engineers and Technologists
Recommended Topics :
1. **TECHNOLGY WITH A HUMAN FACE**
   OBJECTIVE: To make the learner understand how modern life has been shaped by technology.
   OUTCOME: The proposed technology is people's technology. It serves the human person instead of making him the servant of machines.
2. **CLIMATE CHANGE AND HUMAN STRATEGY**
   OBJECTIVE: To make the learner understand how the unequal heating of earth's surface by the Sun, an atmospheric circulation pattern is developed and maintained.
   OUTCOME: The learner's understand that climate must be preserved.
3. **EMRGING TECHNOLOGIES**
   OBJECTIVE: To introduce the technologies of the 20th century and 21st centuries to the learners.
   OUTCOME: The learner will adopt the applications of modern technologies such as nanotechnology.
4. **WATER- THE ELIXIR OF LIFE**
   OBJECTIVE: To inform the learner of the various advantages and characteristics of water.
   OUTCOME: The learners will understand that water is the elixir of life.
5. **THE SECRET OF WORK**
   OBJECTIVE:**:** In this lesson, Swami Vivekananda highlights the importance of work for any development.
   OUTCOME: The students will learn to work hard with devotion and dedication.
6. **WORK BRINGS SOLACE**
   OBJECTIVE: In this lesson Abdul Kalam highlights the advantage of work.
   OUTCOME: The students will understand the advantages of work. They will overcome their personal problems and address themselves to national and other problems.

Text Book : 'Sure Outcomes' by Orient Black Swan Pvt. Ltd. Publishers

NON-DETAILED TEXT:

(From Modern Trailblazers of Orient Blackswan)
(Common single Text book for two semesters)
(Semester I (1 to 4 lessons)/ Semester II (5 to 8 lessons)
5. **J.C. Bose**
   OBJECTIVE: To apprise of J.C.Bose's original contributions.
   OUTCOME: The learner will be inspired by Bose's achievements so that he may start his own original work.
6. **Homi Jehangir Bhaba**
   OBJECTIVE: To show Bhabha as the originator of nuclear experiments in India.

OUTCOME: The learner will be inspired by Bhabha's achievements so as to make his own experiments.

7. **Vikram Sarabhai**
OBJECTIVE: To inform the learner of the pioneering experiments conducted by Sarabhai in nuclear energy and relevance of space programmes.
OUTCOME: The learner will realize that development is impossible without scientific research.

8. **A Shadow- R.K.Narayan**
OBJECTIVE: To expose the reader to the pleasure of the humorous story
OUTCOME: The learner will be in a position to appreciate the art of writing a short story and try his hand at it.

Text Book : 'Trail Blazers' by Orient Black Swan Pvt. Ltd. Publishers

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India
SYLLABUS R13
ELECTRICAL & ELECTRONICS ENGINEERING

I Year – II SEMESTER

T	**P**	**C**
3+1	**0**	**3**

MATHEMATICS – III (MATHEMATICAL METHODS)
Numerical Methods and Integral Transforms

UNIT I Solution of Algebraic and Transcendental Equations:
Introduction- Bisection Method – Method of False Position – Iteration Method – Newton-Raphson Method.
Subject Category
ABET Learning Objectives   a e k
ABET internal assessments   1 2 4 6
JNTUK External Evaluation A B E

UNIT II Interpolation:
Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols- Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unevenly spaced points - Lagrange's Interpolation formula
Subject Category
ABET Learning Objectives   a e
ABET internal assessments   1 2 4 6
JNTUK External Evaluation A B E

UNIT III Numerical solution of Ordinary Differential equations:
Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods
Subject Category
ABET Learning Objectives   a e
ABET internal assessments   1 2 4 6
JNTUK External Evaluation A B E

UNIT IV Fourier Series:
Introduction- Determination of Fourier coefficients – even and odd functions –change of interval– Half-range sine and cosine series
application: Amplitude, spectrum of a periodic function
Subject Category
ABET Learning Objectives   a e d
ABET internal assessments   1 2 6
JNTUK External Evaluation A B E

UNIT V Fourier Transforms:
Fourier integral theorem (only statement) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms
Subject Category
ABET Learning Objectives   a d e k
ABET internal assessments   1 2 6
JNTUK External Evaluation A B E

UNIT VI Z-transform:

Introduction– properties – Damping rule – Shifting rule – Initial and final value theorems - Inverse z transform- -Convolution theorem – Solution of difference equation by Z -transforms.

Subject Category
ABET Learning Objectives   a b e k
ABET internal assessments   1 2 6
JNTUK External Evaluation   A B E

 BOOKS:
1. **B.S. GREWAL,** Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. **DEAN G. DUFFY,** Advanced Engineering Mathematics with MATLAB, CRC Press
3. **V.RAVINDRANATH and   P. VIJAYALAXMI,** Mathematical Methods, Himalaya Publishing House
4. **ERWYN KREYSZIG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India

Subject Category	ABET Learning Objectives	ABET Internal Assessments	JNTUK External Evaluation	Remarks
Theory Design Analysis Algorithms Drawing Others	w) Apply knowledge of math, science, & engineering x) Design & conduct experiments, analyze & interpret data y) Design a system/process to meet desired needs within economic, social, political, ethical, health/safety, manufacturability, & sustainability constraints z) Function on multidisciplinary teams aa)Identify, formulate, & solve engineering problems bb) Understand professional & ethical responsibilities cc)Communicate effectively dd) Understand impact of engineering solutions in global, economic, environmental, & societal context ee)Recognize need for & be able to engage in lifelong learning ff) Know contemporary issues gg) Use techniques, skills, modern tools for engineering practices	25. Objective tests 26. Essay questions tests 27. Peer tutoring based 28. Simulation based 29. Design oriented 30. Problem based 31. Experiential (project based) based 32. Lab work or field work based 33. Presentation based 34. Case Studies based 35. Role-play based 36. Portfolio based	o. Questions should have: p. Definitions, Principle of operation or philosophy of concept. q. Mathematical treatment, derivations, analysis, synthesis, numerical problems with inference. r. Design oriented problems s. Trouble shooting type of questions t. Applications related questions u. Brain storming questions	

	T	**P**	**C**
I Year – II SEMESTER	**3+1**	**0**	**3**

ENGINEERING CHEMISTRY

UNIT-1: WATER TECHNOLOGY
Hard Water – Estimation of hardness by EDTA method – Potable water- Sterilization and Disinfection – Boiler feed water – Boiler troubles – Printing and foaming , scale formation, corrosion, caustic embrittlement, turbine deposits – Softening of water – Lime soda, Zeolite processes – Reverse osmosis – Electro Dialysis, Icon exchange process
Objectives : For prospective engineers knowledge about water used in industries (boilers etc.) and for drinking purposes is useful; hence chemistry of hard water, boiler troubles and modern methods of softening hard water is introduced.

UNIT-2 : ELECTROCHEMISTRY
Concept of Ionic Mobilities – Applications of Kohlrausch law – Conductometric titrations – Galvanic cells – Electrode potentials – Nernst equation – Electrochemical series – Potentiometric titrations – Concentration cells – Ion selective electrode: Batteries and Fuel cells
Objectives : Knowledge of galvanic cells, electrode potentials, concentration cells is necessary for engineers to understand corrosion problem and its control ; also this knowledge helps in understanding modern bio-sensors, fuel cells and improve them.

UNIT-3 : CORRESION
Causes and effects of corrosion – theories of corrosion (dry, chemical and electrochemical corrosion) – Factors effecting corrosion – Corrosion control methods – Cathode protection – Sacrificial Anodic, Impressed current methods – Surface coatings – Methohds of application on metals (Hot dipping, Galvanizing, tinning , Cladding, Electroplating, Electroless plating) – Organic surface coatings – Paints – Their constituents and their functions.
Objectives : the problems associated with corrosion are well known and the engineers must be aware of these problems and also how to counter them

UNIT-4 : HIGH POLYMERS
Types of Polymerization – Stereo Polymers – Physical and Mechanical properties of polymers – Plastics – Thermoplastics and thermo setting plastics – Compounding and Fabrication of plastics – Preparation and properties of Polyethylene, PVC and Bakelite – Elastomers – Rubber and Vulcanization – Synthetic rubbers – Styrene butadiene rubber – Thiokol – applications.
Objectives : Plastics are materials used very widely an engineering materials. An understanding of properties particularly physical and mechanical properties of polymers / plastics / elastomers helps in selecting suitable materials for different purpose.

UNIT-5 : FUELS
Coal – Proximate and ultimate analysis – Numerical problems based on analysis – Calorific vaule – HCV and LCV – Problems based on calorific values; petroleum – Refining – Cracking – Petrol – Diesel knocking; Gaseous fuels – Natural gas – LPG, CNG – Combustion – Problems on air requirements.
Objectives : A board understanding of the more important fuels employed on a large scale is necessary for all engineer to understand energy – related problems and solve them.

UNIT-6 : CHEMISTRY OF ADVENCED MATERIALS
Nanometerials (Preparation of carbon nanotubes and fullerenes – Properties of nanomaterials – Engineering applications) – Liquid crystals (Tyres – Application in LCD and Engineering Applications) – Fiber reinforced plastics – Biodegradable polymers – Conducting polymers – Solar cells (Solar heaters – Photo voltaic cells – Solar reflectors – Green house concepts – Green chemistry (Methods for green synthesis and Applications) – Cement – Hardening and setting – Deterioration of cement concrete

Objectives : With the knowledge available now, future engineers should know at least some of the advanced materials that are becoming available. Hence some of them are introduced here.

STANDARD BOOKS
1. Jain and Jain (Latest Edition), Engineering Chemistry, Dhanpat Rai Publishing company Ltd,
2. N.Y.S.Murthy, V.Anuradha, KRamaRao "A Text Book of Engineering Chemistry", Maruthi Publications
3. C.Parameswara Murthy, C.V.Agarwal, Adhra Naidu (2006) Text Book of Engineering Chemistry, B.S.Publications
4. B.Sivasankar (2010), Engineering Chemistry, McGraw-Hill companies.
5. Ch.Venkata Ramana Reddy and Ramadevi (2013) , Engineering Chemistry, Cengage Learning

REFERENCES
1. S.S. Dara (2013) Text Book of Engineering Chemistry, S.Chand Technical Series
2. K.Sesha Maheswaramma and Mridula Chugh (2013), Engineering Chemistry, Pearson Publications.
3. R.Gopalan, D.Venkatappayya, Sulochana Nagarajan (2011), Text Book of Engineering Chemistry, Vikas Publications.
4. B.Viswanathan and M.Aulice Scibioh (2009), Fuel Cells, Principals and applications

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I Year – II SEMESTER

T	P	C
3+1	0	3

ENIGINEERING MECHANICS

Objectives: The students completing this course are expected to understand the concepts of forces and its resolution in different planes ,resultant of force system, Forces acting on a body, their free body diagrams using graphical methods. They are required to understand the concepts of centre of gravity and moments of inertia and their application, Analysis of frames and trusses, different types of motion, friction and application of work - energy method.

UNIT – I
Objectives: The students are to be exposed to the concepts of force and friction , direction and its application.
Introduction to Engg. Mechanics – Basic Concepts.
Systems of Forces : Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems. Introduction **,** limiting friction and impending motion, coulomb's laws of dry friction , coefficient of friction, cone of friction

UNIT II
Objectives: The students are to be exposed to application of free body diagrams. Solution to problems using graphical methods and law of triangle of forces.
Equilibrium of Systems of Forces : Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorm, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.

UNIT – III
Objectives : The students are to be exposed to concepts of centre of gravity.
Centroid : Centroids of simple figures (from basic principles) – Centroids of Composite Figures
Centre of Gravity : Centre of gravity of simple body (from basis principles), centre of gravity of composite bodies, pappus theorem.

UNIT IV
Objective: The students are to be exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications.
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 – V
Objectives : The students are to be exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion.
Kinematics : Rectilinear and Curvelinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion. **Kinetics :** Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

Contd...

UNIT – VI

Objectives: The students are to be exposed to concepts of work, energy and particle motion

Work – Energy Method : Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method.

TEXT BOOKS:

1. Engg. Mechanics - S.Timoshenko & D.H.Young., 4th Edn - , Mc Graw Hill publications.
2. Engineering Mechanics: Statics and Dynamics 3rd edition, Andrew Pytel and Jaan Kiusalaas; Cengage Learning publishers.

REFERENCES:

1. Engineering Mechanics statics and dynamics – R.C.Hibbeler, 11th Edn – Pearson Publ.
2. Engineering Mechanics , statics – J.L.Meriam, 6th Edn – Wiley India Pvt Ltd.
3. Engineering Mechanics , dynamics – J.L.Meriam, 6th Edn – Wiley India Pvt Ltd.
4. Engineering Mechanics , statics and dynamics – I.H.Shames, – Pearson Publ.
5. Mechanics For Engineers , statics - F.P.Beer & E.R.Johnston – 5th Edn Mc Graw Hill Publ.
6. Mechanics For Engineers, dynamics - F.P.Beer & E.R.Johnston – 5th Edn Mc Graw Hill Publ.
7. Theory & Problems of engineering mechanics, statics & dynamics – E.W.Nelson, C.L.Best & W.G. McLean, 5th Edn – Schaum's outline series - Mc Graw Hill Publ.
8. Engineering Mechanics , Fedinand . L. Singer , Harper – Collins.
9. Engineering Mechanics statics and dynamics , A Nelson, Mc Graw Hill publications
10. Engineering Mechanics, Tayal. Umesh Publ.

LEARNING ASSESSMENT

Distribution and weightage of Marks for all theory subjects:

The Assessment of a student's performance shall be evaluated as suggested below:

a. For theory subjects the distribution shall be 30 marks for Internal Evaluation
   And 70 marks for the End - Examinations.
b. Out of 30 internal marks, the division shall be as shown below:
   - 15 marks shall be assigned for subjective examination
   - 5 marks for objective "On Line" examination
   - 5 marks for tutorials
   - 5 marks for Assignment
c. For theory subjects, during the semester there shall be 2 descriptive tests. Each test shall consist of **90 minutes** duration for **30 marks**. . Each descriptive question paper shall contain 3 questions for 30 marks. The descriptive examination marks for 30 shall be scaled for 15. The best of the two tests shall be taken for internal assessment. The first test is to be conducted from 1-3 units and second test in 4-6 units of each semester.
d. For theory subjects, during the semester there shall be 2 objective online tests. Each test shall consist of **20 minutes** duration for **20 marks**. . Each Objective question paper shall contain 20 objective type questions for 20 marks. The Objective examination marks for 20 shall be scaled for 5. The best of the two tests shall be taken for internal assessment. The first test is to be conducted from 1-3 units and second test in 4-6 units of each semester.

e. For theory subjects, during the semester there shall be a minimum of 10 tutorial classes conducted covering the complete syllabus of each subject. There shall be continuous evaluation of each tutorial and the final evaluation shall be for 5 marks. A record of conduction and evaluation of the tutorials for each subject shall be maintained.

f. For theory subjects, during the semester there shall be a minimum of 6 assignments covering the complete syllabus of each subject. There shall be continuous evaluation of each assignment and the final evaluation shall be for 5 marks. A record of conduction and evaluation of the assignments for each subject shall be maintained.

g. For theory subjects, there shall be an end semester examination for 70 marks. The question paper shall contain 6 questions, out of which the first question shall be compulsory. All the questions, including the compulsory question, shall contain the entire syllabus. The student shall answer 4 questions, including the compulsory question. The compulsory question shall carry 22 marks and the remaining questions shall carry 16 marks each. Each question may consist of sub divisions as per convenience.

	T	P	C
I Year – II SEMESTER	**3+1**	**0**	**3**

ELECTRICAL CIRCUIT ANALYSIS – I

Preamble:
This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes single phase circuits, magnetic circuits, network theorems, transient analysis and network topology.

Objectives:
  i.   To study the concepts of passive elements, types of sources and various network reduction techniques.
 ii.   To understand the behavior of RLC networks for sinusoidal excitations.
iii.   To study the performance of R-L, R-C and R-L-C circuits with variation of one of the parameters and to understand the concept of resonance.
 iv.   To study the concept of magnetic coupled circuit.
  v.   To understand the applications of network topology to electrical circuits.
 vi.   To understand the applications of network theorems for analysis of electrical networks.

UNIT-I
Introduction to Electrical Circuits
Passive components and their V-I relations. Sources (dependent and independent) - Kirchoff's laws, Network reduction techniques(series, parallel, series - parallel, star-to-delta and delta-to-star transformation). source transformation technique, nodal analysis and mesh analysis.

UNIT-II
Single Phase A.C Systems
Periodic waveforms (determination of rms, average value and form factor). Concept of phase angle and phase difference.
Complex and polar forms of representations, steady state analysis of R, L and C circuits.
Power Factor and its significance – Real, Reactive power and apparent Power.

UNIT-III
Resonance
Locus diagrams for various combination of R, L and C. Resonance, concept of band width and Quality factor.

UNIT-IV
Magnetic Circuit
Basic definition of MMF, flux and reluctance. Analogy between electrical and magnetic circuits. Faraday's laws of electromagnetic induction Concept of self and mutual inductance.
Dot convention-coefficient of coupling and composite magnetic circuit. Analysis of series and parallel magnetic circuits.

UNIT-V

Network topology
Definitions of Graph and Tree. Basic cutset and tieset matrices for planar networks. Loop and nodal methods of analysis of networks with dependent and independent voltage and current sources. Duality and Dual networks.

UNIT-VI
Network theorems (DC & AC Excitations)
Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem and compensation theorem.

Outcomes:
Students are able to solve
  i.   Various electrical networks in presence of active and passive elements.
  ii.   Any R, L, C network with sinusoidal excitation.
  iii. Any R, L, C network with variation of any one of the parameters i.e R, L, C, and f.
  iv.   Any magnetic circuit with various dot conventions.
  v.   Electrical networks with network topology concepts.
  vi.   Electrical networks by using principles of network theorems.

TEXT BOOKS:
  1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley,Mc Graw Hill Company,6 th edition
  2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd

REFERENCE BOOKS:
1. Introduction to Circuit Analysis and Design by Tildon Glisson Jr, Springer Publications
2. Electric Circuit Analysis by K.S. Suresh Kumar, Pearson publications
3. Electric Circuits by David A. Bell, Oxford publications
4. Introductory Circuit Analysis by Robert L Boylestad, Pearson Publications
5. Circuit Theory(Analysis and Synthesis) by A.chakrabarthi,Dhanpat Rai&co.

I Year – II SEMESTER

T	P	C
3+1	0	3

COMPUTER PROGRAMMING

Objectives: Formulating algorithmic solutions to problems and implementing algorithms in C

UNIT I:

Unit objective: Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux

Introduction: Computer systems, Hardware and Software Concepts**,**

Problem Solving: Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and highlevel languages, Creating and Running Programs: Writing, Editing(vi/emacs editor), Compiling(gcc), Linking and Executing in under Linux.

BASICS OF C: Structure of a c program, identifiers, basic data types and sizes. Constants, Variables, Arthmetic , relational and logical operators, increment and decrement operators, conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, Sample Programs.

UNIT II:

Unit objective: understanding branching, iteration and data representation using arrays

SELECTION – MAKING DECISION: TWO WAY SELECTION: if-else, null else, nested if, examples, Multi-way selection: switch, else-if, examples**.**

ITERATIVE: loops- while, do-while and for statements , break, continue, initialization and updating, event and counter controlled loops, Looping applications: Summation, powers, smallest and largest.

ARRAYS: Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix**.**

STRINGS: concepts, c strings.

UNIT III:

Objective: Modular programming and recursive solution formulation

FUNCTIONS- MODULAR PROGRAMMING: functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs, Passing 1-D arrays, 2-D arrays to functions.

UNIT IV:

Objective: Understanding pointers and dynamic memory allocation

POINTERS: pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT V:
Objective: Understanding miscellaneous aspects of C
ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures-declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, program applications
BIT-WISE OPERATORS: logical, shift, rotation, masks.

UNIT VI:
Objective: Comprehension of file operations
FILEHANDLING: Input and output- concept of a file, text files and binary files, Formatted I/O, File I/O operations, example programs

Text Books:
1. Problem Solving and Program Design in C, Hanly, Koffman, 7th ed, PERSON
2. Programming in C, Second Edition Pradip Dey and Manas Ghosh, OXFORD Higher Education
3. Programming in C, A practical approach Ajay Mittal PEARSON
4. The C programming Language by Dennis Richie and Brian Kernighan

Reference Books and web links:
1. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE
2. Programming with C, Bichkar, Universities Press
3. Programming in C, Reema Thareja, OXFORD
4. C by Example, Noel Kalicharan, Cambridge

		T	P	C
I Year – I SEMESTER		**0**	**3**	**2**

ENGINEERING CHEMISTRY LABORATORY

List of Experiments

1. Introduction to chemistry laboratory – Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Quantitative analysis etc.,

2. Trial experiment – Estimation of HCI using standard Na_2co_2 solutions

3. Estimation of $KMnO_4$ using standard Oxalic acid solution.

4. Estimation of Ferric iron using standard $K_2Cr_2O_7$ solution.

5. Estimation of Copper using standard $K_2Cr_2O_7$ solution.

6. Estimation of Total Hardness water using standard EDTA solution.

7. Estimation of Copper using standard EDTA solution.

8. Estimation of Copper using Colorimeter

9. Estimation of pH of the given sample solution using pH meter.

10. Conductometric Titrations between strong acid and strong base

11. Conductometric Titrations between strong acid and Weak base

12. Potentiometric Titrations between strong acid and strong base

13. Potentiometric Titrations between strong acid and Weak base

14. Estimatinog of Zinc using standard potassium ferrocyanide solution

15. Estimation of Vitamin – C

STANDARD BOOKS

1. Dr.Jyotsna Cherukuis(2012)Laboratory Manual of Engineering Chemistry-II, VGS Techno Series
2. Chemistry Practical Manual, Lorven Publications
3. K. Mukkanti (2009) Practical Engineering Chemistry, B.S.Publication

	T	P	C
I Year – II SEMESTER	**0**	**3**	**2**

ENGLISH – COMMUNICATION SKILLS LAB – II

Suggested Lab Manuals:

OBJECTIVE: To impart to the learner the skills of grammar as well as communication through listening, speaking, reading, and writing including soft, that is life skills.

ADVANCED COMMUNICATION SKILLS

UNIT 6	Body language
UNIT 7	Dialogues
UNIT 8	Interviews and Telephonic Interviews
UNIT 9	Group Discussions
UNIT 10	Presentation Skills
UNIT 11	Debates

Text Book:

'Strengthen your Communication Skills' Part-B by Maruthi Publications

Reference Books:

1. INFOTECH English (Maruthi Publications)
2. Personality Development and Soft Skills (Oxford University Press, New Delhi)

	T	P	C
I Year – II SEMESTER	0	3	2

C PROGRAMMING LAB

Exercise l
a) Write a C Program to calculate the area of triangle using the formula

area = $(s (s-a) (s-b)(s-c))^{1/2}$ where s= (a+b+c)/2

b) Write a C program to find the largest of three numbers using ternary operator.
c) Write a C Program to swap two numbers without using a temporary variable.

Exercise 2
a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b) Write a C program to find the roots of a quadratic equation.
c) Write a C program, which takes two integer operands and one operator form the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 3
a) Write a C program to find the sum of individual digits of a positive integer and find the reverse of the given number.
b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequenceUse the summing series method to compute the value of SIN(x),COS(x) and e^x.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise 4
a) Write a C Program to print the multiplication table of a given number n up to a given value, where n is entered by the user.
b) Write a C Program to enter a decimal number, and calculate and display the binary equivalent of that number.
c) Write a C Program to check whether the given number is Armstrong number or not.

Exercise 5
a) Write a C program to interchange the largest and smallest numbers in the array.
b) Write a C program to implement a liner search.
c) Write a C program to implement binary search

Exercise 6
a) Write a C program to implement sorting of an array of elements .
b) Write a C program to input two m x n matrices, check the compatibility and perform addition and multiplication of them

Exercise 7
Write a C program that uses functions to perform the following operations:
    i.   To insert a sub-string in to given main string from a given position.
    ii.   To delete n Characters from a given position in a given string.

    iii.   To replace a character of string either from beginning or ending or at a specified location

Exercise 8

Write a C program that uses functions to perform the following operations using Structure:

    i) Reading a complex number   ii) Writing a complex number

    iii) Addition of two complex numbers   iv) Multiplication of two complex numbers

Exercise 9

a) Write C Programs for the following string operations without using the built in functions

    - to concatenate two strings

    - to append a string to another string

    - to compare two strings

Exercise 10

a) Write C Programs for the following string operations without using the built in functions

    - to find t he length of a string

    - to find whether a given string is palindrome or not

Exercise 11

a) Write a C functions to find both the largest and smallest number of an array of integers.

b) Write C programs illustrating call by value and call by reference cncepts.

Exercise 12

a) Write C programs that use both recursive and non-recursive functions for the following

    i) To find the factorial of a given integer.

    ii) To find the GCD (greatest common divisor) of two given integers.

    iii) To find Fibonacci sequence

Exercise 13

a) Write C Program to reverse a string using pointers

b) Write a C Program to compare two arrays using pointers

Exercise 14

a) Write a C program consisting of Pointer based function to exchange value of two integers using passing by address.

b) Write a C program to swap two numbers using pointers

Exercise 15

Examples which explores the use of structures, union and other user defined variables

Exercise 16

a) Write a C program which copies one file to another.

b) Write a C program to count the number of characters and number of lines in a file.

c) Write a C Program t merge two files into a third file. The names of the files must be entered using command line arguments.