REGULATIONS – 2013

DEPARTMENT OF
ELECTRICAL AND ELECTRONICS ENGINEERING

CURRICULUM AND SYLLABI OF
I & II – YEAR
B.E. – ELECTRICAL AND ELECTRONICS ENGINEERING
NATIONAL ENGINEERING COLLEGE, K.R.NAGAR, KOVILPATTI  
(An Autonomous Institution, Affiliated to Anna University, Chennai)

COLLEGE VISION

• Transforming lives through quality Education and research with human values

COLLEGE MISSION

• To maintain excellent infrastructure and highly qualified and dedicated faculty

• To provide a conducive learning environment with an ambience of humanity, wisdom, creativity and team spirit

• To promote the values of ethical behavior and commitment to the society

• To partner with academic, industrial and government entities to attain collaborative research
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

- Promoting active learning, critical thinking coupled with ethical values to meet the global challenges.

MISSION

- To instill state-of-the-art technical knowledge and research capability that will prepare our graduates for professionalism and life-long learning.
- To update knowledge to meet industrial and real world challenges.
- To inculcate social and ethical values.

Program Educational Objectives (PEO)

- Excel in industrial or graduate work in Electrical Engineering and allied fields
- Practice their profession conforming to ethical values and active participation in the affairs of the profession
- Adapt to evolving technologies and stay current with their profession
Program Outcomes (PO)

1. An ability to apply knowledge of mathematics, physical sciences, and engineering.

2. An ability to design and conduct experiments, as well as to analyze and interpret data.

3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, health and safety, manufacturability and sustainability.

4. An ability to identify, formulate and solve electrical engineering problems.

5. An ability to use the techniques, skills, and modern electrical engineering tools necessary for engineering practice.

6. Develop an understanding of contemporary technical and professional issues in the practice of electrical engineering.

7. The broad education necessary to understand the impact of electrical engineering solutions in a global, economic, environmental, and societal context.

8. An understanding of professional and ethical responsibility.

9. An ability to function on multidisciplinary teams.

10. An ability to communicate effectively in a bi-lingual environment.

11. Recognition of the need for and an ability to engage in life-long learning.

12. An ability to administrate the project management and finance.
# REGULATIONS 2013 – CURRICULUM AND SYLLABI

## B.E. – ELECTRICAL AND ELECTRONICS ENGINEERING

**SEMESTER I** (Common to all B.E. / B.Tech., Degree Programmes)

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<tr>
<th>S. No.</th>
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**Total Number of Credits :** 27
## SEMESTER II

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**Total Number of Credits:** 29
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### COURSE OUTCOMES
The Student will
- apply basic grammar in Writing and Speaking.
- prepare formal Letter Writings.
- come out with proper pronunciation.
- speak confidently in interactions.
- develop interest to read any article.

### UNIT I
**Language Focus:** Technical Vocabulary, Word Formation, Concord, Tense (Present).
**Writing:** Leave Application Letter, Paragraph writing.
**Listening:** Listening to correct pronunciation of words.
**Speaking:** Self - Introduction, Greetings.

### UNIT II
**Language Focus:** Words often misspelled, Articles, Tense (Past)
**Writing:** Permission letters (In-plant training/Seminar/Workshop), Chart description.
**Listening:** Listening to the Sentences with correct stress and Intonation.
**Speaking:** Situational Conversations.

### UNIT III
**Language Focus:** Compound nouns, Tense (Future), Preposition, Comparative Adjectives.
**Writing:** Invitation Letter, Acceptance Letter, Declining Letter.
**Listening:** Listening to the conversations.
**Speaking:** One minute speech.

### UNIT IV
**Language Focus:** Modal verbs, Gerund, Infinitives, Voice.
**Writing:** Writing Instructions, Letters to Editor.
**Listening:** Listening to the different Tonal Expressions.
**Speaking:** Giving Opinions.

### UNIT V
**Language Focus:** ‘If’ Conditionals, ‘Wh’ questions, Question Tags.
**Writing:** Reading and Note - taking
**Speaking:** Group Discussion.
**Reading:** ERC, one word questions from the suggested book.

### SUGGESTED ACTIVITIES
2. Exercises on gap filling and correction of errors on Concord (Subject – Verb Agreement).
3. Gap filling exercises using the appropriate Tense forms.
4. Exercises on transferring information from Graph to Text – Bar charts, Flow charts.
5. Making sentences using Modal verbs to express probability, compulsion, etc.
6. Exercises on Writing Instructions.
7. Exercises on framing Questions.
8. Other relevant classroom activities.

**L: 45 T: 15   TOTAL: 60 PERIODS**
BOOK SUGGESTED FOR READING

REFERENCES
SH101 MATRICES AND DIFFERENTIAL CALCULUS  
(Common to all B.E. / B.Tech., Degree Programmes)  
L T P C  
3 1 0 4  

COURSE OUTCOMES  
• Ability to find inverse and integral powers of matrices and to perform transformations of matrices.  
• Ability to find the evolutes of various curves.  
• Ability to solve ordinary and partial differential equations.  
• Ability to obtain constrained maxima and minima.  

UNIT I MATRICES  
12  
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties (excluding proofs); Cayley – Hamilton theorem (excluding proof) – Inverse and integral powers of a matrix using Cayley – Hamilton theorem; Diagonalisation of a matrix by orthogonal transformation; Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.  

UNIT II DIFFERENTIAL CALCULUS  
12  
Curvature in cartesian, parametric and polar forms; Centre, radius and circle of curvature; Evolutes.  

UNIT III FUNCTIONS OF SEVERAL VARIABLES  
12  
Partial derivatives; Total derivatives; Differentiation of implicit functions; Jacobians; Maxima and Minima - Method of Lagrangian multipliers.  

UNIT IV ORDINARY DIFFERENTIAL EQUATIONS  
12  
Higher order linear differential equations with constant coefficients; Method of variation of parameters; Cauchy’s and Legendre’s linear equations; Simultaneous first order linear equations with constant coefficients.  

UNIT V PARTIAL DIFFERENTIAL EQUATIONS  
12  
Formation of partial differential equations; Lagrange’s linear equations; Solutions of standard types of first order partial differential equations; Linear partial differential equations of second and higher order with constant coefficients.  

L: 45 T: 15 TOTAL: 60 PERIODS  

TEXT BOOKS  

REFERENCES  
SH102  APPLIED PHYSICS  
(Common to all B.E. / B.Tech., Degree Programmes)  

L T P C  
3 0 0 3

COURSE OUTCOMES  
The students will be able to  
• gain knowledge on the properties of matter and hydrodynamics.  
• study and apply the ultrasonic methods for industrial and medical field.  
• understand Lasers and to identify the appropriate Laser technique for industrial and medical field.  
• understand the different types, fabrication, losses of optical fibers and the applications of fiber optics in communication and instrumentation.  
• understand the physical properties of photons and electrons and to study the different Electron Microscopes.  

UNIT I  PROPERTIES OF MATTER AND HYDRODYNAMICS  
Properties of Matter  
Stress, Strain, Hooke’s law; Types of moduli of elasticity; Torsional pendulum – Determination of Rigidity modulus of a wire; Bending of beams – Expression for bending moment – Measurement of Young’s modulus by uniform and Non-uniform bending – I Shaped girders.  
Hydrodynamics  
Stream line flow, Turbulent flow, Poiseuille’s formula for flow of liquid through a capillary tube, Determination of coefficient of viscosity of a liquid.  

UNIT II  ULTRASONICS  

UNIT III  LASERS  
Principle of spontaneous emission and stimulated emission, Population inversion, Pumping, Einstein’s A and B coefficients – derivation; Types of Lasers - CO₂ Laser, Nd-YAG Laser, Semiconductor Laser (Homojunction); Determination of wavelength of Laser using grating and Particle size; Applications of Lasers: Industrial applications – Welding, Cutting and Heat treatment; Medical applications; Holography (construction and reconstruction).  

UNIT IV  FIBER OPTICS AND ITS APPLICATIONS  
Principle and propagation of light in optical fibers; Numerical aperture and Acceptance angle; Types of optical fibers – material, refractive index and mode; Double crucible technique of fiber drawing; Splicing – fusion splicing; Loss in optical fiber – attenuation, dispersion and bending; Fiber optical communication system (Block diagram); Advantages and Applications of optical fiber; Fiber optic sensors – temperature and displacement; Endoscope.  

UNIT V  QUANTUM PHYSICS AND MICROSCOPY  
Black body radiation – Planck’s theory (derivation) – Deduction of Wien’s displacement law and Rayleigh Jean’s Law from Planck’s theory; Photoelectric effect – Law of Photoelectric effect – Photoelectric equation; Matter Waves – De Broglie wavelength - Schrodinger’s wave equation – time independent and time dependent equations – Particle in one dimensional box; Heisenberg’s Uncertainty principle; Linear Harmonic oscillator; Electron microscope – scanning electron microscope.  

TOTAL: 45 PERIODS
**TEXT BOOKS**


**REFERENCES**

SH103                     ENGINEERING CHEMISTRY
                            (Common to all B.E. / B.Tech., Degree Programmes)  

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COURSE OUTCOMES
The students will be able to
• select suitable water treatment techniques for industrial and domestic purpose.
• acquire knowledge of electrochemistry.
• apply the contextual knowledge of adsorption techniques for industrial applications.
• synthesize polymers for domestic and industrial applications.
• understand the knowledge of nano materials for their applications in Science and Engineering.

UNIT I   WATER TREATMENT 9

UNIT II   ELECTRO ANALYTICAL TECHNIQUES 9
Electrode potential: definition, measurement of electrode potential, Nernst equation – problems; EMF: definition, measurement of EMF – Poggendorff’s method; reference electrode: standard hydrogen electrode, calomel electrode, glass electrode – measurement of pH using glass electrode; CO\textsubscript{2} sensing electrode; conductometric titrations: acid-base titration (HCl vs NaOH); potentiometric titrations: redox titration (Fe\textsuperscript{3+} vs K\textsubscript{2}Cr\textsubscript{2}O\textsubscript{7}), precipitation titration (Ag\textsuperscript{+} vs NaCl).

UNIT III   CATALYSIS AND SURFACE PHENOMENA 9
Types of catalysis – homogeneous catalysis – heterogeneous catalysis, mechanism of catalytic action - contact theory, catalytic promoters, catalytic poison; enzyme catalysis: Michaelis-Menton equation; adsorption: definition, types – physical adsorption – chemical adsorption – differences between physical and chemical adsorption; adsorption isotherms: definition, Freundlich and Langmuir adsorption isotherms, applications of adsorption.

UNIT IV   ENGINEERING POLYMERS 9

UNIT V   NANO MATERIALS 9
Nanoparticles: definition, carbon nanotubes (CNT), types of carbon nano tubes – single walled and multi walled carbon nanotubes – fullerene; synthesis of carbon nanotubes: chemical vapour deposition – laser ablation – arc-discharge method; properties of CNT: mechanical, electrical, thermal and optical properties; applications of carbon nanotubes in chemical field, medicinal field, mechanical field and current applications.

TOTAL: 45 PERIODS

TEXT BOOKS
REFERENCES
SH104  FUNDAMENTALS OF COMPUTING AND PROGRAMMING IN C  
(Common to all B.E. / B.Tech., Degree Programmes)  

L T P C  
3 0 0 3  

COURSE OUTCOMES  
• Learn the major components of a computer system.  
• Formulate the algorithms and analyze their complexity.  
• Identify the correct and efficient ways of solving problems.  
• Acquire knowledge about dynamic memory allocation, modular programming and data organization.  
• Develop real time applications using the power of C language features.  

UNIT I  COMPUTER FUNDAMENTALS  
10  

UNIT II  BASIC C PROGRAMMING  
9  
Structure of C Program – Keywords, Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output operators – Decision Making – Branching and Looping.  

UNIT III  FUNCTIONS, ARRAYS AND POINTERS  
9  
Functions: User-defined functions – Definitions – Declarations - Call by reference – Call by value.  
Arrays: Declaration – Definition – Multidimensional Arrays – Functions with array as arguments.  
Pointers: Initialization – Pointers as Arguments – Pointers to Pointers – Dynamic Memory Management Functions.  

UNIT IV  STRUCTURES AND UNIONS  
9  

UNIT V  FILE HANDLING  
8  

TOTAL: 45 PERIODS  

TEXT BOOKS  

REFERENCES  
SH105  ENGINEERING GRAPHICS  
(Common to all B.E. / B.Tech., Degree Programmes)  

COURSE OUTCOMES  
• Students will be able to use the drawing instruments effectively.  
• An ability to draw the basic engineering curves and problems related to projections of points, straight lines, planes and solids.  
• Able to apply the knowledge acquired on practical applications of sectioning and development of solids.  
• Able to draw simple solids and its sections in isometric view and projections and also to draw its perspective views.  

Drawing Instruments – IS specifications on lines – drawing sheets – Printing letters and dimensioning – scales (not for examination) – First angle projection should be followed.  

UNIT I  PLANE CURVES  12  
Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of cycloids – Epi and Hypo cycloids - construction of involutes of square and circle – Drawing of tangents and normal to the above curves.  

UNIT II  PROJECTION OF POINTS, LINES AND PLANE SURFACES  12  
Projection of points and straight lines located in the first quadrant – Traces – Determination of true lengths and true inclinations. Projection of regular polygonal surfaces and circular lamina inclined to any one reference plane.  

UNIT III  PROJECTION OF SOLIDS  12  
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.  

UNIT IV  SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES  12  
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinder and cone – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.  

UNIT V  ISOMETRIC AND PERSPECTIVE PROJECTIONS  12  

TOTAL: 60 PERIODS  
Note: In end semester examination from each unit one question with either or pattern may be asked. No short questions.  

TEXT BOOK  
REFERENCES
SH106                      C PROGRAMMING LABORATORY
(Common to all B.E. / B.Tech., Degree Programmes)  L T P C
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COURSE OUTCOMES
• Acquire logical thinking and problem solving skills.
• Implement the algorithms and analyze their complexity.
• Identify the correct and efficient ways of solving problems.
• Acquire hands on practice in dynamic memory allocation, modular programming and data organization.
• Implement real time applications using the power of C language features.

LIST OF EXPERIMENTS
1. Solve problems such as temperature conversion, student grading, interest calculation.
2. Finding the 2’s complement of a binary number.
3. Generation of the first ‘n’ terms of the Fibonacci sequence and prime sequence.
5. Given distance traveled by a vehicle as \( d = ut + \frac{1}{2}at^2 \), where ‘u’ and ‘a’ are the initial velocity and acceleration. Calculate the distance traveled for different time intervals.
6. Solving the roots of a quadratic equation.
7. Designing a simple arithmetic calculator. (Use switch statement)
8. Performing the following operations: (Use loop statement)
   i. Generate Pascal’s triangle.
   ii. Construct a Pyramid of numbers.
9. Performing the following operations to a string:
   i. To insert a sub-string into main string at a given position.
   ii. To delete ‘n’ characters from a given position in a string.
   iii. To replace a character of string either from beginning or ending or at a specified location.
10. Performing the following operations: (Use arrays)
    i. Matrix addition.
    ii. Transpose of a matrix.
    iii. Matrix multiplication by checking compatibility.
11. Performing the following operations: (Use recursive functions)
    i. To find the factorial of a given integer.
    ii. To find the GCD (Greatest Common Divisor) of two given integers.
    iii. To solve Towers of Hanoi problem.
12. Performing the Student Information Processing using File Handling concepts.

TOTAL: 45 PERIODS

SOFTWARE REQUIREMENTS
• Turbo C/ ANSI C Compiler
• Gcc compiler
SH107  PHYSICS AND CHEMISTRY LABORATORY – I
(Common to all B.E. / B.Tech., Degree Programmes)

**PART A – PHYSICS LABORATORY – I**

**COURSE OUTCOMES**
At the end of the Laboratory classes, the students are able to
- develop collaborative learning skills and to add some of their own ideas to the experiments and their explanations.
- understand the optical properties, mechanical properties and electrical properties.

**LIST OF EXPERIMENTS**
1. (a) Particle size determination using Diode Laser.
   (b) Determination of Laser parameters – Wavelength, and angle of divergence.
   (c) Determination of Numerical aperture and acceptance angle of an optical fiber.
2. Determination of thickness of a thin wire – Air wedge method.
3. Determination of velocity of sound and compressibility of the liquid – Ultrasonic Interferometer.
5. Determination of Young’s modulus – Non-uniform bending method.
7. Determination of specific resistance of a given coil of wire – Carey Foster’s Bridge.
   *A minimum of FIVE experiments shall be offered.*

**PART B - CHEMISTRY LABORATORY – I**

**COURSE OUTCOMES**
The student
- can estimate the amount of hardness and acidity present in the water sample.
- gain knowledge about the estimation of nickel in an alloy.
- quantify the electrolyte by measuring the conductance and pH.

**LIST OF EXPERIMENTS**
1. Estimation of hardness of Water sample by EDTA method.
2. Estimation of acidity of Water sample.
3. Estimation of Nickel by EDTA method.
4. Conductometric titration (HCl Vs NaOH).
5. Conductometric titration (BaCl₂ Vs Na₂SO₄).
6. pH metric titration (HCl Vs NaOH).
7. Determination of molecular weight and degree of polymerization using Viscometry.
   *A minimum of FIVE experiments shall be offered.*
   *Laboratory classes on alternate weeks for Physics and Chemistry.*

**TOTAL: 45 PERIODS**
SH108  ENGINEERING PRACTICES LABORATORY  
(Common to all B.E. / B.Tech., Degree Programmes)  

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COURSE OUTCOMES

• Students will be able to prepare the pipe connections and identify the various components used in plumbing.
• An ability to prepare simple wooden joints using wood working tools.
• An ability to prepare simple lap, butt and tee joints using arc welding equipments.
• An ability to prepare simple components using lathe and drilling machine.

PART A – MECHANICAL AND CIVIL ENGINEERING PRACTICES

I PLUMBING WORKS:  
Study of components related to plumbing.  
Hands-on-exercise:  
Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.

II CARPENTRY PRACTICES:  
Study of the joints in roofs, doors, windows and furniture.  
Hands-on-exercise:  
Wood work, joints by sawing, planning and cutting.

III WELDING:  
Study of the tools used in welding Gas welding practice.  
Preparation of butt joints, lap joints and tee joints using arc welding.

IV BASIC MACHINING:  
(a) Simple Turning and Taper turning.  
(b) Drilling Practice.

REFERENCES

PART B – ELECTRICAL AND ELECTRONICS ENGINEERING PRACTICE

COURSE OUTCOMES

- An ability to develop familiarity with rudimentary measurement equipment – signal generators, oscilloscopes, multimeters and power supplies.
- Ability to demonstrate and evaluate the parameters of basic electronic components (wires, resistors, capacitors, diodes etc.) based on their physical parameters and dimensions.
- Define, describe, and analyze fundamentals of Boolean algebra and digital logic gates.
- An ability to predict qualitatively and quantitatively compute the steady state AC responses of basic circuits using the phasor method.
- Gain experience in the documentation of measurements and procedures as well as the preparation of formal reports.

I ELECTRICAL ENGINEERING PRACTICE 10

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
5. Measurement of energy using single phase energy meter.

II ELECTRONICS ENGINEERING PRACTICE 12

1. Study of Electronic components and equipments – Resistor, colour coding, measurement of AC signal parameters (peak-peak, rms period, frequency) using CRO
2. Study of logic gates AND, OR, XOR and NOT.
4. Soldering practice – Components, Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

TOTAL: 45 PERIODS

REFERENCES

13D20  
TECHNICAL ENGLISH – II  
(Common to all B.E. / B.Tech., Degree Programmes)

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COURSE OUTCOMES
The student will be able to
- apply correct form of language while Speaking and Writing.
- prepare his own Professional letter writings.
- interpret any passage after listening.
- interact at different situations fluently.

UNIT I
Language Focus: Homonyms, Different grammatical forms of the same word, correct usage of words / phrases.
Writing: Recommendation writing.
Listening: Interpreting Poetic lines.
Speaking: Telephone English.

UNIT II
Language Focus: Cause and Effect, Phrasal Verbs.
Listening: Conversations.
Speaking: Asking questions.

UNIT III
Language Focus: Idioms and Phrases with animal names.
Writing: Checklist, Process Description.
Speaking: Presentations.

UNIT IV
Language Focus: Technical Definitions, Transformation of Sentences.
Writing: Job Application Letter, Curriculum Vitae, Bio-data, Resume.
Speaking: Mock Interview.

UNIT V
Language Focus: British and American Vocabulary, Numerical Expressions.
Writing: E-mail Writing, Report Writing.
Speaking: Group Discussion.

SUGGESTED ACTIVITIES
1. Making sentences using different grammatical forms of the same word.
2. Exercises on combining sentences using Cause and Effect expressions.
4. Writing exercises on Recommendations.
5. Exercises on Idioms and Phrases.
7. Exercises on British and American English words with meanings.

TOTAL: 45 PERIODS

BOOK SUGGESTED FOR READING
REFERENCES
13D21 INTEGRAL CALCULUS AND TRANSFORMS
(Common to all B.E. / B.Tech., Degree Programmes)  

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COURSE OUTCOMES

- Ability to find area and volume of objects using double and triple integrals.
- Ability to analyze the concepts related to vector calculus and to apply them in engineering field.
- Ability to perform the ideas of Laplace transform and Z-transform in their respective engineering subjects.

UNIT I  MULTIPLE INTEGRALS  
Double integration – Cartesian and polar coordinates; Change of order of integration; Change of variables between cartesian and polar coordinates; Triple integration in cartesian coordinates; Area as double integral; Volume as triple integral.

UNIT II  VECTOR CALCULUS  
Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields; Vector integration – Green’s theorem in a plane, Gauss divergence theorem and Stoke’s theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.

UNIT III  LAPLACE TRANSFORM  

UNIT IV  INVERSE LAPLACE TRANSFORM  
Definition of Inverse Laplace transform – Convolution theorem – Solution of linear ordinary differential equations of second order with constant coefficients using Laplace transformation techniques and solution of simultaneous differential equations of first order with constant coefficients using Laplace transformation techniques.

UNIT V  Z – TRANSFORM  

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS


REFERENCES

13D22 SOLID STATE PHYSICS
(Common to ECE, CSE, EEE, EIE and IT)

COURSE OUTCOMES
The Student will be able to

- identify the crystal lattices, their structures and how the structure influences its major properties at different levels.
- choose the major functional and structural properties required for specific applications of conducting materials
- check the parameter that satisfies superconducting behaviour.
- relate technology to the physics of semiconductor devices.
- classify the magnetic materials and their storage applications.
- design optical materials that are able to be manufactured and measured using the state of art optical fabrication technologies.

UNIT I CRYSTAL PHYSICS 9
Lattice, Unit cell, Bravais lattice, Lattice planes; Miller indices – d-spacing in cubic lattice; Calculation of number of atoms per unit cell, Atomic radius, Coordination number and Packing factor for SC, BCC, FCC and HCP structures; Crystal defects – point, line and surface defects; Burger vector.

UNIT II CONDUCTING MATERIALS AND SUPERCONDUCTORS 9
Conductors
Superconductors
Superconductivity: Properties – Meissner effect – Isotopic effect; Types of superconductors – Type I and Type II superconductors; Applications of superconductors – Magnetic levitation.

UNIT III SEMICONDUCTORS 9
Intrinsic semiconductor – carrier concentration derivation – Fermi level – variation of Fermi level with temperature – electrical conductivity – bandgap determination; Extrinsic semiconductors – carrier concentration derivation in n-type and p-type semiconductor – variation of Fermi level – with temperature and impurity concentration; Hall effect – Determination of Hall coefficient – Applications.

UNIT IV MAGNETIC MATERIALS AND STORAGE DEVICES 9
Origin of magnetic moment, Bohr magneton, Dia and Para magnetism, Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials; Anti-ferromagnetic materials; Ferrites – structure and applications; magnetic recording and readout – storage of magnetic data – tapes, floppy, Hard disk and CD ROM.

UNIT V OPTICAL MATERIALS 9
Optical properties of metals, insulators and semiconductors; Phosphorescence and fluorescence; Excitons traps and color centre and their importance; Different phosphors used in CRO screens, liquid crystal display, LED – working of LED; Thermography and its applications; Solar cell – PN junction solar cell – Conversion efficiency and solar concentration – Hetero junction solar cell.

TOTAL: 45 PERIODS
TEXT BOOKS

REFERENCES
13D23  CHEMISTRY OF ELECTRICAL AND ELECTRONIC MATERIALS  
(Common to ECE, CSE, EEE, EIE and IT)  

COURSE OUTCOMES  
The students can  
• apply the knowledge in designing new energy storing devices.  
• identify the types of corrosion and to design a method to control the corrosion.  
• apply the knowledge of photochemistry in designing the various electronic materials.  
• choose proper analytical technique for analyzing the synthesized electronic materials.  

UNIT I  ENERGY SOURCES AND STORAGE DEVICES  

UNIT II  CORROSION AND ITS CONTROL  

UNIT III  PHOTOCHEMICAL PROCESSES  

UNIT IV  ELECTRONIC MATERIALS  

UNIT V  ANALYTICAL INSTRUMENTATION  

TOTAL: 45 PERIODS
TEXT BOOKS

REFERENCES
13D24 CIRCUIT THEORY (EEE)  

COURSE OUTCOMES
- Describe the basic concepts of electric circuits.
- Illustrate the network theorems for DC and AC circuits.
- Explain the concept of resonant circuits.
- Analyze the dynamic behavior of electric circuits.
- Analyze the three phase electric circuits.

UNIT I BASIC CIRCUITS ANALYSIS 12

UNIT II NETWORK REDUCTION AND NETWORK THEOREMS FOR DC AND AC CIRCUITS 12
Network reduction: voltage and current division, source transformation – star-delta conversion. Thevenin’s and Norton’s Theorem – Superposition Theorem – Maximum Power Transfer Theorem – Reciprocity Theorem.

UNIT III RESONANCE AND COUPLED CIRCUITS 12

UNIT IV TRANSIENT RESPONSE FOR DC CIRCUITS 12
Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and AC with sinusoidal input.

UNIT V ANALYSIS OF THREE PHASE CIRCUITS 12
Three phase balanced / unbalanced voltage sources – Analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced and unbalanced loads – phasor diagram of voltages and currents – power and power factor measurements in three phase circuits.

L: 45  T: 15  TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES

- An ability to identify the various systems and its components of various power plants.
- An ability to state and differentiate the working principles of IC engines.
- Students will be able to identify the various systems and components of refrigeration and air conditioning systems.

A – CIVIL ENGINEERING

UNIT I  SURVEYING AND CIVIL ENGINEERING MATERIALS  15
leveling – determination of areas – illustrative examples.

UNIT II  BUILDING COMPONENTS AND STRUCTURES  15
Foundations: Types, Bearing capacity – Requirement of good foundations.
plastering – Mechanics – Internal and external forces – stress – strain – elasticity – Types of Bridges
and Dams – Basics of Interior Design and Landscaping.

B – MECHANICAL ENGINEERING

UNIT III  POWER PLANT ENGINEERING  10
Introduction, Classification of Power Plants – Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear Power plants – Merits and Demerits – Pumps and turbines – working principle of
Reciprocating pumps (single acting and double acting) – Centrifugal Pump.

UNIT IV  IC ENGINES  10
Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel
Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines –
Boiler as a power plant.

UNIT V  REFRIGERATION AND AIR CONDITIONING SYSTEM  10
Terminology of refrigeration and air conditioning – Principle of vapour compression and absorption
system – Layout of typical domestic refrigerator – Window and Split type room air conditioner.

TOTAL: 60 PERIODS

REFERENCES

1. Shanmugam G. and Palanichamy M.S., “Basic Civil and Mechanical Engineering”, Tata
5. Shantha Kumar S.R.J., “Basic Mechanical Engineering”, Hi-tech Publications,
13D26  COMPUTER PROGRAMMING LABORATORY
(Common to all B.E. / B.Tech., Degree Programmes)

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

- Demonstrate how to use the UNIX Shell commands.
- Use the Shell programming constructs.
- Learn tracing mechanisms (for debugging), user variables, Shell variables, read-only variables, positional parameters, reading input to a Shell script.
- Test on numeric values, test on file type, and test on character strings using shell scripts.
- Write moderately complex Shell scripts and make them executable.

Execute programs written in C under UNIX environment.

LIST OF EXPERIMENTS

1. Study of UNIX OS, vi Editor.
2. Use of Basic UNIX Shell Commands:
   ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit.
3. Shell Programming:
   i. Interactive shell scripts
   ii. Positional parameters
   iii. Arithmetic Operators
   iv. if-then-fi, if-then-else-fi, nested if-else
   v. Logical operators
   vi. if - elif, case structure
   vii. while, until, for loops, use of break
   viii. Metacharacters
4. Shell scripts for the following:
   i. Showing the count of users logged in
   ii. Printing column wise list of files in your home directory
   iii. To count lines, words and characters in its input (do not use wc)
5. C Programming on UNIX:
   i. Dynamic Storage Allocation
   ii. Pointers
   iii. Functions
   iv. File Handling

TOTAL: 45 PERIODS

SOFTWARE REQUIREMENTS
- UNIX/LINUX OS
- Gcc compiler
PART A - PHYSICS LABORATORY – II

COURSE OUTCOMES
At the end of the Laboratory classes, the students
- demonstrate and report the elastic behaviour of materials
- demonstrate the interference property of light waves
- demonstrate the diffraction property of light waves
- measure the thermal properties of conducting materials
- identify the substance that deforms continuously when subjected to shearing stress.

LIST OF EXPERIMENTS
1. Determination of Young’s modulus – Uniform bending method.
2. Determination of Band Gap of a semiconductor material.
3. Determination of Hall Co-efficient.
5. Determination of wavelength of mercury spectrum using spectrometer and grating
7. Torsional pendulum – Determination of Moment of Inertia of the disc and Rigidity modulus of the material of the wire.

* A minimum of FIVE experiments shall be offered.

PART B - CHEMISTRY LABORATORY – II

COURSE OUTCOMES
The student
- can estimate the amount of alkalinity and Dissolved Oxygen (DO) present in the water sample.
- gain knowledge in the estimation of copper in an alloy and iron in rust.
- quantify electrolyte and ion by measuring the conductance and emf.

LIST OF EXPERIMENTS
1. Estimation of copper in brass by EDTA method.
2. Determination of Dissolved Oxygen (DO) in water (Winkler’s method)
3. Estimation of alkalinity of Water sample
4. Estimation of Fe$^{3+}$ ion in rust by Dichrometry
5. Conductometric titration (Mixture of acids vs NaOH)
6. Potentiometric Titration (Fe$^{2+}$ vs K$_2$Cr$_2$O$_7$)
7. Estimation of Fe$^{2+}$ ion by spectrophotometry.

TOTAL: 45 PERIODS

* A minimum of FIVE experiments shall be offered.

Laboratory classes on alternate weeks for Physics and Chemistry.
COURSE OUTCOMES

- Illustrate the basic concepts of electric circuits.
- Relate the physical observations in network theorems of electrical circuits to theoretical principles.
- Examine the electric circuits using mesh and nodal analysis.
- Analyze the dynamic behavior of electric circuits using PSIM.
- Compute the frequency response of resonant and tuned circuits.

LIST OF EXPERIMENTS

1. Verification of Ohm’s laws and Kirchoff’s laws
2. Verification of Thevenin’s and Norton’s theorem
3. Verification of Superposition theorem
4. Verification of Maximum Power Transfer theorem
5. Verification of Reciprocity theorem
6. Measurement of self inductance of a coil
7. Verification of mesh and nodal analysis
8. Transient response of RL and RC circuits for DC input
9. Frequency response of series and parallel resonance circuits
10. Frequency response of single tuned coupled circuits

TOTAL: 45 PERIODS
13D29 ENGLISH LANGUAGE SKILL LABORATORY
(Common to all B.E. / B.Tech., Degree Programmes)

COURSE OUTCOMES
The Student will
- improve their pronunciation skill.
- gather information from any speech.
- imbibe the stress and intonation of the native speakers’ accent.

1. Micro Skills
- Spotting the Homonyms / Silent letter words / mispronounced words
- Identifying the missing words in native speech
- Finding the cluster words
- Marking correct punctuation
- Marking word chunks
- Identification of sentences

2. Content Comprehension and making inferences
- Listening to audio files of Speech, Poetry, Recent Issues, News clippings, etc
  - a. True / False
  - b. Multiple Choice Questions
  - c. Filling the blanks
  - d. Filling the charts

3. Listen and Act
- Drawing the map using audio
- Picture completing task
- Transferring data to Graph

4. Interpreting the video clippings

5. Listening to Conversations

TOTAL: 30 PERIODS
13EE31 FORUER TRANSFORMS AND COMPLEX ANALYSIS

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3 1 0 4

COURSE OUTCOMES
On the successful completion of the course, the student should be able to,

- Perform Fourier series analysis of the functions.
- Implement the properties of Fourier transforms and compute the Fourier transforms of various functions.
- Calculate the Fourier series solution of Wave and Heat equations.
- Grasp analytic functions and their properties and be introduced to the host of conformal mappings with suitable examples that have direct applications.
- Understand the basics of complex integration and the concept of contour integration encountered in practice.

UNIT I FOURIER SERIES

UNIT II FOURIER TRANSFORMS

UNIT III APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS
Solutions of one dimensional wave equation – One dimensional equation of heat conduction– Steady state solution of two-dimensional equation of heat conduction (Insulated edges excluded) – Fourier series solutions in Cartesian coordinates.

UNIT IV ANALYTIC FUNCTIONS
Functions of a complex variable – Analytic functions – Necessary and Sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic functions – Harmonic conjugate – Construction of analytic functions – Conformal mapping: \( w: z+c, cz, 1/z \) and bilinear transformation.

UNIT V COMPLEX INTEGRATION
Complex integration – Statement and applications of Cauchy’s integral theorem and Cauchy’s integral formula (excluding proofs) – Taylor’s and Laurent’s expansions – Singular points – Residues – Residue theorem (excluding proof) – Application of residue theorem to evaluate real integrals – Unit circle and semi-circular contour(excluding poles on boundaries).

L: 45, T: 15, TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
13EE32 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C 3 0 0 3
(Common to all B.E./B.Tech. Degree Programmes)

COURSE OUTCOMES
Upon successful completion of course the student will be able to
- Understand the various ecosystem and biodiversity
- Classify the different types of natural resources and identify the role of individual in conservation of resources
- Identify and analyse the causes, effects and control measures of environmental pollution
- Identify the different types of environmental hazards and their management
- Analyse the social issues related to the environment and how human population affect the environment

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY
Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers– energy flow in the ecosystem – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) aquatic (pond) ecosystems. Field study of simple ecosystems –pond and forest. Introduction to biodiversity: definition - genetic, species and ecosystem diversity – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values –India as a mega-diversity nation – hot spots of biodiversity –threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation. Field study of common plants, insects, birds.

UNIT II NATURAL RESOURCES
Forest resources: Use and over-exploitation, deforestation, case studies- dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide Problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, case studies – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT III ENVIRONMENTAL POLLUTION
Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Noise pollution (e) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – e-Waste: Definition-dimension of the problem - source-toxic Substances in e-waste - risks related to toxic substances–environmental problems-role of an individual in prevention of pollution.

UNIT IV ENVIRONMENTAL HAZARDS
Environmental hazards: Definition – Hazard- Types-Natural and man-made hazards – Natural hazards: Causes, effect and management of Earthquake, Flood, Landslide, Cyclones and Tsunami; Man-made Hazards: Hazards due to dams and reservoirs, hazards due to nuclear power plant, Industrial hazards. Case study: Chernobyl disaster, Bhopal gas tragedy.

UNIT V SOCIAL ISSUES, HUMAN POPULATION AND THE ENVIRONMENT

TOTAL: 45 PERIODS
TEXT BOOKS

REFERENCES
COURSE OUTCOMES
On the successful completion of the course, the student should be able to,

- Describe the concepts of electromechanical energy conversion.
- Discuss the characteristics and applications of DC generators.
- Recognize the characteristics and speed control of DC motors.
- Analyze the performance of transformers.
- Estimate the efficiency of DC machines and transformers by conducting suitable tests.

UNIT I  BASIC CONCEPTS OF ROTATING MACHINES  12

UNIT II  DC GENERATORS  12

UNIT III  DC MOTORS  12

UNIT IV  TRANSFORMERS  12

UNIT V  TESTING OF DC MACHINES & TRANSFORMERS  12
Losses and efficiency – Condition for maximum efficiency – Testing of DC machines: Brake test, Swinburne’s test, Retardation test, Hopkinson’s test – Testing of transformer: polarity test, load test, open circuit and short circuit test, Sumpner’s test – All day efficiency.

TEXT BOOKS

REFERENCES
13EE34     ELECTROMAGNETIC FIELD THEORY       L T P C
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COURSE OUTCOMES
On the successful completion of the course, the student should be able to,
• Apply vector calculus for static electric and magnetic fields
• Analyze the concepts of electrostatic fields and magneto static fields
• Develop the boundary condition for different medium
• Formulate the Maxwell’s equations
• Employ the Maxwell equation for electromagnetic wave propagation

UNIT I     INTRODUCTION
Sources and effects of electromagnetic fields – Vector fields – Different co-ordinate systems- vector
 calculus – Gradient, Divergence and Curl - Divergence theorem – Stoke’s theorem.

UNIT II     ELECTROSTATICS
Coulomb’s Law – Electric field intensity – Field due to point and continuous charges – Gauss’s law
 and application – Electric potential – Electric field and equipotential plots – Electric field in free
 space, conductors, dielectric - Dielectric polarization – Dielectric strength - Electric field in multiple
dielectrics – Boundary conditions, Poisson’s and Laplace’s equations – Capacitance- Energy density.

UNIT III    MAGNETOSTATICS
Lorentz Law of force, magnetic field intensity – Biot–Savart Law - Ampere’s Law – Magnetic field
due to straight conductors, circular loop, infinite sheet of current – Magnetic flux density (B) – B in
free space, conductor, magnetic materials – Magnetization – Magnetic field in multiple media –
Boundary conditions – Scalar and vector potential – Magnetic force – Torque – Inductance – Energy
density – Magnetic circuits.

UNIT IV     ELECTRODYNAMIC FIELDS
Faraday’s laws – induced emf – Transformer and motional EMF – Forces and Energy in quasi-
stationary Electromagnetic Fields - Maxwell’s equations (differential and integral forms) –
Displacement current – Relation between field theory and circuit theory.

UNIT V     ELECTROMAGNETIC WAVES
Electromagnetic wave equations – Wave parameters; velocity, intrinsic impedance, propagation
constant – Waves in free space, lossy and lossless dielectrics, conductors – skin depth, Poynting

L: 45, T: 15, TOTAL: 60 PERIODS

TEXT BOOKS
1. Mathew N. O. Sadiku, “Elements of Electromagnetics”, Oxford University press Inc. 1st India
   Private Limited, New Delhi, 2006.

REFERENCES
13EE35  RENEWABLE ENERGY SYSTEMS  L T P C
3  0  0  3

COURSE OUTCOMES
On the successful completion of the course, the student should be able to,
- Apply the solar energy concept in various applications.
- Explain the fundamentals of wind energy.
- Indicate the essential of biomass energy.
- Describe the importance of geothermal energy.
- Discuss the concept of ocean energy.

UNIT I  SOLAR ENERGY COLLECTION, STORAGE AND APPLICATIONS  9
Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors - Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications - Solar heating / cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT II  WIND ENERGY  9

UNIT III  BIO-MASS  9

UNIT IV  GEOTHERMAL ENERGY  9

UNIT V  OCEAN ENERGY  9
Ocean Thermal Energy Conversion (OTEC) - Principles utilization - setting of OTEC plants - thermodynamic cycles - Tidal and wave energy: Potential and conversion techniques - mini-hydar power plants and their economics.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
13EE36  ELECTRON DEVICES AND CIRCUITS  

COURSE OUTCOMES
On the successful completion of the course, the student should be able to,

- Discuss the VI characteristics of diode and apply the diode concept in rectifiers.
- Analyze the VI characteristics of BJT and FET in different configurations.
- Analyze the different BJT Biasing Circuits and its applications.
- Describe the operation of amplifier and oscillators.
- Discuss the concepts of pulse circuits.

UNIT I  PN DIODE AND ITS APPLICATIONS  

UNIT II  BJT AND FETS  

UNIT III  BJT BIASING AND AMPLIFIERS  
- Need for biasing - Fixed bias and Different types of biasing circuits - Classification of amplifiers - CE CB amplifier and small Signal analysis - frequency response - Class A, B, AB, C&D - RC and transformer coupled power amplifiers - Class B complementary - symmetry, push-pull power amplifiers - Darlington connection.

UNIT IV  FEEDBACK AMPLIFIERS AND OSCILLATORS  

UNIT V  PULSE CIRCUITS  

L: 45, T: 15, TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
13EE37  DC MACHINES AND TRANSFORMERS LABORATORY  L  T  P  C  0  0  3  2

COURSE OUTCOMES
On the successful completion of the course, the student should be able to,
- Describe the performance of DC generators.
- Summarize the characteristics of DC motors under loaded conditions.
- Predetermine the performance of DC motors.
- Implement the speed control in DC shunt motor.
- Analyze the performance of transformers.

LIST OF EXPERIMENTS
1. Study of starters.
2. Open circuit and load characteristics of separately excited DC generators.
3. Open circuit and load characteristics of self excited DC shunt generators.
4. Load characteristics of DC compound generator.
5. Load characteristics of DC shunt and compound motor.
7. Swinburne’s test and speed control of DC shunt motor.
8. Hopkinson’s test on DC motor – Generator set.
9. Load test on single-phase transformer.
10. Open circuit and short circuit tests on single phase transformer.
11. Load test on three phase transformer.
12. Sumpner’s test on transformers.

TOTAL: 45 PERIODS
13EE38  ELECTRON DEVICES AND CIRCUITS LABORATORY  L T P C
                        0 0 3 2

COURSE OUTCOMES
On the successful completion of the course, the student should be able to,
- Describe the VI characteristics of PN diode and Zener diode and design the rectifier and regulator using PN and Zener Diode.
- Compute and Distinguish the VI characteristics of BJT, FET and UJT.
- Develop the Clipping and Clamping Circuits using PN Diode.
- Analyze the frequency response of Amplifiers.
- Illustrate the operation of Oscillators.

LIST OF EXPERIMENTS
1. Characteristics of PN diode and zener diode.
2. Diode Clippers and Clampers.
3. Single phase half wave and full wave rectifiers.
5. Characteristics of Transistor under CE, CC and CB configuration.
6. Characteristics of FET.
7. Characteristics of MOSFET.
8. Characteristics of UJT.
12. RC Phase Shift Oscillator.

TOTAL: 45 PERIODS
13EE41 NUMERICAL METHODS, MATHEMATICAL LOGIC, PROBABILITY AND STATISTICS

COURSE OUTCOMES
On the successful completion of the course, the student should be able to,

- Solve the algebraic equations and construct the interpolating polynomials.
- Develop skills in numerical integration and initial value problems.
- Use computational tools to solve ordinary differential equations and partial differential equations.
- Formulate and interpret statements presented in normal forms and determine their validity by applying the rules and methods of propositional calculus.
- Understand the mathematical basis and foundations of probability and statistics.

UNIT I SOLUTION OF ALGEBRAIC EQUATIONS AND INTERPOLATION 12

UNIT II NUMERICAL INTEGRATION AND INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 12

UNIT III BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 12
Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation.

UNIT IV MATHEMATICAL LOGIC 12

UNIT V PROBABILITY AND STATISTICS 12
Probability – Basic concepts – Baye’S Theorem; Statistics – Concepts on mean, median, mode, standard deviation and expectation – Skewness – Kurtosis – Correlation and Regression.

L: 45, T: 15, TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
On the successful completion of the course, the student should be able to,

- Analyze the performance of synchronous machines.
- Examine the performance of three phase induction machines.
- Discuss the starting and speed control methods of three phase induction motors.
- Describe the performance of single phase induction motor.
- Summarize the features of special machines.

UNIT I SYNCHRONOUS GENERATOR 12

UNIT II SYNCHRONOUS MOTOR 12

UNIT III THREE PHASE INDUCTION MOTOR 12

UNIT IV STARTING AND SPEED CONTROL OF THREE PHASE INDUCTION MOTOR 12
Need for starting – Types of starters – Cogging and Crawling – Speed control – Change of voltage, rotor resistance, number of poles and slip – Cascaded connection – Slip power recovery scheme.

UNIT V SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES 12

L: 45, T: 15, TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
On the successful completion of the course, the student should be able to,

- Summarize the basic concept of measurement system.
- Summarize the operation of various digital electronic instruments like digital voltmeter, multimeter etc. and its specifications.
- Recognize the measuring instruments for analog electrical quantities.
- Justify appropriate methods for measuring electrical and magnetic parameters.
- Design and explain the construction and working of various transducers.
- Illustrate the working of CRO and recorders.
- Tell the construction and working of CRO, LED, LCD.

UNIT I  INTRODUCTION  

UNIT II  MEASURING INSTRUMENTS  

UNIT III  BRIDGES  

UNIT IV  TRANSDUCERS  

UNIT V  DIGITAL INSTRUMENTS AND DISPLAY DEVICES  

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
5. www.cwet.tn.nic.in
13EE44   LINEAR INTEGRATED CIRCUITS AND ITS APPLICATIONS   L T P C
                      3  0  0  3

COURSE OUTCOMES
On the successful completion of the course, the student should be able to,
• Describe the IC fabrication procedure for basic electronic circuits.
• Infer the characteristics of Op-amp ICs.
• Design and construct the basic applications of Op-amp.
• Interpret the internal functional blocks and the applications of special ICs.
• Illustrate the operation of application ICs.

UNIT I    IC FABRICATION  9
IC classification - fundamental of monolithic IC technology, epitaxial growth, masking and etching, diffusion of impurities - Realization of monolithic ICs and packaging - Fabrication of diodes, capacitance, resistance and FETs.

UNIT II   CHARACTERISTICS OF OP-AMP  9
Ideal OP-AMP characteristics, DC characteristics, AC characteristics - offset voltage and current - differential amplifier - frequency response of OP-AMP - Basic applications of OP-AMP – summer, differentiator and integrator.

UNIT III APPLICATIONS OF OP-AMP  9
Instrumentation amplifier - first and second order active filters - V/I & I/V converters - comparators, multivibrators - clippers, clamplers, peak detector, S/H circuit, D/A converter - R-2R ladder and weighted resistor types - A/D converter -Dual slope, successive approximation and flash types.

UNIT IV   SPECIAL ICs  9

UNIT V    APPLICATION ICs  9
IC voltage regulators - LM317, 723 regulators, switching regulator, MA 7840, LM 380 power amplifier, ICL 8038 function generator IC, isolation amplifiers, opto coupler, opto electronic ICs.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
13EE45  DIGITAL LOGIC CIRCUITS  L T P C
3 1 0 4

COURSE OUTCOMES
On the successful completion of the course, the student should be able to,
• Devise the number systems and simplify Boolean functions
• Illustrate the various combinational circuits
• Design the synchronous and asynchronous circuits.
• Analyze the characteristics of digital ICs and memory devices.
• Develop VHDL coding for simple circuits.

UNIT I  BOOLEAN ALGEBRA AND COMBINATIONAL CIRCUITS  12
Boolean algebra: switching functions and simplification using K-maps & Quine McCluskey method, Parity checker - Design of adder, subtractor, comparators, code converters, encoders, decoders, multiplexers and Demultiplexers.

UNIT II  ANALYSIS AND DESIGN OF SYNCHRONOUS SEQUENTIAL CIRCUITS  12
Realization of Flip flops - SR, D, JK and T. Analysis of synchronous sequential circuits; design of synchronous sequential circuits – Counters state diagram; state reduction; state assignment. Shift Register, Sequence detector.

UNIT III  ANALYSIS AND DESIGN OF ASYNCHRONOUS SEQUENTIAL CIRCUITS  12
Analysis of asynchronous sequential machines, state assignment, asynchronous design problem.

UNIT IV  DIGITAL INTEGRATED CIRCUITS  12

UNIT V  VHDL  12

L: 45, T: 15, TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
13EE46  SIGNALS AND SYSTEMS  L T P C  3 1 0 4

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

- Recognize, analyze and manipulate basic continuous time (CT) and discrete time (DT) signals.
- Classify continuous and discrete time systems as to their linearity, time invariance, causality and stability.
- Represent and analyze both CT and DT Signals using appropriate transforms.
- Analyze both CT and DT Linear Time Invariant systems using appropriate transforms.

UNIT I  CLASSIFICATION OF SIGNALS AND SYSTEMS  12
Continuous time signals (CT signals), Discrete time signals (DT signals), Step, Ramp, Pulse, Impulse, Exponential. Classification of CT and DT signals, periodic and aperiodic, random signals, CT systems and DT systems, Basic properties of systems, Linear Time Invariant systems and properties.

UNIT II  ANALYSIS OF CONTINUOUS TIME SIGNALS  12
Fourier series analysis, Spectrum of CT signals, Fourier Transform and Laplace Transform in Signal Analysis.

UNIT III  LINEAR TIME INVARIANT - CONTINUOUS TIME SYSTEMS  12
Differential equation, Block diagram representation, Impulse response, Convolution integral, frequency response, LTI systems analysis using Fourier and Laplace transforms, State variable equations and matrix representation of systems.

UNIT IV  ANALYSIS OF DISCRETE TIME SIGNALS  12
Sampling of CT signals and aliasing, DTFT and properties, Z-transform and properties of Z-transform.

UNIT V  LINEAR TIME INVARIANT - DISCRETE TIME SYSTEMS  12
Difference equation, Block diagram representation, Impulse response, Convolution sum, LTI systems analysis using DTFT and Z-transforms, State variable equations and matrix representation of systems.

L: 45, T: 15, TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
13EE47 AC ROTATING MACHINES LABORATORY

COURSE OUTCOMES
On the successful completion of the course, the student should be able to,

- Compute the regulation of Three Phase Alternator using various methods.
- Evaluate the performance characteristics of AC motors.
- Explain the various starting methods of AC motors.
- Predict the performance characteristics of AC motors.

LIST OF EXPERIMENTS

2. Regulation of Three Phase Alternator by EMF methods.
3. Regulation of Three Phase Alternator by MMF methods.
4. Regulation of Three Phase Alternator by ZPF methods.
5. Regulation of Three Phase Alternator by ASA methods.
6. Regulation of Three Phase Salient Pole Alternator by Slip test.
7. Parallel operation of two Alternators.
8. V and Inverted V curves of Three Phase Synchronous Motor.
9. Load test on Three Phase Induction Motor.
10. No load and blocked rotor test on Three Phase Induction Motor.
12. Load test on Single Phase Induction Motor.
13. No load and blocked rotor test on Single Phase Induction Motor

TOTAL: 45 PERIODS
13EE48 INTEGRATED CIRCUITS LABORATORY  L T P C
0 0 3 2

COURSE OUTCOMES
On the successful completion of the course, the student should be able to,

- Realize adder, subtractor and code converters.
- Design and realize the basic applications of Op-amp and timer.
- Design and implement the 4-bit modulo counters as synchronous and asynchronous types.
- Illustrate the various combinational and sequential circuits.
- Examine the behavior of special ICs.

LIST OF EXPERIMENTS

1. Study of Basic Digital IC’s. (Verification of truth table for AND, OR, XOR, NOT, NOR, NAND, JK FF, RS FF, D FF).
2. Implementation of Boolean Functions, Adder/ Subtractor circuits.
3. (a) Code converters, Parity generator and parity checking, Excess-3, 2’sComplement, Binary to Gray Code using suitable IC’s.
    (b) Encoders and Decoders: Decimal and Implementation of 4-bit shift registers in SISO, SIPO, PISO, PIPO modes using suitable IC’s.
4. Counters: Design and implementation of 4-bit modulo counters as synchronous and Asynchronous types using FF IC’s and specific counter IC.
5. Shift Registers: Design and implementation of 4-bit shift registers in SISO, SIPO, PISO, PIPO modes using suitable IC’s.
7. Timer IC application: Study of NE/SE 555 timer in Astable, Monostable operation.
9. Study of Analog to Digital Converter and Digital to Analog Converter: Verification of A/D conversion using dedicated IC’s.
10. Study of VCO and PLL ICs:
    i. Voltage to frequency characteristics of NE/ SE 566 IC.
    ii. Frequency multiplication using NE/SE 565 PLL IC.

TOTAL: 45 PERIODS
13EE49  COMMUNICATION SKILLS AND TECHNICAL SEMINAR  L T P C
0 0 3 2

COURSE OUTCOMES
On the successful completion of the course, the student should be able to,
- Express themselves fluently and appropriately in social and professional contexts.
- Develop the sub-skills required for paper presentations and group discussions.
- Acquire the soft skills and interpersonal skills which will help them to excel in their workplace.

A) LANGUAGE FUNCTIONS  15
1. Compare and contrast
2. Giving reasons
3. Reporting
4. Expressing agreement and disagreement
5. Evaluating different standpoints
6. Analyzing a problem and giving solution.
7. Describing daily routines, events, and weather
8. Describing Objects
9. Defending a point of view
10. Talking about future plans and intentions

Language Functions:
The teacher should build micro activities to develop the use of language required to handle these Sub-functions of communication. In the process, the learners should get used to the linguistic Elements needed for these functions.

B) SPEECH PRACTICE  15
The themes are:
1. Cloning
2. Artificial satellites
3. Renewable sources
4. Telecommunication
5. Cyber Revolution
6. Space research
7. Polythene pollution
8. Fossil fuels
9. Safety measures in Automobiles
10. Ecological threats
11. Water resources
12. Nuclear technology
13. Scientific farming
14. Thermal power plants
15. Nano Technology
16. Robotics
17. Artificial intelligence
18. Role of Fibre Optics
19. Exploration of Mars
20. Gas turbines
21. Indian space missions
22. Converting agricultural wastes for useful purposes
23. Developments in transportation
24. Scientific farming
25. Impact of global warming
26. Desalination of water
27. Technology for national security
28. Industrial development and ecological issues  
29. Recent trends in Automobiles  
30. Hazards of E-waste  
31. Mobile Jammer  
32. Touch Screen Technology  
33. Tidal Power  
34. 3G Technology  
35. Tsunami Warning System  
36. Blue Tooth Technology

Seminar presentation on the themes allotted:
Each student should collect materials from Books, Internet, Journals and Newspapers for his/her theme and prepare a short Seminar Paper for 4 to 5 Pages. The presentation should be for 10 minutes using power point frames. It should be followed by a Viva Voce during which others should come forward to question, clarify, supplement or evaluate.

C) GROUP DISCUSSION / DEBATE  
Grouping (each group consisting of 12 members)  
Topics (12 topics – 3 topics to be selected by each group - to be practiced in cycles)  
Group Discussion / Debate Topics:
1. Advertising is a legalized form of lying- Discuss.  
2. Communicative competency in English is the golden key for success in the Global arena.  
3. Is it just to force people to retire?  
4. Attitude decides one’s altitude in life.  
5. Should an aspiring student go for a course which is in demand or for a course which he/she likes?  
6. Is westernization a cultural degradation or enrichment?  
7. Is brain drain a threat to India?  
9. Do mobile phones spoil the youth?  
10. No two generations see eye to eye- Discuss.  
11. Is scientific advancement a boon or a bane?  
12. Does ragging develop friendship?

D) SPEAKING ON THE GIVEN PICTURE/DIAGRAM/CHART/TABLE  
RECORD LAY OUT:
Every student has to maintain a record in which he/she has to incorporate the following details.  
• First page containing learner details and the topic of specialization  
• Use of appropriate Language used in Language Function should be listed.  
• Three newspaper cuttings or journal or internet sources related to the specialized theme. (To be pasted on the pages)  
• 10 Quiz questions of the specialized topic with expected answers.  
• The seminar paper presented by the learner (to be pasted).  
• Notes of observation - Lab. (Details about Interview skills – GD – Soft skills)  
• The record should be duly signed by the course teacher and submitted to the External Examiner for verification during the semester practical.

TOTAL: 45 PERIODS

REFERENCES