REGULATIONS – 2015

DEPARTMENT OF
ELECTRONICS AND INSTRUMENTATION ENGINEERING

CURRICULUM & SYLLABUS - FIRST YEAR
B.E. – ELECTRONICS AND INSTRUMENTATION ENGINEERING
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
VISION

- Achieving excellence in Teaching–Learning, Research and Consultancy among nationwide peer groups.

MISSION

The EIE department will achieve its vision by:

- Offering well–balanced curriculum to acquire professional competencies and transferable skills.
- Bringing innovations in Teaching-Learning process through effective content delivery and appropriate assessment methods.
- Catalyzing the research activities of both faculty members and students through more and more sponsored research projects.
- Rendering its consultancy services by providing instrumentation solutions to the nearby Industries.

Program Educational Objectives (PEO)

Within a few years (3 to 5 years) of graduation, our graduates are expected to

1. be an engineer in Design, Manufacturing, Marketing, Operation and Maintenance with the technical and managerial skills in the fields of Measurement, Control, Robotics, and Automation Engineering Technology.

2. utilize modern and effective management skills for Performing Investigation, Analysis and Synthesis in the implementation of instrumentation and automatic control systems.

3. pursue higher studies at the institutes of repute in India and abroad and work in Educational Institutions, Research Organizations and Engineering Consultancy Companies and be successful entrepreneurs.

4. collaborate in multi disciplinary teams and be the leaders in their organization, their profession and in society.
Program Outcomes (PO)


2. Identify, formulate, research literature and analyse complex Engineering problems in Measurement & Instrumentation Systems, Control & Automation Systems and Computer Systems reaching substantiated conclusions using first principles of mathematics, Physics, Mechanics, Chemistry, Thermal Sciences, Earth Sciences, Biological Sciences and Engineering Sciences.


4. Conduct investigations of complex Electronics and Instrumentation Engineering problems in the areas of Instrumentation Devices and automatic control systems using research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

5. Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex Electronics and Instrumentation engineering problems pertaining to Electronics systems, Measurements, Control, Robotics and Automation with an understanding of the limitations.

6. Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice in the fields of Electronics system, Measurements, Control, Robotics and Automation and solutions to complex Electronics and Instrumentation Engineering problems.

7. Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex Electronics and Instrumentation Engineering Problems engineering problems in societal and environmental contexts.

8. Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

9. Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Demonstrate knowledge and understanding of engineering management principles and economic decision making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.
## B.E. – ELECTRONICS AND INSTRUMENTATION ENGINEERING

### REGULATIONS – 2015

**FIRST YEAR CURRICULUM AND SYLLABUS**

### SEMESTER – I

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MAC - Mandatory Course, CFC - Common Foundation Course, SFC - Specific Foundation Course, PCC – Programme Core Course, XEC - X Stands for P or O (PEC – Programme Elective Course, OEC – Open Elective Course)

<sup>®</sup>*Common to all B.E. / B.Tech., Programmes, @Common to EEE and EIE
### Question pattern

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### FORMAT FOR COURSE CODE

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- **1**: Course Number
- **5**: Semester Number
- **E**: Branch Name
- **I**: Compulsory Course
- **2**: Regulations 2015
- **3**: 1 Qn Compulsory & 4 Qns (either or type)
COURSE OUTCOMES

Upon completion of this course, the students will be able to

CO1: acquire the basics of English communication skills. (K3)

CO2: apply the basic language skills to understand various aspects of technical writing. (K3)

CO3: understand main ideas, specific details and implied meaning while listening and develop the factual & imaginative information. (S4)

CO4: coordinate and communicate in a wide range of situation. (S4)

CO5: integrate and apply the acquired skills in real life situation. (S4)

UNIT I

Parts of Speech - Sentence Structure (SV/SVO/SVC/SVIODO) - Identifying the kinds of sentences (Statement, Interrogative, Imperative, Exclamatory & Negative) - Informal writing (Diary writing & letter to friend/ parent/siblings) - Self Introduction - Listening for general information.

UNIT II

Transformation of words into different grammatical forms- Converting one kind of sentence into another sentence (Statement, Interrogative, Imperative, Exclamatory & Negative) - Technical Vocabulary - Tense Usage (Present tense- Past tense - Future tense - Writing passages in all tenses) - Letter writing (Permission letter & Requisition letter) - Listening for specific information.

UNIT III

Personality Adjective - Concord - Letter Writing: Invitation / Acceptance letters - Itinerary Writing (with valued points/ situation) - Phonetics (Vowels - Consonants - Diphthongs) - Listening and filling up the information - Process Description (with valued points).

UNIT IV

IF Conditionals - British & American Vocabulary - Letter Writing (Declining / Thanking letters) - Email writing (with valued points) - Instruction Writing - Listening and giving opinion on the pictures.

UNIT V

Reading comprehension - Error Spotting (Article, Preposition, Modals and Concord) - Presenting article based on newspaper reading- Situational Conversation - Listening and writing dialogues – Checklists.

L: 45 TOTAL: 45 PERIODS

Suggested Activity: Each student should read the suggested fiction for oral assignment

TEXT BOOKS


REFERENCES


Listening files: Audio files from net sources, Softwares: ODLL, Globerena.
COURSE OUTCOMES
Upon completion of this course, the students will be able to

CO 1: make use of orthogonal transformation. (K3)
CO 2: use the basic concepts of three dimensional geometry in engineering. (K2)
CO 3: obtain maxima and minima of real valued functions. (K3)
CO 4: solve ordinary differential equations. (K3)
CO 5: solve partial differential equations. (K3)

UNIT I MATRICES 15
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Independence and dependency of Eigen vectors – Properties of Eigen values and Eigen vectors (excluding proofs) - Diagonalisation of a matrix by orthogonal transformation- Quadratic forms – Reduction of quadratic form to canonical form by orthogonal transformation and its nature.

UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY 15
Direction cosines and Direction ratios- Planes and Lines - Equations of plane and line - Intersection of two planes - Shortest distance between two lines - Equation of a sphere - Plane section of a sphere - Tangent Plane - Orthogonal spheres.

UNIT III FUNCTIONS OF SEVERAL VARIABLES 15
Euler's theorem on homogeneous functions of two variables - Taylor’s Series - Jacobians - Maxima and Minima - Constrained Maxima and Minima by the method of Lagrange multipliers.

UNIT IV ORDINARY DIFFERENTIAL EQUATIONS 15
Solutions of higher order linear differential equations with constant coefficients - Cauchy’s and Legendre’s linear equations - Solutions of simultaneous first order linear equations with constant coefficients - Method of variation of parameters.

UNIT V PARTIAL DIFFERENTIAL EQUATIONS 15

L: 45 T: 30 TOTAL: 75 PERIODS

TEXT BOOKS

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

CO 1: summarize the properties and structures of solids. (K2)
CO 2: define the principles of acoustics and ultrasonics and apply the ultrasonic methods for industrial and medical field. (K1)
CO 3: choose the appropriate Laser technique for industrial and medical applications. (K3)
CO 4: describe the different types, fabrication, losses of optical fibers and their applications in communication and instrumentation.(K1)
CO 5: explain the physical properties of photons & electrons and their applications in different electron microscopes.(K2)

UNIT I PROPERTIES OF MATTER AND CRYSTAL PHYSICS
Hooke’s law - Types of moduli of elasticity - Determination of Rigidity modulus and Young’s modulus - I shaped Girders.
Miller indices – d spacing - Characteristics of SC, BCC, FCC and HCP structures.

UNIT II ACOUSTICS AND ULTRASONICS
Ultrasonics: Production - magnetostriiction generator - piezoelectric generator, Properties - Cavitations - Velocity measurement - acoustic grating, Industrial applications - Medical application - Sonograms.

UNIT III LASER SYSTEM AND APPLICATIONS

UNIT IV FIBER OPTICS AND ITS APPLICATIONS
Numerical aperture and Acceptance angle - Types of optical fibers - Double crucible technique – Splicing - Loss in optical fiber - Fiber optical communication system - Applications - Fiber optic sensors - Endoscope.

UNIT V QUANTUM PHYSICS
Photo electric effect - Matter Waves - Davisson and Germer experiment - Heisenberg’s Uncertainty principle - Schrodinger’s wave equation - particle in one dimensional box - Electron microscope - Scanning electron microscope - Transmission electron microscope.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES

Upon completion of this course, the students will be able to

CO 1: identify suitable water treatment techniques for industrial and domestic purpose. (K3)
CO 2: explain the type of corrosion and corrosion control methods. (K2)
CO 3: select the polymer for specific application. (K3)
CO 4: explain nano materials preparation. (K2)
CO 5: outline the principle and instrumentation of various analytical techniques. (K2)

UNIT I WATER TREATMENT

UNIT II CORROSION AND ITS CONTROL
Chemical corrosion – electrochemical corrosion – mechanism – different types of electrochemical corrosion – factors influencing corrosion – corrosion control methods.

UNIT III ENGINEERING POLYMERS

UNIT IV NANO MATERIALS
Nanoparticles – synthesis of CNT – precipitation, thermolysis, hydrothermal, solvothermal, electrodeposition, chemical vapour deposition, laser ablation – toxic effect of nano materials- properties and applications.

UNIT V ANALYTICAL TECHNIQUES
Principle, instrumentation and applications of UV-Visible and IR spectroscopy; chromatography: instrumentation and working of gas chromatography and HPLC; conductivity measurements – pH measurements – applications.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
15SH15C                        INTRODUCTION TO ENGINEERING                        L T P C
(Co mmon to all B.E./B.Tech. Degree Programmes)                        2 0 0 2

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
   CO 1: recognizes the needs of engineering and should be able to acquaint with various
   fields of engineering and technology. (A4, K2)
   CO 2: practices how to be successful in work and life in general. (K2, S3, A5)
   CO 3: feels proud to be an engineering student. (A4)
   CO 4: appreciates the initial career profiles of engineers. (A3)
   CO 5: prepares for an Engineering Career. (A5)
   CO 6: should be able to appreciate creative thinking means to provide engineering solution
   (K2, A3)
   CO 7: should be able to appraise the values of Outcome Based Education and Choice
   Based Credit System. (K2, A2)

UNIT I   HISTORY OF ENGINEERING AND INTRODUCTION TO ENGINEERING PROFES SION
History of Engineering: Definition of Engineering, The Beginnings of Engineering, Overview of
ancient Engineering, Traveling through the Ages, A case study of two historic Engineers –
Lionardo da Vinci, Gutenberg.
Introduction to Engineering Profession: Engineering work is all around you - Engineering as a
profession and common traits of Good Engineers – History of Engineering Disciplines – Functions
of Engineering.

UNIT II CAREER PATHS OF ENGINEER AND PREPARING FOR AN ENGINEERING CAREER
Career Paths for Engineers: The corporate ladder, The independent entrepreneur, Employment
Opportunities in Government, The military, Engineering and social service abroad, The
Engineering Professor, Graduate work outside of engineering, A mix of two or more of the first six
options.
Preparing for an Engineering Career: Making the Transition from High School to College -
Budgeting Your Time - Daily Studying and Preparation - Getting Involved with an Engineering
Organization - Your Graduation Plan - Other Considerations.

UNIT III PROFILES OF ENGINEERS
Initial Career Profiles of Civil, Mechanical, Electrical, Electronics, Instrumentation, Communication,
Information Technology, Computer Engineering Graduates.

UNIT IV OVERVIEW OF OBE AND CBCS
Graduate attributes of Washington Accord – Programme Specific Criteria (PSC) – Programme
Educational Objectives (PEOs) – Programme Outcomes (POs) – Course Outcomes (COs) –
CBCS : Course categories - Scheme of instruction, Assessment and Evaluation.

UNIT V LEARNING AND CREATIVE THOUGHT
Introduction: The successful engineering student - the engineering curriculum - curriculum
planning and management - adapting to the college classroom.
The learning process: the nature of learning - information processing and memory - determinants
of efficient learning - practical suggestions for learning.
Differences in the way people think: The four-quadrant model of thinking - hindrances to
problem solving.
On Creativity: What is creativity? - the nature of creativity - characteristics of creative people - the creative process - overcoming obstacles to creative thinking.

L: 30 TOTAL: 30 PERIODS

REFERENCES

WEB RESOURCES
www.ieagreements.org/IEA-Grad-Attr-Prof-Competencies.pdf
COURSE OUTCOMES

Upon completion of this course, the students will be able to

CO 1: use the drawing instruments effectively. (K2, S4, A3)
CO 2: draw the projections of points, straight lines, planes. (K2, S3, A3)
CO 3: construct the projections of various solids in different positions. (K3, S3, A3)
CO 4: draw the sectional views of various solids and construct the true shape of the section. (K3, S3, A3)
CO 5: identify and draw the surface areas of simple solids. (K3, S3, A3)
CO 6: draw perspective views of simple solids and draw the orthographic views of simple objects. (K3, S3, A3)

UNIT I PROJECTION OF POINTS, LINES AND PLANE SURFACES 12

Drawing Instruments- IS specifications on lines- drawing sheets- Printing letters and dimensioning- scales - First angle projection. (Not for examination).
Projections of points and straight lines located in the first quadrant-Determination of true lengths and true inclinations. Projections of regular polygonal surfaces and circular lamina inclined to both reference planes

UNIT II PROJECTION OF SOLIDS 12

Projections of simple solids - axis inclined to one reference plane - change of position method.

UNIT III SECTION OF SOLIDS 12

Sectioning of simple solids - cutting planes inclined to one reference plane and perpendicular to the other.

UNIT IV DEVELOPMENT OF SURFACES AND ISOMETRIC PROJECTIONS 12

Development of lateral surfaces of simple and truncated solids - Principles of isometric projection and view of simple solids - truncated prism and pyramids.

UNIT V PERSPECTIVE PROJECTIONS AND ORTHOGRAPHIC PROJECTIONS 12

Perspective projection of cube, prisms and pyramids by visual ray method and vanishing point method. Orthographic projection – simple objects with straight and curved surfaces.

L: 30 P: 30 TOTAL: 60 PERIODS

TEXT BOOKS


REFERENCES

PART A – ENGINEERING PHYSICS LABORATORY

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO1: demonstrate the properties of light waves. (K2, S3)
CO2: interpret the production of ultrasounds and how the velocity of ultrasounds varies with respect to medium. (K2, S3)
CO3: illustrate the mechanical and electrical properties of materials. (K2, S3)

LIST OF EXPERIMENTS
1. Determination of thickness of a thin wire – Air wedge method.
2. Determination of velocity of sound and compressibility of the liquid – Ultrasonic Interferometer.
3. Determination of Dispersive power of a prism using Spectrometer.
5. Torsional pendulum – Determination of Moment of Inertia of the disc and Rigidity modulus of the material of the wire.
6. Determination of specific resistance of a given coil of wire – Carey Foster’s Bridge.
10. Determination of temperature coefficient of resistance.

P:15 TOTAL: 15 PERIODS

PART B - ENGINEERING CHEMISTRY LABORATORY

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO1: estimate the amount of hardness of the water sample (K5, S3)
CO2: determine the rate of corrosion (K5, S3)
CO3: synthesize a polymer and to determine molecular weight of the polymer (K6, S3)
CO4: synthesize silver nano particles (K6, S6)
CO5: quantify different ions by different analytical techniques (K5, S3)

LIST OF EXPERIMENTS
1. Estimation of hardness of water sample by EDTA method
2. Rate of corrosion- weight loss method
3. Synthesis of urea-formaldehyde resin
4. Determination of molecular weight of a polymer – Oswald’s viscometer
5. Synthesis and characterization of silver nano particles.
6. Estimation of iron (Fe$^{2+}$) in water sample by dichrometry
7. Estimation of hydrochloric acid by conductometric method
8. Estimation of mixture of acids by conductometric method

P: 15 TOTAL: 15 PERIODS

- A minimum of FIVE experiments shall be offered.
- Laboratory classes on alternate weeks for Physics and Chemistry.
REFERENCES
PART A - MECHANICAL LABORATORY

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: prepare basic carpentry jobs (at least three joints). (K3,S2,A2)
CO 2: prepare the welded joint (minimum three) using arc and gas welding. (K3,S2,A2)
CO 3: Machine metals using lathe, shaper and drilling machine (each one job). (K3,S2,A2)

UNIT I CARPENTRY PRACTICES 5
Study of carpentry tools – preparation of joints like half lap, Tee and dove tail in wood.

UNIT II WELDING 5
Study of welding tools – Preparation of welded joints with Mild steel specimen like lap, butt and tee joints using ARC and Gas welding. (any one exercise should be given using Gas welding among three)

UNIT III BASIC MACHINING PRACTICES 5
Simple turning and taper turning using lathe – use of shaper and drilling machine for basic operations (Minimum three exercises should be given for students)

P: 15 TOTAL: 15 PERIODS

TEXT BOOK

REFERENCES
PART – B ELECTRICAL AND ELECTRONICS LABORATORY

COURSE OUTCOMES
Upon completion of this course, the students will be able to,
CO 1: develop simple residential wiring circuits. (K6)
CO 2: calculate the basic electrical quantities. (K4)
CO 3: identify the value of resistance using appropriate methods. (K4, A4)
CO 4: realize the fundamentals of Boolean algebra using digital logic gates. (A4)
CO 5: practice soldering to design PCB for electronic circuits. (A5)

I. ELECTRICAL ENGINEERING PRACTICE 8
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 7
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.

P: 15 TOTAL: 15 PERIODS

REFERENCES
COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: contribute the lingual power to frame sentences in different context. (A2)
CO 2: write effectively in any Professional context. (A2)
CO 3: acquire the skills related to Group discussion. (A2)
CO 4: communicate and respond in different social and professional contexts. (A3)
CO 5: recall the acquired skills in solving competitive exam. (K3)

UNIT I
Phrasal Verbs (Based on root words: call, come, get, look, put, run, and take) - Foreign Words and Phrases (from the given list) - Listening to audio files and finding the technical words and framing different sentences - Channel conversion- Descriptive writing on various charts.

UNIT II
Idioms and Phrases (with animal names from the given list) - Report writing (types-structure-stages in report writing- model report) - Job Application Letter with curriculum vitae.

UNIT III
One word substitution (from the list given) Group Discussion (Why is GD a part of selection process? - Structure of GD – Strategies in GD – Team Work - Body Language - Video Samples-GD).

UNIT IV
Choosing a suitable connotation (from the given list) - Note making – Preparing Circular and Minutes of meeting – Listening to TED Talks – Giving opinion on the given TED Talks and interviewing the TED talkers.

UNIT V
Error Spotting (Tense, Relative Pronouns, Conjunctions, Sentence Structure, Adverb Placement) Sentence Completion - Reading comprehension.

L: 45 TOTAL: 45 PERIODS

Activity: Each student should read the suggested fiction for oral assignment.

TEXT BOOK

REFERENCES

Listening files: Audio files from net sources and softwares: ODLL, Globerena.
COURSE OUTCOMES

Upon completion of this course, the students will be able to

CO 1: compute and change variables in double and triple integrals. (K3)
CO 2: analyze the concepts related to vector calculus and apply them in engineering field. (K3)
CO 3: use the concepts of multivariate random variables. (K2)
CO 4: calculate the various measures of dispersion. (K3)
CO 5: explain and successfully apply all aspects of appropriate testing techniques. (K3)

UNIT I            MULTIPLE INTEGRALS            15
Double integration – Cartesian and polar coordinates - Change of order of integration- Change of variables - Cartesian to polar coordinates- Area as double integral- Triple integration - Cartesian and polar coordinates – Change of Variables- Cartesian to spherical and cylindrical coordinates.

UNIT II           VECTOR CALCULUS             15

UNIT III          PROBABILITY               15
Discrete and continuous random variables – Moments - Moment generating function and their properties- Normal Distribution - Joint distributions - Marginal and conditional distributions - Covariance - Correlation and Regression.

UNIT IV           STATISTICS                15
Mean, median, mode and standard deviation – Moments – Skewness – Kurtosis - Correlation of single and bivariate frequency distributions – Regression lines.

UNIT V            TESTING OF HYPOTHESIS       15
Sampling distributions - Tests for single mean, Proportion, Difference of means (for large samples) – Tests for single variance and equality of variances – t-test, F-Test and Chi-square test for goodness of fit – Independence of attributes.

L: 45 T: 30 TOTAL: 75 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: explain the electrical properties of conducting and semiconducting materials.(K2)
CO 2: summarize the physics underlying the magnetic and superconducting behaviour of materials. (K2)
CO 3: predict the mechanism by which the electric field interacts with dielectric material and their applications.(K2)
CO 4: define the mechanical behavior of engineering materials.(K1)
CO 5: describe the properties of advanced materials properties which are used in engineering applications and devices.(K1)

UNIT I  CONDUCTING MATERIALS AND SEMICONDUCTORS  
Conductors:
Semiconductors:
Types of Semiconductors - Intrinsic and Extrinsic Semiconductors – Definition - Hall effect.

UNIT II  MAGNETIC MATERIALS AND SUPERCONDUCTORS 
Magnetic materials:
Superconductors:
BCS Theory, Properties - Meissner effect – Isotopic effect, Type I and Type II superconductors Applications of superconductors – Cryotron, SQUID, Magnetic levitation.

UNIT III  DIELECTRIC MATERIALS 
Types of dielectric materials - polar and non-polar dielectrics - Types of Polarization – electronic, ionic, orientation and space charge polarization - frequency and temperature dependence of polarization, internal field - Clausius – Mosotti relation - dielectric loss and dielectric breakdown - Applications of dielectric materials - Ceramic materials - properties and applications.

UNIT IV  MECHANICAL BEHAVIOR OF ENGINEERING MATERIALS 
Elastic behavior of materials - plastic deformation in single and polycrystalline crystal – mechanism of slip, critical resolved shear stress ductile and brittle failure – Griffith's theory of brittle fracture.

UNIT V  ADVANCED ENGINEERING MATERIALS 
Shape memory alloys (SMA) - Nano materials - Solar cell – Biomaterials – Preparation, Properties and Applications

TEXT BOOKS

REFERENCES
15EI24C ELECTRIC CIRCUIT ANALYSIS L T P C 3 2 0 4

COURSE OUTCOMES
Upon completion of this course, the students will be able to
   CO 1: explain basic concepts of electric potential, current, power and electric network topology including nodes, branches and loops. (K2)
   CO 2: explain the relationship between voltage and current in resistors, capacitors and inductors. (K2)
   CO 3: simplify and analyze the electric circuits using network theorems. (K3)
   CO 4: apply mesh and nodal technique to analyze the circuit (K3)
   CO 5: analyze the dynamic behavior of the first and second order AC and DC circuits. (K3)

UNIT I ELECTRIC CIRCUIT ELEMENTS AND ITS INTERCONNECTION 15

UNIT II TRANSIENT RESPONSE OF ELECTRIC CIRCUITS 15
Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and AC

UNIT III NETWORK ANALYSIS AND THEOREMS FOR DC AND AC CIRCUITS  15
Mesh and nodal analysis for DC and AC circuits - Thevenin’s and Norton’s Theorem – Superposition Theorem – Maximum Power Transfer Theorem – Reciprocity Theorem and their applications.

UNIT IV RESONANCE AND COUPLED CIRCUITS 15

UNIT V INTRODUCTION TO TWO-PORT NETWORK FUNCTIONS 15

L: 45 T: 30 TOTAL: 75 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: recognize the system fundamentals and the role of hardware components of the Computer. (K3)
CO 2: apply the basic concepts and solve simple problems by analyzing the logics of conditional statements and looping constructs. (K3)
CO 3: handle similar types of data using array and utilize their functionality. (K3)
CO 4: appreciate the call by value and call by reference features in functions. (K5)
CO 5: design programs involving their own derived data types, pointers, memory allocation concepts. (K4)
CO 6: handle the file contents with access permissions. (K3)

UNIT I COMPUTER FUNDAMENTALS

UNIT II BASIC C PROGRAMMING
Overview of C Program – Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output operations – Decision Making and Branching – Decision making and Looping.

UNIT III ARRAYS AND FUNCTIONS

UNIT IV STRUCTURES AND POINTERS

UNIT V FILES AND DYNAMIC MEMORY ALLOCATION
File management in C – Defining and opening a file – closing a file - Input and Output operations on file – Error handling during IO operations – Random access to files – Command line Arguments. Dynamic memory allocation: Allocating a block of memory - Allocating a multiple block of memory – Releasing the used space – Altering the size of a block.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
15EI26C
ENVIRONMENTAL SCIENCE AND ENGINEERING
(Common to all B.E. / B.Tech. Degree Programmes)
L T P C
3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: explain the structure and function of ecosystem (K2)
CO 2: recognize the values of biodiversity and natural resources and the ways to protect
the biodiversity of his /her locality (K1)
CO 3: explain the causes and effects of pollution (K2)
CO 4: describe social issues related to the environment and the environment act (K2)
CO 5: identify the nutrients in food and impact of metals on human health (K1)

UNIT I
ENVIRONMENT AND ECOSYSTEMS
Scope and importance of environment – need for public awareness –ecosystem – structure and
function of an ecosystem – energy flow in the ecosystem – forest and aquatic ecosystems – Field
study of simple ecosystems – pond and forest.

UNIT II
BIODIVERSITY AND NATURAL RESOURCES
Biodiversity: genetic, species and ecosystem diversity – threats to biodiversity – endangered and
endemic species in India – conservation of biodiversity; forest resources: use and over-exploitation
– deforestation - dams and their effects on forests and tribal people – water resources: use and
overutilization of surface and ground water – role of an individual in conservation of natural
resources.

UNIT III
ENVIRONMENTAL POLLUTION
Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution
and nuclear hazards – solid waste management – e-waste – toxic substances in e-waste – risks
related to toxic substances – role of an individual in prevention of pollution.

UNIT IV
SOCIAL ISSUES, HUMAN POPULATION AND ENVIRONMENTAL LAW
Water conservation – rain water harvesting – climate change – global warming, acid rain, ozone
layer depletion – population growth – population explosion – family welfare programme;
environment laws: the water (prevention and control pollution) act, 1974-the air (prevention and
control of pollution) act, 1981-environmental (protection) act,1986-the wild life (protection) act
1972.

UNIT V
FOOD AND HUMAN HEALTH
Carbohydrates, amino acids, proteins, lipids and vitamins in balanced diet food; disease caused by
deficiency of carbohydrates, amino acids, proteins, lipids and vitamins - food adulteration - simple
test for food adulterants; environmental toxicology: metals in environment- impacts of fluoride,
arsenic, cadmium, mercury and chromium on human health.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS
   Co., 2012.

REFERENCES
PART A – PHYSICS LABORATORY

COURSE OUTCOMES

Upon completion of this course, the students will be able to

CO 1: demonstrate the optical properties of waves. (K2, S3)
CO 2: analyze the characteristics of semiconducting materials and devices. (K3, S3)
CO 3: quantify the acceleration due to gravity (g). (K2, S3)
CO 4: analyze the thermal properties of materials. (K3, S3)

LIST OF EXPERIMENTS

1) (a) Determination of wave length of Laser source.
(b) Particle size determination using Diode Laser.
(c) Determination of Numerical aperture and acceptance angle of an optical fiber.
2) Determination of Band Gap of a semiconductor material.
4) Determination of wavelength of mercury spectrum using spectrometer & grating
5) Determination of thermal conductivity of a bad conductor – Lee’s Disc method.
6) Determination of g using compound pendulum
7) Determination of Hall Coefficient.
8) Specific heat capacity of liquid – Newton’s law of cooling.
9) Characteristics of LED
10) Study of V-I characteristics of a solar cell.

P: 15 TOTAL: 15 PERIODS

PART – B ENVIRONMENTAL CHEMISTRY LABORATORY

COURSE OUTCOMES

Upon completion of this course, the students will be able to

CO 1: quantify the amount of acidity, alkalinity, DO and COD present in water sample. (K5, S3)
CO 2: analyse the ions present in the soil. (K4, S3)
CO 3: quantify the amount of chloride ion in water sample. (K5, S3)
CO 4: identify the adulteration in food samples. (K1, S3)
CO 5: estimate the amount of metal ions in water sample. (K5, S3)

LIST OF EXPERIMENTS

1. Estimation of acidity of Water sample.
2. Estimation of alkalinity of Water sample.
3. Determination of Dissolved Oxygen (DO) in water sample. (Winkler’s method)
4. Determination of COD in water sample.
7. Estimation of chloride ion in water sample by argentometric method.
8. Simple adulteration test in food samples.

P: 15 TOTAL: 15 PERIODS

• A minimum of FIVE experiments shall be offered.
• Laboratory classes on alternate weeks for Physics and Environmental Chemistry.
REFERENCES
COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: solve the given problem using the syntactical structures of C language. (K3)
CO 2: develop, execute and document computerized solution for various logic based
problems using the flow control features of C language. (K3)
CO 3: enhance the programming skills in C by discriminating constants, variables and
arrays and the functionality. (K3)
CO 4: learn about the connection between function return values and variables. (K5)
CO 5: develop programs using string manipulation and file manipulation functions. (K3)

Simple programs
1. Solve problems such as temperature conversion, student grading, interest calculation.
2. Solving the roots of a quadratic equation
3. Designing a simple arithmetic calculator. (Use switch statement)
4. 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

Programs using different control structures
5. Performing the following operations:
   a. Generate Pascal’s triangle.
   b. Construct a Pyramid of numbers.
6. Generation of the first \( n \) terms of the Fibonacci sequence and prime sequence.
8. Finding the 2’s complement of a binary number.

Programs using arrays
9. Performing the following operations:
   a. Matrix addition.
   b. Transpose of a matrix.
   c. Matrix multiplication by checking compatibility.

Programs using string manipulation
10. Performing the following operations to a string:
    a. To insert a sub-string into main string at a given position.
    b. To delete \( n \) characters from a given position in a string.
    c. To replace a character of string either from beginning or ending or at a specified
        location.

Programs using functions
11. Performing the following operations: (Use recursive functions)
    a. To find the factorial of a given integer.
    b. To find the GCD (Greatest Common Divisor) of two given integers.
    c. To solve Towers of Hanoi problem.

Programs using files
12. Performing the Student Information Processing using Structures and File handling
    concepts.

P:30 TOTAL: 30 PERIODS
15EI29C                             ELECTRIC CIRCUIT ANALYSIS LABORATORY               L   T   P   C
                                              0   0   2   1

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: demonstrate the basic concepts of electric circuits. (K2, S3)
CO 2: examine the electric circuits using mesh and nodal analysis. (K2, S3)
CO 3: analyze electric circuits using network theorems. (K3, S3)
CO 4: compute the frequency response of resonant and tuned circuits. (K2, S3)
CO 5: analyze electric circuits using simulation software. (K3, S3)

LIST OF EXPERIMENTS
1. Verification of Ohm’s law and Kirchoff’s law.
2. Transient response of RL and RC circuits for DC input.
3. Verification of mesh and nodal analysis.
4. Verification of Thevenin’s and Norton’s theorem.
5. Verification of Superposition theorem.
6. Verification of Maximum Power Transfer theorem.
7. Verification of Reciprocity theorem.
10. Frequency response of single tuned coupled circuits.
11. Study of two-port network.
12. Verification of network theorems and response of the given circuits using simulation software.

P: 30 TOTAL: 30 PERIODS