REGULATIONS - 2015

DEPARTMENT OF

COMPUTER SCIENCE AND ENGINEERING

CURRICULUM & SYLLABUS - FIRST YEAR

B.E. – COMPUTER SCIENCE AND 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

- To produce globally competent, innovative and socially responsible computer professionals

MISSION

- To provide world-class teaching-learning and research facilities.
- To stimulate students’ logical thinking, creativity, and communication skills effectively.
- To cultivate awareness about emerging trends through self-initiative.
- To instill a sense of societal and ethical responsibilities.
- To collaborate with industries and government organizations.

Program Educational Objectives (PEO)

- Accomplish their professional career and/or pursue higher education by applying knowledge of computer science and engineering.
- Exhibit their technical skills to analyze and design appropriate solutions with social consciousness and ethical values.
- Adapt themselves to organizational needs by learning advanced technologies.
Program Outcomes (PO)

By the time of graduation graduates will attain the following programme outcomes:

1. Apply knowledge of mathematics, natural science, engineering fundamentals and system fundamentals, software development, networking & communication, and information assurance & security to the solution of complex engineering problems in computer science and engineering.

2. Identify, formulate, research literature and analyse complex computer science and engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, engineering sciences, system fundamentals, software development, networking & communication, and information assurance & security.

3. Design solutions for complex computer science and engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems in networking & communication, and information assurance & security 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 computer science and engineering problems, 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 system development and solutions to complex engineering problems related to system fundamentals, software development, networking & communication, and information assurance & security.

7. Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems related to system fundamentals, software development, networking & communication, and information assurance & security in societal and environmental contexts.

8. Apply ethical principles and commit to professional ethics and responsibilities and norms of computer science and 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. Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

12. 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.
## 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)

*Common to all B.E. / B.Tech., Programmes, $Common to CSE and IT
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**FORMAT FOR COURSE CODE**

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- **Compulsory Course**
- **Course Sequence Number**
- **Semester Number**
- **Branch Name**
- **Year of Regulation**
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.
15SH12C MATHEMATICAL FOUNDATIONS FOR ENGINEERS (Common to all B.E. / B.Tech. Degree Programmes) 3 2 0 4

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 (Common 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 PROFESSION
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.

UNIT III PROFILES OF ENGINEERS

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

15SH17C  ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LABORATORY
(Common to all B.E./B.Tech. Degree Programmes)

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
CO 1: estimate the amount of hardness of the water sample (K5, S3)
CO 2: determine the rate of corrosion (K5, S3)
CO 3: synthesize a polymer and to determine molecular weight of the polymer (K6, S3)
CO 4: synthesize silver nano particles (K6,S6)
CO 5: 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

15CS21C PROFESSIONAL ENGLISH (Common to all B.E. / B.Tech. Degree Programmes) 3 0 0 3

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 9
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 9
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 9
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 9
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 9
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.
15CS22C PROBABILITY AND STATISTICS (Common to CSE and IT) L T P C 3 2 0 4

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: grasp the basic concepts of probability and random variables.(K2)
CO 2: find the correlation and regression of two dimensional random variables.(K2)
CO 3: characterize the phenomena which evolve with respect to time in a probabilistic manner. (K2)
CO 4: calculate the various measures of dispersion.(K3)
CO 5: apply the concepts of estimation and hypothesis testing. (K3)

UNIT I PROBABILITY AND RANDOM VARIABLES 15

UNIT II TWO DIMENSIONAL RANDOM VARIABLES 15
Joint distributions - Marginal and conditional distributions – Covariance - Correlation and regression-Central Limit Theorem.

UNIT III RANDOM PROCESSES 15

UNIT IV STATISTICS 15
Mean – Median- Mode - Moments- Skewness- Kurtosis – Correlation - Single and bivariate frequency distributions - Regression lines.

UNIT V SAMPLING THEORY 15
Large samples - Tests on means and proportions for large samples - Test for single variance and equality of variances - Small samples- t- test- F- test - Chi square test.

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: infer the electrical properties of conducting and superconducting materials. (K2)
CO 2: explain the basics of semiconductors. (K2)
CO 3: describe the operation and characteristics of semiconductor diodes. (K1)
CO 4: express the properties and applications of the optical materials. (K2)
CO 5: classify the magnetic materials and demonstrate their applications in storage devices. (K2)

UNIT I CONDUCTING MATERIALS AND SUPERCONDUCTORS
Conductors:

Superconductors:
BCS Theory, Properties - Meissner effect – Isotopic effect, Types of superconductors – Type I and Type II superconductors; Applications of superconductors – Cryotron, SQUID, Magnetic levitation.

UNIT II SEMICONDUCTORS
Intrinsic semiconductor – carrier concentration – determination of bandgap energy - Extrinsic semiconductors – carrier concentration - Hall effect.

UNIT III SEMICONDUCTOR DIODES

UNIT IV OPTICAL MATERIALS
Optical properties of metals, insulators and semiconductors - Liquid crystal display – LED – Thermography - Solar cell.

UNIT V MAGNETIC MATERIALS AND STORAGE DEVICES

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: analyze the difficulties of problems and design algorithms for simple problems. (K3)
CO 2: make decisions based on the problem and solve it by selection of appropriate technique. (K4)
CO 3: process arrays for different type of problems. (K3)
CO 4: analyze and apply different sorting techniques to solve the problem. (K4)
CO 5: apply various search techniques based on the search criteria. (K3)

UNIT I  BASICS OF PROBLEM SOLVING  15
Overview of programming: Problem Solving in Everyday Life, Types of Problem, Computer-based problem solving, Difficulties in problem solving, Program design, implementation issues, programming environment, Data Storage and Communication with Computer, Organizing the Problem. Algorithms for problem solving: Algorithms and flow charts, flowchart symbols, design of algorithms for simple and scientific problems, divide and conquer strategy.

UNIT II  BASIC TECHNIQUES  15

UNIT III  PROCESSING ARRAYS  15
One dimensional array: Reading, Writing, Processing, Sorting, Evaluating Polynomial. Two Dimensional Array: Reading, Printing, Sum And Difference, Trace, Transpose of Matrices. Multi-Dimensional Arrays, Table Look-Up Technique, Pointer Technique.

UNIT IV  SORTING TECHNIQUES  15
Sorting: Bubble Sort, Selection Sort, Insertion Sort, Postman Sort, Quick Sort, Merge Sort, Radix Sort, Applications

UNIT V  SEARCHING TECHNIQUES  15
Searching algorithms: Linear search, Binary search, Fibonacci search, Golden-ratio selection, Golden section search method, Applications

L: 45 T: 30 TOTAL: 75 PERIODS

TEXT BOOKS

REFERENCE
15CS25C C PROGRAMMING FOR ENGINEERS (Common to all B.E. / B.Tech Degree Programmes) 3 0 0 3

COURSE OUTCOMES

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

CO1: recognize the system fundamentals and the role of hardware components of the Computer. (K3)

CO2: apply the basic concepts and solve simple problems by analyzing the logics of conditional statements and looping constructs. (K3)

CO3: handle similar types of data using array and utilize their functionality. (K3)

CO4: appreciate the call by value and call by reference features in functions. (K5)

CO5: design programs involving their own derived data types, pointers, memory allocation concepts. (K4)

CO6: handle the file contents with access permissions. (K3)

UNIT I COMPUTER FUNDAMENTALS 10


UNIT II BASIC C PROGRAMMING 9

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 9


UNIT IV STRUCTURES AND POINTERS 9


UNIT V FILES AND DYNAMIC MEMORY ALLOCATION 8

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

15CS26C ENVIRONMENTAL SCIENCE AND ENGINEERING (Common to all B.E. / B.Tech Degree Programmes) 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 9
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 9
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 9
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 9
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 9
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,
ar senic, cadmium, mercury and chromium on human health.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS
   Co., 2012.

REFERENCES
2. Strange C. “Environmental Science and production” Nason Trest Publisher, 2010
PART A – APPLIED PHYSICS LABORATORY

COURSE OUTCOMES

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

CO1: demonstrate the properties of optical materials. (K2, S3)
CO2: analyze the characteristics of semiconducting materials and diodes and their applications. (K3, S3)
CO3: 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. V - I Characteristics of PN junction diode.
5. Half Wave and Full Wave Rectifiers.
7. Zener diode as Voltage Regulator
8. Characteristics of LED/LCD.

P:15 TOTAL: 15 PERIODS

PART – B ENVIRONMENTAL CHEMISTRY LABORATORY

COURSE OUTCOMES

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

CO1: quantify the amount of acidity, alkalinity, DO and COD present in water sample (K5, S3)
CO2: analyse the ions present in the soil. (K4, S3)
CO3: quantify the amount of chloride ion in water sample. (K5, S3)
CO4: identify the adulteration in food samples. (K1, S3)
CO5: 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 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

P:30 TOTAL: 30 PERIODS
COURSE OUTCOMES

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

CO 1: explore the numerical environment and its programming. (K3)
CO 2: develop programs using built-in commands and functions. (K3)
CO 3: design and plot 2D/3D shapes and curves using graphic commands. (K3)
CO 4: compute the statistical distribution measures. (K3)

LIST OF EXPERIMENTS

1. Practicing the environment with simple exercises to familiarize Command Window, History, Workspace, Current Directory, Figure window, Edit window, Shortcuts, Help files.

2. Data types, Constants and Variables, Character constants, operators, Assignment statements.

3. Control Structures: For loops, While, If control structures.


<table>
<thead>
<tr>
<th>m, kg</th>
<th>v_p, m/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>83.6</td>
<td>53.4</td>
</tr>
<tr>
<td>60.2</td>
<td>48.5</td>
</tr>
<tr>
<td>72.1</td>
<td>50.9</td>
</tr>
<tr>
<td>91.1</td>
<td>55.7</td>
</tr>
<tr>
<td>92.9</td>
<td>54</td>
</tr>
<tr>
<td>65.3</td>
<td>47.7</td>
</tr>
<tr>
<td>80.9</td>
<td>51.1</td>
</tr>
</tbody>
</table>

   a. Draw 2D plot to depict the relation between mass (m) and velocity (v). Calculate the average mass and velocity.
   b. Considering gravitational acceleration(g) as 9.81, compute drag-coefficient (dc) as, dc = gm/v^2
   c. Analyze the statistical characteristics of dc.

5. Compute values of \( y \) as a function of \( x \)
   \[ y = be^{-ax} \sin(bx)(0.012x^4 - 0.15x^3 + 0.075x^2 + 2.5x) \]

   Use a plot of this function from \( x = -5 \) to 5.

6. Manning’s equation can be used to compute the velocity of water in a rectangular open channel
   \[ U = \frac{\sqrt{S}}{n} \left( \frac{BH}{B+2H} \right)^{2/3} \]

   where \( U \)=velocity (m/s), \( S \)=channel slope, \( n \)=roughness coefficient, \( B \)=width (m), and \( H \)=depth (m). The following data are available for five channels as:

<table>
<thead>
<tr>
<th>n</th>
<th>S</th>
<th>B</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.035</td>
<td>0.0001</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>0.020</td>
<td>0.00002</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>0.015</td>
<td>0.0010</td>
<td>20</td>
<td>1.5</td>
</tr>
<tr>
<td>0.030</td>
<td>0.0007</td>
<td>24</td>
<td>3</td>
</tr>
<tr>
<td>0.022</td>
<td>0.0003</td>
<td>15</td>
<td>2.5</td>
</tr>
</tbody>
</table>

   Store these values in a matrix where each row represents one of the channels and each column represents one of the parameters. Compute a column vector containing the velocities based on the values in the parameter matrix.
7. Given the vector \( x=[2 \ 3 \ 3 \ 4 \ 4 \ 6 \ 6] \). Calculate the coefficient of skewness from its mean and standard deviation.

8. a. A standard, fair die is thrown and the score \( X \) is recorded. Compute each of the following

- \( E(X) \)
- \( \text{var}(X) \)
- \( \text{skew}(X) \)
- \( \text{kurt}(X) \)

b. Suppose that \( X \) has uniform distribution on the interval \([a,b]\). Compute the following:

- \( E(X)=1/2 \cdot (a+b) \)
- \( \text{var}(X)=(1/12)\cdot(b-a)^2 \)

9. The values that divide the data set into 4 equal parts after it has been arranged in ascending order are called **quartiles**. Find the quartiles of the data set: \( \{1, 3, 4, 5, 5, 6, 9, 14, 21\} \)

10. A couple has six children whose ages are 6, 8, 10, 12, 14 and 16. Find the variance in ages. The following table gives the frequency distribution of the number of computers sold during the past 30 weeks at a computer store.

<table>
<thead>
<tr>
<th>Computers Sold</th>
<th>Frequency (f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[0-4]</td>
<td>2</td>
</tr>
<tr>
<td>[4-8]</td>
<td>3</td>
</tr>
<tr>
<td>[8-12]</td>
<td>4</td>
</tr>
<tr>
<td>[12-16]</td>
<td>2</td>
</tr>
<tr>
<td>[16-20]</td>
<td>1</td>
</tr>
</tbody>
</table>

**SUGGESTED SOFTWARE TOOLS**

- MATLAB, ezANOVA, R Tool
- Windows Xp/7

**REFERENCE**

- emathematics.net