REGULATIONS – 2015

CURRICULUM & SYLLABUS

B. E. – COMPUTER SCIENCE AND ENGINEERING
Accredited by NBA
B. E. – COMPUTER SCIENCE AND ENGINEERING
CURRICULUM AND SYLLABUS
# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

## 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 (PEOs)

After 3-4 years of Graduation, our graduates will:

1. Accomplish their professional career and/or pursue higher education by applying knowledge of computer science and engineering.
2. Participate in life-long learning through the successful completion of advanced degrees, continuing education, certifications and/or other professional developments.

## PROGRAM OUTCOMES (POs)

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.
The Curriculum and Syllabi under Regulations 2015 is designed keeping in mind the Outcome Based Education (OBE) and Choice Based Credit System (CBCS). The course content of each course shall be fixed in accordance with the Program Educational Objectives (PEOs), Program Outcomes (POs) and Course Outcomes (COs).

The CBCS enables the students to earn credits across programmes and provides flexibility for slow and fast learners in registering the required number of credits in a semester. The CBCS facilitates transfer of credits earned in different departments / Centers of other recognized / accredited universities or institutions of higher education in India and abroad either by studying directly or by online method.

The curriculum of CSE programme is designed with total number of credits 169 (126 for Lateral entry) and shall have the following category of courses in the curriculum.

1. **Foundation courses**
   a. **Common Foundation Courses (CFC)** include Mathematics, Basic Sciences, Engineering Sciences and Skill Based Courses.
   b. **Specific Foundation Courses (SFC)** include the basic courses specific to a programme of study.

2. **Programme Core Courses (PCC)** include the core courses relevant to the chosen programme of study and the Employability Enhancement courses such as Project, Seminar and Inplant training/ Internship.

3. **Programme Elective Courses (PEC)** include the elective courses relevant to the chosen programme of study.

4. **Open Elective Courses (OEC)** include Inter-disciplinary and Trans-disciplinary courses. The students shall study Inter-disciplinary courses offered in other Engineering/Technology Programmes through regular mode and Trans-disciplinary courses through self study mode.
5. **Mandatory courses (MAC)** include the courses recommended by the regulatory bodies such as AICTE, UGC etc as given below:

   a. Technical English / Professional English
   b. Professional Ethics and Human Values
   c. Environmental Science and Engineering
   d. Communication Skills Laboratory

6. Every student shall undergo one Interdisciplinary and one Transdisciplinary course.

   Performance in each course of study shall be evaluated based on Continuous Assessment throughout the semester and end semester examination at the end of the programme. Keeping in mind the content of the courses and delivery methods, different question paper patterns are suggested.
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### FORMAT FOR COURSE CODE

- **15 CS 2 1 C**
  - Compulsory Course
  - Course Sequence Number
  - Semester Number
  - Branch Name
  - Year of Regulation

- **1 5 CS 0 1 E/L**
  - Elective Course / One credit Elective course
  - Course Sequence Number
  - Branch Name
  - Year of Regulation

- **1 5 ID / TD 0 1 E**
  - Elective Course
  - Course Sequence Number
  - Inter Disciplinary / Trans Disciplinary
  - Year of Regulation
# B.E. – COMPUTER SCIENCE AND ENGINEERING

## REGULATIONS – 2015

## CURRICULUM AND SYLLABUS

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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
### SEMESTER – III

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### National Engineering College, Kovilpattu

(An Autonomous Institution, Affiliated to Anna University, Chennai)

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### ONE CREDIT ELECTIVE COURSES (PEC)

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Open Elective Course (OEC)

**Group – I (Inter-disciplinary courses)**

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**Group-II (Trans-disciplinary courses) - Self Study Course**

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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. (K2, S4)
CO4: coordinate and communicate in a wide range of situations. (K3, S4)
CO5: integrate and apply the acquired skills in real life situations. (K2, S4)

UNIT I
9
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
9
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
9
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
9
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
9
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 L T P C
(Common to all B.E / B.Tech. Degree Programmes) 3 2 0 4

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 – Independency 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 VARIABLE 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  

L: 45 T: 30 TOTAL: 75 PERIODS

TEXT BOOKS

REFERENCES

15SH13C  ENGINEERING PHYSICS  
(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
CO1: summarize the properties and structures of solids. (K2)
CO2: define the principles of acoustics and ultrasonics and apply the ultrasonic methods for industrial and medical fields. (K2)
CO3: choose the appropriate Laser technique for industrial and medical applications. (K3)
CO4: describe the different types, fabrication, losses of optical fibers and their applications in communication and instrumentation. (K2)
CO5: explain the physical properties of photons & electrons and their applications in different electron microscopes. (K3)

UNIT I  PROPERTIES OF MATTER AND CRYSTAL PHYSICS  
UNIT II ACOUSTICS AND ULTRASONICS 9
Ultrasonics: Production - magnetostriction generator - piezoelectric generator, Properties - Cavitations - Velocity measurement - acoustic grating, Industrial applications - Medical applications - Sonogram.

UNIT III LASER SYSTEM AND APPLICATIONS 9

UNIT IV FIBER OPTICS AND ITS APPLICATIONS 9
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 9
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

15SH14C ENGINEERING CHEMISTRY L T P C
(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: identify suitable water treatment techniques for industrial and domestic purpose.(K3)

CO2: explain the type of corrosion and corrosion control methods. (K3)

CO3: select the polymer for specific application. (K2)
CO4: explain the preparation, properties and applications of nano materials. (K2)
CO5: outline the principle and instrumentation of various analytical techniques. (K2)

UNIT I  W A T E R  T R E A T M E N T  9

UNIT II  C O R R O S I O N  A N D  I T S  C O N T R O L  9
Chemical corrosion – electrochemical corrosion – mechanism – different types of electrochemical corrosion – factors influencing corrosion – corrosion control methods.


UNIT IV  N A N O  M A T E R I A L S  9
Nanoparticles – synthesis of CNT – precipitation, thermolysis, hydrothermal, solvothermal, electrodeposition, chemical vapour deposition, laser ablation – toxic effect of nano materials - properties and applications.

UNIT V  A N A L Y T I C A L  T E C H N I Q U E S  9
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
Upon Completion of this course, the students will be able to

CO 1: recognize the history of engineering through various engineering wonders in past and identify the engineering profession. (K2)

CO 2: recognize and analyse various engineering career paths and preparing for an engineering career. (K3)

CO 3: understand the profile of engineers in various fields. (K3)

CO 4: understand the OBE concepts and its components. (K2)

CO 5: understand learning components and creativity. (K3)

UNIT I HISTORY OF ENGINEERING AND INTRODUCTION TO ENGINEERING 7 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 8

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 4


UNIT IV OVERVIEW OF OBE AND CBCS 4

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 7

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.

REFERENCES

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

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

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. (K2)

CO 2: apply the basic concepts to solve simple problems by applying the logics of conditional statements and looping constructs. (K3)

CO 3: handle similar types of data using array and understand their functionality. (K3)

CO 4: appreciate the call by value and call by reference features in functions. (K2)

CO 5: design programs involving their own derived data types, pointers, memory allocation concepts. (K3)

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  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

15SH17C  ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LABORATORY  L T P C
(Common to all B.E./B.Tech. Degree Programmes)  0 0 2 1

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. (K3, S3)
CO2: interpret the production of ultrasounds and how the velocity of ultrasounds varies with respect to medium.(K3, S3)
CO3: illustrate the mechanical and electrical properties of materials. (K3, 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, S3)
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 (Fe²⁺) 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

15CS28C C PROGRAMMING LABORATORY (Common to all B.E. / B.Tech. Degree Programmes)  

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### 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:** demonstrate the connection between function return values and variables. (K2)
- **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

15CS21C PROFESSIONAL ENGLISH L T P C
(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. (K2, A2)
CO 2: write effectively in any Professional context. (K3, A2)
CO 3: acquire the skills related to Group discussion. (K3, A2)
CO 4: communicate and respond in different social and professional contexts. (K3, A3)
CO 5: recall the acquired skills in solving competitive exam. (K2, S3)

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 L T P C 
(Common to CSE and IT) 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.

TEXT BOOKS

REFERENCES

15CS23C  PHYSICS OF SOLID STATE DEVICES  L T P C
(Common to CSE and IT)  3 0 0 3

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. (K2)
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  9
Conductors:
Superconductors:
BCS Theory, Properties - Meissner effect – Isotopic effect, Types of superconductors – Type I and Type II superconductors; Applications of superconductors – Cryotron, SQUID, Magnetic levitated train.
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

15CS24C PROBLEM SOLVING TECHNIQUES

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

15CS26C  ENVIRONMENTAL SCIENCE AND ENGINEERING  L T P C
(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. (K2)
- 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. (K2)

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

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 lead, arsenic, cadmium, mercury and chromium on human health.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
   Press, 2015
2. Strange C. “Environmental Science and production” Nason Trest Publisher, 2010
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

15CS27C APPLIED PHYSICS AND ENVIRONMENTAL CHEMISTRY LABORATORY

PART A – APPLIED PHYSICS LABORATORY

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

CO 1: demonstrate the properties of optical materials. (K2, S3)
CO 2: analyze the characteristics of semiconducting materials and diodes and their applications. (K3, S3)
CO 3: 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

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 Chemistry.

REFERENCES

15CS29C APPLIED NUMERICAL 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: explore the numerical environment and its programming. (K2)
CO 2: develop programs using built-in commands and functions. (K2)
CO 3: design and plot 2D/3D shapes and curves using graphic commands. (K2)
CO 4: compute the statistical distribution measures. (K2)

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_e 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>
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<td>47.7</td>
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<tr>
<td>80.9</td>
<td>51.1</td>
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</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 \( x \)
   \[ y = he^{-ax}\sin(bx)(0.012x^4 - 0.15x^3 + 0.075x^2 + 2.5x) \]
   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
   \[ U = \sqrt{S} \left( \frac{BH}{B + 2H} \right)^{2/3} \]
   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>
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<td>10</td>
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<tr>
<td>0.022</td>
<td>0.0003</td>
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<td>2.5</td>
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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
   - \( E(X) \)
b. Suppose that $X$ has uniform distribution on the interval $[a,b]$. Compute the following:

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

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>
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<tr>
<td>[0-4)</td>
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</tbody>
</table>

**SUGGESTED SOFTWARE TOOLS**
- MATLAB, ezANOVA, R Tool
- Windows Xp/7

**REFERENCE**
- emathematics.net

**PART A - MECHANICAL LABORATORY**

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

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.

REFERENCES


15CS31C DISCRETE STRUCTURES

COURSE OUTCOMES

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

CO 1: check the validity of the arguments. (K2)
CO 2: understand the concepts of Sets, Relations and Functions.(K2)
CO 3: perform the principles of counting and solve recurrence relations. (K3)
CO 4: interpret the basic concepts of graphs. (K2)
CO 5: find all Spanning Trees of a graph. (K3)

UNIT I LOGIC AND PROOFS


UNIT II SETS, RELATIONS AND FUNCTIONS

UNIT III COMBINATORICS

UNIT IV GRAPH THEORY
Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – connectivity – Euler and Hamiltonian graphs.

UNIT V TREES

L: 45 T: 30 TOTAL: 75 PERIODS

TEXT BOOKS

REFERENCES

15CS32C DATA STRUCTURES

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

CO 1: implement basic linear data structures using static and dynamic memory allocation. (K3)
CO 2: recognize the data organization and applications of binary trees and binary search trees. (K3)
CO 3: analyze the importance of self-balancing trees for effective organization of data. (K4)
CO 4: design and implement an appropriate hashing function and heap for an application. (K3)
CO 5: identify suitable algorithms for solving the real life problems shortest path, network link analysis. (K4)
UNIT I  LINEAR STRUCTURES

UNIT II  TREE STRUCTURES

UNIT III  BALANCED TREES

UNIT IV  HASHING AND HEAPS

UNIT V  GRAPHS

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES

15CS33C  COMPUTER NETWORKS  L T P C
3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: understand the functionalities of layers in OSI architecture. (K2)
CO 2: illustrate the various flow and error control techniques and identify the best method for efficient data transmission. (K2)
CO 3: enumerate different medium access control mechanisms.(K2)
CO 4: apply various routing algorithms for a network and determine the optimal path.(K3)

CO 5: integrate the working of protocols in higher level layers.(K3)

UNIT I INTRODUCTION

UNIT II DATA LINK LAYER

UNIT III NETWORK LAYER

UNIT IV TRANSPORT LAYER

UNIT V APPLICATION LAYER

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
15CS34C COMPUTER ORGANIZATION AND ARCHITECTURE L T P C
3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
 CO 1: realize the role of functional units and various architectural features (K2)
 CO 2: examine data representation and execution procedure of an ALU (K2)
 CO 3: identify the factors that degrade the pipeline performance and its counter
 measures (K4)
 CO 4: evaluate and analyze the performance of memory. (K4)
 CO 5: analyze the performance issues of symmetric and distributed architectures. (K4)

UNIT I BASIC STRUCTURE OF COMPUTERS
Functional units – Basic operational concepts – Bus structures – Performance – Memory
locations and addresses- Memory operations - Instructions and instruction sequencing –
Instruction set architecture – Addressing modes- I/O Operations.

UNIT II BASIC PROCESSING UNIT
Fixed point arithmetic- Addition and subtraction of signed numbers –multiplication of
positive Numbers- signed operand multiplication and fast multiplication –restoring and non
restoring division algorithm - floating point numbers and operations. Fundamental
concepts – Execution of a complete instruction – Multiple bus organization – Hardwired
control – Micro programmed control.

UNIT III PIPELINING
Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets –
Data path and control considerations – superscalar operations - Performance
considerations.

UNIT IV MEMORY SYSTEM
Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache
memories –Improving cache performance – Virtual memory – Memory management
requirements – Associative memories – Secondary storage devices.

UNIT V MULTIPROCESSOR
Symmetric shared memory and Distributed shared memory multiprocessors –
Performance issues of symmetric and distributed shared memory – Synchronization –
Models of memory consistency: An introduction – Snoopy bus protocols – Directory based
protocols.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS
REFERENCES

15CS35C OBJECT ORIENTED PROGRAMMING L T P C
3 0 2 4

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: recognize and use object oriented programming constructs to write object oriented programs (K3)
CO 2: adopt appropriate constructor and overloading mechanisms to develop the application (K3).
CO 3: understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code(K2).
CO 4: demonstrate exception handling mechanisms to handle runtime errors and generic programming design (K3).
CO 5: Implement rich data handling through files and streaming (K3)

UNIT I BASIC CONCEPTS

UNIT II FUNCTION OVERLOADING AND CONSTRUCTORS
UNIT III INHERITANCE AND POLYMORPHISM


UNIT IV TEMPLATES AND EXCEPTION HANDLING


UNIT V I/O STREAMS


L: 45; P: 30; TOTAL: 75 PERIODS

TEXT BOOK


REFERENCES


COURSE OUTCOMES

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

CO 1: develop a basic logical expression and apply minimization technique to minimize Boolean expression. (K3)
CO 2: design and analysis of combinational circuits. (K3)
CO 3: describe the sequential circuits and design & analysis of synchronous sequential circuits. (K3)
CO 4: design & analysis of asynchronous sequential circuits.(K3)
CO 5: develop a program in Hardware Description Language.(K2)

UNIT I  NUMBER SYSTEMS AND BOOLEAN ALGEBRA  12

UNIT II  COMBINATIONAL LOGIC DESIGN (Practical)  12
Analysis and design procedures of Combinational circuits - Arithmetic Circuits: Binary / BCD adders and subtractors, Carry look ahead adder, Magnitude comparator, Code conversion Decoders, Encoders, Multiplexers and Demultiplexers.

UNIT III  SYNCHRONOUS SEQUENTIAL LOGIC  12

UNIT IV  ASYNCHRONOUS SEQUENTIAL LOGIC  12
Introduction to Asynchronous Sequential Circuits – Fundamental mode and Pulse mode circuits, Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables – Race free state assignment - Hazards.

UNIT V  PROGRAMMABLE LOGIC DEVICES AND HDL  12
Introduction to PLDs – ROM, PAL, PLA, Implementation of digital functions using PLDs. Introduction to Hardware Description Language – Behavioral, Dataflow and gate level modeling-Simple HDL codes for combinational circuits and sequential circuits (Practical).

L: 30; P: 30; TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
15CS37C  COMPUTER NETWORKS LABORATORY  L T P C  0 0 2 1

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: describe the basic concept of computer networks and analyze the functionalities of OSI model. (K4)
CO 2: implement the various services of data link layer. (K2)
CO 3: instruct to design, troubleshooting, modeling and evaluation of computer networks commands and Protocols. (K2)
CO 4: design cryptographic algorithms for avoiding basic level threats. (K2)
CO 5: implement the working protocols of higher level layer. (K3)

LIST OF EXPERIMENTS
1. Simulate the open system interconnection (OSI Layer model) model that transmit message from sender to receiver through different layers. At sender side, adds the appropriate header and tailer and receiver side removes the same.
2. Study of network devices and different types of network cables. Practically implement the cross-wired cable and straight through cable using clamping tool.
3. Implementation of the data link farming methods for the bit stuffing in a frame.
4. Implementation of data link farming methods for even and odd parity.
5. Connect the computers in Local Area Network.
6. Study of basic network command and network configuration commands.
7. Design the Protocol in which sender sends one data frame and then waits (certain period) for acknowledgement from receiver before proceeding to transmit next frame.
8. Alice and Bob want to communicate each other securely. Design the various encryption and decryption algorithm for their secure communication using following techniques,
   a. \( c = E (k, p) = (p + k) \mod (26) \) & \( p = D (k, c) = (c \mod (26)) \).  
   b. Transposition the message using some keyword.
9. Implement the Distance Vector Routing protocol for finding the shortest path.
10. Write a program to connect server with client and passes information from one system to another and vice versa that by creating / establishing connection.

SUGGESTED HARDWARE & SOFTWARE REQUIREMENTS
2. Software Requirement:
   - Command Prompt and Packet Tracer
   - Turbo C++/ C /JAVA
   - OS – LINUX/ UNIX/Windows 2000/ Windows XP/ NT

P:30; TOTAL: 30 PERIODS
COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: develop programs using dynamic memory allocation and linked list ADT. (K4)
CO 2: apply Stack ADT and Queue ADT to solve problems.(K3)
CO 3: identify and implement the suitable data structures for the given problem. (K4)
CO 4: solve real world problems by finding minimum spanning tree and Shortest path
algorithm. (K3)

LIST OF EXPERIMENTS
1. a. Create two lists L1 and L2. While creating, the new nodes should be added in the
   front of the list by default.
   i. Find the intersection of the two lists L1 and L2 and display the resultant list.
   ii. Find the union of two lists L1 and L2 eliminates the duplicates and display the
        resultant list.

b. Create a list with n nodes. Each node contains data and time tick information.
   i. Insert the node based on the sorted order of time tick.
   ii. Display the list in the reverse order and number of nodes in the list.
   iii. Delete the specified node from the list and display the resultant list.

2. Represent a polynomial as a linked list and write functions to add the following
   polynomial and display the resultant polynomial. 4X^4+3X^3+X+5, 3X^3+2X^2+X+3.

3. Using Stack ADT, write a program to convert infix expression into postfix expression
   which includes ‘(‘,’),‘+’,‘-‘,’*’ and ‘/’.

4. Create a deque with 3 elements. Insert two elements at the rear end (Inject) and
   insert two elements at the front end (Push). Delete an element from the front end
   (Pop) and rear end (Eject). Display the queue after each operation and number of
   elements in the queue.

5. Write a program to implement an expression tree. Produce its pre-order, in-order,
   and post-order traversals.

6. a .i. Implement basic binary search tree operations.
   ii. While deleting the node with two children, replace it with either in-order
        successor or in-order predecessor based on choice.

b. Create a tree with nodes containing first three letters of the month in order. The
   tree’s height should be optimum. ie. It should not exceed 1.44log(n+2). Find the
   height of the tree after each insertion.

7. Write a program to implement the priority queue using binary heap. Compare the
   running time for sorted, reverse-ordered and random inputs.

8. Implement hashing with open addressing. Resolve the collision with
   i. Linear probing         ii. Quadratic probing
9. The ABC Company has its branches in several cities in India. The company wants to lease phone lines to connect them up with each other; and the phone company charges different amounts of money to connect different pairs of cities. They want to connect all the branches with a minimum total cost. Help them to fix their problem.

10. The XYZ Parcel service wants to deliver a package from Madurai to Trivandrum, Bangalore, Hyderabad, Bombay, New Delhi and Kolkata through rail. The train fare between each pair of cities varies. The XYZ Parcel service wants to cut down on the total distance traveled to save transport charge and it wants to know the route with minimum distance from Madurai to all other cities. Help them to find the route.

Note: Refer IRCTC website for rail route.

P: 30; TOTAL: 30 PERIODS

15CS39C COMMUNICATION SKILLS LABORATORY
(Common to all B.E. / B.Tech., Programmes) 0 0 2 1

COURSE OUTCOMES
Upon completion of this course, the student will be able to
CO 1: interpret any passage after listening and interact at different situations fluently (K2, S3).
CO 2: excel appropriately in competitive and professional contexts. (K3, S3)
CO 3: acquire the sub-skills required for paper presentations and group discussions which will help them to excel in their workplace. (K3, S3)

UNIT I
Lab session:
  i) Listening to audio files:
      • Conversations
      • Speech
      • TED Talks
  ii) Listening and responding to any audio files:
      • Drawing the map
      • Picture completing task
      • Transferring data to Graph.

Practice session: On the spot Speaking activities: Just a minute speech, Picture description.

UNIT II
Lab session: Read and understand the comprehension passages given in competitive examinations.

Practice session: Giving opinions and suggestions, analyzing a social issue.

UNIT III
Lab session: Listening to audio files related to soft skills.
Practice session: Practicing Power point presentation, Group discussion and Interview skills.

P:30; TOTAL : 30 PERIODS

REFERENCES

15CS41C APPLIED MATHEMATICS FOR COMPUTER SCIENCE  

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

CO 1: acquire the basic concepts of Number theory. (K2)
CO 2: apply various theorems on congruences. (K3)
CO 3: understand the fundamental concepts of Groups. (K2)
CO 4: recognize the significance of Lattices. (K2)
CO 5: find the Minimum Spanning Tree and Shortest Distance of a graph. (K3)

UNIT I FUNDAMENTAL THEOREM OF ARITHMETIC  
Introduction – Divisibility- Greatest common divisor - Prime numbers - The fundamental theorem of arithmetic - The series of reciprocals of the primes - The Euclidean algorithm - The greatest common divisor of more than two numbers.

UNIT II CONGRUENCES  
Definition and basic properties of congruences - Residue classes and complete residue systems - Linear congruences - Reduced residue systems and Euler- Fermat theorem - Polynomial congruences modulo p - Lagrange's theorem - Applications of Lagrange's theorem - Simultaneous linear congruences. Chinese remainder theorem - Applications of Chinese remainder theorem.

UNIT III ALGEBRAIC STRUCTURES  
Algebraic systems – Semi groups and monoids – Groups - Subgroups – Homomorphisms – Normal subgroups and cosets – Lagrange's theorem – Definitions and examples of Rings and fields.

UNIT IV LATTICES AND BOOLEAN ALGEBRA  

UNIT V ALGORITHMS IN GRAPHS
Dijkstra’s and Floyd's algorithms – Prim’s algorithms and Kruskal’s algorithms.

L : 45; T :30; TOTAL: 75 PERIODS
TEXT BOOKS

REFERENCES

15CS42C DESIGN AND ANALYSIS OF ALGORITHMS

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: analyze the computational complexity of an algorithm in terms of asymptotic notation. (K4)
CO 2: apply algorithmic design techniques to optimize solutions.(K4)
CO 3: solve the combinatorial problem using dynamic programming techniques. (K3)
CO 4: demonstrate a familiarity with backtracking algorithms.(K2)
CO 5: identify the complexity class of any problem and perform polynomial reduction. (K4)

UNIT I ALGORITHM ANALYSIS

UNIT II PROBLEM SOLVING TECHNIQUES

UNIT III DYNAMIC PROGRAMMING
UNIT IV  BACKTRACKING 15

UNIT V  ANALYSIS OF GRAPH 15
Graph Traversals – Connected Components – Spanning Trees – Biconnected components – Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack problem – Introduction to NP-Hard and NP-Completeness.

L: 45; T: 30; TOTAL: 75 PERIODS

TEXT BOOKS

REFERENCES

15CS43C  OPERATING SYSTEMS  L T P C 3 0 0 3

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: acquire knowledge on principles and modules of operating systems (K2)
CO 2: realize the factors in process scheduling strategies, concurrent processes and threads (K2)
CO 3: develop algorithmic solutions to handle deadlock problems (K2).
CO 4: analyze the physical and logical memory management and feel the role of virtual memory (K4)
CO 5: identify and solve the issues related to file system interface, implementation and disk management (K2).

UNIT I  PROCESSES 9
UNIT II  THREADS, PROCESS SCHEDULING AND SYNCHRONIZATION  10

UNIT III  DEADLOCK  8

UNIT IV  STORAGE MANAGEMENT  9

UNIT V  FILE SYSTEMS AND I/O SYSTEMS  9

L : 45; TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES

15CS44C DATABASE MANAGEMENT SYSTEMS  L T P C  3 0 0 3

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: interpret the basic concepts and functions of DBMS and design E-R models for simple database application scenarios. (K2)
CO 2: apply the SQL concepts and relational algebra operations in a database design and enforce the integrity constraints for queries. (K3)
CO 3: analyze the database schema and apply the normalization rules and techniques to optimize the database. (K3)
CO 4: assess the basic issues of transaction processing and recuperate the problems with SQL facilities. (K2)
CO 5: demonstrate the effective data base storage mechanisms and understand query processing. (K2)

UNIT I      INTRODUCTION

UNIT II     RELATIONAL MODEL

UNIT III    DATABASE DESIGN

UNIT IV     TRANSACTION MANAGEMENT

UNIT V      DATA STORAGE AND QUERYING

TEXT BOOKS
REFERENCES

15CS45C SOFTWARE ENGINEERING METHODOLOGIES L T P C
3 0 0 3

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: understand the importance of software engineering practices. (K2)
CO 2: appreciate the roles of agile process models. (K3)
CO 3: effectively participate in software project analysis. (K2)
CO 4: develop a good software design adhering to design principles.(K3)
CO 5: perceive the significance of project estimation, scheduling and risk management. (K2)

UNIT I INTRODUCTION TO SOFTWARE ENGINEERING
Definition - nature of software. Software process: framework - umbrella activities - process adaptation - software engineering practice - personal and team process models.

UNIT II AGILE FRAMEWORK

UNIT III SOFTWARE MODELING

UNIT IV SOFTWARE QUALITY MANAGEMENT

UNIT V MANAGING SOFTWARE PROJECTS

L: 45; TOTAL: 45 PERIODS

TEXT BOOK
REFERENCES

15CS46C  PROFESSIONAL ETHICS AND HUMAN VALUES  (Common to all Programmes)  L  T  P  C  3  0  0  3

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

CO1: Recognize the core human values that shape the ethical behavior of an engineer. (K2)
CO2: Expose awareness on professional ethics. (K2)
CO3: Analyze the engineering ethical breach from past study. (K2)
CO4: Distinguish and apply safety, responsibility and rights in workplaces. (K2)
CO5: Discuss about the global issues with regard to ethics. (K2)

UNIT I  HUMAN VALUES  9

UNIT II  ENGINEERING ETHICS  9

UNIT III  ENGINEERING AS SOCIAL EXPERIMENTATION  9
Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study.

UNIT IV  SAFETY, RESPONSIBILITIES AND RIGHTS  9

UNIT V  GLOBAL ISSUES  9
Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers - consulting engineers - engineers as expert witnesses and advisors - Moral leadership - sample code of Ethics like ASME, ASCE,
IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (IETE), India, etc.

L:45; TOTAL:45 PERIODS

TEXT BOOKS

REFERENCES

15CS47C OPERATING SYSTEMS LABORATORY L T P C 0 0 2 1

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

CO 1: identify the system calls to display the system information. (K2)
CO 2: evaluate the process scheduling algorithms FCFS, SJF, Priority and Round robin. (K3)
CO 3: simulate the process communication through various techniques (K2)
CO 4: simulate memory management schemes (K2)
CO 5: implement File allocation Techniques (K3)

LIST OF EXPERIMENTS
1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, stat, opendir, readdir.
2. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc.)
3. Write a C program SystemInfo.c that will read the /proc file system and print out the following (with an appropriate message in each case):
   a) The number of CPUs in your machine and their clock speed (note that different cores are counted as different CPUs)?
   b) The version of Linux kernel running on your system
   c) The time in day:hr:min:sec when the system was last booted
d) The average load on the system in the last 5 minutes
e) The total usable and currently free memory in the system
f) The swap partitions and their sizes
g) The time did the CPU spend (over all processes) in the user mode, kernel mode, and in servicing interrupts
h) The number of context switches made by the system so far

4. Write a C program ProcessInfo.c that gets the following information specific to a process. The program takes the pid of the process as a command line argument.
a) The command line with which the process was started
b) The time spent by the process in running and in waiting
c) The time spent by the process in the user mode, kernel mode, and in servicing interrupts
d) Can you print out the contents of the address space of the process?

5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)

6. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 Sessions).

7. Write a multi-process message-passing utility. The messages are stored in a shared-memory segment. A static library is created which provides a set of functions to send/receive messages; every user process links with this library and uses these functions for passing messages to other processes. Every access (read or write) to this shared-memory segment is to be guarded by semaphores to effect mutual exclusion. Named processes can transfer messages among each other using this interface.

Data Structures: A message consists of the following four fields:
 a. A sender name (a string of maximum length 10)
b. A recipient name (a string of maximum length 10)
c. A sending time (in whatever format you would like to store)
d. A text message (a string of maximum length 100)
e. A registered process consists of the following two fields:
   • A name (a string of maximum length 10)
   • A process ID

8. Implement Producer-Consumer problem using semaphores. Let the producer have bounded buffer for storing the produced data. Design a suitable consumer to utilize the data which is produced by the consumer. The producer can produce only when the buffer is having space for accommodation and the consumer can consume only when the buffer has data items in it.

9. Implement the banker's algorithm for Deadlock Avoidance for the given scenario. Let n be the number of processes in the system and m be the number of resource types to be allocated
Available system resources:

<table>
<thead>
<tr>
<th>Resource types</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instances</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Processes (currently allocated resources):

<table>
<thead>
<tr>
<th>Processes</th>
<th>Resource Types</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Processes (maximum resources):

<table>
<thead>
<tr>
<th>Processes</th>
<th>Resource Types</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

10. Simulate a memory allocation policy. The requirements of this simulated system is given, which is needed to be used for the simulation task. At one large batch-processing computer installation the management wants to decide what storage placement strategy will yield the best possible performance. The installation runs a large real storage computer under fixed partition multiprogramming. Each user program runs in a single group of contiguous storage locations. Users state their storage requirements and time units for CPU usage on their job control card. The operating system allocates to each user the appropriate partition and starts up the user’s jobs. The jobs remain in memory until completion. A total of 50,000 memory locations are available, divided into block. An instance of the scene is indicated in the below table.

<table>
<thead>
<tr>
<th>Job list</th>
<th>Memory list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job stream number</td>
<td>Time</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

Design suitable User interface to get the required data and present the simulated result in a pleasant form of your choice.

12. Simulate memory management schemes like Paging and Segmentation. Provide good user interface showing the internal functioning of the schemes.

13. Simulate file allocation techniques (Linked, Indexed or Contiguous).

SYSTEM REQUIREMENTS
Hardware: Processors - 2.0 GHz or Higher
RAM - 256 MB or Higher
Hard Disk - 20 GB or Higher
Software: Linux: Ubuntu / OpenSUSE / Fedora / Red Hat / Debian / Mint OS.

P: 30 TOTAL: 30 PERIODS

15CS48C DATABASE MANAGEMENT SYSTEMS LABORATORY

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

CO 1: Design a database schema for a given - problem domain using ER Model (K2)
CO 2: Implement the database schema to enforce integrity constraints and populate & query using SQL commands. (K3)
CO 3: develop PL/SQL programs to enhance the database activities using stored procedures, stored functions and triggers. (K3)
CO 4: Design and build GUI applications using a 4GL which interact with database. (K3)

LIST OF EXPERIMENTS
1. Build the following database schemas and perform the manipulation operations on these schema using SQL DDL,DML,TCL and DCL commands.

   Database Schema for a customer-sale scenario
   Customer(Cust id : integer, cust_name: string)
   Item(Item_id: integer, item_name: string, price: integer)
   Sale(bill_no: integer, bill_date: date, cust_id: integer, item_id: integer, qty_sold: integer)

   For the above schema, perform the following:-
   a) Create the tables with the appropriate integrity constraint Insert around 10 records in each of the tables
   b) List all the bills for the current date with the customer names and item numbers
   c) List the total Bill details with the quantity sold, price of the item and the final amount
   d) List the details of the customer who have bought a product which has a price>200
   e) Give a count of how many products have been bought by each customer
f) Give a list of products bought by a customer having cust_id as 5

g) List the item details which are sold as of today

h) Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold, amount

i) Create a view which lists the daily sales date wise for the last one week

j) Identify the normalization of this schema. Justify your answer. If the schema is not normalized then normalize the schema.

II Database Schema for a Student Library scenario

Student(Stud_no : integer, Stud_name: string)
Membership(Mem_no: integer, Stud_no: integer)
Iss_rec(iss_no:integer, iss_date: date, Mem_no: integer, book_no: integer)

For the above schema, perform the following:

- a) Create the tables with the appropriate integrity constraints
- b) Insert around 10 records in each of the tables
- c) List all the student names with their membership numbers
- d) List all the issues for the current date with student and Book names
- e) List the details of students who borrowed book whose author is CJDATE

- f) Give a count of how many books have been bought by each student
- g) Give a list of books taken by student with stud_no as 5

- h) List the book details which are issued as of today
- i) Create a view which lists out the iss_no, iss_date, stud_name, book name

- j) Create a view which lists the daily issues-date wise for the last one week

- k) Identify the normalization of this schema. Justify your answer. If the schema is not normalized then normalize the schema

III Database Schema for a Employee-pay scenario

employee(emp_id : integer, emp_name: string)
department(dept_id: integer, dept_name:string)
paydetails(emp_id : integer, dept_id: integer, basic: integer, deductions: integer, additions: integer, DOJ: date)
payroll(emp_id : integer, pay_date: date)

For the above schema, perform the following:

- a) Create the tables with the appropriate integrity constraints
- b) Insert around 10 records in each of the tables
- c) List the employee details department wise
- d) List all the employee names who joined after particular date
- e) List the details of employees whose basic salary is between 10,000 and 20,000

- f) Give a count of how many employees are working in each department
- g) Give a names of the employees whose netsalary>10,000

- h) List the details for an employee_id=5

- i) Create a view which lists out the emp_name, department, basic,
deductions, netsalary  

d) Create a view which lists the emp_name and his netsalary  
k) Identify the normalization of this schema. Justify your answer  
l) If the schema is not normalized then normalize the schema.

IV Database Schema for a Video Library scenario  
Customer(cust_no: integer, cust_name: string)  
Membership(Mem_no: integer, cust_no: integer)  
Cassette(cass_no: integer, cass_name: string, Language: String)  
Iss_rec(iss_no: integer, iss_date: date, mem_no: integer, cass_no: integer)

For the above schema, perform the following:—  
a) Create the tables with the appropriate integrity constraints  
b) Insert around 10 records in each of the tables  
c) List all the customer names with their membership numbers  
d) List all the issues for the current date with the customer names and cassette names  
e) List the details of the customer who has borrowed the cassette whose title is “The Legend”  
f) Give a count of how many cassettes have been borrowed by each customer  
g) Give a list of book which has been taken by the student with mem_no as 5  
h) List the cassettes issues for today  
i) Create a view which lists outs the iss_no, iss_date, cust_name, cass_name  
j) Create a view which lists issues-date wise for the last one week  
k) Identify the normalization of this schema. Justify your answer. If the schema is not normalized then normalize the schema.

V Database Schema for a student-Lab scenario  
Student(stud_no: integer, stud_name: string, class: string)  
Class(class: string, description: string)  
Lab(mach_no: integer, Lab_no: integer, description: String)  
Allotment(Stud_no: Integer, mach_no: integer, dayof week: string)

For the above schema, perform the following:—  
a) Create the tables with the appropriate integrity constraints  
b) Insert around 10 records in each of the tables  
c) List all the machine allotments with the student names, lab and machine numbers  
d) List the total number of lab allotments day wise  
e) Give a count of how many machines have been allocated to the ‘CSIT’ class  
f) Give a machine allotment details of the stud_no 5 with his personal and class details
2. Construct a PL/SQL program to find largest number from the given three numbers.

3. Develop simple PL/SQL programs using loop, while and for iterative control statement.

4. Implement PL/SQL a program to check whether the given number is Armstrong or not.

5. Build a PL/SQL program to generate all prime numbers below 100.

6. Construct a PL/SQL program to demonstrate %type and %rowtype attributes.

7. Develop a PL/SQL procedure to find reverse of a given number.

8. Create a PL/SQL procedure to update the salaries of all employees 10% in their basic pay.

9. Execute a PL/SQL procedure to demonstrate IN, OUT and INOUT parameters.

10. Implement a PL/SQL function to check whether given string is palindrome or not.

11. Create a PL/SQL function to find sum of salaries of all employees working in department number 10.

12. Design a PL/SQL trigger before/after update on employee table for each row/statement.

13. Create a PL/SQL trigger before/after delete on employee table for each row/statement.

14. Build a PL/SQL trigger before/after insert on employee table for each row/statement.

15. Design and build the following applications using SQL and front end tool and generate report
   - Student information system for your college.
   - Hospital Management System.
   - A video library management system.
   - Inventory management system for a hardware / sanitary item shop.
   - Banking System.
   - Railway Reservation System
   - Car Insurance Company

**P: 30; TOTAL: 30 PERIODS**

**SOFTWARE REQUIREMENTS**
- Front end: VB/VC ++/JAVA
- Back end: Oracle 11g, my SQL, DB2
COURSE OUTCOMES
Upon Completion of this course, the students will be able to

CO 1: solve real world problems using object oriented concepts (K4)
CO 2: develop multi-thread applications with exception handling (K3)
CO 3: explore Java I/O streams and compute various strings handling methods (K2)
CO 4: demonstrate user interfaces for java application and applets using GUI (K3)
CO 5: build real time applications with JDBC, RMI and Servlet (K3)

UNIT I JAVA BASICS AND OOPS 9

UNIT II MULTITHREADED PROGRAMMING IN JAVA 9

UNIT III I/O AND EXPLORING JAVA.IO 9
I/O Basics - Reading Console Input - Writing Console output - Native Methods - I/O Classes and Interfaces - File - The Byte Streams - The Character Streams - Using Stream I/O - Serialization. String Handling - Special string operations - Character extraction - string comparison - Modifying a String.

UNIT IV APPLETS, EVENT HANDLING AND AWT 9

UNIT V JDBC, RMI AND SERVLETS 9

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS
REFERENCES

15CS52C THEORY OF COMPUTATION L T P C
3 2 0 4

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: apply finite state machines to solve problems in computing. (K3)
CO 2: prove the equivalence of regular expressions and finite automata. (K2)
CO 3: acquire insights into the relationship among formal languages, formal grammars and automata. (K2)
CO 4: realize the concepts of Computable Languages and their relationship to Turing Machines.(K3)
CO 5: recognize the concepts of computability and complexity theory. (K3)

UNIT I  FINITE AUTOMATA

UNIT II  GRAMMARS

UNIT III  PUSHDOWN AUTOMATA

UNIT IV  TURING MACHINES
Definitions of Turing machines – Models – Computable languages and functions – Techniques for Turing machine construction – Multi head and Multi tape Turing Machines - The Halting problem – Partial Solvability – Problems about Turing machine-Chomskian hierarchy of languages.
UNIT V  UNSOLVABLE PROBLEMS AND COMPUTABLE FUNCTIONS  15
Unsolvable Problems and Computable Functions – Primitive recursive functions –
Recursive and recursively enumerable languages – Universal Turing machine.
Measuring and Classifying Complexity: Tractable and Intractable problems- Tractable and
possibly intractable problems - P and NP completeness - Polynomial time reductions.

L: 45 T: 30 TOTAL: 75 PERIODS

TEXT BOOK
1.  J.E. Hopcroft, R. Motwani and J.D. Ullman, “Introduction to Automata Theory,

REFERENCES
1.  Thomas A. Sudkamp, “An Introduction to the Theory of Computer Science,
2.  J. Martin, “Introduction to Languages and the Theory of computation”, 3rd

15CS53C  INTERNET AND WEB TECHNOLOGY  L T P C
3 0 0 3

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1:  recognize the importance of object oriented programming. (K3)
CO 2:  analyze the principles behind the design for construction of Web applications.
(K4)
CO 3:  design a web page in PHP and present the data in XML format. (K3)
CO 4:  develop and deploy an Enterprise Application. (K4)
CO 5:  acquire knowledge in AJAX and web services. (K2)

UNIT I  REVIEW OF OBJECT ORIENTED  9
Objected oriented concepts – object oriented programming (review only) – advanced
concept in OOP – relationship – inheritance – abstract classes – polymorphism –
Object Oriented design methodology – approach – best practices- Interface-
Multithreaded Programming – Java I/O

UNIT II  CLIENT BASED TECHNOLOGIES  9
Client/Server concepts - World Wide Web — MIME types, browsers and web servers -
HTTP protocol – Web applications - Basic HTML5 tags – Look and feel using CSS –
Client side scripting using Java Script and Validations - Document Object Model (DOM).

UNIT III  PHP and XML  9
An introduction to PHP: PHP- Using PHP- Variables- Program control- Built-in functions-
Connecting to Database – Using Cookies-Regular Expressions; XML: Basic XML-
Document Type Definition- XML Schema DOM and Presenting XML, XML Parsers and
Validation, XSL and XSLT Transformation.
UNIT IV: SERVER BASED TECHNOLOGIES


UNIT V: INTRODUCTION TO AJAX and WEB SERVICE


L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
UNIT I INTRODUCTION

UNIT II SYMMETRIC AND ASYMMETRIC KEY ALGORITHMS
Principle of Symmetric and Asymmetric key algorithms - Stream and Block Ciphers - RC4 – Data Encryption Standards (DES) - Advanced Encryption Standard (AES), Rivest Shamir Adleman (RSA) algorithm.

UNIT III AUTHENTICATION AND KEY MANAGEMENT

UNIT IV USER AUTHENTICATION AND KERBEROS

UNIT V NETWORK SECURITY AND ITS APPLICATIONS
Firewalls - Secure Socket Layer (SSL) - Transport Layer Security (TLS) - Secure Electronic Transaction (SET) - Security: E-mail.

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

15CS55C DATA MINING L T P C
3 0 0 3

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: identify the issues in data mining applications. (K2)
CO 2: apply preprocessing methods based on characteristics of data. (K3)
CO 3: comprehend features of classification techniques. (K2)
CO 4: identify appropriate clustering technique to analyze the data. (K3)
CO 5: use association rule mining to generate rules. (K3)
UNIT I       DATA MINING  
Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues.

UNIT II       DATA PREPROCESSING  

UNIT III      CLASSIFICATION  

UNIT IV       CLUSTER ANALYSIS  

UNIT V        ASSOCIATION RULE MINING  

TEXT BOOKS  

REFERENCES  
15CS56C  INTERNET AND WEB TECHNOLOGY LABORATORY  L T P C  0 0 2 1

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: develop new applications with different constraints using java. (K3)
CO 2: design web pages using client side scripting. (K3)
CO 3: populate and query a database using MYSQL. (K3)
CO 4: build interactive web applications using JSP. (K3)
CO 5: develop and deploy a Web Application for new scenario. (K3)

LIST OF EXERCISES
(Practice in Object Oriented Concepts (OOC) – 3 nos.)

1. Develop a java application for Bank Transaction with different constraint:

   Look at the Account class Account.java and write a main method in a different class to briefly experiment with some instances of the Account class.

   • Using the Account class as a base class, write two derived classes called SavingsAccount and CurrentAccount. A SavingsAccount object, in addition to the attributes of an Account object, should have an interest variable and a method which adds interest to the account. A CurrentAccount object, in addition to the attributes of an Account object, should have an overdraft limit variable. Ensure that you have overridden methods of the Account class as necessary in both derived classes.

   • Now create a Bank class, an object of which contains an array of Account objects. Accounts in the array could be instances of the Account class, the SavingsAccount class, or the CurrentAccount class. Create some test accounts (some of each type).

   • Write an update method in the bank class. It iterates through each account, updating it in the following ways: Savings accounts get interest added (via the method you already wrote); CurrentAccounts get a letter sent if they are in overdraft.

   • The Bank class requires methods for opening and closing accounts, and for paying a dividend into each account.

   Hints:
   1. Note that the balance of an account may only be modified through the deposit(double) and withdraw(double) methods.
   2. The Account class should not need to be modified at all.
   3. Be sure to test what you have done after each step.

2. Develop a java program to get employees details with given constraints
Create a class called Employee whose objects are records for an employee. This class will be a derived class of the class Person (it contains: name, age, street, city) which you will have to copy into a file of your own and compile. An employee record has an employee's name (inherited from the class Person), an annual salary represented as a single value of type double, a year the employee started work as a single value of type int and a national insurance number, which is a value of type String.

Your class should have a reasonable number of constructors and accessor methods, as well as an equals method. Write another class containing a main method to fully test your class definition.

3. Analyze and design the java code for given problems, design a Java program to model 3-dimensional shapes (square pyramid, sphere, rectangular prism, cube, cylinder, circular cone). Make a top level shape interface with methods for getting the area and the volume (+ methods toString and equals). Next, build classes and subclasses for the above 3dimensional shapes. Make sure that you place common behavior in superclasses whenever possible. Also, use abstract classes as appropriate. Add methods to subclasses to represent unique behavior particular to each 3-dimensional shape.

(Practices in HTML/JS – 2 nos.)

4. Compute BMI: Write a function computeBMI that takes as parameters a weight in pounds and a height in inches and returns the Body Mass Index (BMI) for an individual with these characteristics. BMI is calculated from the equation: \(703 \times \frac{weight}{(height \times height)}\).

5. BMI Calculator: The following HTML snippet shows the skeleton of a BMI calculator. Write the calculate() function that takes the weight and height in the text boxes and displays the BMI in the span with the id of “score.” You may find the computeBMI function in the Compute BMI exercise helpful for this task.

You should also describe the person’s body type based on their BMI score using the following criteria:

- Underweight: < 18
- Normal: 18 – 25
- Overweight: 25 – 30
- Obese: > 30

The person’s body type should be displayed in the span with the id of “type” and you may assume valid input into the text boxes.

(Practices in JDBC – 2 nos.)

6. Simpsons Database: There is a database for Springfield Elementary School with the following tables:

- Courses(id, name, teacher_id)
- Grades(student_id, course_id, grade)
- Students(id, name, email, password)
- Teachers(id, name)

a) Write a SQL query to return the all the courses offered listed with the name of the teacher who teaches the course.

b) Write a SQL query to return the names of all teachers who have taught a course where at least 2 students received a B- or better in the course. This query should return the following results:
- Dainel Liang
- Herbert Schilt

Remember that the value of an A is less than a B- because A is before B alphabetically, even though A is logically a “greater” grade than B-.

7. World Database: There is a world database with the following tables:
Countries(code, name, continent, surface_area, population, life_expectancy, gnp, ...)
Cities(id, name, country_code, district, population)
CountriesLanguages(country_code, language, official, percentage)

a) Write a MySQL query that will grab all the districts of India with more than 2,500,000 people residing in it. You should use the Cities table in the world database for this problem. Your end result should list three districts:
- Kheri
- Nandurbar
- Chennai

Remember that India’s country code is IND.

b) Create a MySQL query that will grab the top 5 most populous English-speaking nations. You may need to join some or all of the three tables provided: Cities, Countries, and Countries Languages. The result of the query should be:
- United States
- India
- United Kingdom
- South Africa
- Canada

Remember that these results are listed in descending order, with the United States being the first and Canada being the fifth most populous English-speaking country. (Practices in JSP – 3 nos.)

8. Design a web page for an Online voting Form with various HTML components. The form should collect the Voters ID Number, name, Constitution, Booth No. And the form should display the party Name using radio Button. Develop a Servlet application to receive the voting information’s and record the details into a table. The candidate Names are stored in an array in the servlet. Based on the party Name selected by the user the candidate name should be displayed. If voter name or Voter ID Number is empty then display the
message “Enter a Correct Details” and provide a link to the Voting form for reentering the details again.

9. Design a web page for an Email Registration Form with various HTML components. Develop a Servlet application to receive the email registration information and store the details into a table. If passwords are mismatch then display the message “Enter a Correct password” and provide a link to the Registration form for reentering the details again.

10. Design a web page for integrating the RMI server program to find minimum and maximum of three numbers send by the client program. Design a GUI Form for the RMI client to collect three numbers and display the result of minimum, maximum using Text Field. When the user clicks the min button and / or max button the client request to do the functionality.

Mini-Project

Develop and deploy web application project with client using HTML/JS, JDBC and Presentation tier using JSP with back end any one database. (The project group consisting of max 3 members).

Software required for Practical:

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Course</th>
<th>S/W on Students Machine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OOC (Java)</td>
<td>Eclipse 3.2</td>
</tr>
<tr>
<td>2</td>
<td>Client tier (HTML/JS) &amp; Business tier (JDBC)</td>
<td>Eclipse 3.2</td>
</tr>
<tr>
<td>3</td>
<td>Presentation tier (JSP)</td>
<td>Tomcat server in Eclipse 3.2</td>
</tr>
</tbody>
</table>

An alternate Software requirement can be WAMPP (Windows, Apache, MySQL, Perl / PHP) combination. WAMPP is an open source package, hence free too.

P:30; TOTAL: 30 PERIODS

15CS57C NETWORK SECURITY LABORATORY

COURSE OUTCOMES

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

CO 1: explore the basic infrastructure to work with cryptographic and network security algorithms. (K3)
CO 2: analyze and value the importance of cryptographic algorithms. (K3)
CO 3: experiment security algorithms with efficiently implement key exchange algorithm. (K2)
CO 4: configure the mail agent, firewall and secure shell (SSH) for providing secure environment. (K3)
CO 5: install and review the purpose of a protocol analyzer (Wireshark and Snort). (K3)
CO 6: perform basic protocol data unit (PDU) capture, analysis and display filtering using Wireshark features. (K3)
LIST OF EXPERIMENTS

1. Implementation of DES and IDEA Algorithms as per the following requirement shown in the figure.

![Diagram showing implementation of DES and IDEA Algorithms]

2. Implementation of AES and Analyze the following parameters
   a) AES key length. Is it necessary to mention the key length should be 128, 192 or 256 bytes? What if my key is simply five digits i.e. 23456.
   b) AES plain-text length: Is there any restriction on the AES plain-text length?
   c) AES output: What would be the minimum size of AES output string if my key length is say 5 digits and plain-text is say 10 characters.


4. Study of SHA-1 and MD5 hash function and implement the hash code using SHA-1 and hash code using MD5.

5. Authentication using Digital Signature Algorithm - Configure a mail agent to support Digital Certificates, send a mail and verify the correctness of this system using the configured parameters.

6. Configure a firewall to block the following for 5 minutes and verify the correctness of this system using the configured parameters:
   a) Two neighborhood IP addresses on your LAN
   b) All ICMP requests
   c) All TCP SYN Packets

7. Configure SSH (Secure Shell) and send/receive a file on this connection to verify the correctness of this system using the configured parameters.

8. Case Study on Wireshark Installation and Setup.

9. Perform basic PDU capture, analysis and display filtering for a simple scenario using Wireshark.
10. Examine how networking packets are transferred and exchanged in a TCP/IP network. Student will develop an understanding of the protocols in packets transfer and corresponding protocols like Address Resolution Protocol (ARP), and Internet Control Message Protocol (ICMP) using Wireshark software.

11. Case Study on Snort Installation and Setup.

12. Perform Simple experiments using the sniffer mode, the packet logger mode, and the Network Intrusion Detection mode of Snort.

Note:
1. The first four exercises (1-4) have to be implemented in Ubuntu 12.04 using C language.
2. The exercises 5, 6 and 7 have to be implemented using built-in utilities available in Ubuntu 12.04.

SYSTEM REQUIREMENTS FOR A BATCH OF 30 STUDENTS (PER BATCH)

HARDWARE
- 30 Systems with core i5 Processor

SUGGESTED SOFTWARES
- Operating System - Linux (Ubuntu 12.04)
- Wireshark
- Snort or WinIDS AIO software pack

P:30; TOTAL: 30 PERIODS

REFERENCES
2. http://elc.fhda.edu

15CS58C JAVA PROGRAMMING LABORATORY

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

CO 1: develop applications using basic Object Oriented concepts in java. (K2)
CO 2: demonstrate the high end java features such as Inheritance, Interfaces, Polymorphism and exception handling for different scenarios (K2)
CO 3: develop applications for the real world problems with rich interactive user interface design and facilitate appropriate event handling facilities. (K3)
CO 4: develop interactive web applications using servlets which communicate with database. (K3)

LIST OF EXPERIMENTS
1. Develop a java program to find the sum of odd and even numbers in an array.
2. Develop a java program to print the prime numbers between n1 to n2 using class, objects and methods.
3. Develop a program for calculating the age of a person and display the age in the form of years, months and days.
4. Demonstrate a program for method overloading. Consider the different types of transaction modes used for transferring money. (Credit card, Debit card, Net banking etc).
5. Create a Abstract class and calculate the area of different shapes by overriding methods.
6. Develop an java application for mobile recharge using Single inheritance. Consider Customer as base class for storing customer details and Account as derived class for storing account details. Perform the transaction process and recharge the mobile.
7. Develop an application for employee payroll calculation using hierarchial inheritance. Consider FulltimeEmployee, PartTimeEmployee and HourlyEmployee as derived classes and Employee as base class. Also override the method for payroll calculation.
9. Illustrate a java program using packages.
10. Develop a program for banking application with exception handling. Handle the exceptions in following cases:
    a) Account balance <1000
    b) Withdrawal amount is greater than balance amount
    c) Transaction count exceeds 3
    d) One day transaction exceeds 1 lakh.
11. Design a course registration form using AWT controls, validate the fields and handle the events using mouse.
12. Develop the following java applications using string handling methods with Jswing.
    a) Write an application that reads a line of text from the keyboard and prints a table indicating the number of occurrences of each letter of the alphabet in the text.
    b) Dates are printed in several common formats. Two of the more common formats are 04/25/2015 and April 25, 2015
       Write an application that reads a date in the first format and prints it in the second format.
c) Write an application that reads a line of text from the keyboard and prints the count of vowels and consonants present in that text.

d) Write an application to validate email-id and mobile number.

13. Animate a bus using Applets.

14. Create a Student database and store the details of the students in a table. Perform the SELECT, INSERT, UPDATE and DELETE operations using JDBC connectivity.

15. Design a login page using servlets and validate the username and password by comparing the details stored in the database.

P:30; TOTAL: 30 PERIODS

SUGGESTED SOFTWARES
Front end : JAVA, IDE: Net beans / Eclipse
Back end : Oracle 11g
           (DB server could be loaded and can be connected from individual PCs)
Platform : Windows 7/8

15CS61C OBJECT ORIENTED ANALYSIS AND DESIGN L T P C
3 0 2 4

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

CO 1: realize the importance of Object Oriented software development (K2)
CO 2: perform Object Oriented Analysis by using UML diagrams (K3)
CO 3: construct the appropriate UML diagrams for Object Oriented design (K3)
CO 4: identify Object Oriented methodologies to develop OO Design patterns and frameworks (K2)
CO 5: apply various testing strategies for real world applications (K3)

UNIT I INTRODUCTION 15

UNIT II OBJECT ORIENTED ANALYSIS 15
Object Analysis - Use case Diagram- Identifying use cases and relationships - Class Diagram - Identifying Attributes and Methods - Case studies.

UNIT III OBJECT ORIENTED DESIGN 15
Design process and Design axioms - Interaction Diagram: Sequence and Collaboration Diagram- Activity Diagram- State Chart Diagram- Package Diagram

UNIT IV OBJECT ORIENTED METHODOLOGIES 15
Rumbaugh Methodology - Booch Methodology - Jacobson Methodology – Patterns-Frameworks- Unified Approach.
UNIT V OBJECT ORIENTED TESTING


L: 45; P: 30; TOTAL: 75 PERIODS

TEXT BOOKS

REFERENCES

15CS62C C# AND .NET TECHNOLOGIES

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

CO 1: perceive awareness of .NET Environment fundamentals and significant role of .NET in cross platform. (K2)
CO 2: acquire the working knowledge of C# and apply in simple programming constructs(K2)
CO 3: analyze the file types and apply the serialization mechanisms in C# for configuration of objects.(K3)
CO 4: apply the ADO.NET control to strap the data transactions with .NET application. (K4)
CO 5: build the web pages using ASP.NET based on intrinsic controls. (K3)

UNIT I OVERVIEW OF .NET

UNIT II CONCEPTS OF C#
UNIT III FILE I/O AND OBJECTS

UNIT IV ADO.NET
ADO.NET Architecture - ADO.NET - Connected Layer: Data Provider Model - Data Readers - Data Transaction - Disconnected Layer: Dataset - Data Column- Data Row- Table Data.

UNIT V ASP.NET

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES

15CS63C PRINCIPLES OF COMPILER DESIGN

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

CO 1: analyze the source program and recognize the lexical tokens (K2)
CO 2: apply various types of parser to analyze the given grammar (K3)
CO 3: develop the parser to perform translation into the intermediate code language as it parses an input. (K2)
CO 4: generate the target code from directed acyclic graphs for the optimized code.(K2)
CO 5: optimize the source code using suitable code optimization techniques. (K3)

UNIT I LEXICAL ANALYSIS
Introduction to Compiling - Compilers-Analysis of the source program - The phases – Cousins - The grouping of phases - Compiler construction tools. The role of the lexical analyzer - Input buffering - Specification of tokens - Recognition of tokens.

UNIT II SYNTAX ANALYSIS
Syntax Analysis - The role of the parser - Context-free grammars - Writing a grammar –
Top down parsing - Bottom-up Parsing - LR parsers. Type Checking - Type Systems - Specification of a simple type checker.

UNIT III    INTERMEDIATE CODE GENERATION 9
Intermediate languages – Declarations - Assignment statements - Boolean expressions - Case statements – Backpatching - Procedure calls.

UNIT IV    CODE GENERATION 9
Issues in the design of a code generator - The target machine - Run-time storage management - Basic blocks and flow graphs - Next-use information - A simple code generator - Register allocation and assignment - The Directed Acyclic Graph (DAG) representation of basic blocks - Generating code from DAGs.

UNIT V    CODE OPTIMIZATION 9

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES

15CS64C    PROJECT MANAGEMENT AND FINANCE L T P C
(Common to all Programmes) 3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO1: explain the concept of operational and project management. (K2)
CO2: define the scope of a project and develop the project plan. (K2)
CO3: evaluate the technical, business and social environment related to the project. (K3)
CO4: formulate and manage project team successfully. (K5)
CO5: monitor and control projects using tools and techniques. (K3)

UNIT I    BASIC CONCEPT 9
Concept and categories of project - Project development cycle - Concept, tools and techniques of project management - Logistics and supply chain management - Forms of project organizations.
UNIT II PROJECT FORMULATION

UNIT III PROCESS OF PROJECT APPRAISAL
Technical, Economic, Financial, Legal and Social appraisal of the Industrial Projects. Problems due to rate of discount, wage-rate, exchange rates, treatment of taxes, social cost-benefits - treatment of risk and uncertainty - sensitivity analysis and probability approach - Single as well as multiple projects - Big data analytics - PLM and SLM.

UNIT IV PROJECT TEAM FORMULATION AND MAXIMIZING PARTICIPATION
Project Team frame works - Project Team cultures - Barriers and challenges - Selecting Team Members - Key skills of effective project leaders - Giving / receiving feedback from different members of the project.

UNIT V IMPLEMENTATION, MONITORING AND CONTROL OF PROJECTS
Project scheduling, network techniques for resource, cost budgeting and scheduling - project management teams and coordination - Monitoring and post implementation, evaluation of the project - ERP - Project financing.

L:45; TOTAL:45 PERIODS

TEXT BOOKS

REFERENCES

15CS65C MOBILE AND PERVASIVE COMPUTING

L T P C
3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: articulate the basics of Mobile Computing and its standards.(K2)
CO 2: exemplify the mobile communications and protocols.(K2)
CO 3: design a basic architecture for a pervasive computing with smart devices and knowledge of relevant OS.(K3)
CO 4: elucidate the function of Human Computer Interface in ubiquitous computing. (K2)

CO 5: work out on the paradigm of context aware computing and intelligent systems. (K3)

UNIT I MOBILE COMPUTING

UNIT II COMMUNICATIONS AND TRANSPORT LAYER

UNIT III PERVERSIVE COMPUTING AND DEVICES

UNIT IV HUMAN-COMPUTER INTERACTIONS
Motivation and Characteristics - User Interfaces and Interaction for Four Widely Used Devices - Hidden UI Via Basic Smart Devices - Hidden UI Via Wearable and Implanted Devices - Tagging – MEM – Sensors and sensor networks - Embedded systems in Real Time Systems

UNIT V CONTEXT AWARE COMPUTING AND INTELLIGENT SYSTEMS

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: demonstrate applications using fundamental concepts of C#. (K3)
CO 2: experiment and examine runtime errors using exception Handling. (K2)
CO 3: use ADO.NET connectivity to create database. (K2)
CO 4: model .NET components in a windows form based applications.(K2)
CO 5: design online applications using ASP .NET. (K3)

LIST OF EXPERIMENTS
1. Develop a C# program for BMI calculator using class, objects and methods.
2. Develop a C# program for GPA calculator using Single Inheritance. Read the Student and mark details in base class and calculate the GPA in derived class.
3. Demonstrate the various string handling functions in C#.
4. Develop a C# program for finding the area and volume of different shapes by overloading methods.
5. Develop a C# program for calculating Simple Interest of different banks (any three banks) with different rate of interest. Consider the three banks as derived classes and ‘Bank’ as base class and display the name of the bank which offers high rate of interest.
6. Develop a polymorphic banking program using Account hierarchy. Create class for SavingsAccount and CheckingAccount. For each Account, allow the user to specify an amount of money to withdraw from the Account and an amount of money to deposit into the Account. While processing each Account, determine its type. If an Account is a SavingsAccount, calculate the amount of interest owed to the Account using member function calculateInterest, and then add the interest to the account balance. If an Account is a CheckingAccount, deduct fee during withdrawal when the withdrawal amount exceeds a limit using member function deductFee. After processing an Account, print the updated account balance obtained by invoking base class member function getBalance.
7. Develop an Insurance application which calculates interest of an applicant under various insurance policy schemes like pension plans, health plans, individual plans, group schemes and also choose the best insurance policy according to the customer requirement. Allow the applicant to join in more than one scheme and calculate his premium on yearly basis or monthly basis using multiple inheritance.
8. Develop an application that allows the user to buy and sell stock by setting a buy value and a sell value using Indexers. Calculate the total price of purchased products and profit earned by using delegates.
9. Develop a library system and handle all the possible exceptions which occur in cataloging and circulation of books, journals, CDs.
10. Create a Student database with fields Name, RollNo, Department, Place, Mobile_No, email, DOB etc and perform the operations SELECT, INSERT, UPDATE and DELETE by implementing ADO.NET database connectivity.

11. Develop an employee database for an organization to store information about employees, departments and project associated with the employees. Employees work in departments and each department is managed by an employee. When a project is completed the associated employees table should be updated accordingly. Design a normalized table to perform the described actions. Use database wizards and tools that read, display, and allow viewing and editing a specific table in a database. *(Note: The attributes of employee table includes ssn, salary, address and phone number, department table includes dno, dname and current project, project table includes pno, pname, project duration, associated employee, budget.)*

12. Develop a payroll processing application which calculates the wages of employees at all level. Calculate Overtime Rate, Gross Pay and Net Pay of employees and display all the necessary information of an employee in the user interface. Use standard Windows controls to create a user interface and ADO.NET for database connectivity.

13. Create a web application for online registration form with consistent look on all the pages, forms and controls and validate the fields using different validation controls.

14. Create a ASP.Net login page and validate the username and password by comparing the data stored in the SQL Server database using ADO.NET connectivity.

15. **Mini Projects (As per SRS guidelines)**

Design and develop a software application for anyone of the following systems *(3 students per team).*

1. Develop an online shopping application
2. Develop an online banking application
3. Develop an online education system
4. Develop an online ticket reservation System
5. Develop an online inventory management system
6. Develop an online expert counseling system
7. Develop an online passport application system
8. Develop an online examination system
9. Develop an online bus tracking system

**SUGGESTED SOFTWARE TOOLS**

- Operating System : Windows 7/8
- Frontend : Microsoft Visual Studio 2008
- Backend : SQL Server.
15CS67C  COMPREHENSION  L T P C
3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: pursue their higher education and research. (K3)
CO 2: undergo entrance exams such as GATE, GMAT. (K3)
CO 3: demonstrate the comprehensive knowledge being acquired through core engineering courses. (K3)
CO 4: develop logical and analytical skills to ensure on campus placement. (K4)

I. COURSE CONTENT AND LAYOUT
The students will select a particular SIG (Special Interest Group) of subjects as mentioned below to review their competency level:

SIG 1: Computing
It is a Goal-oriented activity requiring, benefiting from, or creating algorithmic processes e.g. through computers.
- Data Structures and Algorithms
- Compiler Design
- Digital Logic Design
- C and OOP Programming
- Theory of Computation

SIG 2: Networking
It is to interact with others to exchange information and develop professional or social contacts.
- Computer Networks
- Web Technology
- Operating System
- Computer Organization and Architecture
- Social Networks

SIG 3: Data Analytics
It is the science of examining raw data with the purpose of drawing conclusions about that information.
- Database Management Systems
- Software Engineering
- Distributed Computing
- Advanced Database Technology
- Data Warehouse and Data Mining

II. ASSESSMENT PROCEDURE
The staff-coordinator per group is responsible for scheduling the session plans, monitoring the activities and recording the continual assessments.

The technical seminars, group discussions and comprehensive viva will be conducted and assisted by subject experts in the department.

1. Technical Seminars: Each student will be required to make one technical presentation for minimum 15 minutes duration in this course. Individual topics will be assigned to the students by the department.

2. Group Discussion: Assessment must focus on evaluating Team spirit and Body Language of student’s participation.

3. Comprehensive Viva: Viva should be handled on their area of interest in both written / oral mode.

Each student must participate in the suggested activities and their performance assessment must be recorded.

Suggested Activities for improving placements:

1. **Written Test:**
   a. Verbal
      - Synonyms
      - Antonyms
      - Sentence completion
      - Passage writing
   b. Aptitude
      - Quantitative and Logical
   c. Analytical
      - Critical Reasoning

2. **Mock Interviews:**
   a. **Pure HR Panel:**
      - Communication Skills
      - Attitude
      - Interpersonal Skills
      - Openness to learn
      - Eligibility Check
      - Stress test
      - Co-curricular achievements
      - Extra-curricular achievements
   b. **Management Interview:**
      - Industry Orientation
      - Industry Trends
      - Career Goals
      - Adaptability
      - Culture Fitment
c. Tech Panel:

- Programming languages you know about.
- Data Structures
- Project related
- Subject Knowledge
- Practical applicability of basic concepts
- Certifications
- Problem Solving

Suggested Activities for Encouraging Higher Studies

1. Mock GATE Examination
   - Solving previous year question papers
   - Objective type test for Aptitude and Verbal practices.

2. Technical Review (Suggested to practice any Two Interview process)

   Set one Interview Process

   Written Test procedure:
   1. Verbal – Synonyms, Antonyms, Sentence completion & passage
   2. Aptitude – Quantitative and Logical reasoning, Old TCS questions
   3. Analytical – Critical Reasoning - Refer Barron's GRE

   Technical interview procedure:
   - Technical interview: C, C++ & java. And interviewer will ask the questions based on your Area of Interest
   - HR interview: It will be like stress interview. There is a possibility for asking the technical questions. But technical questions will ask to test the patience and coolness of a candidate. Some interviewer asks questions rapidly. Sometimes candidate will be asked to talk about current affairs

   Set Two Interview Process

   Round 1: AMCAT ONLINE TEST - computer programming, quantitative, logical and verbal

II. ASSESSMENT PROCEDURE

- The staff-coordinator per group is responsible for scheduling the session plans, monitoring the activities and recording the continual assessments.
- The technical seminars, group discussions and comprehensive viva will be conducted and assisted by subject experts in the department.

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3. Comprehensive Viva: Viva should be handled on their area of interest in both written / oral mode.
   - Each student must participate in the suggested activities and their performance assessment must be recorded.

Suggested Activities for improving placements:

1. **Written Test:**
   - a. Verbal
     - Synonyms
     - Antonyms
     - Sentence completion
     - Passage writing
   - b. Aptitude
     - Quantitative and Logical
   - c. Analytical
     - Critical Reasoning

2. **Mock Interviews:**
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     - Attitude
     - Interpersonal Skills
     - Openness to learn
     - Eligibility Check
     - Stress test
     - Co-curricular achievements
     - Extra-curricular achievements
   - b. Management Interview:
     - Industry Orientation
     - Industry Trends
     - Career Goals
     - Adaptability
     - Culture Fitment
   - c. Tech Panel:
     - Programming languages you know about.
     - Data Structures
     - Project related
     - Subject Knowledge
     - Practical applicability of basic concepts
     - Certifications
     - Problem Solving
Suggested Activities for Encouraging Higher Studies

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   - Solving previous year question papers
   - Objective type test for Aptitude and Verbal practices.

2. Technical Review (Suggested to practice any Two Interview process)

   Set one Interview Process

   Written Test procedure:
   1. Verbal – Synonyms, Antonyms, Sentence completion & passage
   2. Aptitude – Quantitative and Logical reasoning, Old TCS questions
   3. Analytical – Critical Reasoning - Refer Barron's GRE

   Technical interview procedure:
   - Technical interview: C, C++ & java. And interviewer will ask the questions based on your Area of Interest
   - HR interview: It will be like stress interview. There is a possibility for asking the technical questions. But technical questions will ask to test the patience and coolness of a candidate. Some interviewer asks questions rapidly. Sometimes candidate will be asked to talk about current affairs

   Set Two Interview Process

   Round 1: AMCAT ONLINE TEST - computer programming, quantitative, logical and verbal
   Round 2: TECHNICAL HR - In this round, there will be one HR, face to face process.
   Only way to clear this round SPEAK SPEAK SPEAK. Be confident and maintain eye contact
   Round 3: FINAL HR - It took around 10 min…There were 2 HRs.. – Personal Questions

   Set Three Interview Process

   1. Written Test procedure:
      - Verbal – Synonyms, Antonyms, Sentence completion & passage
      - Aptitude – Quantitative and Logical reasoning, Old TCS questions
      - Analytical - Critical Reasoning - Refer Barron’s GRE

   2. Group Discussion: A GD is a methodology used by an organization to gauge whether the candidate has certain personality traits and/or skills(Communication
skills, Interpersonal Skills, Leadership Skills, Motivational Skills, Team Building Skills)

3. **HR Interview**: Both Technical and personal Interview

P:30; TOTAL:30 PERIODS

15CS68C  PRODUCT DEVELOPMENT LABORATORY  L T P C
0 0 4 2

**COURSE OUTCOMES**

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

- CO 1: understand the integration of customer requirements in product design. (K2)
- CO 2: Apply structural approach to concept generation, selection and testing. (K3)
- CO 3: Understand various aspects of design such as industrial design, design for manufacture. (K2)

The objective of this course is to make the students learn methodologies for identifying customer needs, developing new product concepts, prototype development, estimation of manufacturing costs, and developing business plans to support the development and marketing of these products. A student or a team of students shall develop their own products based on the users need, build simple prototypes of their design, and write development plans for the products.

P: 60 TOTAL: 60 PERIODS

15CS71C  RESEARCH PAPER AND PATENT REVIEW – SEMINAR  L T P C
0 0 2 1

During the seminar session each student is expected to prepare and present a topic on engineering / technology, for duration of about 15 to 20 minutes. Each student is expected to present at least twice during the semester and the student is evaluated based on the presentation skill, concept and Query clarification. At the end of the semester, he / she can submit a report on his / her topic of seminar and marks are given based on the report. A Faculty is to be allotted and he / she will guide and monitor the progress of the student and maintain the attendance also. The seminar will be assessed by a committee appointed by the department.

P:30; TOTAL:30 PERIODS
COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: realize the graphs as a modeling tool for formulating solutions. (K3)
CO 2: exemplify the structural features of graphs for connectivity analysis. (K2)
CO 3: identify the real world applications of graphs in solving connectedness issues. (K3)
CO 4: appreciate the role of number theory in computing principles design. (K2)

UNIT I INTRODUCTION

UNIT II TREES, CONNECTIVITY AND PLANARITY

UNIT III MATRICES, COLOURING AND DIRECTED GRAPH

UNIT IV PERMUTATIONS AND COMBINATIONS
Fundamental principles of counting - Permutations and combinations - Binomial theorem - Combinations with repetition - Combinatorial numbers - Principle of inclusion and exclusion.

UNIT V FUNCTIONS AND RELATIONS
Generating functions - Partitions of integers - Exponential generating function - Summation operator - Recurrence relations - First order and second order – Non-homogeneous recurrence relations.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
15CS02E COMPUTER VISION L T P C 3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: identify the geometric primitives and perform the image transformations. (K2)
CO 2: process the image based on the pixel operators. (K2)
CO 3: extract the various features and match the images. (K2)
CO 4: split and merge the images based on algorithms. (K2)
CO 5: apply rendering and reconstruct the images. (K3)

UNIT I IMAGE FORMATION 8
Introduction – Computer vision - Geometric Primitives and Transformations – Photometric image formation – Digital Camera

UNIT II IMAGE PROCESSING 9

UNIT III FEATURE DETECTION AND MATCHING 9
Points and Patches – Edges – Lines - 2D and 3D Feature based alignment – Pose Estimation – Geometric Intrinsic Calibration

UNIT IV SEGMENTATION 9
Active Contours – Split and Merge – Mean Shift and Mode Finding – Normalized Cuts – Graph cuts and Energy based methods

UNIT V 3D RECONSTRUCTION AND RENDERING 10

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
15CS03E APPLIED GAME THEORY L T P C
3 0 0 3

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

CO 1: comprehend a conceptual overview to the tools of game theory and its applications. (K2)
CO 2: analyze situations in which two or more individuals (or firms, political parties, countries) interact in a strategic manner (K4)
CO 3: analyze the situations involving conflict and/or cooperation (K4)
CO 4: incorporate the concepts of Game theory in Wireless Network Applications. (K3)

UNIT I STATIC GAMES OF COMPLETE INFORMATION 9

UNIT II DYNAMIC GAMES WITH COMPLETE INFORMATION 9
Extensive Form Games – strategies and equilibrium in extensive form games - Backward Induction and sub game perfection.

UNIT III STATIC GAMES OF INCOMPLETE INFORMATION 9
Bayesian Games – Bayesian Nash Equilibrium - Applications

UNIT IV DYNAMIC GAMES WITH INCOMPLETE INFORMATION 9
Perfect Bayesian Equilibrium – Signaling Games – Applications

UNIT V APPLICATIONS FOR WIRELESS NETWORKS 9

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

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

CO 1: perceive foundational concepts in machine learning. (K2)
CO 2: construct algorithms for learning the linear and non-linear models. (K3)
CO 3: discriminate the usage of various data clustering algorithms. (K4).
CO 4: understand the learning algorithms for tree and rule-based models. (K2)
CO 5: validate importance of reinforcement learning techniques. (K3)

UNIT I FOUNDATIONS OF LEARNING

UNIT II LINEAR MODELS

UNIT III DISTANCE BASED MODELS

UNIT IV TREE AND RULE BASED MODELS

UNIT V REINFORCEMENT LEARNING

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

15CS05E GREEN COMPUTING

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: acquire knowledge to adopt green computing practices (K2)
CO 2: obtain skills for energy saving practices in use of hardware (K2)
CO 3: understand the modeling of green information systems (K2)
CO 4: understand minimized requirements used for Green initiatives (K2)
CO 5: formulate models based on Green IT Strategies (K5).

UNIT I INTRODUCTION

UNIT II GREEN ASSETS

UNIT III GREEN INFORMATION SYSTEMS

UNIT IV GREEN COMPLIANCE

UNIT V CASE STUDY
Case Study in Applying Green IT Strategies and Applications: Hospital, Packaging Industry, Telecom Sector - Environmentally Responsible Business Strategies

L: 45 TOTAL: 45 PERIODS

TEXT BOOK
REFERENCES


15CS06E NATURAL LANGUAGE PROCESSING L T P C
3 0 0 3

COURSE OUTCOMES

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

CO 1: develop a language model using finite state automata and N-grams. (K3)

CO 2: appreciate the syntax of the language and apply appropriate parsing algorithms (K3)

CO 3: comprehend the high level semantics of the language. (K2)

CO 4: apply the concepts of NLP in Information retrieval, Machine translation oriented applications. (K3)

UNIT I BASICS OF LANGUAGE PROCESSING


UNIT II LANGUAGE CONSTRUCTS


UNIT III SYNTACTIC ANALYSIS


UNIT IV SEMANTIC ANALYSIS

UNIT V APPLICATIONS OF NLP


L: 45 TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES


15CS07E NATURE AND BIO INSPIRED COMPUTING L T P C
3 0 0 3

COURSE OUTCOMES

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

CO 1: acquire in-depth knowledge about the Nature and Bio inspired Computing. (K2)
CO 2: derive the computational complexity of search heuristics using biologically inspired computing. (K2)
CO 3: analyze the optimization algorithms for NP hard problems. (K5)
CO 4: identify the relevant theoretical models, reconfigurable architectures and computing paradigms for solving real world problems. (K3)

UNIT I INTRODUCTION


UNIT II ANT COLONY OPTIMIZATION


UNIT III APPLICATIONS

UNIT IV SWARM INTELLIGENCE
Biological foundations of Swarm Intelligence – Swarm Intelligence in Optimization –
Particle Swarms for dynamic optimization problems.

UNIT V COMPUTING PARADIGMS
Biological Inspired computing to Natural Computing – Integration of Evolutionary
Computation Components in Ant Colony Optimization – Particle Swarm Optimization
based on Socio-cognition.

TEXT BOOKS
2. Eric Bonabeau, Marco Dorigo, Guy Theraulaz, “Swarm Intelligence: From Natural to
3. Leandro N. De Castro, Fernando J. Von Zuben, “Recent Developments in
Biologically Inspired Computing,” Idea Group Inc., 2005

REFERENCE

15CS08E QUANTUM COMPUTING L T P C
3 0 0 3

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

CO 1: understand the building blocks of a quantum computer. (K2)
CO 2: understand the principles, quantum information and limitation of quantum
operations formalizing. (K2)
CO 3: understand the quantum error and its correction. (K2)

UNIT I FUNDAMENTAL CONCEPTS
Global Perspectives- Quantum Bits - Quantum Computation - Quantum Algorithms -
Quantum Information- Postulates of Quantum Mechanisms.

UNIT II QUANTUM COMPUTATION
Quantum Circuits – Quantum algorithms- Single Orbit operations- Control Operations -
Measurement Universal Quantum Gates- Simulation of Quantum Systems- Quantum
Fourier transform- Phase estimation-Applications- Quantum search algorithms – Quantum
counting – Speeding up the solution of NP – complete problems – Quantum Search for an
unstructured database.

UNIT III QUANTUM COMPUTERS
Guiding Principles - Conditions for Quantum Computation - Harmonic Oscillator Quantum
Computer - Optical Photon Quantum Computer – Optical cavity Quantum electrodynamics -
Ion traps - Nuclear Magneticresonance.
UNIT IV QUANTUM INFORMATIONS

UNIT V QUANTUM ERROR CORRECTION

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

15CS09E ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS L T P C
3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: comprehend different types of problem solving agents and its applications. (K2)
CO 2: solve problems using informed and uninformed search strategies.(K3)
CO 3: appreciate the concept of planning. (K2)
CO 4: comprehend and analyze the different types of learning. (K4)
CO 5: realize the concepts and components of expert system and expert system tools. (K2)

UNIT I PROBLEM SOLVING AGENTS AND STRATEGIES

UNIT II LOGICAL REASONING
Logical agents - propositional logic - inferences - first-order logic - inferences in first order logic - forward chaining - backward chaining - unification - resolution.
UNIT III  PLANNING  9
Planning with state-space search - partial-order planning - planning graphs – planning and acting in the real world.

UNIT IV  LEARNING  9
Learning from observation - Inductive learning - Decision trees - Explanation based Learning - Statistical learning methods - Reinforcement Learning.

UNIT V  EXPERT SYSTEMS  9

TEXT BOOKS

REFERENCES

15CS10E  SIMULATION THEORY AND PRACTICES  L T P C
3 0 0 3

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

CO1: understand the behavior of a system by using simulation study. (K2)
CO2: apply the mathematical models to simplification of the system (K3)
CO3: interpret technological requirements for running IPv6 in conjunction with IPv4(K2)
CO4: apply the various image-processing techniques to enhance the digital images (K3)
CO5: organize and analyze the elements of networks by network simulator (K3)

UNIT I  INTRODUCTION TO SIMULATION  9
Introduction - Simulation terminologies - Application areas - Model classification - Types of Simulation - Steps in a simulation study - Concepts in discrete event simulation - Simulation examples.
UNIT II  MATHEMATICAL MODELS  9

UNIT III  LOCAL AREA NETWORK SIMULATION  9
Operation and necessity of using private and public IP addresses for IPv4 addressing - IPv6 addressing scheme to satisfy addressing requirements in a LAN / WAN environment - IPv4 addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment - Technological requirements for running IPv6 in conjunction with IPv4 such as dual stack - IPv6 addresses

UNIT IV  DIGITAL IMAGE PROCESSING SIMULATOR  9
Images: Additive and Subtractive Primary Colours - Line dropout and Salt and Pepper noise removal - Image Differencing (subtraction) – Linear Edge Enhancement - Supervised Classification

UNIT V  NETWORK SIMULATOR  9
NS3 – Introduction - Modeling the Network Elements - Simulating a Computer Network - Smart Pointers - Representing Packets - Object Aggregation - Events - Compiling and Running the Simulation - Animating the Simulation - Analyzing the Results

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
5. www.freecncnastudyguide.com/study-guides/ccna/
6. www.iifm.ac.in/downloads/dips/
15CS11E DIGITAL IMAGE PROCESSING L T P C
3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
- CO1: investigate techniques of image formation, sampling, quantization and transformations. (K4)
- CO2: apply the image intensity transformations and filtering for the purpose of image enhancement in the spatial and frequency domains. (K3)
- CO3: acquire an appreciation for the image restoration issues and Techniques. (K2)
- CO4: conduct independent study and analysis on image compression techniques that are best suitable for real world problems. (K4)
- CO5: analyze the suitable segmentation techniques and perform image analysis in industry, medicine and defense applications (K4)

UNIT I DIGITAL IMAGE FUNDAMENTALS 7

UNIT II IMAGE ENHANCEMENT 9
Spatial domain enhancement: gray level transformations - histogram processing - smoothing spatial filters - sharpening spatial filters - combining spatial enhancement methods. Frequency domain enhancement: filtering in frequency domain - smoothing frequency domain filters - sharpening frequency domain filters - homomorphic filtering.

UNIT III IMAGE RESTORATION 11

UNIT IV IMAGE COMPRESSION 11

UNIT V IMAGE SEGMENTATION 7
Detection of discontinuities: point, line and edge detection - Edge linking and boundary detection. Thresholding: global thresholding - optimal thresholding - local thresholding - thresholds based on several variables. Region based segmentation – Case Study: Applications of segmentation in industry, medicine, and defense related images.

L: 45 TOTAL: 45 PERIODS
TEXT BOOKS

REFERENCES
5. http://www.cse.iitd.ernet.in/~pkalra/csl783/

15CS12E OPEN SOURCE SYSTEMS L T P C 3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: identify the need for open source system and their necessity for moving towards open source system. (K2)
CO 2: demonstrate the underlying applications and choose the appropriate technologies and their approaches for different applications using PHP. (K3)
CO 3: apply the open source tools and technologies to provide the appropriate open source databases for their applications. (K3)
CO 4: develop dynamic web pages for social networking sites using python and perl. (K2)
CO 5: implement projects involving Free and Open Source software and learn how to participate in open-source projects effectively. (K3)

PREREQUISITES: Familiarity with C or Java

UNIT I OVERVIEW OF OPEN SOURCE SOFTWARE AND OPERATING SYSTEM

UNIT II OPEN SOURCE PROGRAMMING LANGUAGE–PHP
Expression - File and Directory Handling - Including Files - File Access - Working With Forms - Processing Forms - Form Validation – Introduction to advanced PHP concepts - Simple programs using PHP

UNIT III OPEN SOURCE DATABASE
MySQL: Introduction - Setting up an account - Starting, Terminating and writing your own MySQL Programs - Record Selection Technology - Working with Strings - Date and Time - Sorting Query Results module - Generating Summary - Working with Metadata - Using Sequences – MySQL and Web- PHP and SQL database: PHP and LDAP ; PHP Connectivity ; Sending and receiving emails-PHP Database Connectivity: Retrieving data from MySQL - Manipulating data in MySQL using PHP-Simple programs using MySQL

UNIT IV PYTHON

UNIT V PERL

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS
2. Rasmus Lerdorf and Levin Tatroe, “Programming PHP”, O’Reilly, 2002

REFERENCES
1. MySQL Bible Steve Suchring John Wiley sons, 2002
3. http://www.ustudy.in/node/489
4. www.tutorialspoint.com/python/
5. www.khanacademy.org/science/computer-science-subject/computer-science
6. spark.incubator.apache.org/docs/latest/python-programming-guide.html
7. en.wikibooks.org/wiki/Python_Programming
15CS13E MOBILE APPLICATION DEVELOPMENT

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

CO1: Work in the mobile application development framework and understand the life cycle of mobile application (K2).
CO2: Design a GUI to develop a mobile application for a given scenario (K3).
CO3: Understand the memory management, workflow concepts (K2).
CO4: Understand about intents and services in android application development (K2).
CO5: Design and develop the android applications for a new scenario (K4).

UNIT I INTRODUCTION

UNIT II USER INTERFACE

UNIT III APPLICATION DESIGN

UNIT IV APPLICATION DEVELOPMENT

UNIT V TOOLS

REFERENCES
15CS14E          ADHOC AND SENSOR NETWORKS          L T P C
                      3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
  CO 1: appreciate the concept of adhoc and sensor networks, their architecture and
  applications. (K2)
  CO 2: analyze various protocol design and issues for adhoc and sensor network. (K4)
  CO 3: recognize the efficiency of power and energy required for adhoc and sensor
  network. (K2)
  CO 4: evaluate the performance of routing protocols for adhoc and sensor network. (K5)

UNIT I   INTRODUCTION TO ADHOC NETWORKS
9
Introduction to Wireless Communication Technology – Characteristics of the Wireless
Channel – IEEE 802.11a/b Standard – Origin of Adhoc Packet Radio Networks –
Architecture of PRNETs – Introduction to Adhoc Wireless Networks – Heterogeneity in
Mobile Devices.

UNIT II ADHOC NETWORK ROUTING PROTOCOLS
9
Introduction to designing a Routing Protocol – Classifications of Routing Protocols –
Wireless Routing Protocol (WRP) – Source–Initiated On–Demand Approaches – Adhoc
On–Demand Distance Vector Routing (AODV) - Introduction to Multicast Routing Protocol
– Classifications of Multicast Routing Protocols.

UNIT III QoS AND ENERGY MANAGEMENT
9
Introduction to QoS in Adhoc Wireless Networks – Classifications of QoS Solutions –
Classification of Energy Management Schemes – Transmission Power Management
Schemes – System Power Management Schemes.

UNIT IV INTRODUCTION TO WIRELESS SENSOR NETWORKS
9
Introduction - Characteristic requirements - Challenges of sensor networks - Emerging
technologies for wireless sensor networks - Advantages of sensor networks - Sensor
network applications.

UNIT V WSN PROTOCOLS
9
Communication protocols- MAC protocols – Naming and Addressing-Routing protocols –
Energy efficient routing.

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS
1. C. Siva Ram Murthy and B. S. Manoj, “Ad Hoc Wireless Networks: Architectures and
REFERENCES

15CS15E SOCIAL COMPUTING L T P C 3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: understand the basics of computational social sciences.(K2)
CO 2: aware about automated information extraction methods and human centered computing. (K2)
CO 3: identify online social networks and human cognition & Decision systems. (K3)
CO 4: analyze the mining methods on social web. (K3)
CO 5: understand social data analytics and its applications. (K2)

UNIT I INTRODUCTION TO COMPUTATIONAL SOCIAL SCIENCE 9

UNIT II AUTOMATED INFORMATION EXTRACTION AND HUMAN CENTRED COMPUTING 9

UNIT III ONLINE SOCIAL NETWORKS 9
Introduction - Definition of network - Elementary Social Applications - Network Structures - The Network Matrix - Types of social networks (e.g., Twitter, Facebook). Human Cognition and Belief systems - Decision Making Models - International Relations-Software for SNA.

UNIT IV MINING THE SOCIAL WEB 9
Mining twitter, Facebook, linkedIn and google+. Mining web pages: Using Natural Language processing to understand Human Language - Summarize Blog posts and more - Twitter Cookbook - Discovering the trending topics - Tabulating frequency analyzing - Getting all friends and Followers for a User.
UNIT V  SOCIAL NETWORK DATA ANALYTICS


L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

15CS16E  BIG DATA ANALYTICS  L T P C
0  0  2  1

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: Learn the fundamentals and describe what Big Data Analytics is. (K1)
CO 2: Understand the Big Data flow and apply necessary components to build a Big Data Analytics System. (K2)
CO 3: Identify and successfully apply appropriate techniques and tools to solve Big Data problems. (K3)
CO 4: Apply the requirements for a Big Data Analytics System for departmental organizational requirements using Hadoop. (K3)
CO 5: Have an in-depth understanding and comparison of the Big Data ecosystem, specifically PIG, Hive. (K2)

UNIT I  INTRODUCTION TO BIG DATA

UNIT II  DATA ANALYSIS METHODS

UNIT III  NoSQL DATA MODEL
Introduction to NoSQL – aggregate data models – aggregates – key-value and document data models – relationships – Graph databases - schemaless databases – distribution
models – master-slave replication – peer-peer replication – sharing and replication – Case Study: MongoDB.

UNIT IV    HADOOP ENVIRONMENT

UNIT V    FRAMEWORKS AND TOOLS

TEXT BOOKS

REFERENCES

15CS17E    DIGITAL IMAGE PROCESSING LABORATORY

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
- CO 1: demonstrate the basic concepts of Matrices. (K3)
- CO 2: apply research solutions for color and texture feature extractions with special emphasis on the color models. (K3)
- CO 3: recognize various filter designs that can enhance the image characteristics and aid to build better learning models. (K3)
- CO 4: develop image compression and segmentation systems based on spatial and geometrical structures of image blocks. (K5)
CO 5: analyze the design issues through several application case studies derived from real-world problems. (K4)

LIST OF EXERCISES

1. Generate B Matrix with 5 rows and 5 columns using rand function. Find out the followings:
   (i) Inverse of A
   (ii) Eigen vectors and Eigen values of A
   (iii) C = A*B
   (iv) Rank of A

   where A =
   \[
   \begin{pmatrix}
   17 & 24 & 1 & 8 & 15 \\
   23 & 5 & 7 & 14 & 16 \\
   4 & 6 & 13 & 20 & 22 \\
   10 & 12 & 19 & 21 & 3 \\
   11 & 18 & 25 & 2 & 9 \\
   \end{pmatrix}
   \]

2. Find whether the given matrix R is
   (i) reflexive (ii) tolerance and (iii) transitivity matrix or not.

   \[
   R =
   \begin{pmatrix}
   1 & 1 & 0 & 0 & 0 \\
   1 & 1 & 0 & 0 & 1 \\
   0 & 0 & 1 & 0 & 0 \\
   0 & 0 & 0 & 1 & 0 \\
   0 & 1 & 0 & 0 & 1 \\
   \end{pmatrix}
   \]

3. Design a photomerge method to create a panorama image from a series of individual pictures of a scene. Have minimum of four images of a scene. For eg.,
4. Color Models
   (i) Convert the given RGB Image into HSI / YCbCr / CMYK color spaces.
   (ii) Perform the color and texture features extraction from different color Spaces.
   (iii) Given a gray X-Ray/CT/MRI image. Perform pseudo coloring techniques to generate color image for improving the clinical decisions.

5. Image Filters Design
   (i) Create a high pass filter with normalised value 0.6 and samples ranging from 128 to 1000/2.
   (ii) Create a low pass filter with normalised value 0.6 and samples ranging from 128 to 1000/2.
   (iii) Design MakeBSFilter function creates biorthonormal filter pairs. The filter pairs are made as Interpolating (Deslauriers - Dubuc) filter of polynomial degree 3.

6. Image Enhancement
   (i) Enhance the contrast of an image using Histogram Equalization.
   (ii) Apply Gordon’s contrast-based enhancement technique, for the detection of edges within the contextual region.

7. Image Compression
   (i) Write a program for image compression by performing the wavelet transforms. The wavelets can be chosen with different polynomial size and find performance of compression.
   (ii) Design efficient data compression techniques using fractals and DCTs.

8. Image Segmentation
   (i) Detect the horizontal, vertical and diagonal edges of an image.
   (ii) Demonstrate the global and local threshold operations of an image.

9. Image Recognition
   (i) Take a hand written document of a particular language (English / TAMIL). Design a template images for each alphabets of the language. Perform preprocessing and segment the document into individual character.
   (ii) Create a synthetic texture mosaic image as shown below. Identify the 16 texture regions into class labels based on physical microstructure relations.

10. Mini-project on any one of the following topics, but not limited to,
    - Moving Object Tracking
    - Land Use – Land Cover Classifier using Remote Sensing images
    - Leaf type identification using shape features
MRI Image Analysis – Knee, spine, Brain, etc.,
Fractal method for texture classification
Automatic Classification of Cancerous Cells
Quantitative measurements of fundus image
IRIS recognition
Nerve Tissue Segmentation

P: 30; TOTAL: 30 PERIODS

SUGGESTED SOFTWARES

- Tool - MatLab R2012 / Labview / Python
- OS - Windows 7/ Windows 8/ Linux

15CS18E OPEN SOURCE SYSTEMS LABORATORY

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: install and run open-source operating systems. (K2)
CO 2: adhere the interoperability principles of open source software. (K3)
CO 3: implement web-enabled projects involving Free and Open Source software like Perl, PHP and Python along with database access like MySQL and learn how to participate in open-source projects effectively. (K3)
CO 4: appreciate the importance of open source licensing and the consequences of using open source in products. (K2)

LIST OF EXPERIMENTS
Case Study on installing the necessary software for setting up kernel configuration for the successful execution of Perl, PHP and Python programs. Install the necessary database that supports these languages.

PHP:
1. Create a PHP file that says “Hai Welcome to PHP World” and execute the file.
2. Build a PHP program to choose a random number and display its square root
3. Design a PHP file that assigns the content of a text file to a variable then displays those contents on the web page.
4. Design and Develop a Simple User Registration Script in PHP and MySql.

Perl:
5. Develop and execute a Perl program which displays "Hello world" and then exits.
6. Develop a Perl program for displaying a number based on following aspects.
   (i) Put the number 4000/7 into a variable, and display it on screen.
   (ii) Adapt the program to display the number to 3 decimal places. (Hint: This is possible using integer math before the final calculation.)
   (iii) Adapt the program to round up if the last decimal place is greater than 5
(iv) Adapt the program to display the number with leading zeros
(v) Adapt the program to show a + sign if the number is positive, and check that it correctly displays a - sign if you subtract 1000 from the number.

7. Build a Perl program that
   - Displays a title on screen
   - Creates 3 random numbers (a,b,c)
   - Displays those numbers neatly formatted
   - Uses those numbers as the coefficients of a quadratic equation, calculates and displays both roots.

8. Design, Develop and access a Student Mark Database using Perl and MySQL

Python

9. Develop a python program that
   - Prints Hello world!
   - Swap Two Variables
   - Generate a Random Number
   - Convert Kilometers to Miles
   - Make a Simple Calculator
   - Remove Punctuations From a String
   - Sort Words in Alphabetic Order
   - Find the Size (Resolution) of Image

10. Design and develop a Simple Login Script using Python and MySQL

SOFTWARE REQUIREMENTS:
   - Perl, PHP and Python software that runs on Linux

REFERENCES
   For Installation and execution of programs

15CS19E    MOBILE APPLICATION DEVELOPMENT LABORATORY

COURSE OUTCOMES
Upon completion of this course, the students will be able to
   CO 1: Install Android Application Tools kit and Setup android application development environment for the development of android applications. (K2)
   CO 2: Emulate android applications in ADT Emulator using built-in commands and functions of Android SDK. (K3)
   CO 3: Design and develop animation based android applications using 2D/3D shapes. (K4)
CO 4: Implement and publish android application in mobile app repositories. (K4)

LIST OF EXERCISES

1. Case Study on setting up android application development environment. Write the procedure to set up a virtual handset device. Study and state a report about the set of tools that are available in Android Studio. Describe in detail about the basic steps and work flow that are involved in the application development. Create your first project to develop an android application to display hello world / your name. Build and test your application using Android SDK.

2. Develop an android application for creating a registration form. Use different UI controls like Edit Text (for Name, email-id, phone number), Button, Spinner (for DOB), Radio Button (for Gender) and CheckBox (for qualification). Write java code for validating the input fields like name, email-id, and phone number.

3. Create an android application for fetch IFSC code of a given bank using control statement and array concept. Design aesthetic user interface using graphics concept of Android. Use following layout as reference for your design. Use EditText box, TextView and Buttons for the application development.

4. Create a simple and elegant application for calculating age using date picker control. It has to display the exact age in (i) years months and days (ii) months (iii) weeks (iv) days. The application has to show the days of next five birthdays.

5. Create an android application for developing a unit conversion system for currency exchange, temperature, length, mass, speed, volume and area using Spinner. The sample GUI is given below.
6. Create an android application for developing number conversion system that has to perform following translations
   a. Binary to Decimal
   b. Binary to Octal
   c. Binary to Hexadecimal
   d. Decimal to Binary
   e. Decimal to Octal
   f. Decimal to Hexadecimal
   g. Octal to Binary
   h. Octal to Decimal
   i. Octal to Hexadecimal
   j. Hexadecimal to Binary
   k. Hexadecimal to Octal
   l. Hexadecimal to Decimal

7. Develop an android application for characterizing the given number into the following types
   a. Prime number or not
   b. Armstrong number or not
   c. Palindrome or not
   d. odd or even
   e. Whole number or not
   f. Natural number or not

8. Create an android application for developing m-tutorials for school kids to learn, train and exam multiplication tables (1 to 12). Use basic 2D Animation for bring aesthetic look to the application.

9. Develop an android application for creating a game for checking the kid’s IQ level about the India’s state capital. The application has to check the IQ level of the kid using three modes namely easy, medium and hard. Each question has to answer within a certain time limit. Use timer and menu concept.

10. Design and Develop an elegant android application to automate the telephone directory for our institution which should have option to add, edit, delete, update and search. Use Menu bar, dialogue box and Action bar concept for implementing the telephone directory.

11. Design and develop an android application to read the message in Inbox of the mobile. Use Text to Speech Conversion for creating the application.

12. Implement a Mini project in any one of the following domain and perform system requirement, system design, system implementation and system testing phases in exhaustive manner. Submit a detailed mini project documentation which includes publishing procedure of the developed android application.
   a. Education
   b. Entertainment
   c. Game
   d. Tour and Travel
   e. Medical

SOFTWARE REQUIREMENTS:

- JDK, Eclipse, Android SDK, Eclipse, Android Emulator, Sqlite-3 and ADT.
- Install all of these in individual PC.

P:30; TOTAL: 30 PERIODS
REFERENCES

1. For Installing Android Application Development Framework -
   http://developer.android.com/develop/index.html,
   http://www.raywenderlich.com/78574/android-tutorial-for-beginners-part-1
3. For Designing and Implementing the application - http://android-
   developers.blogspot.in/, http://www.tutorialspoint.com/android/

15CS20E ADHOC AND SENSOR NETWORKS LABORATORY L T P C
0 0 2 1

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

CO 1: acquire the ability to design WLAN / LAN systems meeting out real time
   requirements. (K5)
CO 2: ability to design routing and security protocols for adhoc and sensor
   networks using NS3. (K5)
CO 3: apply the basic concepts of wireless sensor network nodes and networks.
   (K3)
CO 4: implementation of real time sensor network test bed using motes and Tiny
   OS programming. (K5)
CO 5: develop mini projects on applications of sensor networks in health /
   agriculture / environment / social sectors. (K6)

LIST OF EXERCISES

1. Configuration of LAN, VLAN and WLAN using Switches, Router, Wifi Access Point
   and PDA (Hardware)
2. Use appropriate simulation tools for the simulation of AODV / DSR routing
   algorithm.
3. Use appropriate simulation tools for the simulation of a security algorithm in adhoc
   networks.
5. Simulation of cryptographically secured (private key) communication in Wireless
   Sensor Networks.
7. Sensing data using WSN motes. (Hardware)
8. Develop a Tiny OS program where a PC wirelessly controls a mote by sending it
   packets that command it to do specific functions. (Hardware)
9. Develop mini projects on applications of sensor networks in health / agriculture /
   environment / social sectors.

P: 30; TOTAL: 30 PERIODS
SUGGESTED SOFTWARE AND HARDWARE REQUIREMENT

SOFTWARE
- S3, Tiny OS and MoteView

HARDWARE

15CS21E SOCIAL COMPUTING LABORATORY L T P C

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: analyze and design solutions to social computing issues. (K4)
CO 2: develop solutions using crowd sourcing. (K3)
CO 3: develop Decision Making System through exploitation of social networks. (K3)
CO 4: implement applications related to Blogs. (K3)
CO 5: visualization of data in social networks. (K2)

LIST OF EXPERIMENTS
1. Create a simple Social Network using Pligg.
2. Crowd sourcing using Amazon Mechanical Turk/PYBOSSA
3. Decision Making in the social media.
5. Community discovery- Node Classification.
6. Visualizing Social Network Dynamics using R/Pajeck.

SYSTEM REQUIREMENTS
- Micro Soft Windows XP/7/8, UNIX
- Java Enterprise Edition 8
- Oracle/SQL Server/Mysql
- Web Server (Apache Tomcat/ Glassfish)
- Eclipse/Net beans IDE

P: 30; TOTAL: 30 PERIODS

15CS22E BIG DATA ANALYTICS LABORATORY L T P C

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: develop a map reduce program for parallel tasks. (K3)
CO 2: demonstrate the usage of technologies for big data analytics. (K3)
CO 3: analyze and process data using Big Data processing tools. (K4)
LIST OF EXPERIMENTS
1. Installation of Apache Hadoop using Hortonworks Data Platform
2. Develop a map reduce program for word count
3. Big Data processing with Hive and HCatolog
4. Query Processing using Hive
5. Writing data processing scripts using Pig
6. Using command line to manage HDFS
7. Work with snapshot creation on HDFS
8. Installation of clustered Hadoop and mapreduce
9. Classification analysis using Hadoop mapreduce
10. Cluster analysis using Data Meer

SYSTEM REQUIREMENTS
- Hadoop 20.0, Data Meer 2.0, Eclipse IDE, Java

15CS23E ADVANCED JAVA PROGRAMMING

L T P C
3 0 0 3

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
- CO 1: appraise and understand the advanced features of java. (K2).
- CO 2: apply the various network programming constructs in Java (K3)
- CO 3: practice the client/ server model designs in distributed environment. (K3)
- CO 4: evaluate the database connectivity and extend web applications using JSP and Servlets. (K4)
- CO 5: design and develop enterprise applications. (K3)

UNIT I JAVA BASICS REVIEW

UNIT II NETWORK PROGRAMMING IN JAVA

UNIT III APPLICATIONS IN DISTRIBUTED ENVIRONMENT
Remote Method Invocation – RMI Activation Models - Object Serialization – RMI –IIOP

UNIT IV  MULTI-TIER APPLICATION DEVELOPMENT  9

UNIT V  ENTERPRISE APPLICATIONS  9

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

15CS24E  SOFTWARE QUALITY MANAGEMENT  L T P C
COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO1: Understand the concept of various software quality models and their related metrics. (K2)
CO2: Appreciate the effectiveness of quality plan, implementation and documentation of SQA. (K2)
CO3: Recognise the appropriate usage of quality tools and case tools. (K2)
CO4: Learn and apply quality management system with various models – Rayleigh, Reliability and complexity models. (K3)
CO5: Understand international quality standards such as ISO, CMM, Six Sigma. (K2)

UNIT I  INTRODUCTION TO SOFTWARE QUALITY  9
Software Quality – Hierarchical models of Boehm and McCall – Quality measurement – Metrics measurement and analysis – Gilb’s approach – GQM Model

UNIT II SOFTWARE QUALITY ASSURANCE 9

UNIT III QUALITY CONTROL AND RELIABILITY 9

UNIT IV QUALITY MANAGEMENT SYSTEM 9

UNIT V QUALITY STANDARDS 9

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
3. Introduction to Software Project Management & Quality Assurance: By Ince, Dorrel, and Helen Sharp & Mark Woodman.
8. ISO 9000-3 “Notes for the application of the ISO 9001 Standard to software development”.

15CS25E SOFTWARE TESTING TECHNIQUES L T P C
3 0 0 3

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

CO 1: analyze the behavior of testing techniques to examine the origins of defects in software. (K4)
CO 2: design suitable test cases for the given scenario. (K3)
CO 3: analyze and apply suitable testing strategies for software testing. (K4)
CO 4: identify the suitable test plan components for finding the bugs in the software. (K2)
CO 5: appreciate the test automation concepts and tools. (K2)

UNIT I  INTRODUCTION

UNIT II  TEST CASE DESIGN

UNIT III  LEVELS OF TESTING

UNIT IV  TEST MANAGEMENT

UNIT V  TEST AUTOMATION

L: 45;TOTAL: 45 PERIODS

TEXT BOOKS
REFERENCES

15CS26E UNIX INTERNALS L T P C
3 0 0 3

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: explore the design concepts of UNIX OS (K2)
CO 2: comprehend the internal representation of file system and buffer cache (K2)
CO 3: use appropriate system calls to manipulate file system (K3)
CO 4: demonstrate the system process management and its control (K3)
CO 5: gain knowledge on segmentation, paging and disk drivers (K2)

UNIT I OVERVIEW OF UNIX OS

UNIT II KERNEL DATA STRUCTURES
The Buffer Cache - Headers - Buffer Pool - Buffer Retrieval - Reading and Writing Disk Blocks - Advantages and Disadvantages. Internal Representation of Files - Inodes - Structure - Directories - Path Name to Inode - Super Block - Inode Assignment - Allocation of Disk Blocks - Other File Types.

UNIT III FILE SYSTEM

UNIT IV PROCESS MANAGEMENT AND CONTROL

UNIT V MEMORY AND I/O SUBSYSTEM
Memory Management Policies - Swapping - Demand Paging - a Hybrid System - I/O Subsystem - Driver Interfaces - Disk Drivers - Terminal Drivers.

REFERENCES

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
  CO 1: identify the concepts and tools of Windows. (K2)
  CO 2: understand the internal architecture and mechanism of Windows. (K2)
  CO 3: appreciate the concepts of process management. (K2)
  CO 4: identify the components of I/O systems. (K2)
  CO 5: analyze the working principles of file systems. (K4)

UNIT I  INTRODUCTION

UNIT II  SYSTEM ARCHITECTURE AND MECHANISMS

UNIT III  PROCESS MANAGEMENT MECHANISMS

UNIT IV  I/O SYSTEMS

UNIT V FILE SYSTEMS

TEXT BOOKS

REFERENCE

15CS28E DISTRIBUTED COMPUTING L T P C
3 0 0 3

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: realize the various paradigms in distributed environment. (K2)
CO 2: examine the issues in distributed system and apply the algorithms for synchronization.(K3)
CO 3: recognize the feasibilities and the limitations in managing resources.(K3)
CO 4: analyze the design measures involved in distributed transaction processing. (K4)
CO 5: comprehend the necessity for measuring fault tolerance in distributed environment. (K2)

UNIT I DISTRIBUTED ENVIRONMENT

UNIT II DISTRIBUTED OPERATING SYSTEMS
UNIT III  DISTRIBUTED RESOURCE MANAGEMENT
Distributed Shared Memory – Data-Centric Consistency Models – Client-Centric Consistency Models – Ivy – Munin – Distributed Scheduling – Distributed File Systems – Sun NFS.

UNIT IV  DISTRIBUTED TRANSACTION PROCESSING

UNIT V  FAULT TOLERANCE AND CONSENSUS
Introduction to Fault Tolerance – Distributed Commit Protocols – Byzantine Fault Tolerance – Impossibilities in Fault Tolerance

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: understand the standards that can be adopted for complex and voluminous content transfer over heterogeneous platforms. (K2)
CO 2: knowledge on primitive level performance analysis of traffic Management. (K2)
CO 3: to study the standards adopted for handling congestion and QoS based real time protocols. (K3)
CO 4: obtain the knowledge to setup high speed network with specialized hardware and optimization approaches like parallelism and pipelining. (K2)

UNIT II  ASYNCHRONOUS TRANSFER MODE  10

UNIT III  CONGESTION CONTROL AND QOS IN IP NETWORKS  10

UNIT IV  WDM OPTICAL NETWORKS  8
Introduction to Optical Networks – Wavelength Division Multiplexing (WDM) – Introduction to broadcast and select networks – switch architectures – channel accessing – Wavelength routed networks – switch architectures – Routing and wavelength assignment – Virtual topology design – IP over ATM over WDM – IP over WDM.

UNIT V  SONET AND SDH  7

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

**15CS30E**  \[ \text{INTERNET OF THINGS} \]  \[ \text{L T P C} \]  \[ 3 0 0 3 \]

** COURSE OUTCOMES **

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

- CO 1: understand the various modes of communications with Internet. (K2)
- CO 2: propose methodology of an IoT System. (K3)
- CO 3: knowledge on Python programming and packages for IoT. (K3)
- CO 4: establish the communication to the cloud through WiFi / Bluetooth. (K3)
- CO 5: develop schemes for the applications of IoT in real time scenarios. (K3)

**UNIT I**  \[ \text{INTRODUCTION} \]  \[ 9 \]


**UNIT II**  \[ \text{PROGRAMMING FOR IoT} \]  \[ 9 \]


**UNIT III**  \[ \text{DEVELOPING IoT} \]  \[ 9 \]


**UNIT IV**  \[ \text{IoT PHYSICAL DEVICES & ENDPOINTS} \]  \[ 9 \]

Basic building blocks of an IoT Device - Raspberry Pi - Linux on Raspberry Pi - Raspberry Pi Interfaces - Programming Raspberry Pi with Python - Cloud Storage Models & Communication APIs - WAMP - AutoBahn for IoT - Xively Cloud for IoT

**UNIT V**  \[ \text{FROM THE IoT TO THE WEB OF THINGS} \]  \[ 9 \]


**REFERENCES**

15CS31E IT INFRASTRUCTURE MANAGEMENT

COURSE OUTCOMES

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

CO 1: understand the basic infrastructure management model and trends. (K2)
CO 2: appreciate various infrastructure management schemes in ITIL Process. (K2)
CO 3: recognize service delivery process and different management activities. (K2)
CO 4: identify different service support process for IT Companies (K2)
CO 5: analyze the processes to measure the storage and security management. (K3)

UNIT I INFRASTRUCTURE MANAGEMENT OVERVIEW


UNIT II PREPARING FOR INFRASTRUCTURE MANAGEMENT


UNIT III SERVICE DELIVERY PROCESSES

Service-level management – Financial management and costing – IT services continuity management – Capacity management – Availability management. Case Study: Operational System Integration and Infrastructure Setup in WIPRO.

UNIT IV SERVICE SUPPORT PROCESSES


UNIT V STORAGE AND SECURITY MANAGEMENT

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

15CS32E M-COMMERCE L T P C
3 0 0 3

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

CO 1: comprehend the underlying economic mechanisms and driving forces of E-Commerce. (K2)
CO 2: understand the critical building blocks and network infrastructure of E-Commerce. (K2)
CO 3: realize the infrastructure and types of M-Commerce Services. (K2)
CO 4: recognize the availability of latest technologies of M-commerce in various domains. (K2)
CO 5: show Competency in business application services of M-Commerce. (K3)

UNIT I E-COMMERCE

UNITII NETWORK INFRASTRUCTURE
Introduction - Market forces influencing the i-way - Components of the i-way- Network access equipment - The Last Mile: Local Roads and Access Ramps - Global information distribution networks - Public policy issues shaping the i-way.
UNIT III  M-COMMERCE: BASICS  9

UNIT IV  TECHNOLOGIES  9
Mobile Communications: A Quick Primer - Historical perspective – Basic Architecture – Multiplexing Schemes, 2G Landscape, Closer look at GSM, Roaming and Billing, Transition Toward 3G-GSM, TDMA, PDC Migration and CDMA One Migration.

UNIT V  BUSINESS APPLICATIONS AND SERVICES  9
Mobile Information Services, Directory Services, Banking and Trading, E-Tailing and E-Ticketing, Entertainment, Business Applications and Services, Next Generation M-commerce Scenarios, Personalization, Location-Based Services.

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCE

15CS33E  ADVANCED DATABASE TECHNOLOGY  L T P C
3 0 0 3

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO 1: Learn about different database system architectures. (K2)
CO 2: Manipulate the distributed and parallel databases. (K2)
CO 3: Develop queries for ODMG model using SQL and oracle. (K3)
CO 4: Analyze the various intelligent databases. (K4)
CO 5: Acquire knowledge about data storage structure in emerging information systems. (K2)

UNIT I  INTRODUCTION  8

UNIT II  DISTRIBUTED AND PARALLEL DATABASES  9
Distributed Database Concepts: Homogeneous and Heterogeneous Databases - Distributed Data Storage - Distributed Query Processing - Distributed Transactions –

UNIT III OBJECT ORIENTED DATABASES 8

UNIT IV INTELLIGENT DATABASES 10
Active Databases Concepts and Triggers - Deductive Databases - Temporal Database – Spatial Databases - Data Mining: Overview.

UNIT V EMERGING DATABASE TECHNOLOGIES AND APPLICATIONS 10

TEXT BOOKS

REFERENCE

15CS34E ANALYTIC COMPUTING L T P C
3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: apply statistical analysis methods in Big Data Platform. (K3)
CO 2: analyze the problems appropriate to mining data streams. (K4)
CO 3: apply suitable clustering techniques to solve problems in data mining. (K3)
CO 4: visualize and extract data patterns from social networks. (K3)
CO 5: implement data visualization using various data mining tools (K3).

UNIT I INTRODUCTION TO BIG DATA 9

UNIT II MINING DATA STREAMS 9
Realtime Analytics Platform (RTAP) applications - real time sentiment analysis, stock market predictions.

**UNIT III FREQUENT ITEMSETS AND CLUSTERING**

**UNIT IV SOCIAL NETWORKING DATA ANALYTICS**

**UNIT V FRAMEWORKS AND VISUALIZATION**
MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

**TEXT BOOKS**

**REFERENCES**

**15CS35E BIOINFORMATICS**

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

- CO 1: comprehend the importance of bioinformatics. (K2)
- CO 2: understand the role of data warehousing, data mining and machine learning in bioinformatics applications. (K2)
- CO 3: appreciate various modeling techniques for bioinformatics. (K2)
- CO 4: appraise pattern matching and visualization techniques in sequencing data. (K2)
CO 5: be familiar with the Micro array data analysis. (K2)

UNIT I      INTRODUCTION
Need for Bioinformatics technologies – Overview of Bioinformatics technologies. Structural bioinformatics: Data format and processing – Secondary resources and applications – Role of Structural bioinformatics in Systems Biology.

UNIT II      DATAWAREHOUSING, DATAMINING AND MACHINE LEARNING IN BIOINFORMATICS

UNIT III     MODELING FOR BIOINFORMATICS

UNIT IV     PATTERN MATCHING AND VISUALIZATION

UNIT V      MICROARRAY DATA ANALYSIS

L: 45; TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES

15CS36E        BUSINESS INTELLIGENCE          L T P C
                      3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to,
CO 1: develop a foundation in Business Intelligence (BI) for Business Analysis. (K3)
CO 2: understand the different aspects of the BI environment, and key success factors (K2)
CO 3: understand Technology enabling process in an organization (K2)
CO 4: identify and analyze the new Techniques in BI (K2)
CO 5: apply the techniques in the context of a business problem (K3)

UNIT I  INTRODUCTION TO BUSINESS INTELLIGENCE  9
Business intelligence and its impact - Factors driving Business Intelligence – Business Intelligence and Related Technologies – Case Study - Obstacles to Business Intelligence.

UNIT II  BUSINESS INTELLIGENCE CAPABILITIES  9

UNIT III  TECHNOLOGY ENABLING BUSINESS INTELLIGENCE  9
Technology enabling Organizational Memory – Information Integration – Enabling Insights and Decision – Enabling Presentation - OLAP Cube, Data Slice and Dice - BI in Practice - Performance Dashboards - Balanced Scorecards - IT Governance - Case Study.

UNIT IV  BUSINESS INTELLIGENCE IMPLEMENTATION: AND EMERGING TRENDS INTEGRATION  9

UNIT V  MANAGEMENT AND FUTURE OF BUSINESS INTELLIGENCE  9
Development of BI - Business Intelligence System - Reporting system - Data Warehouse - Data Mart - Knowledge Management Systems - Discussion and Case Study – The Future of Business Intelligence.

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

15CS37E  CYBER FORENSICS AND ETHICAL HACKING  L T P C
3  0  0  3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: analyze the significance of cyber forensics and forensics auditing (K3)
CO 2: examine forensics challenges in digital devices (K3)
CO 3: analyze cyber crime and security pitfalls in organizations (K4)
CO 4: perceive the actions of ethical hackers and their testing strategy (K2)
CO 5: explore different types of attacks(K2)

UNIT I UNDERSTANDING CYBER FORENSICS 9

UNIT II FORENSICS OF HAND-HELD DEVICES 9

UNIT III CYBERSECURITY: ORGANIZATIONAL IMPLICATION 9

UNIT IV INTRODUCTION TO ETHICAL HACKING 9
Introduction to Hacking – Penetration Testing-Legal and Ethical Considerations – Creating and Implementing a Test Plan – Social Engineering – Google Hacking – Foot printing.

UNIT V ETHICAL HACKING TYPES 9

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

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

CO 1: understand the knowledge-based systems representation. (K2)
CO 2: apply AI techniques to the problem of acquisition and representation of expert knowledge for problem solving in the expert’s domain. (K3)
CO 3: understand inductive and deductive learning. (K2)
CO 4: use various knowledge representation methods and different expert system structures from the industrial engineering point of view. (K3)
CO 5: design an expert system using appropriate knowledge-based software tools. (K3)

UNIT I INTRODUCTION TO KNOWLEDGE-BASED SYSTEM 9

UNIT II DEVELOPING KNOWLEDGE-BASED SYSTEM 9

UNIT III KNOWLEDGE REPRESENTATION 9

UNIT IV OPTIMIZATION MODELS 9
UNIT V KNOWLEDGE-BASED EXPERT SYSTEMS

L: 45; TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES

15CS39E CLOUD COMPUTING L T P C 3 0 0 3

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

CO1: recognize the fundamental concepts of Cloud Computing (K2)
CO2: familiar with the various types of virtualization and its importance (K2)
CO3: analyze the various cloud platform to provide cloud based services for complex applications. (K3)
CO4: explore the various cloud infrastructures and application (K2)
CO5 : analyze the methods used for secure cloud access and application development (K3)

UNIT I CLOUD COMPUTING BASICS
Introduction to Cloud Computing: Roots of Cloud Computing-Layers and Types of Clouds-Desired Features of a Cloud-Cloud Infrastructure Management-Infrastructure As A Service Providers-Platform As Service Providers-Challenges and Risks-Migrating into a Cloud: Broad Approaches to Migrating into the Cloud-The Seven-Step Model of Migration into a Cloud.

UNIT II VIRTUALIZATION AND CLOUD ARCHITECTURE

UNIT III CLOUD PLATFORMS
UNIT IV CLOUD INFRASTRUCTURES AND APPLICATIONS 9

UNIT V CLOUD MONITORING AND MANAGEMENT 9
An architecture for federated cloud computing: A typical use case- The basic principles of cloud computing - A model for federated cloud computing - Security considerations - SLA management in cloud computing: A service provider’s perspective - Traditional approaches to SLA management - types of SLA - life cycle of SLA - SLA management in cloud - automated policy-based management-performance prediction for HPC on clouds.

L:45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

15CS40E STORAGE AREA NETWORK AND VIRTUALIZATION L T P C 3 0 0 3

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

CO 1: understand the architecture of storage technology and analyzing the data centre infrastructure. (K2)

CO 2: apply and understand the various levels of Data protection and intelligent storage system. (K3)

CO 3: understand the Direct and Network attached storage architecture and their benefits and limitations. (K2)

CO 4: understand and evaluate the Storage Virtualization Configurations. (K2)

UNIT I INTRODUCTION TO STORAGE TECHNOLOGY 9
Information storage, evolution of storage technology and architecture, data center infrastructure, key challenges in Managing information, information lifecycle. Storage system Environments: components of storage system environment, Disk Drive components, Disk Drive Performance, fundamental laws governing disk performance, logical components of the host, application requirements and disk performance.
UNIT II  
DATA PROTECTION  

UNIT III  
DIRECT ATTACHED STORAGE  
Introduction to SCSI :Types of DAS,DAS benefits and limitations, disk drive interfaces, introduction to parallel SCSI, SCSI command model. Storage Area Networks: fiber channel, The SAN and Its evolution, components of SAN, FC connectivity, Fiber channel ports, fiber channel architecture, zoning, fiber channel login types, concepts in practice: EMC Connectrix.

UNIT IV  
NETWORK ATTACHED STORAGE  

UNIT V  
STORAGE VIRTUALIZATION  

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
B. E. – COMPUTER SCIENCE AND ENGINEERING
ONE CREDIT ELECTIVE COURSES
COURSE OUTCOMES
Upon completion of this course, the students will be able to

CO1: explore the operational models of python like function calls, algorithms, exceptions, object-oriented programming, and GUIs

CO2: develop programming and problem solving skills using Python

LANGUAGE CONSTRUCTS
Running Python - Variables, expressions and Statements - Functions - Conditionals and recursion - Iterations - String - Dictionaries - Tuples - Files – Map, Reduce, Filter – Series – Data Frames

List of Exercises
1. Write a Python program to get the current username, IP address, window size, system time.
2. Write a Python program to perform Interface design using turtle object.
3. Create two frozen sets A and B. Evaluate supports methods like copy (), difference (), intersection (), isdisjoint (), issubset (), issuperset (), symmetric difference () and union ()
4. Write a Python program to sum of all counts in collections.
5. Removal of duplicates from list with or without using set.
6. Pythagorean tuple within a range N without duplicates, using list comprehension
7. Knight move simulation in chess board from source point to destination point, list the set of moves.
8. Analysis of time complexity of selection, merge, Quick sort algorithms.
9. Recursive function design for palindrome, Fibonacci, gcd, factorial, isprime, ascending, descending, updown, downup, alternating sequences.
10. Use of map, reduce and filter to solve repetitive tasks.

MINI PROJECT (Any one topic as similar to the list given below)

I. Word Processing
   i. Design a password generator. Be creative with how you generate passwords - strong passwords have a mix of lowercase letters, uppercase letters, numbers, and symbols. The passwords should be random, generating a new password every time the user asks for a new password. Include your run-time code in a main method.
   ii. Design a TextBased Adventure Game, the program will let users move through rooms based on user input and get descriptions of each room. To create this, you’ll need to establish the directions in which the user can move, a way to track how far the user has moved (and therefore which room he/she is in), and to print out a description. You’ll also need to set limits for how far the user can move. In other words, create “walls” around the rooms that tell the user, “You can’t move further in this direction.”

II. Intelligent Agent Design
   i. Dice Rolling Simulator - a program that simulates rolling dice. When the program runs, it will randomly choose a number between 1 and 6. The number of sides on the die is up to you. The program will print what that number is. It should then ask you if
you’d like to roll again. For this project, you’ll need to set the min and max number that your dice can produce. For the average die, that means a minimum of 1 and a maximum of 6. You’ll also want a function that randomly grabs a number within that range and prints it.

ii. **8-Queen Problem** - This problem can be solved by searching for a solution. The initial state is given by the empty chess board. Placing a queen on the board represents an action in the search problem. In any solution, there must be exactly one queen in each of the columns. Thus, the possible actions can be restricted to placing a queen in the next column that does not yet contain a queen.

III. Data Science

**ApplicantIncome and LoanAmount** –

i. Prepare a boxplot that groups the ApplicantIncome versus their Gender.
ii. Display the ApplicantIncome extrema values as compared with mean values.
iii. Segregate the people with different education levels.
iv. Convert all our categorical variables into numeric by encoding the categories.
v. Make hypothesis to set the ball rolling. The chances of getting a loan will be for:
   - Applicants having a credit history
   - Applicants with higher applicant and co-applicant incomes
   - Applicants with higher education level
   - Properties in urban areas with high growth perspectives

### SOFTWARE REQUIREMENTS

- OpenCV
- Python ver. 2.7/3.0+
- NLTK Toolkit

**P: 30; TOTAL: 30 PERIODS**

### REFERENCES

   NPTEL course material on “Programming, Data Structures and Algorithms in Python” by MadhavanMukund.

### 15CS02L R PROGRAMMING

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### COURSE OUTCOMES

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

- **CO1**: Create access and modify data in vectors, lists and matrices.
- **CO2**: Construct simple test applications using data frames and generic classes.
List of Exercises
1. Design R program for performing linear algebra operations on vectors and matrices.
2. Implement list by accessing/adding/deleting/indexing elements in a list.
3. Design data frames using matrix operations rowMeans(), colMeans(), rbind(), cbind() and apply().
4. Develop R programming structures using control statements.
5. Simulate programming in R using built-in Random Variety Generators.
6. Implement string manipulation utilities such as nchar(), substr(), paste(), sprintf(), grep() and strsplit().
7. Implement a generic function on an S3 classes and S4 classes.

HARDWARE AND SOFTWARE REQUIREMENTS

HARDWARE:
- Processors - 2.0 GHz or Higher
- RAM – 2GB or Higher
- Hard Disk - 320 GB or Higher

SOFTWARE:
- OS – LINUX/ Windows 2007
- R.3.4.0-win and RStudio-1.0.143

P: 30; TOTAL: 30 PERIODS

REFERENCES
2. https://www.r-project.org

15CS03L RUBY ON RAILS WEB DEVELOPMENT L T P C
1 0 0 1

COURSE OUTCOME
Upon completion of this course, the students will be able to:
CO1: To know the fundamental concept of Ruby on Rails and MongoDB

Ruby on Rails: An Introduction - Rails with Active Record and Action Pack - Ruby on Rails Web Services and Integration with MongoDB.

L: 15; TOTAL: 15 PERIODS

REFERENCES
15CS04L   FRONT END WEB DEVELOPMENT   L T P C
          0 0 2 1

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO1: Gain fundamental knowledge of front end web development
CO2: Build interactive websites by learning the foundations on HTML, HTML5, CSS and CSS3.


P: 30; TOTAL: 30 PERIODS

REFERENCES

15CS05L   CUSTOM WEB SERVICE DESIGN   L T P C
          0 0 2 1

COURSE OUTCOME
Upon Completion of this course, the students will be able to
CO1: Create web page using DRUPAL and can manage user and site

Creating first module - Create a custom permission - Using Form API create a form - Create a custom form validation - Create a custom content type manually - Import a content using feeds - Add a google map using theme - Create a block.

P: 30; TOTAL: 30 PERIODS

SOFTWARE REQUIREMENT
- Drupal version 8.x
15CS06L VIRTUALIZED DATA ENVIRONMENT L T P C 1 0 0 1

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

CO1: Understand the basic concepts and methods of Virtualization
CO2: Leverage VMs to build testing, support, and training environments
CO3: Manage Virtual environment and Migrate from physical to virtual machines

VIRTUALIZATION CONCEPTS: Defining virtual machines - Advantages of deploying VM - VMware Workstation – Server - Oracle VirtualBox. ABSTRACTING HARDWARE: Partitioning shared resources - Accessing raw and virtual disks - Virtualizing CPU and memory resources.

DEPLOYING VIRTUAL WORKSTATION SOFTWARE: Planning for automatic installations - Designing virtual networks - Bridged, NAT and host-only networking.

BUILDING GUEST OPERATING SYSTEMS: Allocating host resources - Configuring virtual hard drives - Managing peripheral devices.

EXPLOITING VIRTUAL WORKSTATION FUNCTIONALITY: Creating support platforms - Readying multiple operating systems - Suspending and resuming virtual workstations.

CONSTRUCTING A TEST ENVIRONMENT: Accessing host files - Taking and restoring snapshots.

DEVELOPING TRAINING ENVIRONMENTS: Protecting guest operating systems - Exploiting non-persistent disks.

L: 15; TOTAL: 15 PERIODS

REFERENCES

HARDWARE AND SOFTWARE REQUIREMENTS
• Operating System: Windows 7, Linux (Ubuntu / CentOS / fedora / Linux Mint)
• Software: VMware Workstation, VMware Player, Oracle Virtual Box
• Hardware: RAM – 2 GB Minimum, 500 GB Storage.

15CS07L OPEN SOURCE PRIVATE CLOUD INFRASTRUCTURE DESIGN L T P C 1 0 0 1

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

CO1: Gain the knowledge necessary to plan, deploy and configure private cloud
CO2: Understand the building blocks of Eucalyptus private cloud
CO3: Deploy and configure application delivery to access private cloud
INTRODUCTION

DESIGN AND IMPLEMENTATION
Eucalyptus: Major components - Node Controller (NC) - Cluster Controller (CC) - Walrus Storage Controller (WS3) - Storage Controller (SC) - Cloud Controller (CLC) - Dimensioning the hardware infrastructure - Topologies - Implementation on a single server - Implementation on two physical servers - Other possibilities for implementation – Network reconfiguration.

DEPLOYMENT

L: 15; TOTAL: 15 PERIODS

REFERENCES

HARDWARE AND SOFTWARE REQUIREMENTS
- Operating System: Linux (Ubuntu / CentOS / fedora / Linux Mint)
- Software: VMware Workstation, VMware Player, Oracle Virtual Box, Eucalyptus Cloud, elastic fox
- Hardware: RAM – 4 GB Minimum, 500 GB Storage

15CS08L EXPLORING BIGDATA MANAGEMENT TOOLS L T P C
1 0 0 1

COURSE OUTCOMES
Upon successful completion of this course, the student will be able to:
CO1: Gain knowledge of schema less data storage and its importance
CO2: Manage and work with various big data processing tools

INTRODUCTION
Storage device characteristics: scalability – fast access – redundancy and availability – review of database concepts.

SCHEMA LESS DATA STORAGE
Need for schema less storage - NoSQL: Introduction - NoSQL vs RDBMS databases – MongoDB – Practice with MongoDB.
DISTRIBUTED DATA STORAGE
Hadoop Distributed File System (HDFS) - Components of Hadoop - Java interfaces to HDFS – Glance with map reduce.

DATA PROCESSING TOOLS
Pig Scripting - Hive – HCatalog – HiveQL.

L: 15; TOTAL: 15 PERIODS

REFERENCES

SOFTWARE REQUIREMENTS
Operating System: Windows / Linux (Ubuntu / CentOS / fedora / Linux Mint)

Software: Hadoop 20.0, MongoDB 3.4.0, Horton Works Data Platform sandbox (VM instance for Hadoop and ecosystem tools)

15CS09L CREATIVE IMAGE MANIPULATION L T P C
0 0 2 1

COURSE OUTCOMES
Upon successful completion of this course, the student will be able to:
CO1: Understand image handling basics
CO2: Draw figures using tools and Create animations

List of Exercises
1. Exercises on GIMP Basics, text, colors etc
2. Exercises on Selection tools etc.
3. Cut out an image and insert in another picture.
4. Create Neon Glow effect
5. Exercises on TEXT Effects
6. Photo Manipulation
7. Create a text along the path
8. Create professional looking logo
9. Change or remove the background
10. Create an animation

SOFTWARE REQUIREMENT
• GIMP 2.3

P: 30; TOTAL: 30 PERIODS
15CS10L 3D ANIMATION L T P C 0 0 2 1

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO1: acquire knowledge and skills in computer animation tool
CO2: develop 3D animation from modeling to rendering

Introduction to 3D Animation - Creating a 3D scene from primitives - Materials and Texturing - Cameras and lighting - Animation, Rendering, and Output Techniques - NURBS and spline - based modeling.

List of Exercises
1. Creating a 3D scene (Eg. metropolitan landscape) from primitives
2. Populate the scene with at least three new sculpted polygon objects. One of the objects should be a vehicle of some form.
3. Setup the animated scene for rendering. Render the scene out as a sequence of images and then import the sequence into the post compositing program for final QuickTime output
4. A single piece of paper dropping through the air
5. Stirring a soup pot and tasting from a spoon

P: 30; TOTAL: 30 PERIODS

REFERENCES
1. Autodesk Maya 2014 Essentials: Paul Naas
3. Game Character Development with Maya: Antony Ward

SOFTWARE REQUIREMENT
- Autodesk Maya 2014

15CS11L GAME PROGRAMMING L T P C 1 0 0 1

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO1: Understand the concepts of Game design and development.
CO2: exposed to the Core architectures of Game Programming.

3D GRAPHICS FOR GAME PROGRAMMING

GAME PROGRAMMING
Game logic - Game views - managing memory - controlling the main loop - loading and caching game data.

L: 15; TOTAL: 15 PERIODS
TEXT BOOKS

15CS12L EHR SECURITY L T P C
1 0 0 1

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

CO1: realize the importance of protecting patient health information.
CO2: understand the specific requirements regarding EHR privacy and security.

ELECTRONIC HEALTH CARE RECORDS (EHR)
Understanding Patients’ Health Information Rights - Authorizations of Electronic Health Records - Ownership of HER
SECURING EHR DATA

STANDARDS
Case Study on USA HIPPA standards, EHR standards 2016 for India.

L: 15; TOTAL: 15 PERIODS

REFERENCES

15CS13L MOBILE INTEGRATED HEALTH CARE SYSTEMS L T P C
1 0 0 1

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

CO1: Acquire knowledge on the development and characteristics of innovative healthcare systems and its importance.


L: 15; TOTAL: 15 PERIODS
REFERENCES

15CS14L CELLULAR AUTOMATA PARADIGM L T P C
                                                1 0 0 1

COURSE OUTCOMES
Upon completion of this course, the students will be able to:
CO1: Understand how surprisingly simple rules can lead to phenomenally complex and beautiful behaviors.

Introduction – Game-of-Life – Elementary Cellular Automata (CA) - Injectivity and surjectivity properties – Reversible CA - Details of one-dimensional CA – fractals, cycle lengths, algebraic properties - Totalistic CA - Additive CA - Classes of CA (I, II, III, IV) – Two dimensional CA.

REFERENCES

15CS15L ABSTRACT ALGEBRA L T P C
                                                1 0 0 1

COURSE OUTCOMES
Upon completion of this course, the students will be able to:
CO1: Understand how algebra allows us to abstract out the geometric objects such as groups, rings and fields.
CO2: Understanding of fundamental properties of groups, rings and fields as well as allows us to manipulate them in ways not possible directly.

Introduction to abstraction - Introduction to Groups - Properties of Finite Groups - Applications of Groups - Introduction to Rings - Properties of Finite Rings - Introduction to Fields - Applications of Finite Fields

REFERENCES
15CS16L  TURING MACHINE SIMULATION AND COMPLEXITY THEORY    L T P C
                                       1 0 0 1

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
   CO1: analyze complexity of decidable and undecidable problems

Definition of Turing Machine – Turing Machine Construction – Variants of Turing Machine
  – Decidability – Undecidability – Diagonalization – Simulation of Accepting Turing Machine
  – Introduction to complexity theory – Classes of P and NP – Reductions – NP-complete problems (3-SAT, CLIQUE)

REFERENCES
2. J.E. Hopcroft, R. Motwani and J.D. Ullman, “Introduction to Automata Theory, Languages and Computations”,

15CS17L  VEHICULAR CLOUD NETWORKING    L T P C
                                       1 0 0 1

COURSE OUTCOMES
Upon completion of this course, the students will be able to
   CO1: appreciate the analogy and dissimilarity of cloud computing, Mobile cloud and vehicular ad hoc network. And understand the architecture, design principle, challenges, issues and applications of them. (K4)
   CO2: create a vehicular cloud scenario by exporting real world road map from Open Street map using SUMO simulator. (S4)


Introduction to Simulation of Urban Mobility (SUMO) - packages - Installation - Vehicular Cloud Traffic Infrastructure Generation - Open Street Map - Export map - OSM to XML Conversion

REFERENCES
4. http://www.sumo.dlr.de/userdoc/Networks/SUMO_Road_Networks.html

15CS18L EMBEDDED SYSTEMS DESIGN L T P C
0 0 2 1

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

CO1: acquire knowledge on embedded systems basics and describe the operations of processors
CO2: acquire embedded programming skills in Keil C environment.

Challenges of Embedded Systems – Embedded system design process - Embedded processors – Instruction sets and programming.

LIST OF EXERCISES
1. Write a program to receive the data serially
2. Write a program to convert packed BCD 0x29 to ASCII and Display the bytes on P1 and P2.
3. Write a Program to Read inputs from switches and display on LCD.
4. Write a Program to make LEDs blink.
5. Write a Program to Read Switch status & scrolling the message.
6. Program for serial receive data echo using interrupt
7. Write a Program for encryption / decryption
8. Program to read Temperature value from ADC

P: 30; TOTAL: 30 PERIODS

REFERENCES

SOFTWARE REQUIREMENT
• Keil C
15CS19L  APP DEVELOPMENT USING ANDROID  L T P C 0 0 2 1

COURSE OUTCOMES
Upon Completion of this course, the students will be able to:
CO1: appreciate the fundamentals and describe about Android programming.
CO2: understand and develop the mobile app using android

INTRODUCTION
Geo tag App - Introduction to Geo Tag – Application of Geo tag: Geo location and Landmark Recognition - Media Visualization.

NETWORKING APPLICATIONS
Social Networking Applications – Mapping Application - Tools and Technologies - Mobile App to Geo Tag – Case study:

GEO TAG APP
Bio user functionality - Bhuvan India POST – Implementing a simple Geo tag App

P: 30; TOTAL: 30 PERIODS

REFERENCES

15CS20L  PRACTICING TEST SUITES WITH SELENIUM IDE  L T P C 0 0 2 1

COURSE OUTCOMES
Upon successful completion of this course, the student will be able to:
CO2: Develop test scripting using open-source web based automation tool.

List of Exercises
1. Introduction to Selenium
2. Selenium IDE
   • Install Selenium IDE and FireBug
   • Introduction to Selenium IDE
   • Creating your First Selenium IDE script
   • How to use Locators in Selenium IDE
   • How to enhance a script using Selenium IDE
3. WebDriver

- Introduction to WebDriver & Comparison with Selenium RC
- Guide to install Selenium WebDriver
- Creating your First Script in Webdriver
- Accessing Forms in Webdriver
- Accessing Links & Tables using Selenium Webdriver
- Keyboard Mouse Events , Uploading Files - Webdriver

SOFTWARE REQUIREMENT
- Selenium WebDriver/ Selenium 2.0

15CS21L BUSINESS INTELLIGENCE SOLUTION DEVELOPMENT L T P C 0 0 2 1

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

CO1: Understand the Importance of data mining and its application in business.
CO2: Design, implement, manipulate, and manage multi-dimensional databases through SQL Server 2008 BI tools

List of Exercises
1) Installation and Configuration of database engines and analysis service with Sample
   - DataBases
     a) DataBase Engine creation
     b) Data source (DW_DB) integration
   - Executing simple and MDX queries
2) Creation of Multidimensional Data views in OLAP
   - Cube
   - Dimension table
   - Dimension
   - Hierarchy
   - Level
   - Fact table
   - Measure
   - Schema
3) Simple Case Studies
   a. Build a BI user model to perform Quarterly productivity analysis on Factory Production Data for 4 consecutive years in 3 leading steel factories such as GAIL, Tata, JSW.
   b. Create a 32 dimensional Sales_Cube to implement the following illustration of Sales by Product in a Country.
4) Presentation to Users - To turn a PowerPivot workbook into a data source for creating visual reports to users.

**REFERENCE**

**SOFTWARE REQUIREMENT**
- Microsoft SQL Server 2008 R2 Express

**15CS22L DATABASE ACTIVITY MONITORING**

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

- CO1: understand the database activities, monitoring and control
- CO2: analysis the database activities


**List of Exercises**
1. Auditing and Detection Setup
2. Configure a firewall for monitoring/reporting
3. Monitoring the database performance
4. Activity Analysis
5. Wait Analysis
6. Resource usage
7. Blockers

**REFERENCES**
3. [http://www.myorasql.com](http://www.myorasql.com)

**SOFTWARE REQUIREMENT:**
Open source DAM tool: Myorasql

**15CS23L ENTERPRISE IOT LABORATORY**

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

- CO1: recognize the case studies of selected IoT domains, including smart energy, connected vehicles, and smart cities.
1. Case study on Fine-grained Appliance Usage and Energy Monitoring
Description: A Circuit level Green Building Dataset with Appliance, Room and Floor level Information for Energy Disaggregation. Using smart sensors, the smart building appliances data has been collected from a three-storied townhome (approx. 2000 sq. ft.) with a variety of appliances at the circuit level. Operational Year-wise Dataset is available at the minute-by-minute, hour-by-hour, and day-by-day level. Each column is labeled with <Energy Monitor Channel Number-Circuit Name> by mentioning the sensed data with the following descriptions:
(i) Minute by minute data: wattage (power) by circuit, plus voltage for the whole house and outside temperature (in 7 days or 14 days chunk).
(ii) Hourly data: Kilowatt hours (energy usage) by circuit, plus average voltage for the whole house and outside temperature (in 30 days chunk).
(iii) Daily data: Daily kilowatt hours (energy usage) by circuit and outside temperature (in 6 months, 8 months or entire 1 year chunk).
Exercises: [Using pandas, scikitlearn in PYTHON]
a) Perform autocorrelation of Energy ratings of each channels. Identify the unusual low and high rating conditions.
b) Construct the multivariate distribution models for the energy monitoring of Kitchen appliance usage.
c) Analyze the average power utilization on a weekly, monthly and hourly basis.
d) Build a regression model to predict the month-wise power requirement for the smart building based on the available yearly operational data.

2. Case study on Weather Data Analytics
Description: From US weather station at Charley, during the major storm (Hurricane) alarmed duration August 9-13 of 2004, the observations were collected as measurements of phenomena such as temperature, visibility, precipitation, pressure, wind speed, humidity, etc.
Exercises: [Using pandas, scikitlearn, matplotlib in PYTHON]
a) Perform the tabulation of dependent weather parameters.
b) Identify the weather parameters that are negatively correlated to each other.
c) Design a simple user GUI to imitate the indication of these conditions, with appropriate warning messages.

3. Using Adafruit IR thermal camera, sense the indoor/ outdoor environment with Raspberry Pi / Arduino as an edge computing component.
a) Print the temperature on the monitor and then, based on certain event triggers.
b) Send notifications using InstaPush API on user’s android phone to indicate the weather conditions of indoor/outdoor.

Reference URLs for Data Sets:
1. http://mpsc.umbc.edu/softwaredata/
2. https://www.edureka.co/blog/iot-tutorial/
3. Knoesis_linked_observation data
COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO1: appreciate the need for analyzing the most time-sensitive data at the network edge, close to where it is generated instead of sending vast amounts of IoT.


REFERENCES

Introduction to IoE - Properties – Driving to IoE – The Oppurtunity: Driving Data into Wisdom – Smart Objects: Characteristics – Low Power Lossy Networks (LLNs) – Characteristics of Internet Vs Smart Objects – Connections - Metcalfe’s law - Visibility Context awareness- Mobility / Video Cloud - Filters - Interactive platform- Remote monitoring-applications - Secure mobility Applications– Architecture – Authorization

REFERENCES
15CS26L  INTRODUCTION TO NETWORKS  

L T P C  
1 0 0 1  

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

CO1: build simple LANs, perform basic configurations for routers and switches
CO2: implement IP addressing schemes.

Introduction and explore the network - Configure a network operating system - Network Protocol and Communications - Network Access – Ethernet - Network Layer - IP addressing - Subnetting IP Network - Transport layer - Application Layer - Build a small network

L: 15 TOTAL: 15 PERIODS

REFERENCES
2. https://www.netacad.com/group/resources/ccna-rs-itn/6.0

15CS27L  ROUTING AND SWITCHING ESSENTIAL  

L T P C  
1 0 0 1  

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

CO1: recognize architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality.
CO2: build simple LANs, perform basic configurations for routers and switches, and implement IP


L: 15 TOTAL: 15 PERIODS

REFERENCES
2. https://www.netacad.com/group/resources/ccna-rs-rse/6.0
SCALING NETWORKS

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

CO1: configure and troubleshoot routers and switches for advanced functionality

CO2: resolve common issues with protocols in both IPv4 and IPv6 networks.


REFERENCES
2. https://www.netacad.com/group/resources/ccna-rs-scaling/6.0

CONNECTING NETWORKS

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

CO1: configure and troubleshoot network devices

CO2: implement Virtual Private Networks.


REFERENCES
2. https://www.netacad.com/group/resources/ccna-rs-connect/6.0
15CS30L BUSINESS ANALYTICS L T P C 0 0 2 1

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO1: design and implement Data Mart, multi-dimensional OLAP cubes for business intelligence of businesses. (K3)

LIST OF EXPERIMENTS
1. Study the Fundamentals of Business Analytics
   (i) Analytical Application Structure
   (ii) Microsoft analytics solution OLAP Model
   (iii) Microsoft SQL Server
2. Design and Create the Health care data mart /data warehouse using ETL SQL scripts.
3. Create analytics on Healthcare Data Mart (OLAP) & comprehend the dimensions and Measures using MDX Queries.
4. Create and visualize the analytics reports of health care data mart.

SOFTWARE REQUIREMENTS
- Microsoft SQL Server
- Visual Studio

REFERENCES

P: 30; TOTAL: 30 PERIODS

15CS31L HTML5 AND CSS3 MOBILE APPLICATION DEVELOPMENT L T P C 0 0 2 1

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO1: develop client-side intensive hybrid mobile web applications using HTML5 family technologies.(K3)

LIST OF EXPERIMENTS
1. Study the feasible opportunities and tools availability of creating mobile application using HTML 5 and CSS3.
2. Design and Create the web page using HTML basic styles and formatting elements such as text formatting, images, tables, list.
3. Design and Create the webpage and perform animated activities using advanced HTML5 Graphics, Frames, Media elements.
4. Design the web page and apply styles using [Internal, External and Inline] advanced CSS styles and attributes.
5. Create a typical simple healthcare responsive mobile application using advanced HTML and CSS styles.

SOFTWARE REQUIREMENTS
- HTML5
- CSS3

REFERENCES
2. https://www.w3schools.com/css/

P: 30 ; TOTAL: 30 PERIODS

15CS32L WEB SERVICES FOR MOBILE PROGRAMMING L T P C
0 0 2 1

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO1: develop and use the core standards related to programming of Web services for Mobile and applications environments. (K3)

LIST OF EXPERIMENTS
1. Study about the Scope, importance and role of web services in modern web and mobile applications.
2. Study the basic syntaxes and semantics used to create a web services for web and mobile applications using C#
3. Create the sample web service using C# and perform testing on web service to deploy it on web application.
4. Create web services for mobile application login activity, call the web service from the mobile application during the login and ensure the proper working of web service.
5. Create a data management application software product and apply web service in control the login Page and perform data management [Insert, Select, Update, Delete Data into a database] in SQL Server

SOFTWARE REQUIREMENTS
- Microsoft SQL Server
- Visual Studio
- HTML5
- CSS3
REFERENCES
2. https://www.w3schools.com/css/

P: 30; TOTAL: 30 PERIODS

15CS33L E-LEARNING PLATFORM L T P C
0 0 2 1

COURSE OUTCOMES
Upon Completion of this course, the students will be able to
CO1: recognize the core concepts of E-Learning in various aspects.

LIST OF EXPERIMENTS
1. Study the Scope, importance and structure of E-Learning Platforms and Content Management Applications of Education Sector.
2. Benchmark the standards and Design an E-Learning Application Model in Learner aspects.
3. Learn and Recognize how the content has created and Managed in E-Learning Applications.
4. Study the various aspects of E-Learning Course management, participants management, assessment management.

SOFTWARE REQUIREMENTS
• Microsoft SQL Server
• Visual Studio
• HTML5
• CSS3

REFERENCES

P: 30; TOTAL: 30 PERIODS

15CS34L SQL AND DATABASE DESIGN L T P C
0 0 2 1

COURSE OUTCOMES
Upon completion of this course, the students will be able to:
CO1: design and implement a database schema for a given problem-domain. (K3)
CO2: populate and query a database. (K3)
LIST OF EXPERIMENTS
1. Creation of a database and writing SQL queries to retrieve information from the database
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
3. Use of Aggregate Functions/Arithmetic operators in SQL.
4. Performing Sub queries/Joins based on constraints.
5. Creation of Views, Synonyms, Sequence, Indexes, Save point.

SOFTWARE REQUIREMENTS
• Oracle / SQL

REFERENCES
2. https://www.w3schools.com/sql/

P:30; TOTAL: 30 PERIODS

15CS35L  IPHONE OPERATING SYSTEM  L T P C
0 0 2 1

COURSE OUTCOMES
Upon completion of this course, the student will be able to
CO1: develop a simple application using iOS programming (K3)

LIST OF EXPERIMENTS
1. Installation of iOS Development Environment using XCode IDE
2. Create GUI for FoodTracker application by dragging and dropping controls, views and objects into a workspace using Interface Builder.
3. Run the designed FoodTracker application using iOS simulator
4. Review the source code of the FoodTracker Application using Application Delegate
5. Connect the FooTracker Application GUI to SQLite database
6. Develop iOS application using Controllers and Memory Management

SOFTWARE REQUIREMENTS
• Mac OS X
• iOS SDK
• Xcode

HARDWARE REQUIREMENTS
• Apple Macbook Mini/Pro

REFERENCES

P: 30; TOTAL: 30 PERIODS
COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: understand basic programming concepts and the underlying logic / structure. (K2)
CO 2: manage and use different variables, arguments and Control flow statements. (K3)

INTRODUCTION
Introduction to Robotic Process Automation – Life Cycle of RPA – RPA tools – Advantages of RPA

LIST OF EXPERIMENTS
1. Practice on RPA tool - Managing variables - arguments panel
2. Practice on Control flow statements –Data Manipulation
3. Extracting data from PDF
4. Data Manipulation in Excel
5. Email Automation
6. Transferring Data from one system to another

SOFTWARE REQUIREMENTS
• UiPath or Blue Prism

REFERENCES

P: 30; TOTAL: 30 PERIODS
4. Implementation of Client profile updates  
5. Implementation of Generating Premium renewals  
6. Implementation of Credit card applications  
7. Implementation of Patient registration  

SOFTWARE REQUIREMENTS  
- **UiPath** or **Blue Prism**

REFERENCES  

P: 30; TOTAL: 30 PERIODS

15CS38L CLOUD INFRASTRUCTURE AND DEPLOYMENT L T P C  
0 0 2 1

COURSE OUTCOMES  
Upon Completion of this course, the students will be able to  
- **CO1**: Understand the basic concepts of cloud computing account setup. (K2)  
- **CO2**: Deploy applications on cloud environment. (K3)

LIST OF EXPERIMENTS  
1. Creation Azure Account Setup and Services Overview  
   - Setup a cloud VM for a simple web portal (wordpress)  
   - Setup a cloud SQL service and configure that to use with web portal above  
2. Creation of AWS Account Setup and Services Overview  
   - Create AWS account for the various virtual compute, storage, network infrastructure resources  
3. Configure AWS Application Provisioning and Auto Scaling Adaptation  
   - Setting load balancer configuration, and apply scaling up and scaling down using AutoScaling service adaptations.  
4. Build a simple cloud file storage application using AWS S3 storage  
   - Setup a S3 storage object to store and retrieve any files to and from the S3 storage via any web page setup  
5. Develop a Google app engine program to validate user. Create a database login in mysql and deploy to cloud  
6. Create your resume in a neat format using Google/Zoho cloud

SOFTWARE REQUIREMENTS  
- **Operating System**: Windows / Linux  
- **Software**: Eclipse, VS Code, Online Service Provider AWS, Azure, Google
REFERENCES


P:30; TOTAL:30 PERIODS
B. E. – COMPUTER SCIENCE AND ENGINEERING
OPEN ELECTIVE COURSES
Open Elective Course (OEC)

Group - I (Inter-disciplinary courses)

15ID01E PRODUCT DESIGN AND DEVELOPMENT  L  T  P  C
3  0  0  3

COURSE OUTCOMES

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

CO1: analyze various global trends and identify the scope of a new product (K4)
CO2: perform requirement analysis and convert the requirements into design specification (K4)
CO3: translate conceptual idea into detailed design (K6)
CO4: create prototype to demonstrate the product (K6)
CO5: perform sustenance engineering to improve the longevity of the product (K6)

UNIT I  FUNDAMENTALS OF PRODUCT DEVELOPMENT  9
Introduction to Product Development Methodologies and Management: Overview of Products and Services- Types of Product Development- Overview of Product Development methodologies - Product Life Cycle and PLM - Product Development Planning and Management.

UNIT II  REQUIREMENTS AND SYSTEM DESIGN  9

UNIT III  DESIGN AND TESTING  9
Conceptualization - Industrial Design and User Interface Design - Introduction to Concept generation Techniques - Concept Screening and Evaluation - Concept Design - S/W Architecture - Hardware Schematics and simulation

UNIT IV  IMPLEMENTATION AND INTEGRATION  9
Prototyping: Types of Prototypes -Introduction to Rapid Prototyping and Rapid Manufacturing.
System Integration- Testing- Certification and Documentation: Introduction to Manufacturing/Purchase and Assembly of Systems- Integration of Mechanical, Embedded and S/W systems- Introduction to Product verification and validation processes - Product Testing standards, Certification and Documentation.
UNIT V

SUSTENANCE ENGINEERING AND BUSINESS DYNAMICS 9

Sustenance - Maintenance and Repair - Enhancements
The Industry - Engineering Services Industry overview - Product development in Industry versus Academia
The IPD Essentials - Introduction to vertical specific product development processes - Product development Trade-offs - Intellectual Property Rights and Confidentiality- Security and configuration management

L:45; TOTAL:45 PERIODS

TEXT BOOKS


REFERENCES


15ID02E

DISASTER MANAGEMENT

L T P C
3 0 0 3

COURSE OUTCOMES

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

CO1: classify the various types of disaster. (K2)
CO2: interpret various natural and manmade disasters. (K2)
CO3: choose a Hazard Assessment procedure. (K3)
CO4: construct the protection measures against Disaster. (K3)
CO5: apply Science and Technology in Disaster Management. (K3)
UNIT I  INTRODUCTION TO DISASTER  8
Hazard, risk, vulnerability, disaster significance, nature, importance, dimensions and
scope of disaster management - national disaster management frame work- financial
arrangements- disaster- management cycle.

UNIT II  SOURCES OF DISASTER  10
Natural disasters- significance, nature, types and effects - floods, drought, cyclone,
earthquakes, landslides, avalanches, volcanic eruptions, heat and cold waves, climatic
change - global warming - sea level rise - ozone depletion. Manmade disasters- nuclear ,
chemical, biological, building fire, coal fire, forest fire, oil fire, air pollution, water pollution,
deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents
and sea accidents.

UNIT III  DISASTER MITIGATION AND HAZARDS ASSESSMENT  10
Factors affecting damage – types, social status, habitation pattern, physiology and climate
- Factors affecting mitigation measures - prediction – preparation - communication - area
and accessibility - population - physiology and climate - Vulnerability Assessment and
seismic strengthening of buildings - Vulnerability Assessment of Buildings procedure -
Hazard Assessment-Visual Inspection and Study of Available Documents

UNIT IV  DISASTER MANAGEMENT  9
Disaster management - efforts to mitigate natural disasters at national and global levels -
international strategy for disaster reduction- Rescue ,relief And Rehabilitation, Role Of
National And International Agencies In Disaster Management-National Disaster Policy Of
India (Salient Features).

UNIT V  APPLICATIONS OF SCIENCE AND TECHNOLOGY AND CASE
STUDIES  8
Applications of Science and Technology (RS, GIS, GPS) - Early Warning And Prediction
Systems- Earthquake, cyclone, landslides, fire accidents, accidents- case studies

L: 45; TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCE
1. Annual Report, 2009-10,Ministry of Home Affairs, GOI

15ID03E  ENERGY ENGINEERING  L T P C
            3 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
   CO1: explain the operation of Solar Thermal application and Solar Photovoltaic. (K2)
   CO2: explain the operation of wind energy systems. (K2)
   CO3: describe the concepts of various Bio-Energy Conversion techniques. (K2)
CO4: illustrate the concepts of other conventional and nonconventional power plants. (K2)

CO5: explain the concepts of hydrogen and fuel cell technology. (K2)

UNIT I  INTRODUCTION TO SOLAR ENERGY

UNIT II  WIND ENERGY
Wind energy potential, Principle of wind energy conversion; Basic components, types and their constructional features; design considerations: wind data and site selection.

UNIT III  BIO-ENERGY

UNIT IV  OTHER POWER PLANTS
Layout of Hydel - thermal - Nuclear - Gas turbine - Diesel - MHD- Geo thermal - OTEC - Tidal Power Plants.

UNIT V  HYDROGEN AND FUEL CELLS

L:45; TOTAL:45 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
Upon completion of this course, the students will be able to
   CO 1: explain the elements of a valid contract.
   CO 3: explain provisions relating to incorporation and functioning of company and partnership firm.
   CO 4: understand the fundamentals of Consumer Protection Act and Foreign Exchange Management Act.
   CO 5: understand the basic knowledge of Information Technology Act and RTI Act.

UNIT I THE INDIAN CONTRACT ACT, 1872

UNIT II THE SALE OF GOODS ACT, 1930

UNIT III THE COMPANIES ACT, 1956

UNIT IV THE CONSUMER PROTECTION ACT, 1986
UNIT V THE INFORMATION TECHNOLOGY ACT

TEXT BOOKS

REFERENCES

15TD02E LEADERSHIP AND PERSONALITY DEVELOPMENT L T P C 0 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: identify the various leadership skills.
CO 2: understand group dynamics and factors influencing the team performance.
CO 3: describe the personality dimensions based on personality theories.
CO 4: explain personality determinants and personality types.
CO 5: apply effective training program for personality development.

UNIT I INTRODUCTION

UNIT II TEAMS AND LEADERSHIP
UNIT III PERSONALITY
Personality - Meaning, Concept, Personality Patterns, Symbols of Self, Moulding the Personality Pattern, Persistence & Change - Personality & Personal Effectiveness - Psychometric Theories – Cattell and Big Five - Psychodynamic Theories - Carl Jung and MBTI - Transactional Analysis - Johari – Window - Personal Effectiveness.

UNIT IV PERSONALITY DETERMINANTS
Personality Determinants – Heredity and Environment – Types of personality.

UNIT V PERSONALITY TRAINING

TEXT BOOKS

REFERENCES

15TD03E INTERNATIONAL BUSINESS MANAGEMENT L T P C 0 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: understand the global business environment.
CO 2: explain the impact of economic, legal, cultural, geographical and political factors on international business.
CO 3: discuss the issues and problems of Multinational Enterprises.
CO 4: discuss the role of various international financial institutions.
CO 5: discuss about important aspects of WTO and GATT agreement.

UNIT I INTERNATIONAL BUSINESS ENVIRONMENT
UNIT II RISK ANALYSIS AND PRACTICES
Country Risk Analysis - Political, Social and Economic - Cultural and Ethical practices - Responsibilities of International Business - Economic crisis in foreign countries.

UNIT III MULTINATIONAL ENTERPRISES
Managing Multinational Enterprises - Problems and Potential - Multinational Service Organizations - Indian companies becoming multinationals - Potential, Need and Problems.

UNIT IV INTERNATIONAL FINANCIAL MANAGEMENT

UNIT V INTERNATIONAL AGREEMENT

TEXT BOOKS

REFERENCES

15TD04E BASICS OF MARKETING L T P C
0 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: describe the basic concepts of marketing.
CO 2: discuss the significance of consumer behavior and market segmentation.
CO 3: discuss brand, trade mark, after-sales service and product life cycle concepts.
CO 4: formulate strategies for pricing and channels of distribution.
CO 5: analyze and selection of best promotional technique.

UNIT I INTRODUCTION

UNIT II CONSUMER BEHAVIOR AND MARKET SEGMENTATION

UNIT III PRODUCT PLANNING
Concept of Product - Consumer and Industrial Goods - Product Planning and Development - Packaging - Role and Functions - Brand Name and Trade Mark - After-Sales Service - Product Life Cycle Concept.

UNIT IV PRICING AND PHYSICAL DISTRIBUTION

UNIT V PROMOTION
Definition - Methods of Promotion - Optimum Promotion Mix - Advertising Media - Their Relative Merits and Limitations - Characteristics of an Effective Advertisement - Personal Selling - Selling as a Career - Classification of a Successful Sales Person - Functions of Salesman.

TEXT BOOKS

REFERENCES
15TD05E RETAILING AND DISTRIBUTION MANAGEMENT L T P C 176

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: explain the concepts of retailing and distribution management.
CO 2: analyze and solve retailers’ problems to make decisions in retail organizations.
CO 3: plan and formulate strategy for retail management process.
CO 4: discuss about various distribution technology and stores management.
CO 5: analyze the issues and challenges in Logistic Management

UNIT I INTRODUCTION
Meaning and Nature of Distribution and Retail Industry - Future of Retailing and Distribution in India - Distribution Channels – Concept, Role and Types - Factors Affecting Choice of Distribution Channel.

UNIT II TYPES OF RETAILING
Stores Classified by Owners - Stores Classified by Merchandising Categories - Wheel Of Retailing - Traditional Retail Formats Vs. Modern Retail Formats in India - Store and Non-Store Based Formats - Cash and Carry Business - Retailing Models – Franchiser Franchisee, Directly Owned - Wheel of Retailing and Retailing Life Cycle – Issues in Retailing.

UNIT III MANAGEMENT OF RETAILING OPERATIONS

UNIT IV TECHNOLOGY IN DISTRIBUTION

UNIT V LOGISTICS OF RETAIL MANAGEMENT
Components and Functions; Distribution Related Issues and Challenges - Gaining Competitive Advantage through Logistics Management.

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
Upon completion of this course, the students will be able to
   CO 1: discuss the impact of globalization.
   CO 2: identify and analyze different theoretical models of international economics in
     light of ‘real world’ situations.
   CO 3: examine the consequences of trade policies.
   CO 4: explain the importance of international financial markets.
   CO 5: discuss the important aspects of international banking.

UNIT I INTRODUCTION
Background of International Business Economics - Globalization and International
Business – The Emergence of Global Institutions – Drivers of Globalizations - The
Globalization Debate.

UNIT II THE INTERNATIONAL TRADE THEORY
The Law of Comparative Advantage – The Demand and Supply, Offer Curves - The
Terms of Trade – Factor Endowments and the Heckscher – Ohlin Theory – Implications of
Trade Theories - Economics of Scale - Imperfect Competition.

UNIT III INTERNATIONAL TRADE POLICY
Trade Restrictions - Tariffs, Non – Tariff Trade Barriers - Tariff Vs. Quota - The New
Protectionism – Economic Integration - Custom Unions and Free Trade Areas - Major
Regional Trade Agreements - Foreign Exchange Market – Types of Foreign Exchange
Transactions – Reading Foreign Exchange Quotations – Forward and Futures Market –
Foreign - Currency Options – Exchange Rate Determination – Arbitrage – Speculation
and Exchange - Market Stability.

UNIT IV WORLD FINANCIAL ENVIRONMENT
Global Foreign Exchange Markets – Economic Theories of Exchange - Rate
Determination - International Regime for FDI and MNC - Consequences of Economic
Globalization.

UNIT V INTERNATIONAL BANKING
Reserves, Debt and Risk - Nature of International Reserves – Demand for International
Reserves – Supply of International Reserves – Gold Exchange Standard – Special
Drawing Rights – International Lending Risk – The Problem of International Debt –
Financial Crisis and The International Monetary Fund – Eurocurrency Market.

TEXT BOOKS
   publication, USA, 2014.
REFERENCES

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: discuss the current economic development in India
CO 2: describe the key indicators of estimation of national income
CO 3: explain elementary concepts of economic planning and development in India
CO 4: discuss the concept of public finance and preparation of budget
CO 5: discuss the influence of infrastructure growth on economic development

UNIT I ECONOMIC DEVELOPMENT

UNIT II NATIONAL INCOME

UNIT III ECONOMIC PLANNING
Planning and economic development in India - Planning models in India (Elementary concepts) - Capital formation - Growth of Public and Private sector in India – Industrial policies an assessment - Capital formation and domestic saving.

UNIT IV INDIAN PUBLIC FINANCE
Budgetary policies of the central government - Composition and trends in public revenue and expenditure - Expenditure control and government consumption expenditure - concepts of Budgetary deficits and implications - state budget.

UNIT V INFRASTRUCTURE AND ECONOMIC DEVELOPMENT
Power and energy - Transport system in India’s economic development - Communication system in India - Urban infrastructure - Science and technology - Private investment in infrastructure - Outlook and prospects.

TEXT BOOKS
REFERENCES

15TD08E RURAL ECONOMICS L T P C

0 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: discuss the role and importance of agriculture in economic development of India.
CO 2: describe the impact of agricultural forming in rural employment, wage policy, technological change and green revolution.
CO 3: analyze the relationship between rural and urban society.
CO 4: recognize the formation and system of rural social institutions.
CO 5: compare the social changes in the rural society after modernization and globalization.

UNIT I INTRODUCTION

UNIT II AGRICULTURE AND FARMING
Agricultural Holdings - Fragmentation and Sub-Division of Holdings, Cooperative Farming - Rural Labour Problems - Nature of Rural Unemployment - Employment and Wage Policy - Sources of Technological Change and Green Revolution.

UNIT III RURAL SOCIETY

UNIT IV RURAL SOCIAL INSTITUTIONS

UNIT V SOCIAL CHANGES
Social Change in Rural India-Impact of Westernization - Secularization, Urbanisation, Industrialisation, Migration, Transportation, Modernization of Indian Rural Society - Post Modernization and Globalization and Indian Villages.

TEXT BOOKS
REFERENCES


15TD09E INTERNATIONAL TRADE L T P C 0 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: discuss the importance of international trade in developing countries.
CO 2: describe the impact of Trade agreements in international Business environment.
CO 3: explain the role of foreign exchange and their impact on trade and investment flows.
CO 4: discuss the benefits of Multinational Corporation in Internal Trade
CO 5: analyze the key role of globalisation in Indian economy.

UNIT I INTRODUCTION

UNIT II INTERNATIONAL BUSINESS ENVIRONMENT

UNIT III INTERNATIONAL FINANCIAL ENVIRONMENT

UNIT IV MULTINATIONAL CORPORATIONS
Definition - Organizational Structures - Dominance of MNC’s - Recent Trends - Code of Conduct - Multinationals in India - Issue in Investment, Technology Transfer, Pricing and Regulations - International Collaborations and Strategic Alliances.

UNIT V INDIA IN THE GLOBAL SETTING
India an Emerging Market - India in the Global Trade - Liberalization and Integration with Global Economy - Factors Favouring and Resisting Globalization - Trade Policy and Regulation in India - Trade Strategies - Export-Import Policy - Regulation and Promotion of Foreign Trade in India.
TEXT BOOKS

REFERENCES

15TD10E GLOBAL CHALLENGES AND ISSUES L T P C
0 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO 1: understand the various global issues.
CO 2: demonstrate a reasonable understanding of environmental debates and issues.
CO 3: explain the developmental issues relating to food, health and energy.
CO 4: demonstrate the economical issues in international trade.
CO 5: describe the civilization issues relating to human rights and social justice.

UNIT I SECURITY ISSUES
Nuclear Issues - Global and South Asian Context - Small Weapons Proliferation and Internal Arms Race - Chemical and Biological Weapons – Terrorism - Causes, Consequences And Trends - Cyber Terrorism – Counter Terrorism.

UNIT II ENVIRONMENTAL ISSUES
Global Warming and Climate Change - Threats to Bio-Sphere and Space - Pollutions, Deforestation, Solid, Chemical and Nuclear Wastes and their Management - Preserving the Green Cover and Wild Life.

UNIT III DEVELOPMENTAL ISSUES

UNIT IV ECONOMIC ISSUES ON INTERNATIONAL TRADE

UNIT V CIVILIZATION ISSUES
TEXT BOOKS

REFERENCE

15TD11E INDIAN CULTURE AND HERITAGE

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO1: describe Indian culture, civilization and its features.
CO2: demonstrate stone age, Indian races and their contribution in pre-historic culture.
CO3: explain historical development of Indian culture.
CO4: explain the significance, conditions and development of Vedic culture.
CO5: analyze the advent of Islam and European culture.

UNIT I INTRODUCTION
Introduction to Culture - Meaning and Scope - Culture and Civilization - General Characteristics Features of Indian Culture - Geographical Impact on Indian Culture.

UNIT II PRE-HISTORIC CULTURE
Dravidian Culture - Old Stone Age - New Stone Age - Metal Age - Indian Races and their Contribution to Indian Culture.

UNIT III HISTORICAL DEVELOPMENT OF INDIAN CULTURE
Indus Valley Culture - City Planning - Social and Religious Conditions - Vedic and Later Vedic Cultures - Dharmasastras and Caste Systems - Comparison of Indus and Vedic Culture - Importance of Indus Valley and Vedic Cultures.

UNIT IV CULTURE IN SANGAM AGE AND POST SANGAM AGE
Sangam Literature - Society - Political and Economical Conditions - Trade - Religion and Fine Arts.

UNIT V ADVENT OF ISLAM AND EUROPEAN CULTURE

TEXT BOOKS
REFERENCES

15TD12E INDIAN HISTORY L T P C 0 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO1: illustrate the basics of Indian cultural heritage.
CO2: describe interaction between Ancient Indian cultural heritage and Islamic culture.
CO3: demonstrate Innovation by rulers of medieval period in the area of Administration, and their contact with the Europeans.
CO4: analyse modern Indian movements, Economic history and Impact of the British rule on India.
CO5: demonstrate the concepts of Indian National Movement and the history of freedom struggle in India.

UNIT I ANCIENCY INDIAN CULTURE
Ancient Indian Cultural Heritage - Social, Political, Legal and in the Area of Religion and Philosophy.

UNIT II LAW RELATING TO CULTURE
Law Givers and Dispute Resolution Systems in Ancient India (Administration of Justice in Ancient India - Pre-Islamic Period) - Law Relating to Culture - The Advent of Islam - Interaction between Ancient Indian Cultural Heritage and Islamic Culture - The Emergence of Synthetic Indian Culture.

UNIT III ADMINISTRATION IN ANCIENT INDIA
Innovation by Rulers of Medieval Period in the Area of General and Revenue Administration - District Administration - Court Systems - Indian Contact with the Europeans.

UNIT IV SOCIO-ECONOMIC HISTORY
Socio-Religious Reform Movements in Modern India and its Legal Culture - Economic History of India During British Period - Impact of the British Rule on India – Education.

UNIT V EUROPEAN CULTURE IMPACT
Impact of European Culture and Liberal Thought on India – The Indian National Movement - The History of Freedom Struggle in India upto 1947.
TEXT BOOKS

REFERENCES

15TD13E SUSTAINABLE DEVELOPMENT AND PRACTICES L T P C 0 0 0 3

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

- CO 1: recognize the sustainable development and the way to achieve the sustainable development.
- CO 2: outline the concept, factors governing the sustainability and their linkages.
- CO 3: explain the environmental impact assessment and environmental audit.
- CO 4: describe the environmental planning and managing the resources.
- CO 5: acquire the knowledge about the environmental problems and their solutions.

UNIT I SUSTAINABLE DEVELOPMENT
Need for Sustainability - Nine Ways to Achieve Sustainability - Economics as the Dismal Science - Population, Resources and Environment.

UNIT II CHALLENGES OF SUSTAINABLE DEVELOPMENT
Concept of Sustainability - Factors Governing Sustainable Development - Linkages among Sustainable Development, Determinants of Sustainable Development - Case Studies on Sustainable Development.

UNIT III ENVIRONMENT IMPACT ASSESSMENT AND AUDIT
Concepts-process-evaluation methodology-EIA and EMS integration-setting up of audit programme - typical audit process - carrying out the audit-benefits of environmental auditing-environmental audit programmes in India.

UNIT IV ENVIRONMENTAL PLANNING
Introduction - Perspective of Environmental Planning - land resource development planning - Planning and managing the natural resources - landscape ecological planning - information and decision of environmental planning - Land use policy in India.

UNIT V ENVIRONMENTAL EDUCATION
Knowledge about the environment - Knowledge about the environment and population growth -Knowledge about the solution and environmental problems - Environmental education (EE) – Strategies for EE – Models for future Environmental Education Systems.
TEXT BOOKS

REFERENCES

15TD14E WOMEN IN INDIAN SOCIETY L T P C
0 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO1: Demonstrate historical perspective about women in Indian society.
CO2: Explain social problems of women.
CO3: Understand the legislation for women protection in India.
CO4: Demonstrate the involvement of women literacy, career and politics.
CO5: Analyse the role of NGO’s in women empowerment.

UNIT I INTRODUCTION
A Historical Perspective - Early Vedic, Colonial and Modern Periods - Position of Women in Contemporary India.

UNIT II SOCIAL ISSUES

UNIT III PROTECTIVE LEGISLATION FOR WOMEN
Protective Legislation for Women in the Indian Constitution - Anti Dowry, SITA, PNDT, And Prevention Sexual Harassment At Workplace (Visaka Case) - Domestic Violence (Prevention) Act.

UNIT IV WOMEN AND EDUCATION
Formal and Non-Formal Literacy - Post Literacy - Vocational Training - Dual Career Modernization – Women and Politics - Political Status - Global Movements and Indian Movements.
UNIT V  ROLE OF NGO’S IN WOMEN EMPOWERMENT
Gender Economy - All India Women’s Conference (AIWC) – Women’s India Association (WIA) - National Council of Women in India (NCWIE) - Indian Association of Women’s Studies – Women Development Cells - Self Help Groups.

TEXT BOOKS

REFERENCES

15TD15E  INDIAN CONSTITUTION  L T P C
0 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO1: describe the basic understanding of the Indian Constitution.
CO2: understand the structure and functions of parliament.
CO3: demonstrate the organization and working of the Judiciary.
CO4: understand the structure and functions of state legislature.
CO5: understand the 73rd and 74th Constitutional Amendments.

UNIT I  INDIAN CONSTITUTION

UNIT II  PARLIAMENTARY SYSTEM
Powers and Functions of President and Prime Minister - Council of Ministers - The Legislature Structure and Functions of Lok Sabha and Rajya Sabha – Speaker.

UNIT III  THE JUDICIARY
Organisation and Composition of Judiciary - Powers and Functions of the Supreme Court - Judicial Review – High Courts.

UNIT IV  STATE GOVERNMENTS
Powers and Functions of Governor and Chief Minister – Council of Ministers - State Legislature.
UNIT V  LOCAL GOVERNMENTS
73rd and 74th Constitutional Amendments – Federalism - Center – State Relations.

TEXT BOOKS

REFERENCES

15TD16E  BIO MECHANICS IN SPORTS  L T P C
0 0 0 3

COURSE OUTCOMES
Upon completion of this course, the students will be able to
CO1: discuss the basics of biomechanics in sports & movement technique accurately.
CO2: discuss the basics of linear kinematics and its applications in the field of sports.
CO3: demonstrate the linear kinematics in the field of sports.
CO4: discuss the basics of angular kinematics and its applications in the field of sports.
CO5: demonstrate the angular kinematics in the field of sports.

UNIT I  INTRODUCTION
Meaning, Aim and Objectives, Importance of Biomechanics in Sports - Types of Motion Linear, Angular, Curvilinear and Circular Motion.

UNIT II  LINEAR KINEMATICS
Speed, Velocity, Acceleration, Motion, Projectile Motion – Application of Linear Kinematics in The Field of Physical Education and Sports.

UNIT III  ANGULAR KINEMATICS
Angular Speed - Angular Velocity - Angular Acceleration - Relationship between Linear and Angular Motion – Application of Angular Kinematics in the Field of Physical Education and Sports.

UNIT IV  LINEAR KINETICS
UNIT V  ANGULAR KINETICS

TEXT BOOKS

REFERENCES