# PRIST UNIVERSITY

VALLAM, THANJAVUR.

## DEPARTMENT OF
## COMPUTER SCIENCE & ENGINEERING

# PROGRAM HANDBOOK

## B. TECH-CSE(PART-TIME)

[REGULATION 2022]
[for candidates admitted to B. Tech CSE program from June 2022 onwards]

## PROGRAM EDUCATIONAL OBJECTIVES

The program objectives, address our mission of graduating students with solid foundation in computer science and engineering and to engage in activities that improve the welfare of society within a few years after their graduation. Based on the mission and vision, Program Educational Objectives are listed below:

**I.** Graduating students to practice fundamentals of computer science engineering and apply their problem solving skills to analyze and solve engineering problems to meet the emerging needs of software industry**.**

II. To encourage graduates to pursue advanced education, research and development, and other creative efforts in science and technology.

III. Graduating students to achieve professional status due to their mastery of Computer Science theory and practice, exposure to emerging hardware technologies.

IV. To endorse graduates with communication, and interpersonal skills to enable them to work in team effectively in multidisciplinary field and in their professional careers.

V. To impart the students to engage in lifelong learning and continuing professional development to use their understanding of the impact of technology on society for the benefit of humankind.

## PROGRAM OUTCOMES

Program outcomes are the knowledge, skills, and behaviors that students acquire during the time of graduation through the program objectives. Students should be in possession of:

a) An ability to apply mathematical, algorithmic principles, and computing techniques in the modeling and design of computer-based systems.
b) An ability to apply software engineering techniques to design, implement and test a software system, and to evaluate and compare the efficiencies of alternative solutions.
c) Knowledge to identify and solve the open end problems to meet the requirements in computing industry.
d) Understanding of network technologies to evolve and deploy network.
e) An ability to choose best web technologies for solving web client/server problem and to create web pages with dynamic effects.
f) An ability to work in multi-disciplinary projects.
g) Verbal skills to interact with customers, colleagues, and managers, and possess written communication skills to describe ideas, document processes, and results.
h) An ability to engage in life-long learning to remain current in their profession and be leaders in technological society.
i) The broad education necessary to understand the impact of computing in a global, economic, societal context and in all endeavors.
j) Fundamental knowledge in digital circuits, communication systems and computer hardware.
k) An ability to map computing ideas into working physical systems with the help of computing technologies for the benefit of society.

# MAPPING OF PEO WITH PO

| PEO | PROGRAM OUTCOMES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **a** | **b** | **C** | **d** | **e** | **f** | **g** | **h** | **i** | **j** | **k** |
| **I** | X | X | | X | X | | | | | | |
| **II** | | | X | | | | | X | | | |
| **III** | | | | | | | X | | | | X |
| **IV** | | | | | | | | | X | X | |
| **V** | | | | | | X | | | | | |

# COURSE STRUCTURE

## SEMESTER I

| Subject Code | Subject Name | Periods Per Week | | | C |
|---|---|---|---|---|---|
| | | L | T | P | |
| 22148S11P | Transforms and Partial Differential Equations | 3 | 1 | 0 | 4 |
| 22152S12P | Digital Systems | 3 | 1 | 0 | 4 |
| 22150H13P | Data Structures and algorithms | 3 | 1 | 0 | 4 |
| 22150H14P | Computer Architecture and Organization | 3 | 1 | 0 | 4 |
| 22150H15P | Problem Solving And Python Programming | 3 | 0 | 0 | 3 |
| **Total No. of credits** | | | | | **19** |

## SEMESTER II

| Subject Code | Subject Name | Periods Per Week | | | C |
|---|---|---|---|---|---|
| | | L | T | P | |
| 22148S21P | Numerical Methods | 3 | 1 | 0 | 4 |
| 22150H22P | Microprocessors and Interfacing | 3 | 1 | 0 | 4 |
| 22150H23P | Database Management Systems | 3 | 1 | 0 | 4 |
| 22150H24P | Design and Analysis Of Algorithm | 3 | 1 | 0 | 4 |
| 22150H25P | Programming in C | 3 | 0 | 0 | 3 |
| **Total No. of credits** | | | | | **19** |

## SEMESTER III

| Subject Code | Subject Name | Periods Per Week | | | C |
|---|---|---|---|---|---|
| | | L | T | P | |
| 22148S31P | Discrete Mathematics | 3 | 1 | 0 | 4 |
| 22150H32P | Operating System | 4 | 0 | 0 | 4 |
| 22150H33P | Artificial Intelligence | 4 | 0 | 0 | 4 |
| 22150H34P | Computer Networks | 4 | 0 | 0 | 4 |
| 22150L35P | Operating Systems and Networking Lab | 0 | 0 | 3 | 2 |
| **Total No. of credits** | | | | | **18** |

## SEMESTER IV

| Subject Code | Subject Name | Periods Per Week | | | C |
|---|---|---|---|---|---|
| | | L | T | P | |
| 22150H41P | Software Engineering Fundamentals | 3 | 1 | 0 | 4 |
| 22150H42P | Internet Programming | 3 | 1 | 0 | 4 |
| 22150H43P | C# And .Net Framework | 3 | 1 | 0 | 4 |
| 221_ _E44_P | **Elective-I** | 3 | 1 | 0 | 4 |
| 22150L45P | Internet Programming Lab | 0 | 0 | 3 | 2 |
| **Total No. of credits** | | | | | **18** |

## SEMESTER - V

| Subject Code | Subject Name | Periods Per Week | | | C |
|---|---|---|---|---|---|
| | | L | T | P | |
| 22150H51P | Object Oriented Analysis and Design | 4 | 0 | 0 | 4 |
| 22150H52P | Software Quality Management | 3 | 1 | 0 | 4 |
| 22150H53P | Graphics and Multimedia | 3 | 1 | 0 | 4 |
| 221_ _E54_P | **Elective –II** | 3 | 1 | 0 | 4 |
| 22150L55P | Software Development Lab | 0 | 0 | 3 | 2 |
| **Total No. of credits** | | | | | **18** |

## SEMESTER - VI

| Subject Code | Subject Name | Periods Per Week | | | C |
|---|---|---|---|---|---|
| | | L | T | P | |
| 22150H61P | Cryptography and Network Security | 4 | 0 | 0 | 4 |
| 22150H62P | Advanced Java programming | 3 | 1 | 0 | 4 |
| 22150H63P | Software Testing | 4 | 0 | 0 | 4 |
| 221_ _E64_P | **Elective III** | 4 | 0 | 0 | 4 |
| 22150L65P | Java Programming Lab | 0 | 0 | 3 | 2 |
| **Total No. of credits** | | | | | **18** |

## SEMESTER - VII

| Subject Code | Subject Name | Periods Per Week | | | C |
|---|---|---|---|---|---|
| | | L | T | P | |
| 22160S71P | Total Quality Management | 3 | 0 | 0 | 3 |
| 22150H72P | Grid and Cloud Computing | 4 | 0 | 0 | 4 |
| 22150H73P | Middleware Technologies | 3 | 1 | 0 | 4 |
| 221_ _E74_P | **Elective IV** | 3 | 0 | 0 | 3 |
| 22150P75P | Project | 0 | 0 | 12 | 6 |
| **Total No. of credits** | | | | | **20** |

# LIST OF ELECTIVES

## SEMESTER - IV (ELECTIVE I)

| Subject Code | Subject Name | Periods Per Week | | | C |
|---|---|---|---|---|---|
| | | L | T | P | |
| 22150E44AP | Theory of Computation | 3 | 1 | 0 | 4 |
| 22150E44BP | Data Warehousing and Data Mining | 3 | 1 | 0 | 4 |
| 22150E44CP | Professional Ethics in Engineering | 3 | 1 | 0 | 4 |
| 22150E44DP | Advanced Databases | 3 | 1 | 0 | 4 |

## SEMESTER - V (ELECTIVE II)

| Subject Code | Subject Name | Periods Per Week | | | C |
|---|---|---|---|---|---|
| | | L | T | P | |
| 22150E54AP | Ad hoc and Sensor Networks | 3 | 1 | 0 | 4 |
| 22150E54BP | Principles of Compiler Design | 3 | 1 | 0 | 4 |
| 22150E54CP | Distributed Systems | 3 | 1 | 0 | 4 |
| 22150E54DP | Mobile Computing | 3 | 1 | 0 | 4 |

## SEMESTER - VI (ELECTIVE III)

| Subject Code | Subject Name | Periods Per Week | | | C |
|---|---|---|---|---|---|
| | | L | T | P | |
| 22160E64AP | Principles of Management | 4 | 0 | 0 | 4 |
| 22150E64BP | Unix Internals | 4 | 0 | 0 | 4 |
| 22150E64CP | Graph Theory And Applications | 4 | 0 | 0 | 4 |
| 22150E64DP | Programming paradigms | 4 | 0 | 0 | 4 |

# SEMESTER - VII (ELECTIVE VI)

| Subject Code | Subject Name | Periods Per Week | | | C |
|---|---|---|---|---|---|
| | | L | T | P | |
| 22150E74AP | High Speed Networks | 3 | 0 | 0 | 3 |
| 22150E74BP | Information Retrieval Techniques | 3 | 0 | 0 | 3 |
| 22150E74CP | Software Project Management | 3 | 0 | 0 | 3 |
| 22150E74DP | Cyber Forensics | 3 | 0 | 0 | 3 |

# CREDITS DISTRIBUTION

| Semester | Theory Courses | | Elective Courses | | Practical Courses | | Project | Total Credit |
|---|---|---|---|---|---|---|---|---|
| | Nos | Credit | Nos | Credit | Nos | Credit | Credit | |
| I | 5 | **19** | - | **-** | - | **-** | - | **19** |
| II | 5 | **19** | - | **-** | - | **-** | - | **19** |
| III | 4 | **16** | - | **-** | 1 | **02** | - | **18** |
| IV | 3 | **12** | 1 | **04** | 1 | **02** | - | **18** |
| V | 3 | **12** | 1 | **04** | 1 | **02** | - | **18** |
| VI | 3 | **12** | 1 | **04** | 1 | **02** | **-** | **18** |
| VII | 3 | **11** | 1 | **03** | - | **-** | **06** | **20** |
| **Total Credits** | | | | | | | | **130** |

| TOTAL CREDITS | |
|---|---|
| Semester – I | **19** |
| Semester – II | **19** |
| Semester – III | **18** |
| Semester – IV | **18** |
| Semester – V | **18** |
| Semester – VI | **18** |
| Semester – VI | **20** |
| **TOTAL CREDITS** | **130** |

# 22148S11P -TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

**AIM:**

To develop the skills for the students in the areas of Transforms and Partial Differential Equations. This will be necessary for their effective studies in a large number of engineering subjects like heat conduction, communication systems, electro-optics and electromagnetic theory. The course will also serve as a prerequisite for specialized studies
and research.

**OBJECTIVES:**

- Solve simple second order differential equations;
- Be able to calculate Fourier series;
- Prove the Orthogonality of Eigen functions of boundary value problems;
- Be able to classify second order partial differential equations and choose the appropriate boundary condition;
- Apply the method of separation of variables to standard PDEs;
- Understand the wide applications of differential equation;
- Use Laplace transforms to solve simple linear differential equations.

**UNIT I FOURIERSERIES** **9 + 3hrs**

Periodic Function-Graph of functions- Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of Fourier Series – Parseval's identity – Harmonic Analysis.

**UNIT II FOURIER TRANSFORM** **9 + 3hrs**

Fourier integral theorem (without proof) – Sine and Cosine transforms – Properties (without Proof) – Transforms of simple functions – Convolution theorem – Parseval's identity – Finite Fourier transform, Sine and Cosine transform.

**UNIT III Z -TRANSFORM AND DIFFERENCE EQUATIONS** **9 + 3hrs**

Z-transform - Elementary properties (without proof) – Inverse Z – transform – Convolution theorem -Formation of difference equations – Solution of difference equations using Z – Transform-Sampling of signals –an introduction.

**UNIT IV PARTIAL DIFFERENTIAL EQUATIONS** **9 + 3hrs**

Formation of PDE –solution of standard type first order equation- Lagrange's linear equation – Linear partial differential equations of second order and higher order with Constant coefficients.

**UNIT V BOUNDARY VALUE PROBLEMS** **9 + 3hrs**

Solutions of one dimensional wave equation – One dimensional heat equation – Steady state solution of two-dimensional heat equation (Insulated edges excluded) – Fourier series solutions in Cartesian coordinates.

**TOTAL: 60hrs**

**TEXT BOOKS:**

1.Andrews, L.A., and Shivamoggi B.K., "Integral Transforms for Engineers and Applied

Mathematicians", Macmillan, New York ,1988.

2.Grewal, B.S., "Higher Engineering Mathematics", Thirty Sixth Edition, Khanna Publishers, Delhi, 2001.

3.Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics Volume III", S. Chand & Company ltd., New Delhi, 1996.

**REFERENCES:**

1. Narayanan, S., ManicavachagomPillay, T.K. and Ramanaiah, G., "Advanced Mathematics for Engineering Students", Volumes II and III, S. Viswanathan (Printers and Publishers) Pvt. Ltd. Chennai, 2002.

2. Churchill, R.V. and Brown, J.W., "Fourier Series and Boundary Value Problems", Fourth Edition, McGraw-Hill Book Co., Singapore, 1987.

3. Advanced Modern Engineering mathematics – Glyn James

# 22152S12P- DIGITAL SYSTEMS

**AIM:**

To learn the fundamental concepts those are useful for designing digital systems or circuits.

**OBJECTIVES:**

- To introduce number systems and codes
- To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions
- To introduce the methods for simplifying Boolean expressions
- To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits
- To introduce the concept of memories devices.

## UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9 +3

Binary, Octal, Decimal, Hexadecimal-Number base conversions – complements – signed Binary numbers. Binary Arithmetic- Binary codes -Boolean postulates and laws –De-Morgan's Theorem-Principle of Duality- Boolean expression – Boolean function- Minimization of Boolean expressions– Karnaugh map Minimization.
LOGIC GATES: AND, OR, NOT, NAND, NOR, Exclusive – OR and Exclusive – NOR-Implementations of Logic Functions using gates, NAND –NOR implementations

## UNIT II. COMBINATIONAL CIRCUITS 9 +3

Adders-Subtractors – Serial adder/ Subtractor - Parallel adder/ Subtractor-Carry look ahead adder-Multiplexer/ De multiplexer- Implementation using MUX- encoder / decoder – parity checker –code converters

## UNIT III SEQUENTIAL CIRCUIT 9 +3

Flip flops SR, JK, T, D and Master slave – Characteristic table and equation – Application table – Edge triggering-Level triggering-Realization of one flip flop using other flip flops-Asynchronous / Ripple counters – Synchronous counters –Modulo – n counter –Classification of sequential circuits – Introduction to shift registers

## UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS 9 +3

Introduction to asynchronous sequential circuits - primitive state / flow table – Minimization of primitive state table –state assignment – Excitation table – Excitation map- cycles – Races –Hazards: Static –Dynamic –Essential –Hazards elimination.

**UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS 9 +3**

Introduction to asynchronous sequential circuits - primitive state / flow table – Minimization of primitive state table –state assignment – Excitation table – Excitation map- cycles – Races –Hazards: Static –Dynamic –Essential –Hazards elimination.

**UNIT V MEMORY DEVICES 9 +3**

Classification of memories –RAM organization – Write/Read operation – Memory cycle - Timing wave forms –memory decoding- memory expansion- Static RAM Cell-Bipolar RAM cell – MOSFET RAM cell –Dynamic RAM cell –ROM organization - PROM –EPROM –EEPROM –EAPROM – Programmable Logic Devices –Implementation using ROM- Field Programmable Gate Arrays (FPGA)

**TOTAL:60hrs**

**TEXT BOOKS:**


1. M. Morris Mano, Digital Design, 3.ed., Prentice Hall of India Pvt. Ltd., New Delhi, 2003/Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003 – (Unit I, II, V)
2. John .M Yarbrough, Digital Logic Applications and Design, Thomson- Vikas publishing house, New Delhi, 2002. (Unit III, IV)


**REFERENCES:**


1. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, 2nd ed., Vikas Publishing House Pvt. Ltd, New Delhi, 2004
2. Charles H.Roth. “Fundamentals of Logic Design”, Thomson Publication Company, 2003.
3. Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 5 ed., Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
4. R.P.Jain, Modern Digital Electronics, 3 ed., Tata McGraw–Hill publishing company limited, New Delhi, 2003.
5. Thomas L. Floyd, Digital Fundamentals, Pearson Education, Inc, New Delhi, 2003

# 22150H13P- DATA STRUCTURES AND ALGORITHMS

**AIM:**

To emphasize, the practical application of techniques for analyzing the performance of algorithms and to know fundamentals of data structures.

**OBJECTIVES:**

- To learn the systematic way of solving problems
- To understand the different methods of organizing large amounts of data
- To efficiently implement solutions for specific problems
- To gain knowledge of various sorting techniques.
- To efficiently implement the different data structures

**UNIT-I PROBLEM SOLVING** **9+3**

Problem solving- Top-Down Design- Implementation - Verification- Efficiency -Analysis - Sample Algorithms

**UNIT II LISTS, STACKS AND QUEUES** **9+3**

Abstract Data Type (ADT) – The List ADT – The Stack ADT-Queue as ADT

**UNIT III TREES** **9+3**

Binary trees: Operations on binary trees - Applications of binary trees - Binary tree representation - Node representation of binary trees - Implicit array representation of binary tree

**UNIT-IV SORTING& SEARCHING** **9+3**

Preliminaries – Insertion Sort – Heap sort – Merge sort – Quick sort – Bubble sort
Basic Search Techniques – Linear Search – Indexed Sequential Search , Binary Search – Tree Searching – Inserting into a Binary searching tree – Deleting from a Binary Search tree

**UNIT-V GRAPHS** **9+3**

Definitions – Shortest-Path Algorithms – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's Algorithm - Depth first traversal - Application of depth first traversal -Breadth first traversal- Application of BFS.

**TOTAL: 60 hrs**

**TEXT BOOKS:**

1. R.G.Dromey, "How to solve it by computer", Prentice- Hall of India, 2002.
2. Aaron M. Tenenbaum, YeedidyahLangsam, Moshe J. Augenstein, 'Data structures using C', Pearson Education, 2004 / PHI.
3. M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nded, Pearson Education Asia, 2002

**REFERENCES:**


1. E. Balagurusamy, 'Programming in Ansi C', Second Edition, Tata McGraw Hill Publication, 2003.
2. Robert L. Kruse, Bruce P. Leung Clovis L.Tondo, 'Data Structures and Program Design in C', Pearson Education, 2000 / PHI.
3. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2004.
4. Richard F. Gilberg, Behrouz A. Forouzan, "Data Structures – A Pseudocode Approach with C", Thomson Brooks / COLE, 1998.
5. Aho, J. E. Hopcroft and J. D. Ullman, "Data Structures and Algorithms", Pearson education Asia, 1983.

**CSE/Sem I**

# 22150H14P- COMPUTERARCHITECTURE AND ORGANIZATION

**AIM:**

To understand the basic structure and organization of digital computer.

**OBJECTIVES:**

- To have a thorough understanding of operation of a digital computer.
- To list the operation of the arithmetic unit.
- To study in detail, the different types of control and the concept of pipelining.
- To understand the hierarchy of memories.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

**UNIT I BASIC STRUCTURE OF COMPUTERS 10+3**

Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language

**UNIT II ARITHMETIC UNIT 8+3**

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division

**UNIT III BASIC PROCESSING UNIT 9+3**

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed control - Pipelining – Basic concepts – Data hazards – Instruction hazards –Superscalar operation.

**UNIT IV MEMORY SYSTEM 9+3**

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage.

**UNIT V I/O ORGANIZATION 9+3**

Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).

**TOTAL: 60hrs**

**TEXT BOOK:**

1. Carl Hamacher, ZvonkoVranesic and SafwatZaky, 5th Edition "Computer Organization", McGraw-Hill, 2002.

**REFERENCES:**

1. William Stallings, "Computer Organization and Architecture – Designing for Performance", 6th Edition, Pearson Education, 2003.
2. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The hardware / software interface", 2nd Edition, Morgan Kaufmann, 2002.
3. John P.Hayes, "Computer Architecture and Organization", 3rd Edition, McGraw Hill, 1998.

# 22150H15P-PROBLEMSOLVINGANDPYTHONPROGRAMMING

AIM:

To introduce the students about object oriented programming and design.

OBJECTIVES:

On completion of the class, a student should be able:

- To know the basics of algorithmic problem solving
- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures –-lists, tuples, dictionaries.
- To do input/output with files in Python

**UNITI ALGORITHMICPROBLEMSOLVING 9**

Algorithm, building block of algorithm (statement, state, control flow, function,), notation (pseudo code, flower, Programming language), algorithm problem solving simple strategies for developing algorithm (iteration, recursion) Illustrative problem: find minimuminal list, insert car dinal, guessan integer number in arrange, Tower of Hanoi.

**UNITII DATA, EXPRESSIONS, STATEMENTS 9**

Python Interpreter and interactive mode; values and type: int, float, Boolean, string list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

**UNITIII CONTROLFLOW, FUNCTIONS 9**

Conditionals: Boolean values and operators, conditional(if), alternative(if-else), chained condition (if-else); Iteration: state, while, for break, continue, pass;function:return values,parameters,local and Global scope, function composition, recursion: Strings: string slices, immutability, string function and method, string module; Lists as array. Illustrative program: square root, ged, exponentiation, sum an array of numbers, linear search, binary search.

**UNIT IV LISTS, TUPLES, DICTIONARIES 9**

Lists: list operation, list slices, list methods, list loop, mutability, aliasing, cloning, list parameters; Tuples: tuple assignment, tuple as return values; Dictionaries: operations and methods; advanced List processing-list comprehension; Illustrative program: selection sort, insertion sort, merge sort, Histogram.

**UNITV FILES, MODULES, PACKAGES 9**

Files and exception: textiles, reading and writing files, format operator: command line argument, error and exception, handling exception, modulus, packages;Illustrate program: word count,copy file.

**TOTAL:45 PERIODS**

**Text Book**:
Balagurusamy E, "Object Oriented Programming with C++", 3/E, TMG, 2006.

**Reference:**
1. Hubbard, "Programming with C++", 2/e, Schaum Outline Series, TMH, 2006.
2. Bjarne Stroustrup, "The C++ Programming Language", Addison Wesley Publications, Second Edition, 1991.
3. SarangProonachandra," Object Oriented Programming with C++", PHI, 2006.
4. Jagadev A K, Rath A M, and DehuriS," Object Oriented Programming Using C++"

**CSE/SemII**

# 22148S21P-NUMERICAL METHODS

**AIM:**

Students will develop problem solving skills, with Numerical and Statistical Methods, which can be implemented in I.T. field**.**

**OBJECTIVES:**

- Demonstrate knowledge and understanding of numerical methods to solve ordinary differential equations
- Demonstrate knowledge and understanding of numerical methods to solve simple partial differential equations
- Introduce to student's numerical methods and scientific computation techniques for dealing with important computational problems

**UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3hrs**

Solution of equations–Newton Raphson's method, Regula-false methods Solution of linear System of equations by Gaussian elimination and Gauss-Jordon methods- Iterative methods: Gauss Jacobi and Gauss-Seidel methods– Eigenvalue of a matrix by power method.

**UNIT II INTERPOLATION 9+3hrs**

Newton's forward and backward difference formulas – Central difference formula: Bessels and Stirling's formula - Lagrangian Polynomials – Divided difference method.

**UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9+3hrs**

Derivatives from difference tables – Divided differences and finite differences –Numerical integration by trapezoidal and Simpson's 1/3 and 3/8 rules – Romberg's method – Double integrals using trapezoidal and Simpson's rules.

**UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9+3hrs**

Single step methods: Taylor series method – Euler and modified Euler methods – Fourth order Runge–Kutta method for solving first and second order equations – Multistep methods: Milne's and Adam's predictor and corrector methods

.

**UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9+3hrs**

Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

**TOTAL: 60hrs**

**TEXT BOOKS**


1. Gerald, C.F, and Wheatley, P.O, "Applied Numerical Analysis", Sixth Edition, Pearson Education Asia, New Delhi, 2002.
2. Kandasamy, P., Thilagavathy, K. and Gunavathy, K., "Numerical Methods", S. Chand Co. Ltd., New Delhi, 2003.


**REFERENCES:**


1. Burden, R.L and Faires, T.D., "Numerical Analysis", Seventh Edition, Thomson Asia Pvt. Ltd., Singapore, 2002.
2. Balagurusamy, E., "Numerical Methods", Tata McGraw-Hill Pub.Co. Ltd, New Delhi, 1999.

# 22150H22P - MICROPROCESSORS AND INTERFACING

**AIM:**

To have an in depth knowledge of the architecture and programming of 8-bit and 16-bit Microprocessors, Microcontrollers and to study how to interface various peripheral devices with them.

**OBJECTIVES:**

- To study the architecture and Instruction set of 8085 and 8086
- To develop assembly language programs in 8085 and 8086.
- To design and understand multiprocessor configurations
- To study different peripheral devices and their interfacing to 8085/8086.
- To study the architecture and programming of 8051 microcontrollers.

**UNIT I 8085 CPU** **9+3**

8085 Architecture – Instruction set – Addressing modes – Timing diagrams –Interrupts – Memory interfacing – Interfacing, I/O devices.

**UNIT II PERIPHERALS INTERFACING** **9+3**

Interfacing Serial, I/O (8251)- parallel I/O (8255) –Keyboard and Display controller 8279Interrupt Controller –DMA controller - Bus: RS232C-RS485

**UNIT III 8086 CPU** **9+3**

Intel 8086 Internal Architecture – 8086 Addressing modes- Instruction set- 8086–Interrupts.

**UNIT IV 8086 SYSTEM DESIGN** **9+3**

8086 signals and timing – MIN/MAX mode of operation – Addressing memory and I/O — System design using 8086

**UNIT V 8085 APPLICATIONS** **9+3**

Stepper motor control – DC motor control –Traffic light control – LCD Controller — Square wave generation –Introduction to microcontroller. - 8051 Architecture.

**TOTAL: 60 Hrs.**

**TEXT BOOKS:**


1. Ramesh S Gaonkar, Microprocessor Architecture, Programming and application with 8085, 4th Edition, Penram International Publishing, New Delhi, 2000. (Unit I, II)
2. John Uffenbeck, The 80x86 Family, Design, Programming and Interfacing, Third Edition. Pearson Education, 2002.
3. S.P.Chowdhury , SunetraChowdhury,Microprocessor& Peripherals ,First Edition ,Scitech Publications(INDIA )Pvt. Ltd.(Unit V)


**REFERENCES:**


1. A.K. Ray and K.M.Burchandi, Intel Microprocessors Architecture Programming and Interfacing, McGraw Hill International Edition, 2000(Unit III,IV).
2. Kenneth J Ayala, The 8051 Microcontroller Architecture Programming and Application, 2nd Edition, Penram International Publishers (India), New Delhi, 1996.
3. M. Rafi Quazzaman, Microprocessors Theory and Applications: Intel and Motorola prentice Hall of India, Pvt. Ltd., New Delhi, 2003.

# 22150H23P-DATABASE MANAGEMENT SYSTEMS

## AIM:

To know the methodologies in database technology and an introduction to the current trends in this field.

## OBJECTIVES:

- To learn the fundamentals of data models.
- To understand the internal storage structures using different file and indexing techniques.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To understand the basic concepts of the emerging trends in the area of distributed DB- and OODB.

## UNIT I INTRODUCTION AND CONCEPTUAL MODELING 9 + 3

Introduction to File and Database systems- Database system structure – Data Models – Introduction to Network and Hierarchical Models – ER model – Relational Model – Relational Algebra and Calculus

## UNIT II RELATIONAL MODEL 9 + 3

SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design – Functional dependences and Normalization for Relational Databases (up to BCNF).

## UNIT III DATA STORAGE AND QUERY PROCESSING 9 + 3

Primary file organization- Secondary Storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - Query Processing.

## UNIT IV TRANSACTION MANAGEMENT 9 + 3

Transaction Processing – Introduction- Need for Concurrency control- Schedule and Recoverability- Serializability and Schedules – Concurrency Control – Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control – Recovery Techniques – Concepts- Immediate Update- Deferred Update - Shadow Paging.

**UNIT V CURRENT TRENDS 9 + 3**

Object Oriented Databases – Need for Complex Data types- OO data Model- Nested relations- Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and Heterogeneous- Distributed Data Storage.

**TOTAL: 60 Hrs.**

## TEXTBOOKS:


1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan- "Database System Concepts", Fourth Edition, McGraw-Hill, 2002.


## REFERENCES:


1. RamezElmasri and Shamkant B. Navathe, "Fundamental Database Systems", Third Edition, Pearson Education, 2003.
2. Raghu Ramakrishnan, "Database Management System", Tata McGraw-Hill Publishing Company, 2003.
3. Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- "Database System Implementation"- Pearson Education- 2000.
4. Peter Rob and Corlos Coronel- "Database System, Design, Implementation and Management", Thompson Learning Course Technology- Fifth edition, 2

# 22150H24P- DESIGN AND ANALYSIS OF ALGORITHMS

**AIM:**

This course aims to introduce the classic and complex algorithms in various domains, and techniques for designing and analyzing the efficient algorithms.

**OBJECTIVES:**

- To prove the correctness and analyze the running time of the basic algorithms
- To apply the algorithms and design techniques to solve problems.
- To analyze the complexities of various problems in different domains.

**UNIT I BASIC CONCEPTS OF ALGORITHMS 8 + 3**

Introduction-Notion of Algorithm-Fundamental of Algorithm Solving-Important problem types-Fundamental of the Analysis Framework-Asymptotic Notations and Basic Efficiency classes.

**UNIT II MATHEMATICAL ASPECTS AND ANALYSIS OF ALGORITHMS 8 + 3**

Mathematical Analysis of Non-Recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

**UNIT III ANALYSIS OF SORTING AND SEARCHING ALGORITHMS 10 + 3**

Brute Force – Bubble Sort – Sequential Search and Brute-force string matching – Divide and conquer – Merge sort – Quick Sort – Binary Search – Binary tree- Decrease and Conquer – Insertion Sort – Depth first Search and Breadth First Search.

**UNIT IV ALGORITHMIC TECHNIQUES 10 + 3**

Transform and conquer – Presorting – Balanced Search trees – AVL Trees – Heaps and Heap sort – Dynamic Programming – Warshall's and Floyd's Algorithm – Optimal Binary Search trees – Greedy Techniques – Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm – Huffman trees.

**UNIT V ALGORITHM DESIGN METHODS 9 + 3**

Backtracking – n-Queen's Problem – Hamiltonian Circuit problem – Subset-Sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

**TOTAL: 60 Hrs.**

**TEXT BOOKS:**


1. AnanyLevitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2003.


**REFERENCES:**


1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Pvt. Ltd., 2001
2. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education Asia, 2003.
3. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis Of Computer Algorithms", Pearson Education Asia, 2003.

# 22150H22P - PROGRAMMING IN C

**OBJECTIVES:**

To develop C Programs using basic programming constructs

- To develop C programs using arrays and strings
- To develop applications in C using functions, pointers and structures
- To do input/output and file handling in C

**UNITI BASICS OF C PROGRAMMING 12**

Introduction to programming paradigms-Structure of C program- C programming: Data Types– Storage classes- Constants–Enumeration Constants-Keywords– Operators: Precedence and Associativity- Expressions- Input/output statements, Assignment statements–Decision making statements-Switch Statement-Looping statements – Pre-processor directives- Compilation process.

**UNITII ARRAYS ANDSTRINGS 9+3**

Introduction to Arrays: Declaration, Initialization – One dimensional array – Example Program: Computing Mean, Median and Mode - Two dimensional arrays – Example Program: Matrix Operations (Addition, Scaling, Determinant and Transpose) - String operations: length, compare, concatenate, copy– Selection sort, linear and binary search.

**UNITIII FUNCTIONSANDPOINTERS 9+3**

Introduction to function: Function prototype, function definition, function Call, Built –in function ( string function, math functions)-Recursive – Example program: computation of sine series, Scientific calculation using built-in function ,binary search using recursive function –pointers-pointers operators-pointer arithmetic-Arrays and pointers-Array of pointers-Example program: sorting of names-parameters passing: pass by value, pass by reference-Example program: swapping of two numbers and changing the values of the variables using pass by reference.

**UNITIV STRUCTURES 9+3**

Structure-Nestedstructures–PointerandStructures–Arrayofstructures–ExampleProgramusing structuresandpointers–Self-referential structures–Dynamic memory Allocation-Singly linked list-type def.

**UNITV FILEPROCESSING 9+3**

Files–Types of file processing: Sequentialaccess,Randomaccess–Sequentialaccessfile-Example Program: Findingaverageofnumbersstoredinsequentialaccessfile-Randomaccessfile-Example Program: Transaction processing using random access files – Command line arguments.

**TOTAL:60 PERIODS**

**TOTAL:60 PERIODS**

**OUTCOMES:**

**Learners should be able to :**

- Develop simple applications in C using basic constructs
- Design and implement applications using arrays and strings
- Develop and implement applications in C using functions and pointers.
- Develop applications in C using structures.
- Design applications using sequential land random access file processing.

**TEXTBOOKS:**


1. Reema Thareja, ―Programming in C‖, Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie, D.M, ―The C Programming language‖, Second Edition,

   Pearson Education, 2006


**REFERENCES:**


1. Paul Deitel and Harvey Deitel, ―C How to Program‖, Seventh edition, Pearson Publication
2. Juneja, B. L and Anita Seth, ―Programming in C‖, CENGAGE Learning India pvt. Ltd., 2011
3. PradipDey, ManasGhosh, ―Fundamentals of Computing and Programming in C‖, First
   Edition, Oxford University Press, 2009

4. Anita Goel and Ajay Mittal, ―Computer Fundamentals and Programming in C‖, Dorling
   Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.

5. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with
   C",McGraw-Hill Education, 1996.

# 22148S31P- DISCRETE MATHEMATICS

**AIM:**

This course will develop the intuition for discrete mathematics reasoning involving numbers and sets.

**OBJECTIVES:**

On completing the course, students should be able to

- Write a clear statement of a problem as a theorem in mathematical notation;
- Prove and disprove assertions using a variety of techniques.

- Understand the logic of Propositional and predicate formulas and their relationship to informal reasoning, truth tables, validity.
- Understand the Proving of propositional and predicate formulas in a structured way.
- Know the basic set theory. Relations, graphs, and orders

**UNIT I PROPOSITIONAL CALCULUS 10 + 3hrs**

Propositions – Logical connectives – Compound propositions – Conditional and bi-conditional propositions – Truth tables – Tautologies and contradictions – Contrapositive – Logical equivalences and implications – DE Morgan's Laws - Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments - Validity of arguments.

**UNIT II PREDICATE CALCULUS 9 + 3hrs**

Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – The rules of universal specification and generalization – Validity of arguments.

**UNIT III SET THEORY 10 + 3hrs**

Basic concepts – Notations – Subset – Algebra of sets – The power set – Ordered pairs and Cartesian product – Relations on sets –Types of relations and their properties – Relational matrix and the graph of a relation – Partitions – Equivalence relations – Partial ordering – Poset – Hasse diagram – Lattices and their properties – Sub lattices – Boolean algebra – Homomorphism.

**UNIT IV FUNCTIONS 7 + 3hrs**

Definitions of functions – Classification of functions –Type of functions - Examples – Composition of functions – Inverse functions – Binary and n-ary operations – Characteristic function of a set – Hashing functions – Recursive functions – Permutation functions.

**UNIT V GROUPS 9 + 3hrs**

Algebraic systems – Definitions – Examples – Properties – Semigroups – Monoids – Homomorphism – Sub semigroups and Sub monoids - Cosets and Lagrange's theorem – Codes and group codes – Basic notions of error correction - Error recovery in group codes.

**TOTAL :60hrs**

**TEXT BOOKS:**


1. Trembly J.P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 2003.
2. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Fourth Edition, Pearson Education Asia, Delhi, 2002.


**REFERENCES:**


1. Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, "Discrete Mathematical Structures", Fourth Indian reprint, Pearson Education Pvt Ltd., New Delhi, 2003.

Kenneth H.Rosen, "Discrete Mathematics and its Applications", Fifth Edition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2003.

## 22150H32P-OPERATING SYSTEM

**AIM**

To understand the functions of an operating system.

**OBJECTIVES:**

- To have an overview of different types of operating systems.
- To know the components of an operating system.
- To have a knowledge of process management and storage management.
- To know the concepts of I/O and file systems.
- To know the concepts of Distributed Operating System

**UNIT I** **9**

Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication.

**UNIT II** **9**

Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical- Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors.

**UNIT III** **9**

System Model – Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging.

**UNIT IV** **9**

Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames – Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection.

**UNIT V** **9**

File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. Kernel I/O Subsystems - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management. Case Study: The Linux System, Windows

**TOTAL: 45hrs**

## REFERENCES:


1. Harvey M. Deitel, "Operating Systems", Second Edition, Pearson Education Pvt. Ltd, 2002.
2. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India Pvt. Ltd, 2003.
3. William Stallings, "Operating System", Prentice Hall of India, 4th Edition, 2003.
4. Pramod Chandra P. Bhatt – "An Introduction to Operating Systems, Concepts and Practice", PHI, 2003.

# 22150H33P- ARTIFICIAL INTELLIGENCE

**AIM:**

To create general understanding of major concepts and approaches in knowledge representation, planning, learning, robotics and other AI areas.

**OBJECTIVES:**

- To study various complex problem solving AI tools like Search and optimization
- To facilitate of logic, Probabilistic methods for uncertain reasoning, Classifiers and statistical learning methods, Neural networks, Control theory & Languages.
- To develop programming skills for AI applications.
- To provide exposure to logic programming with practical topics.

## UNIT I INTRODUCTION 8 + 3

Intelligent Agents – Agents and environments - Good behavior – The nature of environments – structure of agents - Problem Solving - problem solving agents – example problems – searching for solutions – uniformed search strategies - avoiding repeated states – searching with partial information.

## UNIT II SEARCHING TECHNIQUES 10 + 3

Informed search and exploration – Informed search strategies – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments - Structure of problems - Adversarial Search.

## UNIT III KNOWLEDGE REPRESENTATION 10 + 3

First order logic – representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic - Inference in First order logic – prepositional versus first order logic – unification and lifting – forward chaining – backward chaining - Resolution - Knowledge representation -Ontological Engineering - Categories and objects – Actions - Simulation and events - Mental events and mental objects.

## UNIT IV LEARNING 9 + 3

Learning from observations - forms of learning - Inductive learning - Learning decision trees - Ensemble learning - Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information – Inductive logic programming - Statistical learning methods - Learning with complete data - Learning with hidden variable .

**UNIT V APPLICATIONS 8 + 3**

Communication – Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation – Ambiguity and disambiguation – Discourse understanding – Grammar induction.

**TOTAL: 60**

**TEXT BOOK:**

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", 2nd Edition, Pearson Education / Prentice Hall of India, 2004.

**RE`FERENCES:**

1. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", 2nd Edition, Tata McGraw-Hill, 2003.

# 22150H34P - COMPUTER NETWORKS

**AIM:**

To introduce the concepts, terminologies and technologies used in modern days data communication and computer networking.

**OBJECTIVES:**

- To understand the concepts of data communications.
- To study the functions of different layers.
- To introduce IEEE standards employed in computer networking.
- To make the students to get familiarized with different protocols and network components.

**UNIT I DATA COMMUNICATIONS 9**

Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies –Protocols and Standards – ISO / OSI model – Transmission Media – Coaxial Cable – Fiber Optics – Line Coding – Modems – RS232 Interfacing sequences**.**

**UNIT II DATA LINK LAYER 9**

Error – detection and correction – Parity – LRC – CRC – Hamming code – low Control and Error control - stop and wait – go Back-N ARQ – selective repeat ARQ- sliding window – HDLC. - LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11 – FDDI - SONET – Bridges.

**UNIT III NETWORK LAYER 9**

Internetworks – Packet Switching and Datagram approach – IP addressing methods – Subnetting – Routing – Distance Vector Routing – Link State Routing – Routers.

**UNIT IV TRANSPORT LAYER 9**

Duties of transport layer – Multiplexing – De multiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services.

**UNIT V APPLICATION LAYER 9**

Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW – Security – Cryptography.

**TOTAL: 45hrs**

**TEXT BOOK:**

1. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 2004.

**REFERENCES:**

James F. Kurose and Keith W. Ross, “Computer Networking: A Top-Down Approach Featuring the Internet”, Pearson Education, 2003.
Larry L.Peterson and Peter S. Davie, “Computer Networks”, Harcourt Asia Pvt. Ltd., Second Edition.
Andrew S. Tanenbaum, “Computer Networks”, PHI, Fourth Edition, 2003.
William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000.

# 22150L35P-OPERATING SYSTEMS AND NETWORKING LAB

**LIST OF EXERCISE:**

**OPERATING SYSTEMS:**

(Implement the following on LINUX platform. Use C for high level language implementation)

1. Shell programming
   - command syntax
   - write simple functions
   - basic tests

2. Shell programming
   - loops
   - patterns
   - expansions
   - substitutions

3. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir

4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)

5. Write C programs to simulate UNIX commands like ls, grep, etc.

6. Implement some memory management schemes

**NETWORKING:**

1. Simulation of ARP / RARP.
2. Write a program that takes a binary file as input and performs bit stuffing and CRC Computation.
3. Simulation of Sliding-Window protocol.
4. Develop a Client – Server application for chat.
5. Develop a Client that contacts a given DNS Server to resolve a given host name.
6. Write a Client to download a file from a HTTP Server.

# 22150H41P- SOFTWARE ENGINEERING FUNDAMENTALS

**AIM:**

To make the students understand the methodologies in preparing a software.

**OBJECTIVES:**

- To know the generic models to structure the software development process.
- To understand different notion of complexity at both the module and system level.
- To be aware of some widely known design methods.
- To understand the role and contents of testing activities in different life cycle phases.

## UNIT I SOFTWARE PROCESS 9

Introduction –S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) - system engineering – computer based system – verification – validation – life cycle process – development process –system engineering hierarchy.

## UNIT II SOFTWARE REQUIREMENTS 9

Functional and non-functional - user – system –requirement engineering process – feasibility studies – requirements – elicitation – validation and management – software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping -S/W document. Analysis and modeling – data, functional and behavioral models – structured analysis and data dictionary.

## UNIT III DESIGN CONCEPTS AND PRINCIPLES 9

Design process and concepts – modular design – design heuristic – design model and document. Architectural design – software architecture – data design – architectural design – transform and transaction mapping – user interface design – user interface design principles. Real time systems - Real time software design – system design – real time executives – data acquisition system - monitoring and control system. SCM – Need for SCM – Version control – Introduction to SCM process – Software configuration items.

## UNIT IV TESTING 9

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in the large. S/W testing strategies – strategic approach and issues - unit testing – integration testing – validation testing – system testing and debugging.

## UNIT V SOFTWARE PROJECT MANAGEMENT 9

Measures and measurements – S/W complexity and science measure – size measure – data and logic structure measure – information flow measure. Software cost estimation – function point models – COCOMO model- Delphi method.- Defining a Task Network – Scheduling – Earned Value Analysis – Error Tracking - Software changes – program evolution dynamics – software maintenance – Architectural evolution. Taxonomy of CASE tools.

**TOTAL: 45hrs**

**TEXT BOOK:**


1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 5th edition, 2001.


**REFERENCES:**


1. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
2. PankajJalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
3. James F Peters and WitoldPedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
4. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.

# 22150H42P-INTERNET PROGRAMMING

**OBJECTIVES:**

- To understand different Internet Technologies.
- To learn java-specific web services architecture to design a context free grammar for any given language

**UNIT I WEBSITE BASICS, HTML 5, CSS 3, WEB 2.0 9**

Web Essential: Clients, Server and Communication- The internet –Basic Internet Protocols-World wide web-HTTP Request Message-HTTP Response Message-Web Clients-Web server-Html5-Tbles-Lists-Image-HTML5 control elements-sematic Elements-Drag and Drop-Audio-video controls-CS33-Inline, embebbed and external style sheets-Rule cascading-Inheritance-Backgrounds-Border-Image-Color-shadows-Text-Transformation-Transition-Animation.

**UNIT II CLOUD SIDE PROGRAMMING 9**

Java Script: An introduction to JavaScript–JavaScript DOM Model-Date and Objects, -Regular Expressions- Exception Handling-Validation-Built-in Objects-Event Handling-DHTML with JavaScript- JSON introduction – Syntax – Function Files – Http Request – SQL.

**UNIT III SERVER SIDE PROGRAMMING 9**

Servlets: Java Servlet Architecture- Servlet Life Cycle- Form GET and POST actions- Session Handling- Understanding Cookies- Installing and Configuring Apache Tomcat Web Server-DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example - JSP: Understanding Java Server Pages-JSP Standard Tag Library (JSTL)-Creating HTML forms by embedding JSP code.

**UNIT IV PHP AND XML 9**

An introduction to PHP: PHP-using PHP- variables-program control- Built-in Function-Form

Validation-Regular Expression-File Handling-Cookies-Connecting to Databases.XML: Basics

XML-Document type definition-XML schema DOM and Presenting XML Parsers and validation, XSL and XSLT Transformation, New feed (RSS and ATOM).

**UNIT V INTRODUCTION TO AJAX and WEB SERVICES** **9**

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods; Web Services: Introduction- Java web services Basics – Creating, Publishing, Testing and Describing a Web services (WSDL)-Consuming a web service, Database Driven web service from an application –SOAP.

**TOTAL : 45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Construct a basic website using HTML and Cascading Style Sheets.
- Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
- Develop server side programs using Servlets and JSP.
- Construct simple web pages in PHP and to represent data in XML format.
- Use AJAX and web services to develop interactive web applications
  Derive whether a problem is decidable or not.

**TEXTBOOKS:**

1.J. Deitel and Deitel and Nieto, -----Internet world wide Web-How to program||, prentice Hall, 5th, Edition,2011.

**REFERENCE:**

1.Stephen Wynkoop and John Burke ―Running a Perfect Website‖, QUE, 2nd Edition,1999.

2.Chris Bates, Web Programming – Building Intranet Applications, 3rd Edition, Wiley Publications, 2009.

3 . Jeffrey C and Jackson, ―Web Technologies a Computer Science Perspective‖ Pearson Education, 2011.

4.Gopalan N.P. and AkilandeswariJ. Web Technology‖, Prentice Hall of India, 2011.

5.UttamK.Roy, ―Web Technologies‖, Oxford University Press, 2011.

# 22150H43P-C # AND. NET FRAMEWORK

**AIM:**

The goal of this course is to provide students with the knowledge and skills they need to develop C# applications for the Microsoft .NET Platform.

**OBJECTIVES:**

- An ability to understand C# program structure, language syntax, and implementation details.
- An ability to develop application using C# on .NET frame work.

**UNIT I INTRODUCTION TO C 8+3**

Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations.

**UNIT II OBJECT ORIENTED ASPECT OF C# 9+3**

Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.

**UNIT III APPLICATION DEVELOPMENT ON .NET 8+3**

Building Windows Applications, Accessing Data with ADO.NET.

**UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET 8+3**

Programming Web Applications with Web Forms, Programming Web Services.

**UNIT V THE CLR AND THE .NET FRAMEWORK 12+3**

Assemblies, Versioning, Attributes, Reflection, Viewing Metadata, Type Discovery, reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, specifying a Server with an Interface, building a Server, Building the Client, Using Single Call, Threads.

**TOTAL: 60 hrs**

## TEXT BOOKS:

1.E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 2004. (Unit I, II)
2.J. Liberty, "Programming C#", 2nd ed., O'Reilly, 2002. (Unit III, IV, V)

## REFERENCES:

1. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 2004.
2. Robinson et al, "Professional C#", 2nd ed., Wrox Press, 2002.
3. Andrew Troelsen, "C# and the .NET Platform", A! Press, 2003.
4. S. ThamaraiSelvi, R. Murugesan, "A Textbook on C#", Pearson Education, 2003.

# 22150L45P- INTERNET PROGRAMMING LAB

1. Write programs in Java to demonstrate the use of following components Text fields, buttons, Scrollbar, Choice, List and Check box
2. Write Java programs to demonstrate the use of various Layouts like Flow Layout, Border Layout, Grid layout, Grid bag layout and card layout
3. Write programs in Java to create applets incorporating the following features:
4. Create a color palette with matrix of buttons
    i) Set background and foreground of the control text area by selecting a color from color palette.
    ii) In order to select Foreground or background use check box control as radio buttons
    iii) To set background images
5. Write programs in Java to do the following.
    i) Set the URL of another server.
    ii) Download the homepage of the server.
    iii) Display the contents of home page with date, content type, and Expiration date. Last modified and length of the home page.
6. Write programs in Java using sockets to implement the following:
    i) HTTP request
    ii) FTP
    iii) SMTP
    iv) POP3
7. Write a program in Java for creating simple chat application with datagram sockets and datagram packets.
8. Create a web page with the following using HTML
    i) To embed a map in a web page
    ii) To fix the hot spots in that map
    iii) Show all the related information when the hot spots are clicked.
9. Create a web page with the following.
    i) Cascading style sheets.
    ii) Embedded style sheets.
    iii) Inline style sheets.
    iv) Use our college information for the web pages.

# 22150H51P- OBJECT ORIENTED ANALYSIS AND DESIGN

**AIM:**

Study and learn the analysis techniques and methodologies.

**OBJECTIVES:**

- To study the concepts of modeling in object oriented context.
- To learn about the Object Constraint Language.
- To study the Use cases, Interaction Diagrams, Class Diagrams and System Sequence Diagrams.
- To study implementation related issues.
- To study and learn how to apply advanced techniques including Architectural Analysis and Design Patterns.

**UNIT I INTRODUCTION 8**

An Overview of Object Oriented Systems Development - Object Basics – Object Oriented Systems Development Life Cycle.

**UNIT II OBJECT ORIENTED METHODOLOGIES 12**

Rumbaugh Methodology - Booch Methodology - Jacobson Methodology - Patterns – Frameworks – Unified Approach – Unified Modeling Language – Use case - class diagram - Interactive Diagram - Package Diagram - Collaboration Diagram - State Diagram - Activity Diagram.

**UNIT III OBJECT ORIENTED ANALYSIS 9**

Identifying use cases - Object Analysis - Classification – Identifying Object relationships - Attributes and Methods.

**UNIT IV OBJECT ORIENTED DESIGN 8**

Design axioms - Designing Classes – Access Layer - Object Storage - Object Interoperability.

**UNIT V SOFTWARE QUALITY AND USABILITY 8**

Designing Interface Objects – Software Quality Assurance – System Usability - Measuring User Satisfaction.

**TOTAL: 45hrs**

## TEXT BOOKS:


1. Ali Bahrami, "Object Oriented Systems Development", Tata McGraw-Hill, 1999 (Unit I, III, IV, V).
2. Martin Fowler, "UML Distilled", Second Edition, PHI/Pearson Education, 2002. (UNIT II)


## REFERENCES:


1. Stephen R. Schach, "Introduction to Object Oriented Analysis and Design", Tata McGraw-Hill, 2003.
2. James Rumbaugh, Ivar Jacobson, Grady Booch "The Unified Modeling Language Reference Manual", Addison Wesley, 1999.
3. Hans-Erik Eriksson, Magnus Penker, Brain Lyons, David Fado, "UML Toolkit", OMG Press Wiley Publishing Inc., 2004.

# 22150H52P- SOFTWARE QUALITY MANAGEMENT

## AIM:

To introduce an integrated approach to software development incorporating quality management methodologies.

## OBJECTIVES:

- Software quality models.
- Quality measurement and metrics.
- Quality plan, implementation and documentation.
- Quality tools including CASE tools.
- Quality control and reliability of quality process.
- Quality management system models.
- Complexity metrics and Customer Satisfaction.
- International quality standards – ISO, CMM.

### UNIT I INTRODUCTION TO SOFTWARE QUALITY 9+3

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+3

Quality tasks – SQA plan – Teams – Characteristics – Implementation – Documentation – Reviews and Audits

### UNIT III QUALITY CONTROL AND RELIABILITY 9+3

Tools for Quality – Ishikawa's basic tools – CASE tools – Defect prevention and removal – Reliability models – Rayleigh model – Reliability growth models for quality assessment

### UNIT IV QUALITY MANAGEMENT SYSTEM 9+3

Elements of QMS – Rayleigh model framework – Reliability Growth models for QMS – Complexity metrics and models – Customer satisfaction analysis.

### UNIT V QUALITY STANDARDS 9+3

Need for standards – ISO 9000 Series – ISO 9000-3 for software development – CMM and CMMI – Six Sigma concepts.

**TOTAL :60 hrs**

**TEXT BOOKS:**


1. Allan C. Gillies, "Software Quality: Theory and Management", Thomson Learning, 2003. (UI : Ch 1-4 ; UV : Ch 7-8)
2. Stephen H. Kan, "Metrics and Models in Software Quality Engineering", Pearson Education (Singapore) Pte Ltd., 2002. (UI : Ch 3-4; UIII : Ch 5-8 ; UIV : Ch 9-11)


**REFERENCES:**


1. Norman E. Fenton and Shari Lawrence Pfleeger, "Software Metrics" Thomson, 2003
2. Mordechai Ben – Menachem and Garry S.Marliss, "Software Quality", Thomson Asia Pte Ltd, 2003.
3. Mary Beth Chrissis, Mike Konrad and Sandy Shrum, "CMMI", Pearson Education (Singapore) Pte Ltd, 2003.
4. ISO 9000-3 "Notes for the application of the ISO 9001 Standard to software development".

# 22150H53P- GRAPHICS AND MULTIMEDIA

**AIM:**

Provide an opportunity for students to represent, design and implement two dimensional and three dimensional objects and introducing different media used in multimedia systems.

.

**OBJECTIVES:**

- Explain two and three dimensional concepts and their applications.
- Identify all techniques related to modern graphics programming concepts.
- Identify the media used in multimedia systems and to assess their relative advantages and disadvantages relative to both user and system points of view.
- Explain the interaction problems introduced by multimedia (e.g., compression and synchronization).

**UNIT I OUTPUT PRIMITIVES 9+3**

Introduction -Line -Curve and Ellipse Drawing Algorithms – Attributes – Two-Dimensional Geometric Transformations – Two-Dimensional Clipping and Viewing.

**UNIT II THREE-DIMENSIONAL CONCEPTS 9+3**

Three-Dimensional Object Representations – Three-Dimensional Geometric and Modeling Transformations – Three-Dimensional Viewing – Color models – Animation.

**UNIT III MULTIMEDIA SYSTEMS DESIGN 9+3**

An Introduction – Multimedia applications – Multimedia System Architecture – Evolving technologies for Multimedia – Defining objects for Multimedia systems – Multimedia Data interface standards – Multimedia Databases.

**UNIT IV MULTIMEDIA FILE HANDLING 9+3**

Compression & Decompression – Data & File Format standards – Multimedia I/O technologies - Digital voice and audio – Video image and animation – Full motion video – Storage and retrieval Technologies.

**UNIT V HYPERMEDIA 9+3**

Multimedia Authoring & User Interface – Hypermedia messaging - Mobile Messaging – Hypermedia message component – Creating Hypermedia message – Integrated multimedia message standards – Integrated Document management – Distributed Multimedia Systems.

**TOTAL : 60hrs**

**TEXT BOOKS:**


1. Donald Hearn and M.Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003. (UNIT I : Chapters 1 to 6; UNIT 2: Chapter 9 – 12, 15, 16)
2. Prabat K Andleighand KiranThakrar, "Multimedia Systems and Design", PHI, 2003. (UNIT 3 to 5)


**REFERENCES:**


1. Judith Jeffcoate, "Multimedia in practice technology and Applications", PHI, 1998.
2. Foley, Vandam, Feiner, Huges, "Computer Graphics: Principles & Practice", Pearson Education, second edition 2003.

# 22150L55P- SOFTWARE DEVELOPMENT LAB

**IMPLEMENTATION OF PROJECT USING SOFTWARE ENGINEERING TECHNIQUES:**

1. PROJECT PLANNING
2. SOFTWARE REQUIREMENT ANALYSIS
3. DATA MODELLING & IMPLEMENTATION
4. SOFTWARE TESTING
5. SOFTWARE DEBUGGING

**LIST OF EXPERIMENTS**

Develop the following software using software Engineering methodology:

1. Online Railway reservation system
2. Simulator software for parallel processing operation
3. Payroll processing application
4. Inventory system
5. Simulator software for compiler operation
6. Automating the Banking process
7. Software for game
8. Library management system
9. Text editor
10. Create a dictionary
11. Telephone directory
12. Create an E- Book of your choice.

# 22150S61P- CRYPTOGRAPHY AND NETWORK SECURITY

**OBJECTIVES:**

- To understand Cryptography Theories, Algorithms and Systems.
- To understand necessary Approaches and Techniques to build protection mechanisms in order to secure computer networks.

## UNIT I INTRODUCTION 9

Security trends - Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies - Model of network security – Security attacks, services and mechanisms – OSI security architecture – Classical encryption techniques: substitution techniques, transposition techniques, steganography- Foundations of modern cryptography: perfect security – information theory – product cryptosystem – cryptanalysis.

## UNIT II SYMMETRIC KEY CRYPTOGRAPHY 9

MATHEMATICS OF SYMMETRIC KEY CRYPTOGRAPHY: Algebraic structures - Modular arithmetic-Euclid‟s algorithm- Congruence and matrices - Groups, Rings, Fields- Finite fields- SYMMETRIC KEY CIPHERS: SDES – Block cipher Principles of DES – Strength of DES – Differential and linear cryptanalysis - Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – Advanced Encryption Standard - RC4 – Key distribution.

## UNIT III PUBLIC KEY CRYPTOGRAPHY 9

MATHEMATICS OF ASYMMETRIC KEY CRYPTOGRAPHY: Primes – Primality Testing – Factorization – Euler‟s totient function, Fermat ‟s and Euler‟s Theorem - Chinese Remainder Theorem – Exponentiation and logarithm - ASYMMETRIC KEY CIPHERS: RSA cryptosystem – Key distribution – Key management – Diffie Hellman key exchange - ElGamal cryptosystem – Elliptic curve arithmetic-Elliptic curve cryptography.

## UNIT IV MESSAGE AUTHENTICATION AND INTEGRITY 9

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA –Digital signature and authentication protocols – DSS- Entity Authentication: Biometrics, Passwords, Challenge Response protocols- Authentication applications - Kerberos, X.509

## UNIT V SECURITY PRACTICE AND SYSTEM SECURITY 9

Electronic Mail security – PGP, S/MIME – IP security – Web Security - SYSTEM SECURITY: Intruders – Malicious software – viruses – Firewalls.

**TOTAL : 45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
- Apply the different cryptographic operations of symmetric cryptographic algorithms
- Apply the different cryptographic operations of public key cryptography
- Apply the various Authentication schemes to simulate different applications.
- Understand various Security practices and System security standards

**TEXTBOOKS:**

1. William Stallings, Cryptography and Network Security: Principles and Practice, PHI 3rd Edition, 2006.

**REFERENCES:**

1. C K Shyamala, N Harini and Dr. T R Padmanabhan: Cryptography and Network Security, Wiley India Pvt.Ltd
2. BehrouzA.Foruzan, Cryptography and Network Security, Tata McGraw Hill 2007.
3. Charlie Kaufman, Radia Perlman, and Mike Speciner, Network Security: PRIVATE Communication in a PUBLIC World, Prentice Hall, ISBN 0-13-046019-2

# 22150H62P- ADVANCED JAVA PROGRAMMING

**AIM:**

To explore, advanced Java language features and packages.

**OBJECTIVES:**

- Use Java to implement OOAD.
- to have in depth knowledge about Object serialization, reflection,RMI,Swing,JAR files .
- an ability to Write Servlets and Java Server Pages.
- Gain an in-depth understanding of database programming in Java using JDBC.
- Learn Java's security model and how to do security programming in Java.

## UNIT I JAVA FUNDAMENTALS 9+3

Java I/O streaming – filter and pipe streams – Byte Code interpretation - reflection – Dynamic Reflexive Classes – Threading – Java Native Interfaces- Swing.

## UNIT II NETWORK PROGRAMMING IN JAVA 9+3

Sockets – secure sockets – custom sockets – UDP datagrams – multicast sockets – URL classes – Reading Data from the server – writing data – configuring the connection – Reading the header – telnet application – Java Messaging services

## UNIT III APPLICATIONS IN DISTRIBUTED ENVIRONMENT 9+3

Remote method Invocation – activation models – RMI custom sockets – Object Serialization – RMI – IIOP implementation – CORBA – IDL technology – Naming Services – CORBA programming Models - JAR file creation

## UNIT IV MULTI-TIER APPLICATION DEVELOPMENT 9+3

Server side programming – servlets – Java Server Pages - Applet to Applet communication – applet to Servlet communication - JDBC – Using BLOB and CLOB objects – storing Multimedia data into databases – Multimedia streaming applications – Java Media Framework.

## UNIT V ENTERPRISE APPLICATIONS 9+3

Server Side Component Architecture – Introduction to J2EE – Session Beans – Entity Beans – Persistent Entity Beans – Transactions.

**TOTAL: 60 hrs**

**TEXT BOOKS:**


1. Elliotte Rusty Harold, " Java Network Programming", O'Reilly publishers, 2000 (UNIT II)
2. Ed Roman, "Mastering Enterprise Java Beans", John Wiley & Sons Inc., 1999. (UNIT III and UNIT V)
3. Hortsmann& Cornell, "CORE JAVA 2 ADVANCED FEATURES, VOL II", Pearson Education, 2002. (UNIT I and UNIT IV)


**REFERENCES:**


1. Web reference: http://java.sun.com.

Patrick Naughton, "COMPLETE REFERENCE: JAVA2", Tata McGraw-Hill, 2003

# 22150H63P- SOFTWARE TESTING

**AIM:**

It explains how to review, test and manage test requirements and how to incorporate testing into the software development life cycle.

**OBJECTIVES:**

- To determine software testing objectives and criteria.
- To develop and validate a test plan.
- To select and prepare test cases.
- To identify the need for testing.
- To prepare testing policies and standards.
- To use testing aids and tools.
- To test before buying a software package and Test after maintenance and enhancement changes.
- To measure the success of testing efforts.

**UNIT I INTRODUCTION** **9**

Testing an Engineering Activity-Role of process in software Quality-Testing as a process-Basic Definition-Software testing principle-The Tester's Role in a software testing organization-origin of defects-Defect Classes-The Defect Repository and test Design-Defect Example-Developers/Tester Support for Developing a Defect Repository.

**UNIT II TEST CASE DESIGN** **9**

Introduction to testing design strategies-The smarter Tester-Test case design statedies-Using Black Box Approach to test case design random testing-Requirements based testing-Positive and negative testing-Boundary Values Analysis-Decision Tables-Equivalence Class Partitioning state-cause effect graphing-Error guessing-compatibility testing-user documentation testing-domain testing Using white-Box Approach to Test design-Test Adequacy Criteria-static testing vs structural testing-code functional testing-Coverage and control flow graphs-covering code Logic-paths-Their Role in white-box Based Test Design-code complexity testing-Evaluating Test Adequacy criteria.

**UNIT III LEVELS OF TESTING**

The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests. The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – scenario testing –defect bash elimination -System Testing – types of system testing - Acceptance testing –performance testing - Regression Testing – internationalization testing – ad-hoc testing -Alpha – Beta Tests – testing OO systems – usability and accessibility testing.

**UNIT IV TEST MANAGEMENT** **9**

People and organizational issues in testing – organization structures for testing teams –testing services - Test Planning – Test Plan Components – Test Plan Attachments –role of three groups in Test Planning and Policy Development – Introducing the testspecialist – Skills needed by a test specialist – Building a Testing Group.

**UNIT V CONTROLLING AND MONITORING** **9**

Software test automation – skills needed for automation – scope of automation – designand architecture for automation – requirements for a test tool – challenges in automation- Test metrics and measurements –project, progress and productivity metrics – Status Meetings – Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – evaluating software quality – defect prevention – testing maturity model

**TOTAL: 45hrs**

**TEXT BOOKS:**

1. SrinivasanDesikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson education, 2006.
2. AdityaP.Mathur, "Foundations of Software Testing", Pearson Education,2008.

**REFERENCES:**

1. Boris Beizer, "Software Testing Techniques", Second Edition,Dreamtech, 2003
2. Elfriede Dustin, "Effective Software Testing", First Edition, Pearson Education, 2003.
3. RenuRajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.

# 22150L65P- JAVA PROGRAMMING LAB

## LIST OF PRACTICALS

**AIM:**

To learn and Practice the basics of JAVA language

**OBJECTIVES:**

1. To learn & practice the Object Oriented concepts like Inheritance, Overloading etc.
2. To learn & practice Interfaces and Packages
3. To learn &practice Java applet programming

**JAVA BASICS**

1. Programs illustrating various data types in Java
2. Programs illustrating class, objects and methods
3. Programs for addition and multiplication of Matrices
4. Programs illustrating Overloading in Java
5. Programs illustrating the implementation of Various forms of Inheritance( Single, Hierarchical, Multilevel )
6. Programs illustrating Overriding methods in Java
7. Programs illustrating Exception Handling
8. Programs to manipulate strings

**JAVA INTERFACES, PACKAGES and THREADS**

9. Programs illustrating Interfaces in Java
10. Programs to create Packages in Java
11. Programs illustrating Threads in Java

**JAVA APPLETS**

12. Programs to write applets to draw the various shapes
13. Programs to manipulate labels, lists, text fields and panels

# 22150S71P-TOTAL QUALITY MANAGEMENT

**AIM:**

Learning various TQM techniques to tackle and analyze problems in improving quality with particular reference to their own working environment.

**OBJECTIVE**:

- Develop the ability to adopt new techniques and synthesize new knowledge.
- Analyze basic operational and research data using TQM techniques in a systematic way.
- Cooperate efficiently and effectively in a team to apply TQM techniques and tools for accomplishing pre-determined goals.
- Identify opportunities for improvement in the business, service, administrative and manufacturing environments of applying the methodology such as Six Sigma, Kaizen, and other appropriate tools to achieve breakthrough improvements in these processes.

**UNIT I FUNDAMENTALS 9**

Definition of quality − Dimensions of quality − Quality planning − Quality costs −Analysis techniques for quality costs − Basic concepts of total quality management −Historical review − Principles of TQM − Leadership − Concepts − Role of senior management − Quality council − Quality statements − Strategic planning − Deming philosophy − Barriers to TQM implementation.

**UNIT II TQM PRINCIPLES 9**

Customer Satisfaction − Customer Perception of Quality − Customer Complaints −Service Quality − Customer Retention − Employee Involvement – Motivation −Empowerment − Teams − Recognition and Reward − Performance Appraisal −Benefits − Continuous Process Improvement − Juran Trilogy − PDSA Cycle − 5S −Kaizen − Supplier Partnership – Partnering − Sourcing − Supplier Selection −Supplier Rating − Relationship Development − Performance Measures – Basic Concepts − Strategy − Performance Measure.

**UNIT III STATISTICAL PROCESS CONTROL (SPC) 9**

The Seven Tools of Quality − Statistical Fundamentals − Measures of Central Tendency and dispersion − Population and Sample − Normal Curve − Control Charts for Variables and Attributes − Process Capability − Concept of Six Sigma − New Seven Management Tools**.**

**UNIT IV TQM TOOLS 9**

Benchmarking − Reasons to Benchmark − Benchmarking Process − Quality Function Deployment (QFD) − House of Quality − QFD Process − Benefits − Taguchi Quality Loss Function − Total Productive Maintenance (TPM) − Concept − Improvement Needs − FMEA − Stages of FMEA.

**UNIT V QUALITY SYSTEMS 9**

Need for ISO 9000 and Other Quality Systems − ISO 9000:2000 Quality System – Elements − Implementation of Quality System−Documentation−Quality Auditing−TS 16949−ISO 14000 – Concept−Requirements and Benefits.

**Total: 45hrs**

**TEXT BOOK:**

1. Bester filed et al D.H., "Total Quality Management", Pearson Education, Inc.2003.

**REFERENCES:**

1. Evans, J. R. and Lidsay, W. M., "The Management and Control of Quality", 5th Edition, South-Western (Thomson Learning), 2002
2. Feigenbaum, A.V., "Total Quality Management", McGraw-Hill, 1991.
3. Oakland, J.S., "Total Quality Management", 3rd Edition, Elsevier, 2005.
4. Narayana, V. and Sreenivasan, N. S., "Quality Management - Concepts and Tasks", New Age International, 1996.
**5.** Zeiri, "Total Quality Management for Engineers", Wood Head Publishers,1991**.**

# 22150H72P-GRID AND CLOUD COMPUTING

**OBJECTIVES:**

**The student should be made to:**

- Understand how Grid computing helps in solving large scale scientific problems.
- Gain knowledge on the concept of virtualization that is fundamental to cloud computing.
- Learn how to program the grid and the cloud.
- Understand the security issues in the grid and the cloud environment.

**UNIT I INTRODUCTION 9**

Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computers - Grid Computing Infrastructures – cloud computing - service oriented architecture – Introduction to Grid Architecture and standards – Elements of Grid – Overview of Grid Architecture.

**UNIT II GRID SERVICES** 9

Introduction to Open Grid Services Architecture (OGSA) – Motivation – Functionality Requirements – Practical & Detailed view of OGSA/OGSI – Data intensive grid service models – OGSA services.

**UNIT III VIRTUALIZATION 9**

Clouddeployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software - Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

**UNIT IV PROGRAMMING MODEL 9**

Open source grid middleware packages – Globus Toolkit (GT4) Architecture, Configuration – Usage of Globus – Main components and Programming model - Introduction to Hadoop Framework – Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.

**UNIT V SECURITY 9**

Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Apply techniques to solve large scale scientific problems.
- Apply the concept of virtualization.
- Use the grid and cloud tool kits.
- Apply the security models in the grid and the cloud environment.

**TEXT BOOK:**

1. Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, "Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012.

**REFERENCES:**

1. Jason Venner, "Pro Hadoop- Build Scalable, Distributed Applications in the Cloud", A Press, 2009

2. Tom White, "HadoopThe Definitive Guide", First Edition.
O"Reilly, 2009.
3. Bart Jacob (Editor), "Introduction to Grid Computing", IBM Red Books, Vervante, 2005
4. Ian Foster, Carl Kesselman, "The Grid: Blueprint for a New Computing Infrastructure", 2nd Edition,Morgan Kaufmann.
5. Frederic Magoules and Jie Pan,
"Introduction to Grid Computing" CRC Press, 2009.
6. Daniel Minoli, "A Networking Approach to Grid Computing", John Wiley Publication, 2005.
7. Barry Wilkinson, "Grid Computing: Techniques and Applications", Chapman and Hall, CRC, Taylor and Francis Group, 2010.

# 2150H73P -MIDDLEWARE TECHNOLOGIES

**AIM:**
Students are able to gain in-depth knowledge popular middleware platforms.

**OBJECTIVES:**

Students can able to

- Understand that middleware is an intermediary software layer between the application and the operating system, which encapsulates the heterogeneity of the underlying communication network, operating system or hardware platform.
- Acquire the knowledge of integrating these systems by using middleware technologies.

**UNITI CLIENT/SERVERCONCEPTS 9+3**

Client server – File server – Database server – Group server – Object server – Web server – Middleware – General middleware – Service specific middleware – Client / Server building blocks – RPC – Messaging – Peer-to-Peer.

**UNITII EJBARCHITECTURE 9+3**

EJB – EJB Architecture – Overview of EJB software architecture – View of EJB – Conversation – Building and deploying EJB – Roles in EJB.

**UNITIII EJBAPPLICATIONS 9+3**

EJB session beans – EJB entity beans – EJB clients – EJB deployment – Building an application withEJB.

**UNITIV CORBA 9+3**

CORBA – Distributed systems – Purpose – Exploring CORBA alternatives – Architecture overview – CORBA and networking model – CORBA object model – IDL – ORB – Building an application with CORBA.

**UNITV COM 9+3**

COM – Data types – Interfaces – Proxy and stub – Marshalling – Implementing server / client – Interface pointers – object creation – Invocation – Destruction – Comparison COM and CORBA – Introduction to .NET – Overview of .NET architecture – Marshalling – Remoting.

**TOTAL:60 hrs**

**TEXTBOOKS:**

1. Robert Orfali, Dan Harkey and Jeri Edwards, "The Essential Client / Server Survival Guide",Galgotia Publications Pvt. Ltd., 2002.2. Tom Valesky, "Enterprise Java Beans", Pearson Education, 2002.

**REFERENCES:**

1. Mowbray, "Inside CORBA", Pearson Education, 2002.

2. Jeremy Rosenberger, "Teach Yourself CORBA in 14 days", TEC Media, 2000.
3. Jason Pritchard, "COM and CORBA Side by Side", Addison Wesley, 2000.
4. Jesse Liberty, "Programming C#", 2nd Edition, O'Reilly Press, 2002.

# SEMESTER - IV (ELECTIVE I)

## 22150E44AP- THEORY OF COMPUTATION

**AIM:**

To introduces basic computation models and the necessary mathematical techniques to express computer science problems as mathematical statements and to formulate proofs

**OBJECTIVES:**

- To focus on the study of abstract models of computation.
- To assess via formal reasoning what could be achieved through computing when they are using it to solve problems in science and engineering.
- To introduce fundamental questions about problems, such as whether they can or not be computed, and if they can, how efficiently.

**UNIT I AUTOMATA 9+3**

Introduction to formal proof – Additional forms of proof – Inductive proofs –Finite Automata (FA) – Deterministic Finite Automata (DFA)– Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

**UNIT II REGULAR EXPRESSIONS AND LANGUAGES 9+3**

Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata.

**UNIT III CONTEXT-FREE GRAMMAR AND LANGUAGES 9+3**

Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata.

**UNIT IV PROPERTIES OF CONTEXT-FREE LANGUAGES 9+3**

Normal forms for CFG – Pumping Lemma for CFL - Closure Properties of CFL – Turing Machines – Programming Techniques for TM.

**UNIT V UNDECIDABILITY 9+3**

A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem - The Classes P and NP.

**TOTAL: 60hrs**

**TEXT BOOK:**

1. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2003.

**REFERENCES:**

1. H.R.Lewis and C.H.Papadimitriou, "Elements of The theory of Computation", Second Edition, Pearson Education/PHI, 2003
2. J.Martin, "Introduction to Languages and the Theory of Computation", Third Edition, TMH, 2003.
3. MichealSipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.

# 22150E44BP- DATA WAREHOUSING AND DATA MINING

**OBJECTIVES:**

- To understand data warehouse concepts, architecture, business analysis and tools
- To understand data pre-processing and data visualization techniques
- To study algorithms for finding hidden and interesting patterns in data
- To understand and apply various classification and clustering techniques using tools.

**UNIT I DATA WAREHOUSING, BUSINESS ANALYSIS AND ON-LINE ANALYTICAL PROCESSING(OLAP) 9**

Basic Concepts - Data Warehousing Components – Building a Data Warehouse – Database Architectures for Parallel Processing – Parallel DBMS Vendors - Multidimensional Data Model – Data Warehouse Schemas for Decision Support, Concept Hierarchies - Characteristics of OLAP Systems – Typical OLAP Operations, OLAP and OLTP.

**UNIT II DATA MINING – INTRODUCTION 9**

Introduction to Data Mining Systems – Knowledge Discovery Process – Data Mining Techniques– Issues – applications- Data Objects and attribute types, Statistical description of data, Data Preprocessing – Cleaning, Integration, Reduction, Transformation and discretization, Data Visualization, Data similarity and dissimilarity measures.

**UNIT III DATA MINING - FREQUENT PATTERN ANALYSIS 9**

Mining Frequent Patterns, Associations and Correlations – Mining Methods- Pattern Evaluation Method – Pattern Mining in Multilevel, Multi-Dimensional Space – Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns

**UNIT IV CLASSIFICATION AND CLUSTERING 9**

Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines — Lazy Learners – Model Evaluation and Selection-Techniques to improve Classification Accuracy.

Clustering Techniques – Cluster analysis-Partitioning Methods - Hierarchical Methods – Density Based Methods - Grid Based Methods – Evaluation of clustering – Clustering high dimensional data- Clustering with constraints, Outlier analysis-outlier detection methods.

**UNIT V WEKA TOOL 9**

Datasets – Introduction, Iris plants database, Breast cancer database, Auto imports database - Introduction to WEKA, The Explorer – Getting started, Exploring the explorer, Learning algorithms, Clustering algorithms, Association–rule learners.

**TOTAL : 45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Design a Data warehouse system and perform business analysis with OLAP tools.
- Apply suitable pre-processing and visualization techniques for data analysis
- Apply frequent pattern and association rule mining techniques for data analysis
- Apply appropriate classification and clustering techniques for data analysis

**TEXTBOOKS:**

1.Jiawei Han and Micheline Kamber, ―Data Mining Concepts and Techniques‖, Third Edition, Elsevier, 2012.

**REFERANCES:**

1. Alex Berson and Stephen J.Smith, ―Data Warehousing, Data Mining & OLAP‖, TataMcGraw – Hill Edition, 35th Reprint 2016.

2. K.P. Soman, ShyamDiwakar and V. Ajay, ―Insight into Data Mining Theory and

3. Practice‖,Eastern Economy Edition, Prentice Hall of India, 2006.

Ian H.Witten and Eibe Frank, ―Data Mining: Practical Machine Learning Tools andTechniques‖, Elsevier, Second Edition

# 22150E44CP-PROFESSIONAL ETHICS IN ENGINEERING

**OBJECTIVES:**

To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

**UNIT I HUMAN VALUES** **10**

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self-confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

**UNIT II ENGINEERING ETHICS** **9**

Senses of _Engineering Ethics'– Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

**UNIT III ENGINEERING AS SOCIAL EXPERIMENT** **9**

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics –A Balanced Outlook on Law.

**UNIT IV SAFETY, RESPOSIBILITYIES, RIGHTS** **9**

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk- Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR)– Discrimination.

**UNIT V GLOBAL ISSUES** **8**

Multinational Corporation-Environmental ethics-computer Ethics-Weapons Development-Engineers as Manager-Consulting Engineers-Engineers as Expert Witnesses and Advisory-Moral Leadership-Code of Conduct-Corporate Social Responsibility.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

To apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

**TEXTBOOKS:**


1. Mike W. Martin and Roland Schinzinger, ―Ethics in Engineering‖, Tata McGraw Hill, New Delhi,2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, ―Engineering Ethics‖, Prentice Hall of India, New Delhi, 2004.


**REFERANCES:**


1. Charles B. Fleddermann, ―Engineering Ethics‖, Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, ―Engineering Ethics –Concepts and Cases‖, Cengage Learning, 2009.
3. John R Boatright, ―Ethics and the Conduct of Business‖, Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, ―Fundamentals of Ethics for Scientists andEngineers‖, Oxford University Press, Oxford, 2001.
5. Laura P. Hartman and Joe Desjardins, ―Business Ethics: Decision Making for PersonalIntegrity and Social Responsibility‖ McGraw Hill education, India Pvt. Ltd.,New Delhi, 2013.
6. 6. World Community Service Centre, _ Value Education‘, Vethathiri publications, Erode, 2011.

# 22150E44DP- ADVANCED DATABASES

**AIM:**

To have strong knowledge on Database Management Systems, Database technologies
, an application-oriented, system-oriented approach towards data base design.

**OBJECTIVES:**

- Be able to design high-quality relational databases and database applications.
- Have developed skills in advanced visual & conceptual modeling and database design.
- Be able to translate complex conceptual data models into logical and physical database designs.
- Have developed an appreciation of emerging database trends as they apply to semi- structured data, the internet, and object-oriented databases.

**UNIT I DISTRIBUTED DATABASES 9+3**

Distributed DBMS Concepts and Design – Introduction – Functions and Architecture of DDBMS – Distributed Relational Database Design – Transparency in DDBMS – Distributed Transaction Management – Concurrency control – Deadlock Management – Database recovery – The X/Open Distributed Transaction Processing Model – Replication servers – Distributed Query Optimisation - Distribution and Replication in Oracle.

**UNIT II OBJECT ORIENTED DATABASES 9+3**

Object Oriented Databases – Introduction – Weakness of RDBMS – Object Oriented Concepts Storing Objects in Relational Databases – Next Generation Database Systems – Object Oriented Data models – OODBMS Perspectives – Persistence – Issues in OODBMS – Object Oriented Database Management System Manifesto – Advantages and Disadvantages of OODBMS – Object Oriented Database Design – OODBMS Standards and Systems – Object Management Group – Object Database Standard ODMG – Object Relational DBMS – Postgres - Comparison of ORDBMS and OODBMS.

**UNIT III WEB DATABASES** **9+3**

Web Technology and DBMS – Introduction – The Web – The Web as a Database Application Platform – Scripting languages – Common Gateway Interface – HTTP Cookies – Extending the Web Server – Java – Microsoft's Web Solution Platform – Oracle Internet Platform – Semi structured Data and XML – XML Related Technologies – XML Query Languages.

**UNIT IV INTELLIGENT DATABASES** **9+3**

Enhanced Data Models for Advanced Applications – Active Database Concepts and Triggers – Temporal Database Concepts – Deductive databases – Knowledge Databases.

**UNIT V CURRENT TRENDS** **9+3**

Mobile Database – Geographic Information Systems – Genome Data Management – Multimedia Database – Parallel Database – Spatial Databases - Database administration – Data Warehousing and Data Mining.

**TOTAL : 60 hrs**

**TEXT BOOK:**


1. Thomas M. Connolly, Carolyn E. Begg, "Database Systems - A Practical Approach to Design , Implementation, and Management", Third Edition, Pearson Education, 2003


**REFERENCES:**


1. Ramez Elmasri &ShamkantB.Navathe, "Fundamentals of Database Systems", Fourth Edition , Pearson Education , 2004.
2. M.TamerOzsu , Patrick Ualduriel, "Principles of Distributed Database Systems", Second Edition, PearsonEducation, 2003.
3. C.S.R.Prabhu, "Object Oriented Database Systems", PHI, 2003.
4. Peter Rob and Corlos Coronel, "Database Systems – Design, Implementation and Management", Thompson Learning, Course Technology, 5th Edition, 2003.

# SEMESTER – V (LECTIVE II)

## 22150E54AP- AD HOC AND SENSOR NETWORKS

**OBJECTIVES:**

**The student should be made to:**

- Understand the design issues in ad hoc and sensor networks.
- Learn the different types of MAC protocols.
- Be familiar with different types of adhoc routing protocols.
- Be expose to the TCP issues in adhoc networks.
- Learn the architecture and protocols of wireless sensor networks.

**UNIT I INTRODUCTION 9**

Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio propagation Mechanisms – Characteristics of the Wireless Channel -mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs): concepts and architectures. Applications of Ad Hoc and Sensor networks. Design Challenges in Ad hoc and Sensor Networks.

**UNIT II MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS 9**

Issues in designing a MAC Protocol- Classification of MAC Protocols- Contention based protocols- Contention based protocols with Reservation Mechanisms- Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.11

**UNIT III ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS 9**

Issues in designing a routing and Transport Layer protocol for Ad hoc networks- proactive routing, reactive routing (on-demand), hybrid routing- Classification of Transport Layer solutions-TCP over Ad hoc Wireless Networks.

**UNIT IV WIRELESS SENSOR NETWORKS (WSNS) AND MAC PROTOCOLS 9**

Single node architecture: hardware and software components of a sensor node - WSN Network architecture: typical network architectures-data relaying and aggregation strategies - MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.

**UNIT V WSN ROUTING, LOCALIZATION & QOS 9**

Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

**Upon completion of the course, the student should be able to:**

- Explain the concepts, network architectures and applications of ad hoc and wireless sensor networks
- Analyze the protocol design issues of ad hoc and sensor networks
- Design routing protocols for ad hoc and wireless sensor networks with respect to some protocol design issues
- Evaluate the QoS related performance measurements of ad hoc and sensor networks

**TEXT BOOK:**

1. C. Siva Ram Murthy, and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols ", Prentice Hall Professional Technical Reference, 2008.

**REFERENCES:**

1. Carlos De MoraisCordeiro, Dharma Prakash Agrawal "Ad Hoc & Sensor Networks: Theory and Applications", World Scientific Publishing Company, 2006.
2. Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks", Elsevier Publication - 2002.
3. Holger Karl and Andreas Willig "Protocols and Architectures for Wireless Sensor Networks", Wiley, 2005
4. KazemSohraby, Daniel Minoli, &TaiebZnati, "Wireless Sensor Networks-Technology, Protocols, and Applications", John Wiley, 2007.

# 22150E54BP- PRINCIPLES OF COMPILER DESIGN

**AIM:**

To understand the design and implementation of a simple compiler.

**OBJECTIVES:**

- To understand the functions of the various phases of a complier.
- To learn the overview of the design of lexical analyzer and parser.
- To study the design of the other phases in detail.
- To learn the use of compiler construction tools.

## UNIT I INTRODUCTION TO COMPILING 9+3

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens.

## UNIT II SYNTAX ANALYSIS 9+3

Role of the parser –Writing Grammars –Context-Free Grammars – Top Down parsing – Recursive Descent Parsing – Predictive Parsing – Bottom-up parsing – Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser.

## UNIT III INTERMEDIATE CODE GENERATION 9+3

Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls.

## UNIT IV CODE GENERATION 9+3

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization.

## UNIT V CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS9+3

Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

**TOTAL: 60hrs**

**TEXT BOOK:**

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", Pearson Education Asia, 2003.

**REFERENCES:**

1. Allen I. Holub "Compiler Design in C", Prentice Hall of India, 2003.
2. C. N. Fischer and R. J. LeBlanc, "Crafting a compiler with C", Benjamin Cummings, 2003.
3. J.P. Bennet, "Introduction to Compiler Techniques", Second Edition, Tata McGraw-Hill, 2003.
4. Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", PHI, 2001.
5. Kenneth C. Louden, "Compiler Construction: Principles and Practice", Thompson Learning, 2003

# 22150E54CP- DISTRIBUTED SYSTEMS

**AIM:**

This course discuss the fundamental aspects on design of distributed systems, and the principles underlying them with an emphasis on fault tolerance and security.

**OBJECTIVES:**

- To understand distributed computing system models and introduction to distributes databases.
- To have an in-depth knowledge of distributed algorithms .
- To understand asynchronous shared memory model, mutual exclusion, resource allocation, consensus, asynchronous network model, basic asynchronous network algorithms, shared memory Vs networks and introduction to parallel distributed processing.
- To understand the various security algorithms in distributing environment.

## UNIT I INTRODUCTION 9+3

Introduction to Distributed systems-examples of distributed systems, challenges-architectural models-fundamental models - Introduction to interprocess communications-external data representation and marshalling- client server communication-group communication – Case study: IPC in UNIX

## UNIT II DISTRIBUTED OBJECTS AND FILE SYSTEM 9+3

Introduction - Communication between distributed objects - Remote procedure call - Events and notifications - Java RMI case Study - Introduction to DFS - File service architecture - Sun network file system - Introduction to Name Services- Name services and DNS - Directory and directory services.

## UNIT III DISTRIBUTED OPERATING SYSTEM SUPPORT 11+3

The operating system layer – Protection - Process and threads - Communication and invocation - Operating system architecture - Introduction to time and global states - Clocks, Events and Process states - Synchronizing physical clocks - Logical time and logical clocks - Global states - Distributed debugging – Distributed mutual exclusion.

## UNIT IV TRANSACTION AND CONCURRENCY CONTROL – DISTRIBUTED TRANSACTIONS 8+3

Transactions – Nested transaction – Locks - Optimistic concurrency control - Timestamp ordering - Comparison of methods for concurrency control - Introduction to distributed transactions - Flat and nested distributed transactions - Atomic commit protocols - Concurrency control in distributed transactions - Distributed deadlocks - Transaction recovery.

## UNIT –V SECURITY AND REPLICATION 8+3

Overview of security techniques - Cryptographic algorithms – Digital signatures - Cryptography pragmatics – Replication - System model and group communications – Fault tolerant services – Highly available services – Transactions with replicated data

**TOTAL : 60hrs**

**TEXT BOOK:**

1. George Coulouris, Jean Dollimore, Tim Kindberg "Distributed Systems Concepts and Design" Third Edition – 2002- Pearson Education Asia.

**REFERENCES:**

1. A.S.Tanen baum, M.Van Steen " Distributed Systems" Pearson Education 2004
2. MukeshSinghal, Ohio State University, Columbus "Advanced Concepts In Operating Systems" McGraw-Hill Series in Computer Science, 1994.

# 22150E54DP- MOBILE COMPUTING

**AIM:**

The aim of the course is to make student to be familiar with the basics concept of Mobile Communication and mobile devices .Focus will be on cellular mobile system units and different aspects of cellular communication.

**OBJECTIVES:**

- To present necessary concepts for Mobile Communication.
- Understanding different mobile devices and system.
- Understanding the Cellular System design.
- Study Co-channel and Non Co-Channel Interference.
- Understanding channel assignment and hand off.
- Study Digital Cellular System.

**UNIT I WIRELESS COMMUNICATION FUNDAMENTALS 9+3**

Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

**UNIT II TELECOMMUNICATION NETWORKS 11+3**

Telecommunication systems – GSM – GPRS – DECT – UMTS – IMT-2000 – Satellite Networks - Basics – Parameters and Configurations – Capacity Allocation – FAMA and DAMA – Broadcast Systems – DAB - DVB.

**UNIT III WIRLESS LAN 9+3**

Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a - 802.11b standards – HIPERLAN – Blue Tooth.

**UNIT IV MOBILE NETWORK LAYER 9+3**

Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV – DSR – Alternative Metrics.

**UNIT V TRANSPORT AND APPLICATION LAYERS 7+3**

Traditional TCP – Classical TCP improvements – WAP, WAP 2.0.

**Total:60hrs**

**TEXT BOOKS:**


1. Jochen Schiller, "Mobile Communications", PHI/Pearson Education, Second Edition, 2003. (Unit I Chap 1,2 &3- Unit II chap 4,5 &6-Unit III Chap 7. Unit IV Chap 8- Unit V Chap 9&10.)

2. William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, 2002. (Unit I Chapter – 7&10-Unit II Chap 9)


**REFERENCES:**


1. KavehPahlavan, PrasanthKrishnamoorthy, "Principles of Wireless Networks", PHI/Pearson Education, 2003.

2. Uwe Hansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, New York, 2003.
3. Hazyszt of Wesolowshi, "Mobile Communication Systems", John Wiley and Sons Ltd, 2002.

# SEMESTER - VI
# (ELECTIVE III)

## 22160E64AP- PRINCIPLES OF MANAGEMENT

**AIM:**

To understand the basic principles of management.

**OBJECTIVES:**

Knowledge on the principles of management is essential for all kinds of people in all kinds of organizations. After studying this course, students will be able to have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling. Students will also gain some basic knowledge on international aspect of management.

**UNIT I HISTORICAL DEVELOPMENT 9**

Definition of Management – Science or Art – Management and Administration – Development of Management Thought – contribution of Taylor and Fayol – Functions of Management – Types of Business Organization.

**UNIT II PLANNING 9**

Nature & Purpose – Steps involved in planning – Objective – Setting Objectives – Process of Managing by Objectives – Strategies, Policies & Planning premise – Forecasting – Decision-making.

**UNIT III ORGANISING 9**

Nature and purpose – Formal and informal organization – Organization Chart – Structure and Process – Departmentation by difference strategies – Line and Staff authority – Benefits and Limitations – Selection Process – Techniques – HRD – Managerial Effectiveness.

**UNIT IV DIRECTING 9**

Scope – Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment – Communication – Process of Communication – Barriers and Breakdown – Effective Communication – Electronic media in Communication.

**UNIT V CONTROLLING 9**

System and process of Controlling – Requirements for effective control – The Budget as Control Technique – Information Technology in Controlling – Use of computers in handling the information – Productivity – Problems and Management – Control of overall Performance – Direct and Preventive Control – Reporting – The Global Environment – Globalization and Liberalization – International Management and Global theory of Management.

**TOTAL:45 hrs**

**TEXT BOOKS:**


1. Harold Kooritz& Heinz Weihrich "Essentials of Management", Tata McGraw-Hill, 1998.
2. Joseph L Massie "Essentials of Management", Prentice Hall of India, (pearson) Fourth Edition, 2003.


**REFERENCES**


1. Tripathy PC And Reddy PN, "Principles of Management", Tata McGraw-Hill,1999.
2. Decenzo David, Robbin Stephen A, "Personnel and Human Reasons Management", Prentice Hall of India, 1996.
3. JAF Stomer, Freeman R.E and Daniel R Gillbert Management, pearson Education, Sixth Edition,2004.
4. Fraidoon Mazda, "Engineering Management", Addison Wesley, 2000.

# 22150E64BP- UNIX INTERNALS

**AIM:**

This course focus to bend the learning curve for those system programmers who need to cast free software kernels.

**OBJECTIVES:**

- An ability to understand design and implementation of a multi-programmable operating system.
- A good understanding of the fundamentals of a monolithic kernel.
- A basic-to-intermediate experience in kernel and driver/module programming.

**UNIT I** **9**

General Review of the System-History-System structure-User Perspective-OperatingSystem Services-Assumptions About Hardware. Introduction to the Kernel-ArchitectureSystem Concepts-Data Structures- System Administration.

**UNIT II** **9**

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** **9**

System Calls for the File System-Open-Read-Write-Lseek-Close-Create-Special files Creation-Change Directory and Change Root-Change Owner and Change Mode- Stat-Fstat-Pipes-Dup-Mount- Unmount-Link-Unlink-File System Abstraction-Maintenance.

**UNIT IV** **9**

The System Representation of Processes-States-Transitions-System Memory-Context of a Process-Saving the Context-Manipulation of a Process Address Space-Sleep Process Control-signals-Process Termination-Awaiting-Invoking other Programs-The Shell-System Boot and the INIT Process.

**UNIT V** **9**

Memory Management Policies-Swapping-Demand Paging-a Hybrid System-I/Subsystem-Driver Interfaces-Disk Drivers-Terminal Drivers.

**TOTAL: 45 hrs**

**TEXTBOOK:**

1. Maurice J. Bach, "The Design of the Unix Operating System", Pearson Education, 2002.

**REFERENCES:**

1. UreshVahalia, "UNIX Internals: The New Frontiers", Prentice Hall, 2000.
2. John Lion, "Lion's Commentary on UNIX", 6th edition, Peer-to-Peer Communications, 2004.
3. Daniel P. Bovet & Marco Cesati, "Understanding the Linux Kernel", O'REILLY, Shroff Publishers &Distributors Pvt. Ltd, 2000.
4. M. Beck et al, "Linux Kernel Programming", Pearson Education Asia, 2002

# 22150E64CP- GRAPH THEORY AND APPLICATIONS

**OBJECTIVES:**

- To understand fundamentals of graph theory.
- To study proof techniques related to various concepts in graphs.
- To explore modern applications of graph theory.

**UNIT I** **9**

Introduction - Graph Terminologies - Types of Graphs - Sub Graph- Multi Graph - Regular Graph - Isomorphism - Isomorphic Graphs - Sub-graph - Euler graph - Hamiltonian Graph - Related Theorems.

**UNIT II** **9**

Trees -Properties- Distance and Centres - Types - Rooted Tree-- Tree Enumeration- Labeled Tree - Unlabeled Tree - Spanning Tree - Fundamental Circuits- Cut Sets - Properties - Fundamental Circuit and Cut-set- Connectivity- Separability -Related Theorems.

**UNIT III** **9**

Network Flows - Planar Graph - Representation - Detection - Dual Graph - Geometric and Combinatorial Dual - Related Theorems - Digraph - Properties - Euler Digraph.

**UNIT IV** **9**

Matrix Representation - Adjacency matrix- Incidence matrix- Circuit matrix - Cut-set matrix - Path Matrix- Properties - Related Theorems - Correlations. Graph Coloring - Chromatic Polynomial - Chromatic Partitioning - Matching - Covering - Related Theorems.

**UNIT V** **9**

Graph Algorithms- Connectedness and Components- Spanning Tree- Fundamental Circuits- Cut Vertices- Directed Circuits- Shortest Path - Applications overview.

**TOTAL : 45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Understand the basic concepts of graphs, and different types of graphs
- Understand the properties, theorems and be able to prove theorems.
- Apply suitable graph model and algorithm for solving applications.

**TEXTBOOKS:**


1. Narsingh Deo, "Graph Theory with Application to Engineering and Computer Science", Prentice-Hall of India Pvt.Ltd, 2003.
2. L.R.Foulds , "Graph Theory Applications", Springer ,2016.


**REFERENCES:**


1 .Bondy, J. A. and Murty, U.S.R., "Graph Theory with Applications", North Holland Publication,2008.

2. West, D. B., ―Introduction to Graph Theory‖, Pearson Education, 2011.

3. John Clark, Derek Allan Holton, ―A First Look at Graph Theory‖, World Scientific Publishing Company, 1991.

4. Diestel, R, "Graph Theory", Springer,3rd Edition,2006.

5. Kenneth H.Rosen, "Discrete Mathematics and Its Applications", McGraw Hill , 2007.

# 22150E64DP- PROGRAMMING PARADIGMS

**AIM:**

Develop a greater understanding of the issues involved in programming language Design and implementation

**OBJECTIVES:**

- Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.
- Implement several programs in languages other than the one emphasized in the core curriculum (Java/C++).
- Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing.
- Develop an understanding of the compilation process.

**UNIT I OBJECT-ORIENTED PROGRAMMING – FUNDAMENTALS 9**

Review of OOP - Objects and classes in Java – defining classes – methods - access specifiers – static members – constructors – finalize method – Arrays – Strings - Packages – Java Doc comments

**UNIT II OBJECT-ORIENTED PROGRAMMING – INHERITANCE 9**

Inheritance – class hierarchy – polymorphism – dynamic binding – final keyword – abstract classes – the Object class – Reflection – interfaces – object cloning – inner classes – proxies

**UNIT III EVENT-DRIVEN PROGRAMMING 9**

Graphics programming – Frame – Components – working with 2D shapes – Using color, fonts, and images - Basics of event handling – event handlers – adapter classes – actions – mouse events – AWT event hierarchy – introduction to Swing – Model-View- Controller design pattern – buttons – layout management – Swing Components

**UNIT IV GENERIC PROGRAMMING 9**

Motivation for generic programming – generic classes – generic methods – generic code and virtual machine – inheritance and generics – reflection and generics – exceptions – exception hierarchy – throwing and catching exceptions – Stack Trace Elements - assertions – logging

**UNIT V CONCURRENT PROGRAMMING 9**

Multi-threaded programming – interrupting threads – thread states – thread properties – thread synchronization – thread-safe Collections – Executors – synchronizers – threads and event-driven programming.

] **TOTAL:45hrs**

**TEXT BOOK:**

1. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals", Eighth Edition, Sun Microsystems Press, 2008.

**REFERENCES:**

1. D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 2000.
2. John J. Donovan "Systems Programming", Tata McGraw-Hill Edition, 2000.
3. John R. Levine, Linkers & Loaders – Harcourt India Pvt. Ltd., Morgan Kaufmann Publishers, 2000.

# SEMESTER - VII (ELECTIVE VI)
# 22150E73AP- HIGH SPEED NETWORKS

**AIM:**

This course provides introduction to emerging high speed network technologies and facilitates the students identify where the new technology can be used to enhance performance of business networks.

**OBJECTIVES:**

- Good understanding of packet-switched networking concepts and principles of operation.
- Good understanding of Internet protocols and architectures (e.g., IP protocol stack).
- Solid foundation in computer operating systems fundamentals.
- Ability to perform independent research, analyze findings in high speed networks.

**UNIT I HIGH SPEED NETWORKS 9**

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL.High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fibre Channel – Wireless LAN's: applications, requirements – Architecture of 802.11

**UNIT II CONGESTION AND TRAFFIC MANAGEMENT 8**

Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

**UNIT III TCP AND ATM CONGESTION CONTROL 12**

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management.

**UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 8**

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services

**UNIT V PROTOCOLS FOR QOS SUPPORT 8**

RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.

**TOTAL:45hrs**

**TEXT BOOK:**


1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Education, Second Edition, 2002. [Chapter – 4-6, 8, 10, 12, 13, 17,18]


**REFERENCES:**


1. Warland&PravinVaraiya, "HIGH PERFORMANCE COMMUNICATION NETWORKS", Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
2. IrvanPepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003

# 22150E73BP-INFORMATION RETRIEVAL TECHNIQUES

**OBJECTIVES:**

- To understand the basics of Information Retrieval.
- To understand machine learning techniques for text classification and clustering.
- To understand various search engine system operations.
- To learn different techniques of recommender system.

**UNIT I INTRODUCTION 9**

Information Retrieval – Early Developments – The IR Problem – The User_s Task – Information versus Data Retrieval - The IR System – The Software Architecture of the IR System – The Retrieval and Ranking Processes - The Web – The e-Publishing Era – How the web changed Search – Practical Issues on the Web – How People Search – Search Interfaces Today – Visualization in Search Interfaces.

**UNIT II MODELING AND RETRIEVAL EVALUATION 9**

Basic IR Models - Boolean Model - TF-IDF (Term Frequency/Inverse Document Frequency) Weighting - Vector Model – Probabilistic Model – Latent Semantic Indexing Model – Neural Network Model – Retrieval Evaluation – Retrieval Metrics – Precision and Recall – Reference Collection – User-based Evaluation – Relevance Feedback and Query Expansion – Explicit Relevance Feedback.

**UNIT III TEXT CLASSIFICATION AND CLUSTERING 9**

A Characterization of Text Classification – Unsupervised Algorithms: Clustering – Naïve Text Classification – Supervised Algorithms – Decision Tree – k-NN Classifier – SVM Classifier – Feature Selection or Dimensionality Reduction – Evaluation metrics – Accuracy and Error – Organizing the classes – Indexing and Searching – Inverted Indexes – Sequential Searching – Multi-dimensional Indexing.

**UNIT IV WEB RETRIEVAL AND WEB CRAWLING 9**

The Web – Search Engine Architectures – Cluster based Architecture – Distributed Architectures– Search Engine Ranking – Link based Ranking – Simple Ranking Functions – Learning to Rank –Evaluations -- Search Engine Ranking – Search Engine User Interaction – Browsing – Applications of a Web Crawler – Taxonomy – Architecture and Implementation – Scheduling Algorithms –Evaluation.

**UNIT V RECOMMENDER SYSTEM 9**

Recommender Systems Functions – Data and Knowledge Sources – Recommendation Techniques – Basics of Content-based Recommender Systems – High Level Architecture – Advantages and Drawbacks of Content-based Filtering – Collaborative Filtering – Matrix factorization models – Neighborhood models..

**TOTAL : 45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Use an open source search engine framework and explore its capabilities
- Apply appropriate method of classification or clustering.
- Design and implement innovative features in a search engine.
- Design and implement a recommender system.

**TEXTBOOKS:**


1. 1.RicardoBaeza-Yates and BerthierRibeiro-Neto, ―Modern Information Retrieval: The Concepts and Technology behind Search, Second Edition, ACM Press Books, 2011.
2. Ricci, F, Rokach, L. Shapira, B.Kantor, ―Recommender Systems Handbook‖, First Edition, 2011.

   Edition, 2011.


**REFERENCES:**


1. C. Manning, P. Raghavan, and H. Schütze, ―Introduction to Information Retrieval, Cambridge University Press, 2008.
2. Stefan Buettcher, Charles L. A. Clarke and Gordon V. Cormack, ―Information Retrieval: Implementing and Evaluating Search Engines, The MIT Press, 2010.

# 22150E73CP- SOFTWARE PROJECT MANAGEMENT

**AIM**:

Software Project Management provides insight to the importance of careful project management

**OBJECTIVES:**

- Understand Project planning and management
- Identify Client management and project definition
- Understand testing based approach to development
- Team management and ongoing schedule tracking

## UNIT 1 SOFTWARE MANAGEMENT 9

Conventional Software Management - The Waterfall Model - Conventional Software Management Performance. Evolution of Software Economics - Pragmatic Software Cost Estimation. Reducing Software Product Size – Languages -Object-Oriented Methods and Visual Modeling - Reuse. Improving Software Processes - Team Effectiveness -
Automation through Software Environments - Achieving Required Quality. Modern Software Management -Transitioning to an Iterative Process

## UNIT 2 SOFTWARE MANAGEMENT PROCESS FRAMEWORK 9

Life-Cycle Phases - Engineering and Production Stages - Inception Phase - Elaboration Phase - Construction Phase -Transition Phase. Artifacts of the Process - Artifact Sets - Management Set - Engineering Sets - Artifact Evolution over the Life Cycle - Test Artifacts - Management Artifacts - Engineering Artifacts - Pragmatic Artifacts. Model-Based Software Architectures - Management Perspective - Technical Perspective. Workflows of the Process - Software Process Workflows - Iteration Workflows - Checkpoints of the Process.

## UNIT 3 SOFTWARE MANAGEMENT DISCIPLINES 9

Iterative Process Planning - Work Breakdown Structures - Conventional WBS Issues - Planning Guidelines - Cost and Schedule Estimating Process - Iteration Planning Process. Project Organizations and Responsibilities - Line-of-Business Organizations - Project Organizations - Evolution of Organizations. Process Automation - Tools: Automation Building Blocks - Project Environment - Round-Trip Engineering - Change Management. Project Control and Process Instrumentation - Seven Core Metrics - Management Indicators - Quality Indicators - . Pragmatic Software Metrics -Metrics Automation.

**UNIT 4 PROJECT PROFILES** **9**

Continuous Integration - Early Risk Resolution - Evolutionary Requirements - Teamwork among Stakeholders - Top 10 Software Management Principles - Software Management Best Practices - Next-Generation Software Economics - Next-Generation Cost Models - Modern Software Economics - Modern Process Transitions.

**UNIT 5 PROJECT EXECUTION AND CLOSURE** **9**

Review Process – Planning - Overview and Preparation - Group Review Meeting - Rework and Follow-up – Guidelines for Reviews in Projects - Analysis and Control Guidelines – Case Studies. Project Monitoring and Control – Project Tracking - Activities Tracking - Defect Tracking - Issues Tracking - Status Reports - Milestone Analysis. Defect Analysis and Prevention - Process Monitoring and Audit. Project Closure – Analysis - Analysis Report.

**TOTAL 45hrs**

**TEXT BOOKS:**

1. Walker Royce, "Software Project Management: A Unified Framework", Pearson, 2000
2. Pankaj Jalote, "Software Project Management in Practice", Pearson, 2002.

**REFERENCES:**

1. Joel Henry, "Software Project Management: A Real-World Guide to Success". Pearson, 2004.
2. Kathy Schwalbe, "Information Technology Project Management", Course Technology, 2005

# 22150E73DP-CYBER FORENSICS

**OBJECTIVES:**

- To learn computer forensics
- To become familiar with forensics tools
- To learn to analyze and validate forensics data.

**UNIT I INTRODUCTION TO COMPUTER FORENSICS 9**

Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft & Identity Fraud. Types of CF techniques - Incident and incident response methodology - Forensic duplication and investigation. Preparation for IR: Creating response tool kit and IR team. - Forensics Technology and Systems - Understanding Computer Investigation – Data Acquisition.

**UNIT II EVIDENCE COLLECTION AND FORENSICS TOOLS 9**

Processing Crime and Incident Scenes – Working with Windows and DOS Systems. Current Computer Forensics Tools: Software/ Hardware Tools.

**UNIT III ANALYSIS AND VALIDATION 9**

Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics

**UNIT IV ETHICAL HACKING 9**

Introduction to Ethical Hacking - Foot printing and Reconnaissance - Scanning Networks - Enumeration - System Hacking - Malware Threats - Sniffing.

**UNIT V ETHICAL HACKING IN WEB 9**

Social Engineering - Denial of Service - Session Hijacking - Hacking Web servers – Hacking Web Applications – SQL Injection - Hacking Wireless Networks - Hacking Mobile Platforms.

**TOTAL : 45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Understand the basics of computer forensics
- Apply a number of different computer forensic tools to a given scenario
- Analyze and validate forensics data
- Identify the vulnerabilities in a given network infrastructure
- Implement real-world hacking techniques to test system security.

**TEXTBOOKS:**


1. Bill Nelson, Amelia Phillips, Frank Enfinger, Christopher Steuart, ―Computer Forensics and Investigations‖, Cengage Learning, India Edition, 2016.
2. CEH official Certified Ethical Hacking Review Guide, Wiley India Edition, 2015.


**REFERENCES:**


1. John R. Vacca, ―Computer Forensics‖, Cengage Learning, 2005
2. MarjieT.Britz, ―Computer Forensics and Cyber Crime‖: An Introduction‖, 3rd Edition, Prentice Hall, 2013.
3. AnkitFadia ― Ethical Hacking‖ Second Edition, Macmillan India Ltd, 2006
4. Kenneth C.Brancik ―Insider Computer Fraud‖ Auerbach Publications Taylor & Francis Group–2008.