

**KUMARAGURU COLLEGE OF TECHNOLOGY
COIMBATORE – 641 049.**



Regulations, Curriculum and Syllabus 2014

**MCA Programme
(2014-2015 onwards)**

KUMARAGURU COLLEGE OF TECHNOLOGY, COIMBATORE –49
(An Autonomous College Affiliated to Anna University)
M.C.A – Curriculum 2014

Total Credits – 134

SEMESTER –I

Code No.	Course Title	L	T	P	C
Theory					
P14MAT110	Mathematical Foundations of Computer Science	3	1	0	4
P14CAT101	Advanced Database Management Systems	3	0	0	3
P14CAT102	Operating Systems	3	1	0	4
P14CAT103	Data Structures	3	0	0	3
P14CAT104	Accounting and Financial Management	3	1	0	4
Practical					
P14CAP101	Problem Solving and Programming in ‘C’ Lab	0	0	6	3
P14CAP102	DBMS Lab	0	0	6	3
P14CAP103	Multimedia Lab	0	0	3	1

Total Credits: 25

SEMESTER –II

Code No.	Course Title	L	T	P	C
Theory					
P14MAT202	Probability and Applied Statistics	3	1	0	4
P14CAT201	Advanced Data Structures	3	0	0	3
P14CAT202	Computer Networks	3	0	0	3
P14CAT203	Software Engineering	3	0	0	3
P14CAT204	Ethics in Computing	3	0	0	3
Practical					
P14CAP201	Data Structures Using C++ Lab	0	0	6	3
P14CAP202	Programming in Java Lab	0	0	6	3
P14CAP203	Web Design Lab	0	0	6	3

Total Credits: 25

SEMESTER –III

Code No.	Course Title	L	T	P	C
Theory					
P14CAT301	Business Intelligence	3	0	0	3
P14CAT302	Information Security	3	0	0	3
P14CAT303	Knowledge Management	3	0	0	3
P14CAT304	Object Oriented Analysis & Design	3	0	0	3
	Elective I	3	0	0	3
Practical					
P14CAP301	Business Intelligence Lab	0	0	6	3
P14CAP302	J2EE Lab	0	0	6	3
P14CAP303	Advanced Web Designing Lab	0	0	6	3

Total Credits: 24

SEMESTER –IV

Code No.	Course Title	L	T	P	C
Theory					
P14CAT401	Software Project Management	3	0	0	3
P14CAT402	Data Warehousing and Data Mining	3	0	0	3
P14CAT403	Managing Technical People	3	0	0	3
	Elective II	3	0	0	3
	Elective III	3	0	0	3
Practical					
P14CAP401	Service Oriented Architecture Lab	0	0	6	3
P14CAP402	Cloud Computing Lab	0	0	6	3
	Elective Lab	0	0	6	3

Total Credits: 24

SEMESTER –V

Code No.	Course Title	L	T	P	C
Theory					
P14CA7501	Principles of Management and Organizational Behavior	3	0	0	3
P14CA7502	Software Testing and Quality Assurance	3	0	0	3
P14CA7503	Business Process Management	3	0	0	3
	Elective IV	3	0	0	3
	Self Study / International Certification	3	0	0	3
Practical					
P14CAP501	Software Testing Lab	0	0	6	3
P14CAP502	C#.Net Lab	0	0	6	3
P14CAP503	Mini Project	0	0	6	3

Total Credits: 24

SEMESTER –VI

Code No.	Course Title	L	T	P	C
Practical					
P14CAP601	Project Work	0	0	24	12

Total Credits: 12

SEMESTER I

Course Objectives

- To know about matrices, to find eigen values and eigen vectors of a matrix.
- To understand the concepts of set theory and relations.
- To understand mathematical logic (propositional and predicate logic).

Course Content

MATRIX ALGEBRA 12

Matrices – Rank of Matrix – Solving System of Equations – Eigen Values and Eigen Vectors – Inverse of a Matrix – Cayley Hamilton Theorem.

BASIC SET THEORY 12

Basic Definitions – Venn Diagrams and Set Operations – Laws of Set Theory – Principle of Inclusion and Exclusion – Partitions – Relations – Properties of Relations – Matrices of Relations – Functions – Injective, Surjective and Bijective Functions.

MATHEMATICAL LOGIC 12

Propositions and Logical Operators – Truth Table – Equivalence and Implication – Basic Laws – Functionally Complete Set of Connectives – Normal Forms – Proofs in Propositional Calculus – Predicate Calculus.

FORMAL LANGUAGES 12

Languages and Grammars – Phrase Structure Grammar – Classification of Grammars – Pumping Lemma for Regular Languages – Context Free Languages.

FINITE STATE AUTOMATA 12

Finite State Automata – Deterministic Finite State Automata(DFA), Non Deterministic Finite State Automata (NFA) – Equivalence of DFA and NFA – Equivalence of NFA and Regular Languages.

Total Hours: 60

REFERENCES:

1. Kenneth H Rosen, “Discrete Mathematics and Its Applications”, Tata McGraw Hill, 7th Edition 2011.
2. Venkatraman M. K., “Engineering Mathematics”, Volume II, National Publishing Company, 2nd Edition ,1989.

Course Outcomes

After successful completion of this course, the students should be able to

- Solve the system of linear homogeneous as well as non-homogeneous equations and to find the eigen values and eigen vectors of real symmetric as well as non-symmetric matrices.
- Know the concept and applications of different types of relations and functions.
- Analyze the given propositions and finding the results using mathematical logic operators.
- Describe the different types of languages and grammars.
- Understand the difference between deterministic and non deterministic finite state automata and the conversion of NFA to DFA.

Course Objectives

- To understand the needs and uses of database management systems in business.
- To give an introductory understanding of some advanced topics, like distributed databases, database administration (backup and restore, tuning).
- To understand the context, phases and techniques for designing and building database information systems in business.
- To understand the components of a computerized database information system.

Course Content**INTRODUCTION****7**

Introduction – Database Architecture – Structure of Relational Databases – Database Schema – Schema Diagrams – Relational Query Languages – Keys – Basic Structure of Queries and Operations – Integrity Constraints – ER Model – Why NoSQL.

DATABASE DESIGN**9**

Relational Database Design – First Normal Form – Second Normal Form – Third Normal Form Boyce–Codd Normal Form – NoSQL: Aggregate Data Model – Distribution Model.

DATABASE IMPLEMENTATION**11**

Physical Database Design and Tuning – Database Transaction: Transaction Concept and State Recovery: Failure Classification – Log Based Recovery – NoSQL Implementation: Key Value Database – Document Database.

DATABASE FUNCTIONALITY**9**

Introduction – DB2 – Oracle – Microsoft SQL Server – MySql – MongoDB – Database Connectivity using ODBC and JDBC.

EMERGING TECHNOLOGIES AND APPLICATIONS**9**

Active Database Concepts and Triggers Distributed Databases: Concepts – Database Design and Types – Database Applications in Mobile Communication – Multimedia Databases – Genome Data Management.

Total Hours: 45**REFERENCES:**

1. Abraham Silberschatz, Henry F.Korth and S.Sudarshan, “Database System Concepts”, Tata McGraw Hill International Edition, 6th Edition, 2011.
2. Pramodkumar J. Sadalage and Martin Fowler.” NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence”, AddisonWesley Professional, 1st Edition, 2012.
3. R. Elmasri and S.B. Navathe, “Fundamentals of Database Systems”, Pearson Education, 5th Edition, 2008.
4. C.J.Date, “An Introduction to Database Systems”, Pearson Education Inc, 8th Edition, 2004.

Course Outcomes

After successful completion of this course, the students should be able to

- Use the techniques, components and tools of a typical database management system.
- Design a correct, new database information system for a business functional area and implement the design in either SQL or NoSQL.
- Understand the concepts of open source databases like MongoDB and MySQL.

Course Objectives

- To learn the fundamentals of operating systems.
- To gain knowledge on process management, CPU scheduling and memory management.
- To gain knowledge on disk scheduling and file systems.

Course Content

INTRODUCTION	8
Computer System Organization – Computer System Architecture – Operating System Structure – Operating System Services – User Operating System Interface – System Calls – System Programs – Design and Implementation – Virtual Machines – Debugging.	
	7
PROCESS MANAGEMENT	
Process Concepts – Process Scheduling – Operations on Processes – Inter Process Communication – Examples – Threads – Overview – Multi Threading Models – Libraries – Issues.	
	5
CPU SCHEDULING	
Basic Concepts – Scheduling Criteria – Scheduling Algorithms.	
	6
PROCESS SYNCHRONIZATION	
Background – Critical Section Problem – Peterson’s Solution – Synchronization Hardware – Semaphores – Classic Problem of Synchronization – Monitors – System Model.	
	6
DEADLOCK	
Deadlock Characterization – Handling Deadlocks – Deadlock Prevention – Avoidance – Detection – Recovery.	
	5
MEMORY MANAGEMENT	
Background – Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Segmentation.	
	7
VIRTUAL MEMORY MANAGEMENT	
Background – Demand Paging – Copy on Write – Page Replacement – Thrashing –Working Set.	
	6
I/O MANAGEMENT AND DISK SCHEDULING	
Organization of I/O function – Evolution of I/O function – Types of I/O devices – Logical Structure of I/O functions – I/O Buffering – Disk I/O – Disk Scheduling algorithms – Disk Cache.	
	10
FILE SYSTEMS	
File Concept – Access Methods – Directory and Disk Structure – File System Mounting – File Sharing – Protection – File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free Space Management.	
CASE STUDIES: Windows 2000, Linux, Unix and Solaris.	

Total Hours: 60

REFERENCES:

1. Silberschatz and Galvin, “Operating System Concepts”, John Wiley & Sons, Inc., 8th Edition, 2008.
2. P.C.Bhatt, “An Introduction to Operating Systems–Concepts and Practice”, Prentice Hall of India, 2010.
3. H.M.Deitel, “An Introduction to Operating Systems”, Pearson Education, 3rd Edition, 2003.
4. William Stallings, “Operating Systems: Internals and Design Principles”, Prentice Hall, 2011.
5. D. M. Dhamdhere, “Operating Systems: A Concept based Approach”, Tata McGraw Hill, 2006.

Course Outcomes

After successful completion of this course, the students should be able to

- Know various synchronization, scheduling and memory management issues.
- Understand about mutual exclusion and deadlock concepts.
- Understand and analyze various disk scheduling algorithms.

Course Objectives

- To know about basic data structures related to handling data and various sorting, searching algorithms.
- To understand the basic techniques of algorithm analysis.

Course Content**INTRODUCTION****3**

Data Structures – Abstract Data Type – Primitive Data Structures – Analysis of Algorithms – Notations.

ARRAYS**5**

Representation of Arrays – Operation on Arrays – Applications – Polynomials: Addition of Two Polynomials – Multiplication of Two Polynomials – Sparse Matrices: Addition of Two Sparse Matrices – Transpose of a Sparse Matrix.

LIST**5**

Concepts and Basic Operations on Linked List – Applications – Reversing a Linked List Concatenation of Two Lists – Circular Linked List – Doubly Linked List – Doubly Circular Linked List .

STACK**5**

Definition – Operations on Stack – Static and Dynamic Implementation of a Stack – Applications– Recursion – Infix, Prefix & Postfix Expressions – Balancing the Parentheses in an Expression – Arithmetic Expression Evaluation.

QUEUE**5**

Definition – Operations on Queue – Static and Dynamic Implementation of a Queue – Types of Queue – Circular Queue – Priority Queue – DEQueue – Applications – Job Scheduling – Reversing Stack using Queue.

TREE**5**

Tree Terminology – Binary Tree – Binary Tree Representation – Binary Search Tree(BST) – Creating BST – Tree Traversals.

GRAPH**5**

Introduction – Graph Representation – Adjacency Matrix – Adjacency List – Graph Traversals – Applications of Graph.

SORTING ALGORITHM AND ANALYSIS**8**

Bubble Sort – Insertion Sort – Shell Sort – Selection Sort – Quick Sort – Merge Sort – Heap Sort – Radix Sort – Analysis.

SEARCHING ALGORITHM AND ANALYSIS**4**

Linear Search – Binary Search – Fibonacci Search –Analysis.

Total Hours: 45

REFERENCES:

1. Vijayalakshmi Pai G.A, "Data Structures and Algorithms: Concepts Techniques and Applications", Mc Graw Hill, 2009.
2. Aaron M Tanenbaum, Moshe J Augenstein and Yedidyah Langsam, "Data Structures using C and C++", PHI Learning, 2009.
3. D.S.Malik, "Data Structures using C++", Cengage Learning Inc, 2nd Edition, 2009.
4. Adam Drozdek, "Data Structures and Algorithms in C++", Cengage Learning Inc, 3rd Edition, 2004.
5. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, 2006.
6. Sahni Sartaj, "Data Structures, Algorithms and Applications in C++", WCB / Tata McGraw Hill, 2005.

Course Outcomes

After successful completion of this course, the students should be able to

- Understand the behavior of basic data structures.
- Analyze a problem and determine the appropriate data structure for the problem.
- Understand and analyze elementary algorithms: sorting & searching.

Course Objectives

- To understand the basic principles of double entry system and preparation of balance sheet.
- To understand the process of estimating the cost of a particular product.
- To prepare the estimate for various business activities such as purchase, sale, production and cash budgets
- To ensure decision making process of an organization.

Course Content**FINANCIAL ACCOUNTING****14**

Meaning and Scope of Accounting – Principles – Concepts and Conventions – Double Entry Book Keeping – Books of Accounts: Preparation of Journals – Ledger – Trial Balance – Trading, Profit and Loss Account – Balance Sheet.

COST ACCOUNTING**14**

Meaning – Objectives – Elements of Cost – Preparation of Cost Sheet – Methods of Costing – Marginal Costing – Cost Volume Profit Analysis – Break Even Analysis – Fund Flow Analysis – Cash Flow Analysis.

BUDGETS AND BUDGETING CONTROL**12**

Budgets and Budgetary Control – Meaning – Types – Sales Budget – Production Budget – Cost of Production Budget – Flexible Budgeting – Cash Budget – Master Budget – Zero Base Budgeting.

FINANCIAL MANAGEMENT AND COST OF CAPITAL**10**

Objectives and Functions of Financial Management – Cost of Capital – Factors Affecting Cost of Capital – Capital Budgeting: Net Present Value – Internal Rate of Return – Profitability Index – Pay – Back and Discounted Pay – Back Method.

CAPITAL STRUCTURE AND WORKING CAPITAL MANAGEMENT**10**

Capital Structure – Factors Affecting Capital Structure – Dividend Policy – Types of Dividend Policy – Concepts of Working Capital – Working Capital Policies – Factors Affecting Working Capital – Estimation of Working Capital Requirements.

Total Hours: 60**REFERENCES:**

1. S.N.Maheswari, “Financial and Management Accounting”, Sultan Chand & Sons, 2009.
2. R.K Sharma and Shashi V. K.Gupta, “Management Accounting: Principles of Practice”, Kalyani Publishers, 2006.
3. I.M.Pandey, “Financial Management”, Vikas Publications, 2010.
4. S.P.Iyengar, “Cost and Management Accounting”, Sultan Chand & Co, 2008.
5. I.M.Pandey, “Elements of Management Accounting”, Vikas Publishing House, 2008.
6. R.L Gupta and V.K.Gupta, “Financial Accounting”, Sultan Chand & Sons, 2004.

Course Outcomes

After successful completion of this course, the students should be able to

- Understand the balance sheet preparation and do analysis.
- Understand the budget preparation and control of a company.
- Decide about the state of affairs of a particular firm / company.
- Ensure the preparation of fiscal policies of the organization.
- Ensure the factors to be considered in investment policies.

Course Objectives

- Understand the basic concepts of C programming.
- Practice the use of conditional and looping statements.
- Implement arrays, functions and pointers.
- Gain skills to handle strings and files.

EXERCISES:

1. Simple programs to understand the concepts of data types and expressions
2. Familiarizing conditional and control statements
3. Implementing repetition statements
4. Usage of single and multi dimensional arrays including storage operation
5. Defining and handling of strings
6. Implementation of functions and recursive functions
7. Defining and handling structures, array of structures and union
8. Implementation of pointers, operation on pointers and dynamic storage allocation
9. Creating and processing data files

Course Outcomes**After successful completion of this course, the students should be able to**

- Employ good software engineering practices such as incremental development, data integrity checking and adherence to style guidelines.
- Select and model data using primitive and structured types.
- Construct programs that demonstrate effective use of C features including arrays, structures, pointers and files.

Course Objectives

- To give a good formal foundation on the relational model of data.
- To present SQL and procedural interfaces to SQL comprehensively.
- To present the concepts and techniques relating to query processing by SQL engines.
- To present the concepts and techniques relating to ODBC and its implementations.

EXERCISES:

1. DDL & DML – data types, create, alter, drop table, integrity constraints
2. Insert, delete and update commands
3. DCL & TCL – grant, revoke, rollback and commit
4. Select command with operators like arithmetic, comparison, logical, order by, group by etc.
5. SQL Functions – date, numeric, character, conversion, avg, max, min, sum, count
6. Set operations – union, intersect and minus
7. Join query concept – simple, equi, non–equi, self, outer join
8. Complex and sub queries
9. Database objects – view, synonym, index, sequence – create, alter and drop
10. Report writer using SQL
11. PL/SQL – Introduction – character set, data types – execution
12. PL/SQL attributes %type, %rowtype, function comparison, if condition, loop, for, while and goto etc.
13. Record management using cursors
14. Function – definition and implementation
15. Database triggers – syntax, parts and types of triggers
16. Develop a package using database connectivity
17. Exercises using NoSQL database

Course Outcomes

After successful completion of this course, the students should be able to

- Design and implement a database schema for a given problem domain.
- Populate and query a database using SQL DDL/DML commands.
- Program in PL/SQL including stored procedures, stored functions, cursors, packages.
- Design and build a GUI application using a 4GL.

Course Objectives

- To give an overall view of multimedia tools.
- To understand and differentiate text, image, video & audio

EXERCISES:

1. Program to generate frame by frame animation using multimedia flash
2. Program to create an advertisement for a product using techniques like guide layer, masking, morphing, and onion skin using flash
3. Program to create an image and demonstrate basic image editing using photoshop
4. Program to demonstrate rasterization and filtering of layers, blending effects, text effects using photoshop
5. Program to create a logo design using adobe illustrator
6. Audio and video editing exercises

Course Outcomes**After successful completion of this course, the students should be able to**

- Design and implement an animation for various themes.
- Prepare multimedia advertisement.
- Edit image.

SEMESTER II

Course Objectives

- To know the use of measures of central tendency, dispersion and correlation for analysis of data.
- To understand the concepts of probability and random variables.
- To know about some standard distributions and their properties.

Course Content**STATISTICAL MEASURES****12**

Measures of Central Tendency: Mean, Median and Mode – Measures of Variation – Range, Standard Deviation, Mean Deviation and Coefficient of Variation – Correlation and Regression: Karl Pearson's Coefficient of Correlation – Rank Correlation – Regression Lines (Definitions and Simple Numerical Problems Only).

PROBABILITY AND RANDOM VARIABLE**12**

Axioms of Probability – Conditional Probability – Total Probability – Baye's Theorem – Random Variable – Distribution Function – Properties – Probability Function – Probability Density Function – Moments and Moment Generating Function – Properties.

STANDARD DISTRIBUTIONS**12**

Binomial, Poisson and Normal Distributions – Properties – Fitting of Binomial, Poisson and Normal Distributions to Data.

TESTING OF HYPOTHESIS**12**

Testing of Hypothesis for Large Samples (Single Mean, Difference of Means, Single Proportion, Difference of Proportions) – Small Samples Tests Based on T and F Distributions (Single Mean, Difference of Means, Paired t -Test and Variance Ratio Test) – Chi-square Test for Independence and Goodness of Fit – Simple Numerical Problems Only.

DESIGN OF EXPERIMENTS AND QUALITY CONTROL**12**

Analysis of Variance – One Way Classification – Two Way Classification – CRD – RBD – Latin Square – LSD Concept of Process Control – Control Charts for Variables – \bar{X} , R-Charts – Control Charts for Attributes – p, np, c-Charts – Tolerance Limits.

Total Hours: 60**REFERENCES:**

1. Veerarajan T, "Probability and Statistics", Tata McGraw Hill, New Delhi, 2007 & 2nd Reprint 2004.
2. Gupta S. P, "Statistical Methods", Sultan Chand & Sons Publishers, 2004.
3. Johnson R. A, "Miller & Freund's Probability and Statistics for Engineers", Pearson Education, Delhi, 6th Edition, 2000.
4. Gupta S.C, and Kapur, J.N., "Fundamentals of Mathematical Statistics", Sultan Chand, New Delhi, 9th Edition, 1996.
5. Walpole R. E., Myers S.L. and Keying Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education Inc, 2002.

Course Outcomes

After successful completion of this course, the students should be able to

- To be able to test hypothesis using various tests for large and small samples.
- To analyze experiments based on one-way, two-way and latin square classifications.
- To understand the basics of quality control using control charts.

Course Objectives

- The advanced data structures related to handling data (AVL trees, B trees, B+ trees, Heap, Table) are introduced in this course.
- Analyze the asymptotic performance of algorithms.
- Apply important algorithmic design paradigms and methods of analysis.

Course Content**INTRODUCTION****5**

Algorithm – Fundamentals of Analysis of Algorithm Efficiency – Asymptotic Notations – Mathematical Analysis of Recursive and Non-recursive Algorithms.

TREES**7**

B – Trees (Definition, Insertion, Deletion) – B + Trees – Splay Trees – AVL Trees – Binomial Heap.

TABLES**7**

Introduction – Operations – Hash Table: Hash functions – Implementation – Overflow Handling Techniques – Linear Open Addressing – Chaining – Successful and Unsuccessful Searches – Data Structures for Disjoint Sets: Disjoint Set Operations – Linked List representation of Disjoint Sets.

DIVIDE AND CONQUER**5**

Introduction – Example and Analysis: Multiplication of Large Integer – Strassen’s Multiplication – Finding Maximum and Minimum.

GREEDY METHOD**6**

Introduction – Example and Analysis: Prim’s Algorithm, Kruskal’s Algorithm – Dijkstra’s Algorithm – Huffman Coding.

DYNAMIC PROGRAMMING**5**

Introduction – Example and Analysis: Warshall’s Algorithm – Floyd’s Algorithm.

BACK TRACKING**5**

Introduction – Example and Analysis: n-Queens Problem – Hamiltonian Circuit Problem – Subset Sum Problem.

BRANCH AND BOUND**5**

Introduction – Example and Analysis: Assignment Problem – Knapsack Problem – Travelling Salesman Problem.

Total Hours: 45**REFERENCES:**

1. Anany Levitin ,“Introduction to the Design and Analysis of Algorithms”, Pearson Education, 2nd Edition, 2007.
2. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Pearson Education, 2006.

3. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein “Introduction to Algorithms”, The MIT Press, 2009.
4. Vijayalakshmi Pai G.A, “Data Structures and Algorithms: Concepts Techniques and Applications”, Mc Graw Hill, 2009.
5. Horowitz Ellis and Sartaj Sahni, “Fundamentals of Computer Algorithms”, Galgotia Publications, 2004.
6. Sahni Sartaj, “Data Structures, Algorithms and Applications in C++”, WCB / Tata McGraw Hill, 2005.

Course Outcomes

After successful completion of this course, the students should be able to

- Understand the behavior of advanced data structures.
- Analyze and determine the appropriate data structure for a problem.
- Apply the algorithms and design techniques to solve problems.
- Analyze the complexities of various problems in different domains.

Course Objectives

- Understand the theoretical concepts used in the present day computer networks.
- Understand the design of wireless, cellular and adhoc networks.
- To have hands on experience with the protocol analyzer and simulation tools.

Course Content**PHYSICAL AND DATA LINK LAYER****9**

Introduction – Network Models – OSI Model – Layers in the OSI Model – Transmission Media – Guided Media – Unguided Media – Switching – Circuit Switched Networks – Datagram Networks – Virtual Circuit Networks – Error Detection and Correction – Data Link Control – Multiple Access – Wired LANs – Connecting LANs, Backbone Networks – Virtual LANs.

NETWORK AND TRANSPORT LAYER**9**

Logical Addressing – IPv4 Addresses – IPv6 Addresses – Internet Protocol – IPv4 – IPv6 – Network Layer Delivery Forwarding – Unicast Routing Protocols – Process-to-Process Delivery – User Datagram Protocol(UDP) – Transmission Control Protocol(TCP) – Congestion Control and Quality of Service(QoS) – Congestion Control – Techniques to Improve QoS.

APPLICATION LAYER**9**

Domain Name System(DNS) – Name Space – DNS – Distribution of Name Space – DNS in the Internet – Resolution – DNS Messages – Types of Records – Remote Logging – Electronic Mail – Simple Mail Transfer Protocol(SMTP) – File Transfer – World Wide Web(WWW) – Hyper Text Transfer Protocol(HTTP) – Simple Network Management Protocol(SNMP) – Security – Cryptography – Network Security.

WIRELESS LAN**9**

Fundamentals of Wireless – LANs, PANs, WANs, MANs – Wireless Internet: IEEE 802.11 and ETSI, HIPER-LAN Standards – Bluetooth – HomeRF – Cellular Concept and Architecture – First, Second and Third Generation Cellular Networks – Mobile IP – TCP in Wireless Domain.

AD HOC WIRELESS NETWORKS**9**

Ad hoc Wireless Networks – Issues and Challenges in Infrastructure-less Networks – MAC Protocols for Adhoc Wireless Networks – Issues in Designing – Design Goals – Classifications – Routing Protocols – Introduction – Issues – Classification – Wireless Sensor Networks – Introduction – Sensor Network Architecture – MAC Protocols for Sensor Networks – Location Discovery.

Total Hours: 45**REFERENCES:**

1. Behrouz A. Forouzan, “Data Communication and Networking”, Tata McGraw Hill, 5th Edition, 2010.
2. C. Siva Ram Murthy and B.S. Manoj, “Ad Hoc Wireless Networks: Architectures and Protocols”, Pearson Education, 15th Edition, 2014.
3. Andrew S.Tanenbaum, “Computer Networks”, Prentice Hall, 4th Edition, 2003.

4. Larry L. Peterson and Bruce S. Davie, “Computer Networks: A Systems Approach”, Morgan Kaufmann Publishers, 4th Edition, 2007.

Course Outcomes

After successful completion of this course, the students should be able to

- Identify the various computer network protocol design models and the usage of various types of transmission media and working of LAN technology.
- Understand the IP addressing, routing, congestion control and flow control concepts.
- Understand the various network applications and the supporting protocols.
- Familiarize the various wireless LAN concepts and the design of adhoc wireless network.

Course Objectives

- To provide an insight into the processes of software development.
- To understand and practice the various fields such as analysis, design, development, testing of software engineering.
- To develop skills to construct software of high quality with high reliability.

Course Content**INTRODUCTION****9**

Introduction to Software Engineering – A Generic Process Model – Prescriptive Process Models: Waterfall, Incremental, Prototyping, and Spiral Model – The Unified Process – Agile Development: Agile Process – Extreme Programming (XP) – Adaptive Software Development – Scrum.

MODELING**9**

Modeling Principles – Understanding Requirements – Requirements Modeling: Scenario-Based, Data, Class-Based, Flow-Oriented, Behavioral Modeling.

SOFTWARE DESIGN**9**

Design Concepts – Design Models – Architectural Design: Software Architecture – Architectural Styles – Architectural Design – Component Level Design: Component – Designing Class Based and Traditional Components.

QUALITY MANAGEMENT**9**

Quality Concepts – Review Techniques – Software Quality Assurance – A Strategic Approach to Software Testing – Strategic issues – Software Configuration Management (SCM) – SCM Repository – SCM Process – Software Maintenance and Supportability.

REENGINEERING AND SOFTWARE PROCESS IMPROVEMENT**9**

Reengineering – Business Process Reengineering – Software Reengineering – Reverse Engineering – Restructuring – Software Process Improvement (SPI) – SPI Process – The CMMI – The People CMM – Other SPI Frameworks.

Total Hours: 45**REFERENCES:**

1. Roger Pressman S., “Software Engineering: A Practitioner's Approach”, Tata McGraw Hill, 7th Edition, 2010.
2. Pfleeger and Atlee, “Software Engineering”, Pearson Education, 2006.
3. Carlo Ghezzi, Mehdi Jazayari & Dino Mandrioli, “Fundamentals of Software Engineering”, Prentice Hall of India, 2010.
4. Ian Sommerville, “Software Engineering”, Pearson Education, 8th Edition, 2009.

Course Outcomes

After successful completion of this course, the students should be able to

- Get an insight into the processes of software development.
- Understand the problem domain for developing SRS and various models of software engineering.
- Model software projects into high level design using DFD, UML diagrams.
- Measure the process performance using various metrics.

Course Objectives

- To understand the concepts of computer ethics in work environment.
- To understand the threats in computing environment.
- To understand the intricacies of accessibility issues.
- To ensure safe exits when designing the software projects.

Course Content**COMPUTER ETHICS INTRODUCTION AND COMPUTER HACKING 9**

A General Introduction – Computer Ethics: An Overview – Identifying an Ethical Issue – Ethics and Law – Ethical Theories – Professional Code of Conduct – An Ethical Dilemma – A Framework for Ethical Decision Making – Computer Hacking – Introduction – Definition of Hacking – Destructive Programs – Hacker Ethics – Professional Constraints – BCS Code of Conduct – To Hack or Not To Hack? – Ethical Positions on Hacking.

ASPECTS OF COMPUTER CRIME AND INTELLECTUAL PROPERTY RIGHTS 9

Aspects of Computer Crime Introduction – What is Computer Crime – Computer Security Measures – Professional Duties and Obligations – Intellectual Property Rights – The Nature of Intellectual Property – Intellectual Property – Patents, Trademarks, Trade Secrets, Software Issues, Copyright – The Extent and Nature of Software Piracy – Ethical and Professional Issues – Free Software and Open Source Code.

REGULATING INTERNET CONTENT, TECHNOLOGY AND SAFETY 9

Introduction – In Defense of Freedom Expression – Censorship – Laws Upholding Free Speech – Free Speech and the Internet – Ethical and Professional Issues – Internet Technologies and Privacy – Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk.

COMPUTER TECHNOLOGIES ACCESSIBILITY ISSUES 9

Introduction – Principle of Equal Access – Obstacles to Access for Individuals – Professional Responsibility – Empowering Computers in the Workplace – Introduction – Computers and Employment – Computers and the Quality of Work – Computerized Monitoring in the Work Place – Telecommuting – Social, Legal and Professional Issues – Use of Software, Computers and Internet Based Tools – Liability for Software Errors – Documentation Authentication and Control – Software Engineering Code of Ethics and Practices – IEEECS – ACM Joint Task Force.

SOFTWARE DEVELOPMENT AND SOCIAL NETWORKING 9

Software Development – Strategies for Engineering Quality Standards – Quality Management Standards – Social Networking – Company Owned Social Network Web Site – The Use of Social Networks in the Hiring Process – Social Networking Ethical Issues – Cyber Bullying – Cyber Stalking – Online Virtual World – Crime in Virtual World – Digital Rights Management – Online Defamation – Piracy – Fraud.

Total Hours: 45

REFERENCES :

1. Penny Duqueno, Simon Jones and Barry G Blundell, "Ethical, legal and professional issues in Computing", Middlesex University Press, 2008.
2. George Reynolds, "Ethics in Information Technology", Cengage Learning, 2011.
3. Caroline Whitback, "Ethics in Engineering Practice and Research", Cambridge University Press, 2011.
4. Richard Spinello, "Case Studies in Information and Computer Ethics", Prentice Hall, 1997.
5. John Weckert and Douglas Adeney, "Computer and Information Ethics", Greenwood Press, 1997.
6. Sara Baase, "A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet", 3rd Edition, Prentice Hall, 2008.

Course Outcomes

After successful completion of this course, the students should be able to

- Examine situations and to internalize the need for applying ethical principles, values to tackle with various situations.
- Develop a responsible attitude towards the use of computer as well as the technology.
- Envision the societal impact on the products/ projects they develop in their career.
- Understand the code of ethics and standards of computer professionals.
- Analyze the professional responsibility and empowering access to information in the work place.

Course Objectives

- Understand the fundamentals of object oriented concepts.
- Be able to write a C++ program to solve various problems.
- Be able to choose appropriate data structures to solve the problems.

EXERCISES:

1. Program to illustrate the concept of classes and objects
2. Program to implement various types of functions
3. Program to implement various types of inheritance
4. Program to illustrate overloading and file operations
5. Program to implement exceptions handling mechanism
6. Program to implement the concept of stack and queue
7. Program to implement the concept of linked list
8. Program using trees
9. Program to illustrate the concept of graphs
10. Program to illustrate various types of sorting

Course Outcomes

After successful completion of this course, the students should be able to

- Understand the object oriented concepts for implementation.
- Implement the data structure concepts.

Course Objectives

- Understand fundamentals of programming such as variables, conditional and iterative execution, APIs etc.
- Understand fundamentals of object oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Have the ability to write computer programs to solve specific problems.
- Be able to use the Java SDK environment to create, debug and run Java programs.

EXERCISES:

1. Program to illustrate declaration and access control
2. Program to illustrate assignments
3. Program to illustrate the use of operators
4. Program to illustrate flow control
5. Program to implement various OOPS concepts
6. Program to illustrate APIs like collection, I/O etc.
7. Program to implement the concept of interfaces and packages
8. Program to implement exceptions handling mechanism
9. Program using applets
10. Program to illustrate the use of RMI (Remote Method Invocation)

Course Outcomes

After successful completion of this course, the students should be able to

- Understand the Java programming language in the aspects of designing, coding and implementation.
- Know about new ideas and advances, techniques, and tools and to use them effectively.

Course Objectives

- To understand the importance of the web as an effective medium of communication.
- To develop basic skills in analyzing the usability of a web site.
- To develop hands on experience using open source technologies such as HTML, CSS, JavaScript, PHP and MySQL.
- To implement static, dynamic and interactive web pages and web applications.
- To be able to analyze the available open source technologies and select the appropriate one based on need.

EXERCISES:**HTML**

1. Write a HTML program for creation of web site with forms, frames, links, etc.
2. Design a web site using HTML and DHTML. Use basic text formatting and image tags
3. Create a personal website using HTML and DHTML
4. Write a HTML program to display a traditional newspaper with the use of table tags

CSS 3.0

1. Implement a CSS programs describing layers, inline, internal and external style sheets
2. Develop a webpage using CSS to set the background color, font, and paragraph
3. Develop a webpage using external CSS to import classes for various HTML tags
(Use link and import)
4. Develop a webpage in various styles using CSS

Java Script

1. Develop a web page to validate the registration, user login, user profile and payment by credit card pages using JavaScript by importing a .js file
2. Develop a web page to count the number of words and number of vowels in a passage
3. Develop a web page to display a digital clock at the status bar using JavaScript
4. Develop a tool tip text (for form validation) for a web page

PHP & MySQL

1. Design and implement a user login form
2. Implement an online shopping cart
3. Implement an online exam system
4. Implement an interactive and effective student progress monitoring system

Course Outcomes

After successful completion of this course, the students should be able to

- Design, develop and host a user friendly website.
- Know the usage of APIs.
- Layout management in line with current trend.