

REGULATION 2013

SEMESTER - I

Course Code	Course Title	Hours / week			C	Maximum Marks			CAT
		L	T	P		CA	SEE	Total	
THEORY									
13EN101	Technical English - I	3	0	0	3	40	60	100	HUM
13MA102	Linear Algebra, Calculus and Applications	3	1	0	4	40	60	100	BS
13PY103	Engineering Physics	3	0	0	3	40	60	100	BS
13CS105	Fundamentals of Computing and C Programming	4	0	0	4	40	60	100	EAS
13CE106	Basics of Civil and Mechanical Engineering	4	0	0	4	40	60	100	EAS
13CH108	Engineering Chemistry for Electrical Sciences	3	0	0	3	40	60	100	BS
PRACTICAL									
13CS111	Fundamentals of Computing and C Programming Laboratory	0	0	3	1	60	40	100	EAS
13ME112	Engineering Graphics	1	0	3	2	60	40	100	EAS
13PY211	Physics/Chemistry Laboratory*	0	0	3	Refer Sem. II & footnote #			BS	
Total		21	1	9	24				

SEMESTER - II

Course Code	Course Title	Hours / week			C	Maximum Marks			CAT
		L	T	P		CA	SEE	Total	
THEORY									
13EN201	Technical English - II	3	0	0	3	40	60	100	HUM
13MA202	Transform Techniques and Integral Calculus	3	1	0	4	40	60	100	BS
13CH204	Environmental Science	3	0	0	3	40	60	100	EAS
13IT206	Advanced C Programming and Data Structures	3	0	0	3	40	60	100	DC
13EE207	Basics of Electrical and Electronics Engineering	4	0	0	4	40	60	100	EAS
13PY208	Materials Science for Electrical Sciences	3	0	0	3	40	60	100	BS
PRACTICAL									
13PY211	Physics/Chemistry Laboratory*	0	0	3	2	60	40	100	BS
13IT212	Advanced C Programming and Data Structures Laboratory	0	0	3	1	60	40	100	DC
13ME213	Engineering Practices	0	0	3	1	60	40	100	EAS
Total		19	1	9	24				

SEMESTER - III

Course Code	Course Title	Hours / week			C	Maximum Marks			CAT
		L	T	P		CA	SEE	Total	
THEORY									
13CS301	Database Management Systems	3	0	0	3	40	60	100	DC
13MA302	Discrete Transforms and Fourier Analysis	3	1	0	4	40	60	100	BS
13CS303	Object Oriented Programming and C++	3	0	0	3	40	60	100	DC
13IT304	Digital Principles and System Design	4	0	0	4	40	60	100	DC
13IT305	Advanced Data Structures and Algorithm Analysis	4	0	0	4	40	60	100	DC
13IT306	Principles of Communication	3	0	0	3	40	60	100	DC
PRACTICAL									
13IT311	Advanced Data Structures and Algorithm Analysis Laboratory	0	0	3	1	60	40	100	DC
13CS312	Database Management System Laboratory	0	0	3	1	60	40	100	DC
13IT313	Object Oriented Programming and C++ Laboratory	0	0	3	1	60	40	100	DC
Total		20	1	9	24				

SEMESTER - IV

Course Code	Course Title	Hours / week			C	Maximum Marks			CAT
		L	T	P		CA	SEE	Total	
THEORY									
13IT401	Computer Organization and Architecture	4	0	0	4	40	60	100	DC
13IT402	Software Engineering Methodologies	4	0	0	4	40	60	100	DC
13MA403	Discrete Mathematics	3	1	0	4	40	60	100	BS
13IT405	Signals and Systems	3	0	0	3	40	60	100	DC
13CS407	System Programming and Operating Systems	4	0	0	4	40	60	100	DC
13EC409	Microprocessors, Microcontrollers and Applications	4	0	0	4	40	60	100	EAS
PRACTICAL									
13CS412	Digital Laboratory	0	0	3	1	60	40	100	DC
13CS413	System Programming and Operating Systems Laboratory	0	0	3	1	60	40	100	DC
13EC414	Microprocessors and Microcontrollers Laboratory	0	0	3	1	60	40	100	EAS
Total		22	1	9	26				

SEMESTER - V

Course Code	Course Title	Hours / week			C	Maximum Marks			CAT
		L	T	P		CA	SEE	Total	
THEORY									
13MA501	Probability and Queuing Theory	3	1	0	4	40	60	100	BS
13CS502	Theory of Computation	4	0	0	4	40	60	100	DC
13IT503	Java and Internet Programming	3	0	0	3	40	60	100	DC
13IT504	Computer Communication Networks	3	0	0	3	40	60	100	DC
13IT505	Distributed Systems	3	0	0	3	40	60	100	DC
13EC507	Digital Signal Processing	3	1	0	4	40	60	100	EAS
PRACTICAL									
13IT511	Computer Networks Laboratory	0	0	3	1	60	40	100	DC
13IT512	Java and Internet Programming Laboratory	0	0	3	1	60	40	100	DC
13IT513	Social Relevant Project	0	0	3	1	60	40	100	HUM
13CS515	CASE Tools Laboratory	0	0	3	1	60	40	100	DC
Total		19	2	12	25				

SEMESTER - VI

Course Code	Course Title	Hours / week			C	Maximum Marks			CAT
		L	T	P		CA	SEE	Total	
THEORY									
13MA601	Numerical Methods	3	1	0	4	40	60	100	BS
13MB602	Principles of Management	3	0	0	3	40	60	100	HUM
13CS603	Compiler Design	4	0	0	4	40	60	100	DC
13IT604	Cryptography and Network Security	3	0	0	3	40	60	100	DC
13IT605	Graphics and Multimedia	3	0	0	3	40	60	100	DC
13ITXXX	Elective I	3	0	0	3	40	60	100	DE
PRACTICAL									
13IT611	Graphics and Multimedia Laboratory	0	0	3	1	60	40	100	DC
13EN612	Communication Skills Laboratory	1	0	3	2	60	40	100	HUM
13CS613	Compiler Design Laboratory	0	0	3	1	60	40	100	DC
Total		20	1	9	24				

SEMESTER - VII

Course Code	Course Title	Hours / week			C	Maximum Marks			CAT
		L	T	P		CA	SEE	Total	
THEORY									
13IT701	Service Oriented Architecture	3	0	0	3	40	60	100	DC
13IT702	Mobile Computing	3	0	0	3	40	60	100	DC
13IT703	Virtualization Techniques	3	0	0	3	40	60	100	DC
13IT704	Cloud Computing	3	1	0	4	40	60	100	DC
13ITXXX	Elective II	3	0	0	3	40	60	100	DE
13ITXXX	Elective III	3	0	0	3	40	60	100	DE
PRACTICAL									
13IT711	Service Oriented Architecture Laboratory	0	0	3	1	60	40	100	DC
13IT712	Virtualization Techniques Laboratory	0	0	3	1	60	40	100	DC
13IT721	Comprehensive Viva - Voce	0	0	0	1	-	100	100	DC
13IT751	Project Work - Phase I	0	0	3	1	60	40	100	DC
Total		18	1	9	23				

SEMESTER - VIII

Course Code	Course Title	Hours / week			C	Maximum Marks			CAT
		L	T	P		CA	SEE	Total	
THEORY									
13ITXXX	Elective IV	3	0	0	3	40	60	100	DE
13ITXXX	Elective V	3	0	0	3	40	60	100	DE
PROJECT WORK									
13IT851	Project Work - Phase II	0	0	18	6	60	40	100	DC
Total		6	0	18	12				

L	-	Lecture	T	-	Tutorial
P	-	Practical	C	-	Credits
CA	-	Continuous Assessment	SEE	-	Semester End Examination
BS	-	Basic Science	HUM	-	Humanities
EAS	-	Engg. Arts & Science	CAT	-	Category
DC	-	Department Core	DE	-	Department Elective

- Continuous Assessment marks are awarded for performance in both semesters I & II with marks for final test to be scheduled by the faculty concerned at the end of semester II covering the entire syllabus

* - Laboratory classes on alternate weeks for Physics and Chemistry

LIST OF ELECTIVES
COMMUNICATION SYSTEMS

Course Code	Course Title
13IT001	Communication switching Techniques
13IT002	Information Coding Techniques
13IT003	Information Security
13IT004	Embedded Systems
13IT005	Digital Image Processing

PROGRAMMING AND DATABASES

Course Code	Course Title
13CS001	C# & .NET Framework
13CS004	UNIX Internals
13IT021	Data Warehousing and Mining
13IT024	Fundamentals of Open Source Software
13IT025	Big Data
13CS045	Advanced Databases

NETWORKING

Course Code	Course Title
13IT041	Client Server Computing
13IT042	Grid Computing
13IT043	Wireless Networks
13IT044	Soft Computing
13IT045	Pervasive Computing
13CS046	Parallel Computing
13IT047	High Speed Networks

MANAGEMENT TECHNIQUES

Course Code	Course Title
13GE001	Intellectual Property Rights
13GE002	Total Quality Management
13GE005	Professional Ethics
13IT063	Resource Management Techniques
13IT064	Management Information Systems
13IT065	E-Learning
13IT066	E-Commerce

ADVANCED WEB TECHNOLOGY AND SOFTWARE DEVELOPMENT

Course Code	Course Title
13IT081	Advanced Web programming
13IT082	Semantic Web
13IT083	Software Project Management
13IT084	Software Testing
13IT085	Web Services

SEMESTER III

13CS301

DATABASE MANAGEMENT SYSTEMS

3 0 0 3

OBJECTIVES

- To understand the fundamentals of data models and to conceptualize and depict a database system using ER diagram.
- To learn about SQL and relational database design.
- To study the basic concepts in deadlock occurrence and recovery techniques.
- To understand the emerging trends in the area of distributed database

OUTCOMES

At the end of the course the student should be able to

- Develop an Entity Relationship Model with the appropriate entities, attributes, relationships.
- Develop an understanding of essential DBMS concepts such as: concurrency, distributed database, and transaction management
- Design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS

UNIT I INTRODUCTION AND CONCEPTUAL MODELING 9

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 AND DOCUMENT-ORIENTED DATA MODEL 9

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

Record storage and 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 - B+ Tree - Query Processing.

UNIT IV TRANSACTION MANAGEMENT 9

Transaction Processing - Introduction - Need for Concurrency control - Desirable properties of Transaction - Schedule and Recoverability - Serializability and Schedules - Concurrency Control - Types of Locks -Two Phases locking – Deadlock - Recovery Techniques - log based recovery.

UNIT V OBJECT ORIENTED AND DISTRIBUTED DATABASE 9

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-Distributed transactions

UNIT VI STATE OF ART/ADVANCES (NOT FOR EXAMINATION)

JSON - Complex Event Processing - Data Stream Management System -No SQL -In memory database

TOTAL: 45

TEXT BOOK

1. Abraham Silberschatz, Henry F.Korth, “Database System Concepts”, 6th Edition, McGraw –Hill,2011

REFERENCES

1. Ramez Elmasri, Shamkant B.Navathe, “Fundamentals of Database Systems”, 6th Edition, Pearson Education, 2011.
2. Raghu Ramakrishnan,Johannes Gehrke, “Database Management Systems”, 3rd Edition, McGraw-Hill,2003

3. Hector Garcia-Molina, Jeffrey D.Ullman, Jennifer D.Widom, "Database System Implementation" Prentice Hall, 2000.
4. http://nptel.ac.in/courses/IIT-MADRAS/Intro_to_Database_Systems_Design/index.php
5. <http://www.json.org>

13MA302 DISCRETE TRANSFORMS AND FOURIER ANALYSIS 3 1 0 4

OBJECTIVES

- To study the concept of mathematical formulation of certain practical problems in terms of partial differential equations, solve them and physically interpret the results.
- To understand the different possible forms of Fourier series and the frequently needed practical harmonic analysis that an engineer may have to make from discrete data.
- To learn the working procedure of formulating and identifying certain boundary value problems encountered in engineering practices, decide on applicability of the Fourier series method of solution, solve them and interpret the results.
- To learn the concept of evaluating the complex integration in terms of residue theorem.
- To understand the basics of Z – transform in its applicability to discretely varying functions.

OUTCOMES

At the end of the course the student should be able to

- Solve the engineering problems using PDE
- Find Fourier series solution to the engineering problems
- Find the derivatives of the complex numbers and to evaluate complex integrals.
- Design and formulate certain problems in terms of difference equations and solve them using Z-transform technique

UNIT I PARTIAL DIFFERENTIAL EQUATIONS 9

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions- Solution of standard types of first order partial differential equations- Lagrange's linear equation – Linear homogeneous partial differential equations of second and higher order with constant co-efficient

UNIT II FOURIER SERIES 9

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series –Change of interval- Parseval's identity- harmonic analysis.

UNIT III BOUNDARY VALUE PROBLEMS 9

Classification– Solution of one dimensional wave equation – one dimensional heat equation – steady state solution of two dimensional equations (excluding insulated edges) – Fourier series solution in Cartesian coordinates.

UNIT IV ANALYTIC FUNCTIONS AND COMPLEX INTEGRATION 9

Functions of a complex variable–Analytic functions–Necessary conditions, Cauchy-Riemann equation and Sufficient conditions (excluding proofs) – Harmonic conjugate – Construction of analytic functions - Complex integration–Singular points – Residues – Residue theorem statement – Application of residue theorem to evaluate real Integrals.

UNIT V Z- TRANSFORM AND DIFFERENCE EQUATIONS 9

Z-transform- Properties – Inverse Z- transform- Convolution theorem- Formation of difference equations – Solution of difference equations using Z-transform

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Modeling of heat and mass transfer equation using PDE – Discrete Fourier transform in the field of Digital Signal Processing and Spectral analysis – Analytic continuation – Special functions.

TUTORIAL: 15

TOTAL: 60

TEXT BOOKS

1. B.Trivedi,” Programming with ANSI C++”, 2nd Edition, Oxford University Press, 2012.
2. B.Stroustrup, “The C++ Programming Language”,4th Edition, Pearson Education, 2013.

REFERENCES

1. K.R.Venugopal, Rajkumar, T.Ravishankar, “Mastering C++ “,Tata McGraw Hill, 2007.
2. E.Balagurusamy, “Object Oriented Programming with C++”, Tata McGraw Hill, 5th Edition, 2011.

13IT304

DIGITAL PRINCIPLES AND SYSTEM DESIGN

4 0 0 4

OBJECTIVES

- To understand different methods used for the simplification of Boolean functions.
- To study combinational circuits.
- To learn synchronous sequential circuits.
- To understand asynchronous sequential circuits.
- To gain knowledge about the fundamentals of HDL.

OUTCOMES

At the end of the course the student should be able to

- Simplify boolean functions using different methods.
- Design and implement combinational logic circuits.
- Design and implement various sequential logic circuits
- Write HDL code for digital circuits

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES

12

Binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Realization of Boolean functions using Logic gates

UNIT II COMBINATIONAL LOGIC

12

Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations - Code conversion - Multiplexers and Demultiplexers - Decoders and encoders -Memory and programmable logic.

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC

12

Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC

12

Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables – Race-free state assignment – Hazards

UNIT V HARDWARE DESCRIPTION LANGUAGE (HDL)

12

Introduction to Hardware Description Language (HDL) - HDL for combinational circuits- HDL for sequential logic circuits, Shift registers and counters.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Field Programmable Gate Array (FPGA) - Simple Programmable Logic Device (SPLD)-Complex Programmable Logic Devices (CPLD) - Power Logic 8 bit shift register.

TOTAL: 60

TEXT BOOK

1. M.Morris Mano, Michael D.Ciletti, “Digital Design”, 5th edition, Prentice Hall, 2013.

REFERENCES

1. Charles H.Roth, Jr. "Fundamentals of Logic Design", 7th Edition, Jaico Publishing House, 2013.
2. Donald D.Givone, "Digital Principles and Design", 7th Edition, Tata McGraw-Hill, 2010.
3. <http://nptel.ac.in/courses.php?disciplineId=117>.

13IT305

**ADVANCED DATA STRUCTURES AND
ALGORITHM ANALYSIS**

4 0 0 4

OBJECTIVES

- To study the concept of the data structures that effectively models the information in a problem.
- To understand the running-time complexity/analysis of an algorithm on simple sorting/searching algorithms.
- To learn the working of algorithmic design techniques to evaluate the performance of an algorithm.
- To learn the working of various advanced data structures.

OUTCOMES

At the end of the course the student should be able to

- Analyze and apply amortized analysis on data structures, including binary search trees, AVL trees, heaps.
- Use the characteristics and optimal behavior of hash tables for access and retrieval.
- Analyze the mathematical background of algorithm analysis to determine run time of code.
- Use algorithm design techniques including greedy, divide-and-conquer, dynamic programming, branch and bound, randomized algorithms, and backtracking.

UNIT I TREES AND HEAP STRUCTURES

12

Binary Search Trees – AVL Trees – Red-Black trees – Multi-way Search Trees– Splay Trees – Tries- Min/Max heaps- Binomial Heaps

UNIT II GRAPHS AND HASHING FUNCTIONS

12

Graphs – Directed Graphs – Shortest Path Problem – Undirected Graph – Spanning Trees – Graph Traversals-Hash table representation-Hash functions-Collision Resolution- Separate Chaining-Open Addressing-Linear Probing-Quadratic Probing- Double Hashing-Rehashing

UNIT III ALGORITHM ANALYSIS

12

Algorithm Analysis – Asymptotic Notations – Properties of Big-Oh notation – Recurrence equations Solving recurrence equations – Conditional asymptotic notation –Divide and Conquer: General Method – Binary Search-Merge Sort-Quick Sort-Greedy Algorithms: General Method – Container Loading – Knapsack Problem

UNIT IV DYNAMIC PROGRAMMING AND BACKTRACKING

12

Dynamic Programming: General Method – Multistage Graphs – All-Pair shortest paths – Travelling salesperson problem -Backtracking: General Method – 8 Queens Problem – Sum of subsets – Graph coloring – Hamiltonian Problem.

UNIT V BRANCH AND BOUND

12

Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack Problem – Travelling Sales Person Problem -Introduction to NP-Hard and NP-Completeness

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Data Structures for File Systems, Data Structures for Indexing and Searching and Search Engines- Big Data

TOTAL: 60

TEXT BOOKS

1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, 4th Edition Pearson Education, 2013.
2. Anany Levitin, “Introduction to the Design and Analysis of Algorithm”, 3rd Edition Pearson Education Asia, 2011.

REFERENCES

1. E. Horowitz, S.Sahni and Dinesh Mehta, “Fundamentals of Data structures in C++”, University Press, 2009.
2. AhoHopcroft Ullman, “Data Structures and Algorithms”, Pearson Education, 2009
3. E. Horowitz, S. Sahni and S. Rajasekaran,”Computer Algorithms/C++”, Second Edition, University Press,2008
4. Tanenbaum A.S, Langram Y, Augestien M.J., “Data Structures using C & C++”, Prentice Hall of India, 2002.
5. http://www.iitg.ernet.in/nptel/Comp_Sci_Engg/IIT%20Guwahati/Data%20Structures%20and%20Algorithms.htm
6. <http://nptel.ac.in/courses/106101060/>

13IT306

PRINCIPLES OF COMMUNICATION

3 0 0 3

OBJECTIVES

- To understand different types of AM & FM Communication systems Transmitters & Receivers.
- To gain knowledge about different digital modulation techniques for digital transmission.
- To have knowledge about base band transmission ISI and distortion free base band transmission.
- To understand the concept of spread spectrum modulation techniques and different multiple access methods.

OUTCOMES

At the end of the course the student should be able to

- Analyze the analog and digital communication principles and systems.
- Design and optimize data communication systems

UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION

9

Principles of amplitude modulation- AM envelope- Frequency spectrum and bandwidth- Modulation index and percent modulation-AM Voltage distribution- AM power distribution- Angle modulation - FM and PM waveforms-Phase deviation and modulation index- Frequency deviation and Percent modulation-Frequency analysis of angle modulated waves-Bandwidth requirements for Angle modulated waves.

UNIT II DIGITAL COMMUNICATION

9

An Overview of Digital Communication- Shannon limit for information capacity- Digital amplitude modulation- Frequency shift keying- FSK bit rate and baud- FSK transmitter- BW consideration of FSK- FSK receiver- Phase shift keying – Binary phase shift keying – QPSK- Quadrature Amplitude modulation- Bandwidth efficiency- Carrier recovery – Squaring loop- Costas loop- DPSK.

UNIT III DIGITAL TRANSMISSION

9

Basics of Digital Transmission - Pulse modulation- PCM – PCM sampling- Sampling rate- Signal to quantization noise rate- Compounding – Analog and digital – Percentage error- Delta modulation- Adaptive delta modulation- Differential pulse code modulation- Pulse transmission – Intersymbol interference- Eye patterns

UNIT IV DATA COMMUNICATIONS

9

Standards Organizations for data communication- data communication circuits- data communication codes- Error control- Error Detection- Error correction- Data communication Hardware- serial and parallel interfaces- data modems- modem control.

UNIT V SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 9

Spread Spectrum- Pseudo-noise sequence- DS spread spectrum with coherent binary PSK- Processing gain- FH spread spectrum- Multiple access techniques – FDMA-TDMA and CDMA in wireless communication systems.

UNIT IV STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

4G-Near Field Communication –Satellite communication- Microwave communication

TOTAL: 45

TEXT BOOKS

1. Frenzel Louis E, “Principles of Electronic Communication Systems” Tata McGraw Hill, 3rd Edition, 2008.
2. Taub,Schilling ,”Principles of communication systems”,2nd edition, Tata McGraw Hill,2010.

REFERENCES

1. Wayne Tomasi, “Electronic Communication Systems: Fundamentals Through Advanced”,5th edition, Pearson Education, 2009.
2. Simon Haykin, “Communication Systems”, 5h Edition, John Wiley & Sons., 2009.
3. Blake, “Electronic Communication Systems”, 2nd edition,Thomson Delmar Publications, 2002.
4. Martin S.Roden, “Analog and Digital Communication System”, 3rd Edition, PHI, 2007.
5. [http:// nptel.iitm.ac.in/ courses/ IIT-MADRAS/Principles_Of_Communication/ pdf / Lecture01_Intro.pdf](http://nptel.iitm.ac.in/courses/IIT-MADRAS/Principles_Of_Communication/pdf/Lecture01_Intro.pdf)
6. http://nptel.ac.in/courses/IIT-MADRAS/Principles_Of_Communication/index.php

13IT311 ADVANCED DATA STRUCTURES AND ALGORITHM ANALYSIS LABORATORY 0 0 3 1

OBJECTIVES

- To understand the concept of different algorithmic approaches.
- To learn and write ADTs for all data structures.
- To understand the working of various algorithmic design techniques.

LIST OF EXPERIMENTS

1. Binary Search Trees
2. AVL Trees
3. Min/Max Heaps
4. Write a C program to implement all the functions of a dictionary (ADT) using hashing.
5. Write a C program to implement directed and undirected graphs.
6. Implementation of divide and conquer algorithmic technique.
7. Implementation of Greedy Method algorithmic technique.
8. Implementation of Dynamic Programming algorithmic technique.
9. Implementation of Backtracking algorithmic technique.
10. Implementation of Branch & Bound algorithmic technique.

TOTAL: 45

13CS312 DATABASE MANAGEMENT SYSTEMS LABORATORY 0 0 3 1

OBJECTIVES

- To learn the fundamental aspects of a relational database.
- To understand and use Data Definition Language, data manipulation language and to query, update, and manage a Database.
- To understand SQL and PL/SQL queries to create, report, and update data in a relational database.
- To study the purpose of and be able to create views, scripts, triggers, and transactions.
- To learn about relational database design using Normal form.

LIST OF EXPERIMENTS

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS.
3. High-level language extension with Cursors.
4. High level language extension with Triggers
5. Procedures and Functions.
6. Embedded SQL.
7. Design and implementation of Distributed Database
 - (i) Student Internal Mark- Student Name list, Register number, List of Subject, Marks, % calculation, Grade Calculation.
 - (ii) Student Attendance-Student name, Register number, Class, Total no of hour present, total no of hour absent, attendance percentage.
 - iii) Student bio data- Student name, Address, Phone number, Blood group, Academic detail.
 - 1)job detail
 - 2)Course detail
 - 3)Security detail
8. Design and implementation of Object Oriented Database.

TOTAL: 45

13IT313

**OBJECT ORIENTED PROGRAMMING AND C++
LABORATORY**

0 0 3 1

OBJECTIVES

- To learn the fundamentals of object oriented programming concepts.
- To study exception handling mechanisms.
- To understand and improve the programming skills using constructor and function overloading.
- To learn the purpose of dynamic memory allocation concepts.
- To study the real world problem in object oriented programming environment.

LIST OF EXPERIMENTS

1. Design C++ classes with static members, methods with default arguments, friend functions. (For example, design matrix and vector classes with static allocation, and a friend function to do matrix – vector multiplication).
2. Implement complex number class with necessary operator over loadings and type conversions such as integer to complex, double to complex, complex to double etc.
3. Implement matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor and overloading of assignment operator.
4. Overload the new and delete operators to provide custom dynamic allocation of memory.
5. Develop a template of linked list class and its methods.
6. Develop templates of standard sorting algorithms such as bubble sort, merge sort, insertion sort and quick sort.
7. Design stack and queue classes with necessary exception handling.
8. Define Point class and an Arc class. Define a Graph class which represents graph as a collection of Point Objects and Arc Objects. Write a method to find the minimum cost spanning tree in a graph.
9. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, and Square, Circle, Ellipse, Triangle, Polygon etc.Design a simple test application to demonstrate dynamic polymorphism and RTTI.
10. Write a C++ program that randomly generates complex numbers (use previously designed complex class)and writes them two per line in a file along with an operator(+,-,* or /).The numbers are written to file in the format (a+ib).Write another program to read one line at a time from this file, perform the

corresponding operation on the two complex numbers read, and write the result to another file(one per line).

TOTAL: 45

SEMESTER IV

13IT401 COMPUTER ORGANIZATION AND ARCHITECTURE 4 0 0 4

OBJECTIVES

- To study the concept of the basic structure and operation of a digital computer.
- To learn the working of different types of arithmetic operations.
- To understand the different types of control and the concept of pipelining.
- To learn the working of different types of memories.
- To understand the different types of communication with I/O devices and standard I/O interfaces

OUTCOMES

At the end of the course the student should be able to

- Design various computational and processing units of a computer.
- Analyze parallel, pipelined, superscalar, and RISC/CISC architectures.
- Evaluate the performance of a computer system.

UNIT I BASIC STRUCTURE OF COMPUTERS 12

Functional units - Basic operational concepts - Bus structures - performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues

UNIT II ARITHMETIC UNIT 12

Addition and subtraction of signed numbers – Design of Fast adders – Multiplication of positive numbers - Signed operand multiplication – Fast multiplication – Integer division – Floating point numbers and operations.

UNIT III BASIC PROCESSING UNIT 12

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control- Pipelining: Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation

UNIT IV MEMORY SYSTEM 12

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 12

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

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Parallel and distributed organization- Instruction level parallelism (ILP)-Simultaneous Multi threaded (SMT) architecture-Multi Core Architectures- Energy efficient architectures.

TOTAL: 60

TEXT BOOKS

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", 6th Edition, McGraw-Hill, 2003.
2. M. Morris Mano, "Computer System Architecture, 3rd edition, Pearson Education, 2007

REFERENCES

1. William Stallings, "Computer Organization and Architecture – Designing for Performance", 6th Edition, Pearson Education, 2009.
2. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The hardware / software interface", 4th Edition, Morgan Kaufmann, 2008.
3. John P. Hayes, "Computer Architecture and Organization", 3rd Edition, McGraw-Hill, 2002.
4. Dimitrios Soudris and Axel Jantsch, " Scalable Multi-core Architectures: Design Methodologies and Tools", Springer, 2011.
5. http://nptel.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/comp_org_arc/web/index.htm

13IT402 SOFTWARE ENGINEERING METHODOLOGIES 4 0 0 4

OBJECTIVES

- To study the concept of different life cycle models and object oriented concepts.
- To analyze the importance of software requirements.
- To learn the various design concepts.
- To understand the different types of testing techniques.
- To learn the concepts of software metrics and measurements.

OUTCOMES

At the end of the course the student should be able to

- Analyze the need of lifecycle models for software development.
- Analyze different types of software requirements and modeling using UML diagrams.
- Design software architect using patterns and frameworks.
- Solve verification and validation process using testing techniques.
- Use software metrics and measurement for effective cost estimation.

UNIT I SOFTWARE DEVELOPMENT PROCESS 12

Overview of Software Engineering Paradigm – Life cycle models (Water fall, Incremental, Spiral, WINWIN Spiral, Prototyping) –Structured System Analysis-Introduction to Object Oriented Concepts-Object Oriented Analysis-Comparison of SSA and OOA.

UNIT II SOFTWARE REQUIREMENTS AND MODELING 12

Software Requirements-Types-Requirement Engineering Process – Elicitation – Validation and management –Introduction to UML-Modeling requirements using Use case diagram- Analysis and modeling – Data, Functional and Behavioral models-Modeling Interactions and behavior using UML diagrams.

UNIT III DESIGN CONCEPTS AND PRINCIPLES 12

Design Concepts –Design Concepts-Modular Design – Architectural Design –Data Design – User Interface Design – Real Time Software Design –Patterns and Frameworks-Cohesion and Coupling-Types.

UNIT IV TESTING 12

Taxonomy of Software Testing – Levels – Testing Strategies – Black Box Testing – Testing Boundary Conditions – Structural Testing – Types of Software Testing-Unit, Integration, Smoke, Regression Testing–Alpha and Beta testing-Validation and Verification- System Testing And Debugging.

UNIT V SOFTWARE PROJECT MANAGEMENT 12

B TECH: INFORMATION TECHNOLOGY

Software Measures and Metrics-Software cost estimation – FP model – COCOMO model- Delphi method- Task Network – Scheduling – Earned Value Analysis – Error Tracking - Software changes – Software Configuration Management-Software Auditing-Software Maintenance.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Agile Marketing in Large Organizations- Software Testing Tools- Automated Tools.

TOTAL: 60

TEXT BOOKS

1. Roger S.Pressman, Software engineering- A practitioner’s Approach, 7th edition, McGraw-Hill International Edition, 2010.
2. Timothy Christian Lethbridge, Robert Laganieri, ”Object-Oriented Software Engineering: Practical Software Development using UML and Java”, 2nd Revised Edition, McGraw-Hill, 2004
3. Ian Sommerville, Software engineering, 8th edition, Pearson education Asia, 2010.

REFERENCES

1. PankajJalote- An Integrated Approach to Software Engineering, 5th edition, Springer Verlag, 2011.
2. James F Peters and WitoldPedryez, “Software Engineering – An Engineering Approach”, John Wiley and Sons, New Delhi, 2008.
3. Ali Behforooz and Frederick J Hudson, “Software Engineering Fundamentals”, Oxford University Press, New Delhi, 2008.
4. Ali Bahrami, “Object Oriented Systems Development”, Tata McGraw-Hill, 2008.
5. <http://nptel.ac.in/courses/106101061/>

13MA403

DISCRETE MATHEMATICS

3 1 0 4

OBJECTIVES

- To study the concepts needed to test the logic of a program.
- To understand the different types of applications in expert system, in data base and basic for the prolog language.
- To understand and identify different types of patterns on many levels.
- To learn the working of class of functions which transform a finite set into another finite set which relates to input output functions in computer science.
- To learn the working of graphical models in sensor networks.

OUTCOMES

At the end of the course the student should be able to

- use the concepts of Discrete Mathematics in software development and hardware design.
- analyse fault tolerant computing system using graph models.
- use graph algorithm in computer network security.

UNIT I PROPOSITIONAL CALCULUS

9

Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contrapositive – Logical equivalences and implications – DeMorgan’s Laws – Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments - Validity of arguments.

UNIT II PREDICATE CALCULUS

9

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

9

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.

UNIT IV FUNCTIONS **9**

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

UNIT V GRAPH THEORY **9**

Introduction – Basic Definitions – Degree of a vertex – Some Special Simple Graphs – Matrix Representation of Graphs – Paths, Cycles and Connectivity – Eulerian and Hamiltonian Graphs – Connectedness in Directed Graphs – Shortest Path Algorithms (Dijkstra’s Algorithm, Warshall’s Algorithm) – Trees – Spanning Trees – Minimum Spanning Tree – Rooted and Binary Tree – Binary Tree – Tree Traversal – Expression Trees.

UNIT VI STATE OF THE ART/ADVANCES(NOT FOR EXAMINATION)

Application of Discrete Maths in software development and hardware design – Clustering of web documents using graph model - Modeling sensor networks as graph.

TUTORIAL: 15

TOTAL: 60

TEXT BOOKS

1. Tremblay J.P and Manohar R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.
2. Kenneth H.Rosen, “Discrete Mathematics and its Applications”, Seventh Edition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2011.

REFERENCES

1. Ralph. P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, Fifth Edition, Pearson Education Asia, Delhi, 2003.
2. Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, “Discrete Mathematical Structures”, sixth edition , Pearson Education Pvt Ltd., New Delhi, 2008.
3. Thomas Koshy, “Discrete Mathematics with Applications”, Elsevier Publications, 2006.

13IT405

SIGNALS AND SYSTEMS

3 0 0 3

OBJECTIVES

- To understand the representation and classification of signals.
- To understand the classification of CT and DT systems
- To understand the Sampling techniques and its effect.
- To analyze the linear time invariant systems using Transforms and state equations.

OUTCOMES

At the end of the course the student should be able to

- Analyze the system type and signal type.
- Analyze the LTI system in continuous time systems.
- Analyze the LTI system in discrete time systems.

UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS **9**

Signals-Classifications of Signals-Continuous time signals (CT signals) and Discrete time signals (DT signals)- Even and Odd signals- Periodic and Nonperiodic signals- Deterministic and random signals-Energy and power signals- Basic operations on signals-Scaling- time shifting –Elementary Signals-step-Ramp- Impulse- Exponential

UNIT II CLASSIFICATION OF SYSTEMS **9**

B TECH: INFORMATION TECHNOLOGY

Continuous and Discrete time systems- Interconnections of systems- Basic system Properties: Systems with and without memory- Inevitability and Inverse systems- Causality- Stability- Time Invariance and Linear.

UNIT III SAMPLING **9**

Representation of a CT signal by its samples: The Sampling theorem-Representation of a signal from its samples using interpolation-The effect of under sampling: Aliasing-Discrete-Time Processing of CT Signals-Sampling of Discrete-Time Signals.

UNIT IV LTI-CT SYSTEMS **9**

Differential equation- Block diagram representation- Impulse response- Convolution Integral- Frequency response- State equations and Matrix.

UNIT V LTI-DT SYSTEMS **9**

Difference equations- Block diagram representation- Impulse response- Convolution SUM- Frequency response- State variable equation and Matrix..

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Signal Processing in Smart TV- Signal Processing in 3D smart phones-Audio-Video Speech Processing- Fourier Transforms in Image Processing

TOTAL: 45

TEXT BOOKS

1. Alan V. Oppenheim, Alan S. Willsky with S.HamidNawab, "Signals & Systems", Pearson / Prentice Hall of India Pvt. Ltd., 2007.
2. P.RamakrishnaRao, "Signals &Systems",TataMcGraw-Hill Publication,2008.

REFERENCES

1. K.Lindner, "Signals and Systems", McGraw-Hill International, 2003.
2. Simon Haykin and Barry Van Veen, "Signals and Systems", John Wiley & Sons, Inc., 2nd edition, 2007

13CS307/13CS407 SYSTEM PROGRAMMING AND OPERATING SYTEMS 4 0 0 4

OBJECTIVES

- To understand data structures and algorithms of Assembler, Linker, Loader and Macro processor.
- To learn different types of Operating System.
- To learn the concepts of CPU scheduling, memory management and file management of Operating System.

OUTCOMES

At the end of the course the student should be able to

- Design Assembler, Linker, and Loader and Macro processor.
- Analyze the various types of Operating System.
- Use the concepts of CPU scheduling, memory management and file management of Operating system.

UNIT I SYSTEM PROGRAMMING **12**

Simplified Instruction Computer- CISC machines- RISC machines- Assembler- Basic Assembler Functions-Machine dependent assembler features- Machine independent assembler features- Basic loader functions-Machine dependent loader features- Basic Macro processor functions.

UNIT II EVOLUTION OF OS AND PROCESS CONCEPTS **12**

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 III CPU SCHEDULING AND SYNCHRONIZATION 12

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 IV DEADLOCK AND MEMORY MANAGEMENT 12

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 V VIRTUAL MEMORY AND FILE MANAGEMENT 12

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

UNIT VI STATE OF THE ART(NOT FOR EXAMINATION)

Cloud Operating Systems - Multi core Operating systems - Grid Operating Systems - Mobile Operating Systems.

TOTAL: 60

TEXT BOOKS

1. Leland L. Beck, “System Software – An Introduction to Systems Programming”, 3rd Edition, Pearson Education Asia, 2000.
2. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 8th Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2008.

REFERENCES

1. D. M. Dhamdhere, “Systems Programming and Operating Systems”, Second Revised Edition, Tata McGraw-Hill, 1999.
2. Harvey M. Deitel, “Operating Systems”, 3rd Edition, Pearson Education Pvt. Ltd, 2004.
3. Andrew S. Tanenbaum, “Modern Operating Systems”, 3rd Edition, Prentice Hall of India Pvt. Ltd, 2008.
4. William Stallings, “Operating Systems: Internals & Design Principles”, 7th Edition, Prentice Hall of India, 2011.

13EC409 MICROPROCESSORS, MICROCONTROLLERS AND APPLICATIONS 4 0 0 4

OBJECTIVES

- To understand 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 know about different peripheral devices and their interfacing to 8085/8086.
- To understand the architecture and programming of 8051 microcontroller.

OUTCOMES

At the end of the course the student should be able to

- Obtain knowledge in microprocessor architectures and assembly language programming
- Design a microprocessor /microcontroller based system for an application.

UNIT I	8085 MICROPROCESSOR	12
Introduction to 8085 – Microprocessor architecture – Instruction set – Programming the 8085 –Timing diagram		
UNIT II	8086 SOFTWARE ASPECTS	12
Intel 8086 microprocessor – Architecture – Instruction set and assembler directives – Addressing modes – Assembly language programming – Procedures – Macros – Interrupts and interrupt service routines.		
UNIT III	8086 SYSTEM DESIGN	12
8086 signals and timing – MIN/MAX mode of operation – Addressing memory and I/O – Multiprocessor configurations-Co-processor configuration- Closely coupled – loosely coupled configuration – System design using 8086		
UNIT IV	I/O INTERFACING	12
Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller		
UNIT V	MICROCONTROLLERS	12
Architecture of 8051 – Signals – Operational features – Memory and I/O addressing – Instruction set- Interrupts – Interfacing of keyboard, LCD,ADC & DAC		
UNIT VI	STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)	
Intel, AMD and ARM Processors		
		TOTAL :60

TEXT BOOKS

1. Ramesh S.Gaonkar, “Microprocessor - Architecture, Programming and Applications with the 8085”, Penram International publishing private limited, fifth edition, 2002.
2. A.K. Ray &K.M.Bhurchandi, “Advanced Microprocessors and peripherals- Architectures, Programming and Interfacing”, second edition, TMH, 2002 reprint.

REFERENCES

1. Douglas V.Hall, “Microprocessors and Interfacing: Programming and Hardware”, TMH, Third edition, 2006
2. Yu-cheng Liu, Glenn A.Gibson, “Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design”, PHI 2003
3. Mohamed Ali Mazidi, Janice GillispieMazidi, “The 8051 microcontroller and embedded systems”, Pearson education, 2004.
4. http://nptel.iitm.ac.in/courses/Webcourse-contents/IISc-BANG/Microprocessors%20and%20Microcontrollers/New_index1.html
5. <http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-KANPUR/microcontrollers/micro/ui/Course%20Objective.html>

13CS412

DIGITAL LABORATORY

0 0 3 1

OBJECTIVES

- To design and to implement the combinational & sequential circuits using logic gates, flip-flops, MSI devices.
- To design and verify combinational & sequential circuit using Hardware Description Language.

LIST OF EXPERIMENTS

1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of combinational circuits using basic gates for arbitrary functions
3. Design and implementation of code converter using logic gates
4. Design and implementation of 4-bit binary adder / subtractor using IC7483.

B TECH: INFORMATION TECHNOLOGY

5. Design and implementation of parity generator / checker using basic gates.
6. Design and implementation of magnitude comparator
7. Design and implementation of Boolean function using multiplexers
8. Design and implementation of Shift registers
9. Design and implementation of Synchronous and Asynchronous counters
10. Coding combinational circuits using Hardware Description Language
11. Coding sequential circuits using Hardware Description Language

TOTAL: 45

**13CS313/13CS413 SYSTEM PROGRAMMING AND OPERATING SYSTEMS 0 0 3 1
LABORATORY**

OBJECTIVES

- To implement the pass1 and pass2 assembler algorithms
- To learn the various shell commands and scripts
- To use the various system calls of UNIX operating system
- To implement the CPU scheduling, synchronization and memory management algorithms

LIST OF EXPERIMENTS

1. Design and implement two pass assembler.
2. Implement an absolute loader.
3. Shell programming
 - Command syntax
 - write simple functions
 - loops
 - Patterns
 - Expansions
 - Substitutions
4. Write programs using the following system calls of UNIX operating system:
 - i. fork, exec, getpid, exit, wait, close, stat, opendir, readdir
5. Write C programs to simulate UNIX commands like ls, grep, etc.
6. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS, SJF, Priority and Round Robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.
7. Implement the Producer – Consumer problem using semaphores.
8. Implement all page replacement algorithms.
9. Implement disk scheduling algorithms.
10. Design of File Systems.

TOTAL: 45

**13EC414 MICROPROCESSORS AND MICROCONTROLLERS 0 0 3 1
LABORATORY**

OBJECTIVES

- To implement 8085 program for developing arithmetic and bit manipulations.
- To demonstrate basic instructions with 8086 microprocessor based operations using Assembler.
- To interface 8085/8086 using 8255,8279.
- To develop simple programs using 8051.

LIST OF EXPERIMENTS

1. Programming with 8085 – Arithmetic operations,
2. Programming with 8085 - bit manipulation.
3. Programming with 8085 –code conversion.
4. Programming with 8086 – String manipulation-search, find and replace. (PC Required).

TEXT BOOKS

1. Gupta, S.C., & Kapoor, V.K., Fundamentals of Mathematical Statistics, Sultan Chand & Sons, Reprint 2011.
2. Gross, D. and Harris, C.M., “Fundamentals of Queuing theory”, John Wiley and Sons, third Edition, New York, 2004.

REFERENCES

1. Medhi J., “Stochastic Processes”, New Age Publishers, New Delhi, 3rd Edition 2009.
2. Ross. S., “A first Course in Probability”, ninth Edition, Pearson Education, Delhi, 2014.
3. Palaniammal .S. “Probability and Queuing theory”, PHI Learning pvt. ltd, New Delhi, 2012.
4. Veerarajan, T., “Probability, Statistics and Random Processes”, Tata McGraw-Hill, 2nd Edition, New Delhi, 2010.
5. Allen, A.O, “Probability, Statistics and Queuing Theory with Computer Applications”, Elsevier, California, 2nd Edition, 2005.

13CS502

THEORY OF COMPUTATION

4 0 0 4

OBJECTIVES

- To have an understanding of finite state and pushdown automata.
- To have a knowledge of regular languages and context free languages.
- To make a study of the programming capabilities of Turing machines.

OUTCOMES

At the end of the course the student should be able to

- Design automata to solve problems
- Write regular expressions and Context Free Grammar to represent languages
- Prove a language is not regular
- Prove a language is not context-free

UNIT I FINITE AUTOMATA

12

Mathematical preliminaries and notations – Central concepts of automata theory – Finite automata - Deterministic Finite Automata - Nondeterministic Finite Automata – Equivalence of DFA and NFA – Finite Automata with Epsilon transitions - Application of FA.

UNIT II REGULAR EXPRESSIONS

12

Regular languages: Regular Expressions – Finite Automata and Regular Expressions –Applications of Regular Expressions - Regular Grammars.

UNIT III REGULAR LANGUAGES

12

Properties of regular languages: Pumping lemma for regular languages – Closure properties of regular languages –Equivalence and Minimization of Finite Automata.

UNIT IV CONTEXT FREE GRAMMAR

12

Context Free languages: Context Free Grammars – Parse Trees - Ambiguity in Grammars and languages – Applications of Context Free Grammars – Pushdown automata (PDA) – Languages of a PDA - Equivalence of PDA’s and CFG’s

UNIT V CONTEXT FREE LANGUAGES AND TURING MACHINES

12

Properties of Context Free Languages: Normal Forms (CNF, GNF) for Context Free Grammars - Pumping lemma for CFL’s - Closure properties of CFL - Turing Machines- Simple examples.

UNIT VI STATE OF THE ART/ADVANCES(NOT FOR EXAMINATION)

Advanced Turing machines, Post Correspondence Problem

TOTAL:60

B TECH: INFORMATION TECHNOLOGY

1. Herbert Schildt, "Java The Complete Reference", 8th Edition, McGraw-Hill Osborne Media, 2011.
2. Paul Deitel, "Internet & World Wide Web: How to Program", Prentice Hall, 5th Edition, 2011.

REFERENCES

1. Cay S. Horstmann and Gary Cornell, "Core Java™, Volume I – Fundamentals" 9th Edition, Prentice Hall, 2012.
2. Cay S. Horstmann and Gary Cornell, "Core Java, Vol. 2: Advanced Features", 9th Edition, Prentice Hall, 2013.
3. Robert W. Sebesta, "Programming the World Wide Web", Addison-Wesley, 7th Edition, 2012.
4. Elliotte Rusty Harold, "Java Network Programming", 4th Edition, O'Reilly, 2013.
5. Uttam K. Roy, "Web Technologies", Oxford University Press, 1st Edition, 2011.
6. Leon Shklar and Rich Rosen, "Web Application Architecture: Principles, Protocols and Practices", Wiley, 2nd Edition, 2009.

13IT504

COMPUTER COMMUNICATION NETWORKS

3 0 0 3

OBJECTIVES

- To study the concepts of data communications.
- To understand the functions of different layers of ISO/OSI reference architecture.
- To study the concepts of subnetting and routing mechanisms.
- To understand the different types of protocols and network components.

OUTCOMES

At the end of the course the student should be able to

- Analyze the existing network architectures, protocols and networks.
- Analyze and design the topological and routing strategies for an IP based networking infrastructure.
- Solve contemporary issues in networking technologies.

UNIT I DATA COMMUNICATIONS

9

Components–Direction of Data flow networks- Analog versus Digital communication –Modems, Multiplexers –Serial versus parallel communication–Simplex– Duplex, and half duplex communication– Synchronous and asynchronous communication–Protocols and Standards – ISO / OSI model–Line Coding.

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

IP addressing methods –Forwarding and Routing – Network Service Models – Virtual Circuit and Datagram Networks – Router – Internet Protocol (IP) – IPv4 and IPv6 – ICMP – Link State Routing Distance Vector Routing – Hierarchical Routing – RIP – OSPF – BGP – Broadcast and Multicast Routing – MPLS - Mobile IP – IPsec.

UNIT IV TRANSPORT LAYER

9

Transport services - Elements of transport Protocols - Simple transport Protocols –UDP –TCP - Performance issues-Integrated and Differentiated Services: Intserv– Diffserv.

UNIT V APPLICATION LAYER

9

DNS - E-mail (SMTP, MIME, POP3, IMAP) - WWW-Multimedia - Introduction to Cryptography– Symmetric key Algorithms –Public key Algorithms-Firewalls.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Voice over Internet Protocol (VoIP) –Virtual Private Network (VPN) – WAN Virtualization-Network Function Virtualization- Software Defined for Everything (SDX).

TOTAL: 45

TEXT BOOKS

1. Behrouz A. Forouzan, “Data communication and Networking”, Fourth edition, Tata McGraw-Hill, 2007.
2. Andrew S. Tanenbaum, “Computer Networks”, Prentice-Hall of India, Fourth edition, 2008.

REFERENCES

1. James F. Kurose and Keith W. Ross, “Computer Networking: A Top-Down Approach Featuring the Internet”, 4th edition, Pearson Education, 2007.
2. Larry L. Peterson and Peter S. Davie, “Computer Networks”, Harcourt Asia Pvt. Ltd, 2013.
3. William Stallings, “Data and Computer Communication”, 8th Edition, Pearson Education, 2006.
4. Kumar Reddy, Victor Moreno, Network virtualization, Cisco Press, July, 2006.
5. http://nptel.ac.in/courses/IIT-MADRAS/Computer_Networks/index.php

13IT505

DISTRIBUTED SYSTEMS

3 0 0 3

OBJECTIVES

- To learn the concepts of Distributed objects and File Systems.
- To understand the operating system support in Distributed systems.
- To study the security techniques for distributed transactions and communications.

OUTCOMES

At the end of the course the student should be able to

- Design distributed systems and apply distributed algorithms in various levels.
- Analyze various methods and protocols for distributed transactions..
- Apply security algorithms for group and interprocess communication.

UNIT I INTRODUCTION TO DISTRIBUTED SYSTEMS

9

Overview of 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

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

9

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 DISTRIBUTED TRANSACTIONS

9

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

9

B TECH: INFORMATION TECHNOLOGY

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

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Cloud Computing-Grid Computing-Cloud Security-Internet of Things

TOTAL: 45

TEXT BOOKS

1. George Coulouris, Jean Dollimore, Tim Kindberg “Distributed Systems Concepts and Design”,5th edition, Pearson Education Asia,2011.
2. A.S.Tanenbaum, M.Van Steen “ Distributed Systems”,2nd edition, Pearson Education ,2008.

REFERENCES

1. A.S.Tanenbaum, M.Van Steen “DistributedSystems:Principles and Paradigms”, Prentice Hall,2008.
2. MukeshSinghal, Ohio State University, Columbus “Advanced Concepts In Operating Systems”,2nd edition, McGraw-Hill Series in Computer Science, 2008.
3. <http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-824-distributed-computer-systems-engineering-spring-2006>

13EC507/13EC607

DIGITAL SIGNAL PROCESSING

3 1 0 4

OBJECTIVES

- To understand the basic concepts of signals and systems.
- To implement Fourier Transformations- DFT & FFT.
- To understand the structure and design of IIR & FIR filters.
- To know the various applications of DSP.

OUTCOMES

At the end of the course the student should be able to

- Analyze and design a discrete LTI system
- Design IIR Filters
- Design FIR Filters

UNIT I SIGNALS AND SYSTEMS

9

Basic elements of digital signal Processing-Classifications of Signals–Concept of frequency in continuous time and discrete time signals –Discrete time signals: Classifications of DTS, Manipulation of DTS-Discrete time systems : Input/Output descriptions of DTS, Classifications of Discrete time System.

UNIT II FAST FOURIER TRANSFORMS

9

FFT algorithms– Radix-2 FFT algorithms – Decimation in Time, Decimation in Frequency algorithms – Application of FFT: Use of FFT algorithms in Linear Filtering and correlation

UNIT III IIR FILTER DESIGN

9

Structure of IIR – System Design of Discrete time IIR filter from continuous time filter – IIR filter design by Impulse Invariance, Bilinear transformation , Approximation derivatives – Design of Digital Butterworth filter

UNIT IV FIR FILTER DESIGN

9

Structure of FIR-Symmetric & Antisymmetric FIR filters – Design of Linear phase filter using Rectangular Window techniques — Design of Linear phase filter using Frequency sampling techniques.

UNIT V APPLICATIONS OF DSP

9

B TECH: INFORMATION TECHNOLOGY

Role of DSP for 3G mobile Communication Systems-DSP function in GSM Mobile Station-DSP function in Base station --Image processing: Compression, Enhancement, JPEG Standard- DSP trends in wireless : Multiplexing, Echo Control, Power dissipation.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Signal Processing in Cloud computing-DSP in 4K-TV and UHD TV, Signal processing in Nano Scale technology

TUTORIAL: 15

TOTAL: 60

TEXT BOOK

1. John G Proakis and Dimtris G Manolakis, "Digital Signal Processing Principles, Algorithms and Application", 4th edition, PHI/Pearson Education, 2009.

REFERENCES

1. Alan V Oppenheim, Ronald W Schaffer and John R Buck, "Discrete Time Signal Processing", 3rd edition, PHI/Pearson Education, 2009.
2. Johnny R. Johnson, "Introduction to Digital Signal Processing", Prentice Hall of India/Pearson Education, 2002.
3. Sanjit K. Mitra, "Digital Signal Processing: A Computer – Based Approach", Second Edition, Tata McGraw- Hill, 2006.
4. <http://nptel.ac.in/courses/117102060/http://meseec.ce.rit.edu/eccc722-fall2003/722-10-8-2003.pdf>
5. <http://researchtrend.net/ijet/5%20SHIVI.pdf>

13IT511

COMPUTER NETWORKS LABORATORY

0 0 3 1

OBJECTIVES

At the end of the course the student should be able

- To study the programs for implementation of bit stuffing and CRC computation.
- To learn the working of different types of routing protocols using simulation tools.
- To understand and implement simple client server application.
- To study basic programming aspects using network simulation software tools.

LIST OF EXPERIMENTS

1. Simulation of ARP / RARP.
2. Write a program that takes a binary file as input and performs bit stuffing and CRC Computation.
3. Develop an application for transferring files over RS232.
4. Simulation of Sliding-Window protocol.
5. Simulation of BGP / OSPF routing protocol.
6. Develop a Client – Server application for chat.
7. Develop a Client that contacts a given DNS Server to resolve a given host name.
8. Write a program to download a file from HTTP Server.
9. Evaluate MAC and network protocols using network simulation software tools such as NS-2 / OPNET/Qualnet/MiniNET/FledLight
10. Evaluate the performance of network routing protocols using NS-2 / OPNET/Qualnet/MiniNET/FledLight

TOTAL:45

13IT512

**JAVA AND INTERNET PROGRAMMING
LABORATORY**

0 0 3 1

OBJECTIVES

- To understand the different types of inheritances and interfaces in java.

B TECH: INFORMATION TECHNOLOGY

- To study and develop network socket programming using java.
- To learn the working of applet and AWT swings.
- To study and develop client server communication.

LIST OF EXPERIMENTS

1. Java classes and objects
2. Inheritance, Polymorphism
3. Interfaces and Exception Handling, Packages
4. Using InetAddress class
5. Socket Programming in Java
6. RMI
7. Client side scripting using XHTML, Javascript/DOM /CSS/XML/DTD, Parsers, XSLT
8. Programming with AJAX
9. Java Applets, AWT, Swings
10. Server Side programming (Implement these modules using any of the server side scripting languages like PHP, Servlets, JSP, ASP.NET
Gathering form data
Querying the database
Response generation
Session management
11. MySQL/JDBC/Oracle Application development
12. Development of applications using Multimedia Tools.

TOTAL: 45

13CS515/13CS615

CASE TOOLS LABORATORY

0 0 3 1

OBJECTIVES

At the end of the course the student should be able

- To understand and apply the principles of software development
- To use CASE tools for software development
- To model a system using different diagram
- To test any application

LIST OF EXPERIMENTS

Solve simple problems using CASE tools and prepare the following documents for the experiments listed.

1. Program Analysis and Project Planning
Thorough study of the problem – Identify Project Scope, Objectives, Infrastructure
2. Software Requirement Analysis
Describe the individual Phases / Modules of the Project, Identify Deliverables
3. Data Modeling
Use work products – Data Dictionary, Use case diagrams and Activity diagrams
4. Build Class diagrams, Sequence diagrams and add interface to Class diagrams.
5. Software Development and Debugging
6. Software Testing
Prepare Test Plan, Perform Validation Testing, Coverage Analysis, Develop Test Case Hierarchy.

Suggested List of Applications:

1. Payroll system
2. Online shopping
3. Banking system

4. Text editor
5. Online voting system
6. Library automation system
7. Student Marks Analyzing System
8. Quiz System
9. Online Ticket Reservation System
10. Course Registration System
11. Expert Systems
12. ATM System
13. Stock Maintenance

TOTAL: 45

SEMESTER VI

13MA401/13MA601

NUMERICAL METHODS

3 1 0 4

OBJECTIVES

- To study the concept of calculating the roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigen value problem of a matrix can be obtained numerically where analytical methods fail to give solution.
- To study the concept of constructing approximate polynomial to represent the given numerical data and to find the intermediate values.
- To learn the methods of finding the solution of ordinary differential equations and partial differential equations as most of the engineering problems are characterized in the form of either nonlinear ordinary differential equations or partial differential equations.

OUTCOMES

At the end of the course the student should be able to

- Find the numerical solutions of nonlinear (algebraic or transcendental) equations, simultaneous equations.
- Use numerical methods to solve differential equations and partial differential equations.
- Solve integral equations numerically.

UNIT I SOLUTIONS OF EQUATIONS

9

Solutions of non linear equations by Iteration method, Regula - Falsi method and Newton Raphson method – Solutions of linear system of equations by Gauss Elimination, Gauss Jordan, Gauss Jacobian and Gauss Seidel methods – Inverse of a matrix by Gauss Jordan.

UNIT II INTERPOLATION AND APPROXIMATION

9

Equal Intervals - Newton's Forward and Backward difference formulas - Unequal intervals - Newton's' Divided difference formula , Lagrangian and inverse Lagrangian polynomials.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION

9

Newton's Forward and Backward Differences to compute derivatives- -Trapezoidal rule – Simpson's 1/3 rule, Simpson's 3/8 rule (both Single and Double integral) — Two and three point Gaussian quadrature formulas.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS

9

Taylor series method- Euler and modified Euler method – Fourth order Runge-Kutta method for solving first order equations- Milne's and Adam's Predictor and Corrector methods.

UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

9

Finite difference solution of second order ordinary differential equations- Finite difference solutions of one dimensional heat equation – Bender - Schmidt method – Crank Nicolson method - One

dimensional wave equation -Two dimensional Laplace and Poisson equations.

UNIT VI STATE-OF-THE-ART/ADVANCES (NOT FOR EXAMINATION)

Solutions of transcendental and algebraic equations – differential equations – integral equations using mathematical software.

TUTORIAL:15

TOTAL: 60

TEXT BOOKS

1. Grewal, B.S., Numerical methods in Engineering and Science. 9th edition, Khanna Publishers, 2007.
2. Venkataraman M.K., “Numerical Methods”, National Publishing Company, 2000.

REFERENCES

1. Rajasekaran S., Numerical methods in Science and Engineering – A Practical Approach, 2nd edition, Wheeler Publishing, 1999.
2. Jain M.K. Iyengar, K & Jain R.K., “Numerical Methods for Scientific and Engineering Computation”, New Age International (P) Ltd, Publishers 2003.
3. Sankara Rao. K., “Numerical Methods for Scientists and Engineers”, PHI Pvt Ltd, New Delhi, 3rd Edition, 2007.

13MB502/13MB602

PRINCIPLES OF MANAGEMENT

3 0 0 3

I

OBJECTIVES

- To study the basic managerial functions such as planning, organizing, leading, and controlling resources to accomplish organizational goals.
- To understand different types of management theories, models and principles
- To learn the various levels of management

OUTCOMES

At the end of the course the student should be able to

- Apply management functions such as planning, organizing and budgeting.
- Analyze the role of the managers and resources they use.
- Evaluate different management approaches.

UNIT I MANAGING

9

Management : Definition –Nature & Scope- Functions- Evolution- Managerial roles and Styles - Decision making approach – Management & Society.

UNIT II PLANNING

9

Nature and purpose of planning - Planning process - Types of plans – Objectives - Managing by Objective (MBO) Strategies - Types of strategies - Policies - Planning premises- Forecasting- Decision Making - Types of decision - Decision Making Process.

UNIT III ORGANIZING & STAFFING

9

Nature and Purpose of Organizing - Organization Structure - Formal and Informal Organization - Line and Staff Authority – Departmentation – Line/Staff authority, Empowerment and Decentralization - Staffing - Selection and Recruitment – Selection Process-Techniques– Training – Feed Back- Performance Appraisal.

UNIT IV DIRECTING

9

Human Factors and Motivation - Motivation Theories - Leadership Styles -Leadership Traits- Leadership Theories - Communication – Communication Process- Barriers to Effective Communication .

UNIT V CONTROLLING

9

B TECH: INFORMATION TECHNOLOGY

Process of Controlling - Types of Control - Control Techniques - Managing Productivity - Cost Control - Purchase Control – Maintenance Control - Quality Control - Planning Operations.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Social Responsibility of Business - Ethics- Value Chain of Business- Creativity and Innovation- Globalization of Business- Management of Big Data.

TOTAL: 45

TEXT BOOKS

1. Harold Koontz and Heinz Wehrich, “Essentials of Management”, Tata McGraw Hill ,2009.
2. Tripathy and Reddy, Principles of Management, Tata McGraw Hill,2008

REFERENCES

1. Rao and Hari Krishna, Management: Text and Cases, Excel Books, 2008.
2. Aswathappa and Karminder Ghuman, Management : Concept and Cases, McGraw Hill, 2010
3. Karuppasamy and Saravnan, Principles of Management, Sci Tech,2010

13CS603

COMPILER DESIGN

4 0 0 4

OBJECTIVES

- To understand, design and implement a lexical analyzer and parser.
- To design DFA & NFA with different conversion techniques.
- To implement code generation schemes.
- To perform optimization of codes and gain knowledge about runtime environments.
- To Understand Lex and YACC tools.

OUTCOMES

At the end of the course the student should be able to

- Design a scanner to identify the tokens in a program
- Design a parser through the application of grammar
- Implement a semantic analyzer for a programming language
- Design, analyze, implement and test a working compiler for a small language

UNIT I INTRODUCTION TO COMPILING AND LEXICAL ANALYSIS

12

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. Recognition of Tokens- A language for Specifying Lexical Analyzer, Finite Automata - From a regular expression to an NFA and DFA

UNIT II SYNTAX ANALYSIS

12

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

UNIT III INTERMEDIATE CODE GENERATION AND TYPE CHECKING

12

Syntax- Directed definitions, Construction of Syntax Trees. Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Type system- Type checker- Type expression –Type conversion.

UNIT IV CODE GENERATION

12

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – A simple Code generator – DAG representation of Basic Blocks- peephole optimization.

UNIT V CODE OPTIMIZATION

12

Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Loops in flow graph

– Introduction to Global Data Flow Analysis.

UNIT VI STATE OF THE ART/ADVANCES(NOT FOR EXAMINATION)

Just in time compiler -Compiler Optimization -Dynamic Compilation-Compilers for multi core programming

TOTAL: 60

TEXT BOOK

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, “Compilers Principles, Techniques and Tools”, 2nd Edition, Pearson Education Asia, 2007.

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”,1stEdition,Benjamin Cummings, 2008.
3. J.P. Bennet, “Introduction to Compiler Techniques”, 2nd Edition, Tata McGraw- Hill, 2003.
4. HenkAlblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001.
5. Kenneth C. Louden, “Compiler Construction: Principles and Practice”, 2nd Edition,Thompson Learning, 2003.
6. <http://nptel.ac.in/syllabus/syllabus.php?subjectId=106108113>

13IT604

CRYPTOGRAPHY AND NETWORK SECURITY

3 0 0 3

OBJECTIVES

- To understand the different types of modern cryptographic techniques.
- To study the concepts of public key encryption and number theory.
- To learn authentication standards and applications.
- To learn the network security tools and applications.
- To study the concept of main security threats and techniques to diminish these threats in communication networks

OUTCOMES

At the end of the course the student should be able to

- Design a security solution for a given application.
- Apply the Key Management techniques and Number Theory.
- Analyze the Intrusion detection and Firewall Design Principles.

UNIT I ENCRYPTION TECHNIQUES

9

OSI Security Architecture - Classical Encryption techniques – Cipher Principles – Data EncryptionStandard – Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES –AES Cipher – Triple DES – Placement of Encryption Function – Traffic Confidentiality.

UNIT II PUBLIC KEY CRYPTOGRAPHY

9

Key Management - Diffie-Hellman key Exchange – Elliptic Curve Architecture and Cryptography - Introduction to Number Theory – Confidentiality using Symmetric Encryption – Public KeyCryptography and RSA.

UNIT III AUTHENTICATION AND HASH FUNCTION

9

Authentication requirements – Authentication functions – Message Authentication Codes – HashFunctions – Security of Hash Functions and MACs – MD5 message Digest algorithm - Secure HashAlgorithm – RIPEMD – HMAC Digital Signatures – Authentication Protocols – Digital SignatureStandard.

UNIT IV NETWORK SECURITY

9

B TECH: INFORMATION TECHNOLOGY

Authentication Applications: Kerberos , X.509, PKI –Authentication Service – Electronic Mail Security –PGP – S/MIME - IP Security – Web Security: SSL,TLS,SET.

UNIT V SYSTEM LEVEL SECURITY 9

Intrusion detection – Password management – Viruses and related Threats – Virus Countermeasures – Firewall Design Principles – Trusted Systems.

UNIT IV STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Mobile Device Security and Ethical Hacking - Virtualization and Private Cloud Security- Vehicular Security - Smartphone Security-Distributed Denial of Service.

TOTAL: 45

TEXT BOOKS

1. William Stallings, “Cryptography and Network Security – Principles and Practices”, 5th edition,Prentice Hall of India,2011.
2. Behrouz A.Forouzon,”Cryptography and network security”, 2nd edition, Tata McGraw-Hill, 2010.

REFERENCES

1. AtulKahate, “Cryptography and Network Security”, 2nd edition, Tata McGraw-Hill, 2009.
2. Bruce Schneier, “Applied Cryptography”, 2nd edition, John Wiley & Sons Inc, 2007.
3. Charles B. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, 4th Edition, Pearson Education, 2007.
4. <http://nptel.ac.in/courses/106105031>

13IT605 GRAPHICS AND MULTIMEDIA 3 0 0 3

OBJECTIVES

- To learn the rules and algorithms in generating graphical outputs.
- To study the concept of 3-dimensional objects using suitable transformations.
- To understand the architecture for design of multimedia system.
- To understand the issues related to multimedia file handling.
- To learn about the hypermedia standards in developing multimedia applications

OUTCOMES

At the end of the course the student should be able to

- Use the rules and algorithms in generating graphical outputs applying 2D and 3D transformations.
- Analyze the system design and architecture of multimedia and hypermedia systems.

UNIT I OUTPUT PRIMITIVES 9

Graphics Standards - Line - Curve and Ellipse Algorithms – Attributes – Two-Dimensional Geometric Transformations – Two-Dimensional Viewing.

UNIT II THREE DIMENSIONAL CONCEPTS 9

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

UNIT III MULTIMEDIA SYSTEMS DESIGN 9

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

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

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

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Digital Spherical Display –Digital Spokesperson – Motion Graphics for Multimedia –Digital 3D Design and Modeling.

TOTAL: 45

TEXT BOOKS

1. Donald Hearn and M.Pauline Baker, “Computer Graphics C Version”, Pearson Education, 2011.
2. Prabat K AndleighandKiranThakrar, “Multimedia Systems and Design, Thirdedition, PHI, 2006.

REFERENCES

1. Judith Jeffcoate, “Multimedia in practice technology and Applications”, PHI,2007.

13IT611

GRAPHICS AND MULTIMEDIA LABORATORY

0 0 3 1

OBJECTIVES

- To understand the graphical objects using built-in functions.
- To study the concept of 2D Clipping and windowing
- To learn the programs to visualize the projections of 3D images
- To understand the programs to implement text compression and image compression algorithm

LIST OF EXPERIMENTS

1. To implement Bresenham’s algorithms for line, circle and ellipse drawing
2. To perform 2D Transformations such as translation, rotation, scaling, reflection and shearing.
3. To implement Cohen-Sutherland 2D clipping and window-viewport mapping
4. To perform 3D Transformations such as translation, rotation and scaling.
5. To visualize projections of 3D images.
6. To convert between color models.
7. To implement text compression algorithm.
8. To implement image compression algorithm.
9. To perform animation using any Animation software.
10. To perform basic operations on image using any image editing software.

TOTAL: 45

13EN512/13EN612

COMMUNICATION SKILLS LABORATORY

1 0 3 2

OBJECTIVES

- To equip students of engineering and technology with effective speaking and listening skills in English.
- To help them develop their soft skills and interpersonal skills, which will make the transition from college to workplace smoother and help them excel in their job.
- To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment exercises.

Theory

15

Presentation Skills –Group Discussion-Body Language-Team Work- Time Management-Stress Management –Interview Skills

A. English Language Lab **18**

1. Listening Comprehension:

Listening and typing – Listening and sequencing of sentences – Filling in the blanks -Listening and answering questions.

2. Reading :

Reading Newspapers- Skimming –Scanning -Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.

3. Speaking:

Phonetics: Intonation – Ear training - Correct Pronunciation – Sound recognition exercises –Common Errors in English.

Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)

4.Writing

Correction of Errors- Sequencing of Sentences - Letter Writing-Resume-Technical Reports –Minutes of meeting –E mail Communication

B. Viewing and discussing audio-visual materials /Practice Sessions **27**

1. Resume / Report Preparation / Letter Writing

Structuring the resume / Report - Letter writing / Email Communication.

2. Presentation skills:

Elements of effective presentation – Structure of presentation - Presentation tools – Voice Modulation – Audience analysis - Body language

3. Soft Skills:

Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise

4. Group Discussion:

GD a part of selection process - Structure of GD – Moderator –Types of GD- Strategies in GD – Team work - Body Language - Mock GD - Technical seminar

5. Interview Skills:

Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews.

TOTAL: 60

13CS613

COMPILER DESIGN LABORATORY

0 0 3 1

OBJECTIVES

- To learn the concept of token separation.
- To understand the construction and conversion of NFA and DFA.
- To study the working of LEX and YACC tools.
- To understand the construction of various types of parsers.

LIST OF EXPERIMENTS

1. Implementation of lexical analyzer.
2. Construction of NFA from a given regular expression.
3. Construction of DFA from a given regular expression.
4. Implementation of Predictive parsing.

B TECH: INFORMATION TECHNOLOGY

5. Implementation of Shift Reduce Parsing Algorithm.
6. Implementation of LR parsing.
7. Implement the front end of a compiler that generates the three address code for a simple language with: one data type integer, arithmetic operators, relational operators, variable declaration statement, one conditional construct, one iterative construct and assignment statement.
8. Implement the back end of the compiler which takes the three address code as input and produces assembly language instructions that can be assembled and run using an 8086 assembler. The target assembly instructions can be simple move, add, sub, and jump.

LEX & YACC:

1. Study of LEX and YACC.
2. Implementation of lexical analyzer using LEX.
3. Implement a calculator that takes an expression with digits, + and * and computes & prints its value, using YACC.
4. Use YACC and LEX to implement a parser.

TOTAL: 45

SEMESTER VII

13IT701

SERVICE ORIENTED ARCHITECTURE

3 0 0 3

OBJECTIVES

- To understand the basic principles of service orientation.
- To study service oriented analysis techniques.
- To study technology underlying the service design.
- To understand advanced concepts such as service composition, orchestration and choreography.
- To learn the various WS specification standards.

OUTCOMES

At the end of the course the student should be able to

- Analyse different service oriented business architecture.
- Analyse and design SOA based applications.
- Design web services and realization of SOA.
- Design SOAP, RESTful services.
- Design and implement SOA based application integration using BPEL.

UNIT I FUNDAMENTALS OF SOA

9

Defining SOA-Evolution of SOA-Service Oriented Enterprise-Comparing SOA to client-server and distributed internet architectures-Basic SOA –Architecture concepts-Key Service characteristics-Technical Benefits-Business Benefits.

UNIT II COMBINING SOA AND WEB SERVICES

9

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns-Web Service Platform-Service Contract-Service Level Data Model-Service Discovery-Service Level Security-Service Level Interaction Patterns-Atomic and Composite Services-Service Enabling Legacy System-Enterprise Service Bus Pattern.

UNIT III MULTI CHANNEL ACCESS AND WEB SERVICES COMPOSITION

9

SOA for Multi-Channel Access-Business Benefits-Tiers-Business Process Management-Web Service Composition-BPEL-RESTFUL Services-comparison of BPEL and RESTFUL Services.

UNIT IV JAVA WEB SERVICES

9

SOA support in J2EE – Java API for XML-based web services(JAX-WS)-Java Architecture for XML binding (JAXB) – Java API for XML Registries(JAXR)-Java API for XML based RPC (JAX-RPC)-

B TECH: INFORMATION TECHNOLOGY

Web Services Interoperability-SOA support in .NET– ASP.NET web services – Case Studies- Web Services Enhancements (WSE)

UNIT V WEB SERVICES SECURITY AND TRANSACTION 9

Meta Data Management-Advanced Messaging- Addressing – Reliable Messaging–Policies-WS-Policy– Security- WS-Security–Notification and Eventing-Transaction Management

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

WS BPEL-Web Services using SOAP-Web Services using REST.

TOTAL: 45

TEXT BOOKS

1. Eric Newcomer, Lomow, “Understanding SOA with Web Services”, Pearson Education, 2005.
2. JamesMcGovern,SameerTyagi,Michael E Stevens,SunilMathew, ”Java Web Services Architecture”,Elsevier,2003.

REFERENCES

1. Thomas Erl, “Service Oriented Architecture”,Pearson Education,2005
2. SandeepChatterjee, James Webber, “Developing Enterprise Web Services, An Architect’s Guide”, Pearson Education, 2005.
3. Dan Woods and Thomas Mattern, “Enterprise SOA Designing IT for Business Innovation” O’REILLY, First Edition, 2006.
4. Frank Cohen, “FastSOA”,Elsevier,20075.
5. Jeff Davies, “The Definitive Guide to SOA”,Apress,2007

13IT702

MOBILE COMPUTING

3 0 0 3

OBJECTIVES

- To learn the concepts of telecommunication networks.
- To study the basic concepts of Mobile IP.
- To understand session initiation protocol.
- To understand mobile middleware and mobile operating system.

OUTCOME

At the end of the course the student should be able to

- Design and develop mobile content applications

UNIT I TELECOMMUNICATION NETWORKS 9

Telecommunication systems - Spread spectrum techniques – GSM – GPRS – DECT – 3G Wireless Systems-UMTS core Network Architecture – Satellite Networks - Basics – Parameters and Configurations

UNIT II MOBILE NETWORK LAYER 9

Introduction to Mobile IP – Components of mobile IP network- Agent Discovery- Registration-tunneling – security- Dynamic Host Configuration Protocol - Routing – DSDV – DSR- Alternative Metrics-Capacity Allocation – FAMA and DAMA

UNIT III TRANSPORT AND APPLICATION LAYERS 9

Traditional TCP – Classical TCP improvements – Introduction to SIP, SIP Architecture, Applications, Services

UNIT IV MOBILE MIDDLEWARE 9

Mobile middleware, Middleware for Application development, Adaptation, Mobile Agents, Service

Discovery Middleware, Services, Garbage Collection, Eventing, Security.

UNIT V MOBILE OPERATING SYSTEMS **9**
Android OS –Architecture- security - ios- Palm OS - Windows CE - Symbian OS - Linux for Mobile Devices

UNIT VI STATE OF THE ART/ADVANCES(NOT FOR EXAMINATION)
Wimax Networks-Introduction to 5G Networks-Near Field Communication-Mobile Cloud Computing

TOTAL: 45

TEXT BOOKS

1. Jochen Schiller, “Mobile Communications”, PHI/Pearson Education, 2nd Edition, 2008.
2. Frank Adelstein, Sandeep K S Gupta, Golden G Richard, Loren Schwiebert, “Fundamentals of Mobile and Pervasive Computing,”Tata Mc-Graw Hill Education Pvt. Ltd., New Delhi, 2005.

REFERENCES

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, PHI/Pearson Education, 2003.
2. Raj Kamal, “Mobile Computing”, Oxford University Press, New Delhi, 2007.
3. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, New York, 2003.
4. Hazysztof Wesolowshi, “Mobile Communication Systems”, John Wiley and Sons Ltd, 2002.

13IT703 VIRTUALIZATION TECHNIQUES 3 0 0 3

OBJECTIVES

- To understand the need of virtualization.
- To explore the types of virtualization.
- To understand the concepts of virtualization and virtual machines.
- To understand the practical virtualization solutions and enterprise solutions.

OUTCOMES

At the end of the course the student should be able to

- Deploy legacy OS on virtual machines.
- Understand the intricacies of server, storage, network, desktop and application virtualizations.
- Design new models for virtualization.

UNIT I OVERVIEW OF VIRTUALIZATION **9**
Basics of Virtualization –Types of Virtualization Techniques –Merits and demerits of virtualization – Full Vs Para - virtualization – Virtual Machine Monitor/Hypervisor - Virtual Machine Basics – Taxonomy of Virtual machines – Process Vs System Virtual Machines Emulation: Interpretation and Binary Translation - HLL Virtual Machines.

UNIT II SERVER AND NETWORK VIRTUALIZATION **9**
Server Virtualization: Virtual Hardware Overview - Server Consolidation – Partitioning Techniques - Uses of Virtual server Consolidation – Server Virtualization Platforms, Network Virtualization: Design of Scalable Enterprise Networks

UNIT III STORAGE VIRTUALIZATION **9**
Storage Virtualization: Hardware Devices – SAN backup and recovery techniques RAID – Classical Storage Model – SNIA Shared Storage Model – Virtual Storage: File System Level and Block Level.

UNIT IV DESKTOP AND APPLICATION VIRTUALIZATION **9**

Desktop Virtualization: Concepts - Desktop Management Issues - Potential Desktop Virtualization Scenarios - Desktop Virtualization Infrastructures, Application Virtualization: Concepts - Application Management Issues - Redesign Application Management – Application Migration.

UNIT V APPLYING VIRTUALIZATION

9

Practical Virtualization Solutions: Comparison of Virtualization Technologies: Guest OS/ Host OS – Hypervisor – Emulation – Kernel Level – Shared Kernel, Enterprise Solutions: VMWare Server – VMWare ESXi – Citrix Xen Server – Microsoft Virtual PC – Microsoft Hyper - V – Virtual Box, Server Virtualization: Configuring Servers with Virtualization Adjusting and Tuning Virtual servers – VM Backup – VM Migration, Desktop virtualization: Terminal services – Hosted Desktop – Web - based Solutions – Localized Virtual Desktops, Network and Storage Virtualization: Virtual Private Networks ..

UNIT VI STATE OF THE ART/ADVANCES(NOT FOR EXAMINATION)

Virtual LAN SAN and VSAN – NAS – Virtualization Management software.

TOTAL: 45

TEXT BOOKS

1. James E. Smith, Ravi Nair ,Virtual Machines: Versatile Platforms for Systems and Processes, Elsevier/Morgan Kaufmann, 2005.
2. David Marshall, Wade A. Reynolds, Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center, Auerbach Publications, 2006.

REFERENCES

1. Kumar Reddy, Victor Moreno, Network virtualization, Cisco Press, July, 2006.
2. Chris Wolf, Erick M. Halter, Virtualization: From the Desktop to the Enterprise, APress 2005.
3. Danielle Ruest, Nelson Ruest Virtualization: A Beginner’s Guide, TMH, 2009
4. Kenneth Hess,Amy Newman: Practical Virtualization Solutions: Virtualization from the Trenches Prentice Hall 2010
5. John Rittinghouse, James Ransome, Cloud Computing, Implementation, Management an Strategy, CRC Press, 2010.
6. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter - Cloud Computing: A Practical Approach, TMH, 2010
7. Lee Badger , Tim Grance , Robert Patt - Corner , Jeff Voas - Cloud Computing Synopsis and Recommendations NIST, May 2011
8. Tom White - Hadoop: The Definitive Guide Storage and Analysis at Internet Scale 'Reilly Media Press May 2012
9. Dave Shackelford-Virtualization security- Protecting Virtualized Environments, Sybex Publishers, First Edition, 2012

13IT704/13IT074

CLOUD COMPUTING

3 1 0 4

OBJECTIVES

- To understand basic architecture and service models of cloud computing
- To understand the concepts of Virtualization and Cloud architecture
- To study cloud platforms and applications

OUTCOMES

At the end of the course the student should be able to

- Analyze the problems and solutions to cloud application development.
- Apply principles of best practice in cloud application design and management.
- Design cloud applications and assess their importance

UNIT I INTRODUCTION TO CLOUD COMPUTING 9

Vision of cloud computing – Defining a cloud – Cloud computing reference model –Characteristics and benefits – Challenges – Historical developments: Distributed systems, Virtualization, Web 2.0, Service – oriented computing, Utility – oriented computing – Building cloud computing environments: Application development, Infrastructure and system development, Computing platforms and technologies

UNIT II VIRTUALIZATION 9

Characteristics of virtualized environments – Taxonomy of virtualization techniques Virtualization and cloud computing – Pros and cons of virtualization – Technology examples: Xen: Para virtualization, VMware: full virtualization, Microsoft Hyper – V.

UNIT III CLOUD COMPUTING ARCHITECTURE AND SERVICES 9

Cloud reference model – Architecture – Infrastructure – and hardware as a service – Platform as a service – Software as a service – Types of clouds: Public, Private, Hybrid, Community Clouds – Economics of the cloud – Open Challenges

UNIT IV USING CLOUD SERVICES 9

Collaborating on Calendars – Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing – Collaborating on Databases – Storing and Sharing Files

UNIT V INDUSTRIAL PLATFORMS AND NEW DEVELOPMENTS 9

Cloud Platforms in Industry: Amazon web services – Amazon EC2, Amazon S3 – Google AppEngine, – Third Party Cloud Services: MetaCDN, SpotCloud– Cloud Applications :Healthcare, Business and Consumer Applications

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Energy efficient and green cloud computing architecture – Cloud and Big Data Analytics – Social Networking-Open Stack-Open Compute.

TOTAL: 45

TEXT BOOKS

1. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, “Mastering Cloud Computing”, Tata McGraw Hill, New Delhi, India, 2013.
2. Michael Miller, “ Cloud Computing”, Pearson Education, New Delhi, 2009

REFERENCES

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.
3. Toby Velte, Anthony Velte and Robert Elsenpeter “Cloud Computing – A Practical Approach”, Tata McGraw Hill, 2010.
4. Jeorge Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud”, O’Reilly Applications, 2009.
5. www.manjrasoft.com
6. www.openstack.org
7. www.eucalyptus.com

13IT711 SERVICE ORIENTED ARCHITECTURE LABORATORY 0 0 3 1

OBJECTIVES

B TECH: INFORMATION TECHNOLOGY

- To work with XML and related technologies.
- To implement Web services in the Java and .NET frameworks.
- To study and work with Web service security and smart device applications

LIST OF EXPERIMENTS

1. Creation of XML files, and validating it using DTD and XML Schema
2. Parsing and XML document using DOM and SAX parsers
3. XML – RPC Implementation
4. Develop at least five components such as order processing payment processing using .NET component technology.
5. Develop components for order processing and payment processing using EJB component technology
6. Invoke .NET components as web services.
7. Invoke EJB components as web services.
8. Develop a service Orchestration Engine (workflow) using WS-BPEL and implement service composition. For example, a business process for planning business for planning business travels will invoke several airline companies (Such as American Airlines, Delta Airlines etc.) to check the airfare price .
9. Develop a J2EE client to access a .NET web service.
10. Develop a J2EE client to access a J2EE web service.
11. Creating Web Services in Java and .Net
12. Web Service Security in J2EE

TOTAL: 45

13IT712 VIRTUALIZATION TECHNIQUES LABORATORY 0 0 3 1

OBJECTIVES

- To study and work with server virtualization
- To work with storage virtualization techniques.
- Implement of remote desktop services.
- To build Private Cloud.

LIST OF EXPERIMENTS

1. Build server virtualization with KVM Citrix Xen Server , Hypervisor
2. Working with virtual network tools.
3. Implementations of block-level and file-level virtualization
4. Build desktop virtualization with VirtualBox.
5. Application virtualization using Citrix XenApp, Microsoft App-V.
6. Building and managing private cloud using openstack.
7. Building private cloud using Eucalyptus.

TOTAL:45

ELECTIVES

COMMUNICATION SYSTEMS

13IT001 COMMUNICATION SWITCHING TECHNIQUES 3 0 0 3

OBJECTIVES

- To understand the concepts of data communications and telecommunication systems.
- To understand the fundamentals of Switching methods, Traffic Load and Queuing Analysis.
- To study the various types of network in terms of the technologies, hardware, and usage.

B TECH: INFORMATION TECHNOLOGY

- To learn the principles of cellular communication networks.

OUTCOMES

At the end of the course the student should be able to

- Analyze the concepts of telecommunication and switching systems.
- Design and analysis of Traffic Load and Queuing systems.
- Analyze the concepts of digital communication and its applications in telecommunication.
- Design and development of cellular communication and personal area networks.

UNIT I COMPONENTS AND PRINCIPLES 9

Block Diagram Of Switching System – Pulse and DTMF Dialing – Signaling Tones –Stronger Switching with design examples – Principles of Common Control- Cross Bar Switching

UNIT II SPACE DIVISION AND TIME DIVISION SWITCHING 9

Stored Program Control – Centralized and Distributed SPC- 2stage- 3 Stage and N Stage Networks- Time Division Time and Space Switching- Time Multiplexed Time and Space Switching- Combination Switching.

UNIT III TRAFFIC ENGINEERING 9

Network Traffic Load and Parameters- Grade Of Service and Blocking Probability- Modeling Switching Systems- Blocking Models and Loss Estimates- Delay Models and Queue Analysis.

UNIT IV DIGITAL SUBSCRIBER ACCESS 9

Integrated Services Digital Network- High Data Rate Digital Subscriber Loops- Digital Loop Carrier Systems and Fiber in the loop- Voice Band Modems.

UNIT V CELLULAR WIRELESS NETWORKS 9

Principles of Cellular Networks- Frequency Reuse- Channel Assignment Strategies- Handoff Strategies- Cordless Systems- Wireless Local Loop- and Wireless Application Protocol- BLUE TOOTH: Overview- Radio specification- Base Band Specification- Link Manager Specification- Logical Link Control and Adaptation Protocol.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

3G- Harmonized 3G- 3G CDMA- Smart Phones and Tablets-4G Evolution.

TOTAL: 45

TEXT BOOKS

1. Viswanathan.T,“Telecommunication Switching System and Networks”, Prentice Hall, New Delhi, 2004.
2. William Stallings, “Wireless Communication and Networks”, 2nd edition, Pearson Education, New Delhi, 2005.

REFERENCES

1. Frenzel, “ Communication Electronics – Principles and Applications”,3rd edition, Tata Mc-Graw Publishing Co. Ltd., New Delhi, 2009.
2. John. C. Bellamy, “Digital Telephony”,3rd edition, John Wiley & Sons, Singapore, 2009.
3. BehrouzForouzan, “Introduction to Data Communication and Networking”, 3rd edition, Tata McGraw Hill, New York,2007.
4. Marion Cole, “Introduction to Telecommunications Voice, Data & the Internet”,2nd edition, Pearson Education, New Delhi, 2002.

13IT002 INFORMATION CODING TECHNIQUES 3 0 0 3

OBJECTIVES

- To study the concepts of error–control and coding techniques.
- To understand encoding and decoding of digital data streams.

B TECH: INFORMATION TECHNOLOGY

- To learn the working principles of compression and decompression techniques.
- To study the concepts of multimedia communication.

OUTCOMES

At the end of the course the student should be able to

- Analyze the fundamental parameters relevant to information theory.
- Design and analyze the source coding, compression and error control methods.
- Design and development of multimedia applications.

UNIT I INFORMATION THEORY FUNDAMENTALS

9

Information – Entropy, Information rate, classification of codes, Kraft McMillan inequality, Source coding theorem, Shannon-Fano coding, Huffman coding, Extended Huffman coding - Joint and conditional entropies, Mutual information - Discrete memoryless channels – BSC, BEC – Channel capacity, Shannon limit.

UNIT II ERROR CONTROL CODING: BLOCK CODES

9

Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding - Single parity codes, Hamming codes, Repetition codes - Linear block codes, Cyclic codes - Syndrome calculation, Encoder and decoder - CRC

UNIT III ERROR CONTROL CODING: CONVOLUTIONAL CODES

9

Convolutional codes – code tree, trellis, state diagram - Encoding – Decoding: Sequential search and Viterbi algorithm – Principle of Turbo coding

UNIT IV SOURCE CODING: TEXT, AUDIO AND SPEECH

9

Text: Adaptive Huffman Coding, Arithmetic Coding, LZW algorithm – Audio: Perceptual coding, Masking techniques, Psychoacoustic model, MEG Audio layers I,II,III, Dolby AC3 - Speech: Channel Vocoder, Linear Predictive Coding

UNIT V COMPRESSION TECHNIQUES

9

Principles – Text compression – Static Huffman Coding – Dynamic Huffman coding – Arithmetic coding – Image Compression – Graphics Interchange format – Tagged Image File Format – Digitized documents – Introduction to JPEG standards.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Advanced Video and Image Compression techniques – Motion estimation – Motion compensation– MPEG standard.

TOTAL: 45

TEXT BOOKS

1. R Bose, “Information Theory, Coding and Cryptography”, TMH 2007
2. Fred Halsall, “Multimedia Communications, Applications Networks Protocols and Standards”, Pearson Education, Asia 2008.

REFERENCES

1. Simon Haykin, “Communication Systems”, 5th Edition, John Wiley and Sons, 2009.
2. Mark Nelson, “Data Compression Book”, 2nd edition, BPB Publication 2012.
3. Watkinson J, “Compression in Video and Audio”, Focal Press, London, 1995.
4. <http://utuubersity.com/?page id=964>

13IT003

INFORMATION SECURITY

3 0 0 3

OBJECTIVES

- To study the concept of basics of Information Security.

B TECH: INFORMATION TECHNOLOGY

- To learn the legal, ethical and professional issues in Information Security.
- To study the aspects of risk management.
- To understand the types of various standards in this area

OUTCOMES

At the end of the course the student should be able to

- Analyze the various risks involved in information systems.
- Design the security systems for IT systems at various levels.
- Design the access control mechanism used for user authentication and authorization.

UNIT I INTRODUCTION 9

History- What is Information Security?- Critical Characteristics of Information- NSTISSC Security Model- Components of an Information System- Securing the Components- Balancing Security and Access- The SDLC- The Security SDLC

UNIT II SECURITY INVESTIGATION 9

Need for Security- Business Needs- Threats- Attacks- Legal- Ethical and Professional Issues

UNIT III SECURITY ANALYSIS 9

Risk Management: Identifying and Assessing Risk- Assessing and Controlling Risk

UNIT IV LOGICAL DESIGN 9

Blueprint for Security- Information Security Policy- Standards and Practices- ISO 17799/BS 7799- NIST Models- VISA International Security Model- Design of Security Architecture- Planning for Continuity

UNIT V PHYSICAL DESIGN 9

Security Technology- IDS- Scanning and Analysis Tools- Cryptography- Access Control Devices- Physical Security- Security and Personnel

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

RADIUS Protocol - Developer Centric Approach to a Dynamic Android Permission System - Security API for Distributed Social Networks - MD5 collisions on multimedia files

TOTAL: 45

TEXT BOOKS

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", 3rd edition, Vikas Publishing House, New Delhi, 2009.
2. Micki Krause, Harold F. Tipton, "Handbook of Information Security Management", Vol 1-3, 2nd edition, CRC Press LLC, 2003.

REFERENCES

1. Stuart McClure, Joel Scrambray, George Kurtz, "Hacking Exposed", 10th anniversary edition, Tata McGraw-Hill, 2009.
2. Matt Bishop, "Computer Security Art and Science", 1st edition, Pearson/PHI, 2002.

13IT004

EMBEDDED SYSTEMS

3 0 0 3

OBJECTIVES

- To understand the hardware and software of an embedded systems.
- To learn the various devices and buses used for embedded networking.
- To learn programming concepts and embedded programming in C and C++.
- To understand the real time operating systems, inter-task communication and an exemplary case of MUCOS – IRTOS.

OUTCOMES

At the end of the course the student should be able to

- Analyze the hardware and software of an embedded systems.
- Use embedded programming in C and C++.
- Design the RTOS systems and analyze its various functionalities.

UNIT I INTRODUCTION TO EMBEDDED SYSTEMS

9

Definition and Classification – Overview of Processors and hardware units in an embedded system – Software embedded into the system – 8051 Microcontroller, ARM processor – Architecture, Instruction sets and programming.

UNIT II DEVICES AND BUSES FOR DEVICES NETWORK

9

I/O Devices - Device I/O Types and Examples – Synchronous - Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices - UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in Devices/Ports- Timer and Counting Devices - ‘12C’, ‘USB’, ‘CAN’ and advanced I/O Serial high speed buses- ISA, PCI, PCI-X, CPCI and advanced buses.

UNIT III PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C, C++

9

Programming embedded systems in assembly and C – Meeting real time constraints –Multi-state systems and function sequences - Concepts of EMBEDDED PROGRAMMING in C++ - Objected Oriented Programming – Embedded Programming in C++, ‘C’ Program compilers – Cross compiler – Optimization of memory codes.

UNIT IV REAL TIME OPERATING SYSTEMS – PART – 1

9

Definitions of process, tasks and threads – Clear cut distinction between functions – ISRs and tasks by their characteristics – Operating System Services- Goals – Structures- Kernel - Process Management – Memory Management – Device Management – File System Organisation and Implementation – I/O Subsystems – Interrupt Routines Handling in RTOS, REAL TIME Operating Systems : RTOS Task scheduling models - Handling of task scheduling and latency and deadlines as performance metrics – Co-operative Round Robin Scheduling – Cyclic Scheduling with Time Slicing (Rate Monotonics Co-operative Scheduling) – Preemptive Scheduling Model strategy by a Scheduler – Critical Section Service by a Preemptive Scheduler – Fixed (Static) Real time scheduling of tas - Inter Process Communication And Synchronisation – Shared data problem – Use of Semaphore(s) – Priority Inversion Problem and Deadlock Situations – Inter Process Communications using Signals – Semaphore Flag or mutex as Resource key – Message Queues – Mailboxes – Pipes – Virtual (Logical) Sockets – Remote Procedure Calls (RPCs).

UNIT V REAL TIME OPERATING SYSTEMS – PART – 2

9

Study of Micro C/OS-II or Vx Works or Any other popular RTOS – RTOS System Level Functions – Task Service Functions – Time Delay Functions – Memory Allocation Related Functions – Semaphore Related Functions – Mailbox Related Functions – Queue Related Functions – Case Studies of Programming with RTOS – Understanding Case Definition – Multiple Tasks and their functions – Creating a list of tasks – Functions and IPCs – Exemplary Coding Steps.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Heterogeneous Architecture- Convergence Embedded systems-Middleware Systems.

TOTAL:45

TEXT BOOKS

1. Rajkamal, ” Embedded Systems Architecture, Programming and Design”, TATA McGraw-Hill, First reprint Oct. 2008.
2. Wayne Wolf, “Computers as Components: Principles of Embedded Computer System Design”, Elsevier, Third Edition, 2012.
3. Michael J. Pont, “Embedded C”, Pearson Education, 2007.

REFERENCES

1. Steve Heath, "Embedded Systems Design", Second Edition-2003, Newnes.
2. David E.Simon, "An Embedded Software Primer, Pearson Education Asia", First Indian Reprint 2000.
3. Wayne Wolf, "Computers as Components; Principles of Embedded Computing System Design – Harcourt India", Morgan Kaufman Publishers, First Indian Reprint 2001.
4. Frank Vahid and Tony Givargis, "Embedded Systems Design – A unified Hardware /Software Introduction", John Wiley, 2002.
5. <http://www.eg3.com/>

13IT005

DIGITAL IMAGE PROCESSING

3 0 0 3

OBJECTIVES

- To study the image fundamentals and mathematical transforms necessary for image processing.
- To understand the image enhancement techniques.
- To learn the image restoration procedures.
- To learn the image compression procedures.

OUTCOMES

At the end of the course the student should be able to

- Apply the image transforms functions for image processing.
- Use different image enhancement algorithms.
- Use the different image restoration procedures.
- Analyze the image compression techniques.

UNIT I DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS 9

Elements of visual perception – Image sampling and quantization Basic relationship between pixels – Basic geometric transformations-Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT – Separable Image Transforms –Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms.

UNIT II IMAGE ENHANCEMENT TECHNIQUES 9

Spatial Domain methods: Basic grey level transformation – Histogram equalization –Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters –Laplacian filters – Frequency domain filters : Smoothing – Sharpening filters –Homomorphic filtering.

UNIT III IMAGE RESTORATION 9

Model of Image Degradation/restoration process – Noise models – Inverse filtering -Least mean square filtering – Constrained least mean square filtering – Blind image restoration – Pseudo inverse – Singular value decomposition.

UNIT IV IMAGE COMPRESSION 9

Lossless compression: Variable length coding – LZW coding – Bit plane coding predictive coding-DPCM. Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards: JPEG, MPEG, Basics of Vector quantization.

UNIT V IMAGE SEGMENTATION AND REPRESENTATION 9

Edge detection –Thresholding - Region Based segmentation – Boundary representation: chain codes-Polygonal approximation –Boundary segments –boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors –Simple descriptors- Texture.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

CT based 3D image processing – Medical and Biomedical Image Processing – Multimodal Biometrics.

TOTAL:45

TEXT BOOKS

1. Rafael C Gonzalez, Richard E Woods 2nd Edition, Digital Image Processing - Pearson Education, New Delhi, 2009.
2. A.K. Jain, “Fundamentals of Digital Image Processing”, PHI Learning , NewDelhi, 2005.
3. William K Pratt, “Digital Image Processing”, John Willey & Sons, New Delhi,2007.

REFERENCES

1. MillmanSonka, Vaclav hlavac, Roger Boyle, Broos/colic, “Image Processing Analysis and Machine Vision”, Thompson Learning, New Delhi, 1999.
2. ChandaDuttaMagundar, “Digital Image Processing and Applications”, Prentice Hall of India, New Delhi, 2000.
3. <http://nptel.ac.in/courses/106105032/>

PROGRAMMING AND DATABASES

13CS001

C # & .NET FRAMEWORK

3 0 0 3

OBJECTIVES

- To understand the fundamental aspects of C#
- To gain knowledge about the oops paradigms in C#
- To gain programming skills in C# both in basic and advanced levels.
- To develop simple applications based on .NET

OUTCOMES

At the end of the course the student should be able

- To design a program in fundamental programming concepts such as variables, conditional statements, looping constructs and methods in C#
- To apply inheritance mechanism in C#
- To develop web applications using .NET
- To develop a program that demonstrate the concepts of .NET frameworks

UNIT I INTRODUCTION TO C#

8

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

UNIT II OBJECT ORIENTED ASPECTS OF C#

9

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

UNIT III APPLICATION DEVELOPMENT ON .NET

8

Building Windows Applications, Accessing Data with ADO.NET.

UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET

8

Programming Web Applications with Web Forms, Programming Web Services.

UNIT V THE CLR AND THE .NET FRAMEWORK

12

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.

UNIT VI STATE OF THE ART/ADVANCES(NOT FOR EXAMINATION)

Automated test code generation system,Managed codes for bioimaging on ASP.NET,Security vulnerabilities and leaks in ASP.NET websites, Webpage trojan horse in IIS Server.

TOTAL: 45

TEXT BOOKS

1. E. Balagurusamy, "Programming in C#", 2nd Edition, Tata McGraw-Hill, 2004.
2. J. Liberty, "Programming C#", 5th Edition, O'Reilly, 2002.
3. Christian Nagel et al. —Professional C# 2005 with .NET 3.0||, Wiley India , 2007

REFERENCES

1. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 2010.
2. Robinson et al, "Professional C#", 3rd Edition, Wiley Publications, 2004.
3. Andrew Troelsen, "C# 2008 and the .NET 3.5 Platform", 4th Edition, A Press, 2007.
4. S.Thamarai Selvi, R. Murugesan, "A Textbook on C#", Pearson Education, 2003.

13CS004

UNIX INTERNALS

3 0 0 3

OBJECTIVES

- To have thorough understanding of the kernel.
- To understand the file organization and management.
- To learn the various system calls.
- To have knowledge of process architecture, process control & scheduling, I/O Sub system and memory management.

OUTCOMES

At the end of the course the student should be able to

- Design the kernel
- Solve the file organization and management
- Use the various system calls.
- Design the process architecture, process control & scheduling, I/O Sub system and memory management

UNIT I GENERAL OVERVIEW OF THE SYSTEM 9

History – System structure – User perspective – Operating system services – Assumptions about hardware. Introduction to the Kernel: Architecture of the UNIX operating system – Introduction to system concepts – Kernel data structures – System administration.

UNIT II BUFFER CACHE 9

Buffer headers – Structure of the buffer pool –Scenarios for retrieval of a buffer-Advantages and disadvantages of the buffer cache. Internal representation of files: Inodes – Structure of a regular file – Directories – Conversion of a path name to an Inode – Super block – Other file types

UNIT III SYSTEM CALLS FOR FILE SYSTEM 9

Open – Read – Write – File and record locking – Adjusting the position of file I/O –LSEEK – Close – File creation – Creation of special files – Pipes – Dup – Mounting and unmounting file systems

UNIT IV THE STRUCTURE OF PROCESSES 9

Process states and transitions – Layout of system memory – The context of a process – Saving the context of a process. Process Control: Process creation – Signals – Process termination – Awaiting process termination – The user ID of a process – Changing the size of a process – The shell – System boot and the INIT process

UNIT V PROCESS SCHEDULING AND MEMORY MANAGEMENT POLICIES 9

Process Scheduling: Algorithm – Parameters – Examples – Controlling process priorities – Fair share scheduler. Memory Management Policies: Swapping. The I/O Subsystem: Driver Interfaces– Disk Drivers-Terminal Drivers

UNIT VI STATE OF THE ART/ADVANCES(NOT FOR EXAMINATION)

Interprocess Communication: Pipes - Shared Memory & Semaphores - UNIX IPC: Message Queues - Unix Sockets: UDP & TCP/IP – Accessing Unix Documents Using X Windows.

TOTAL: 45

TEXT BOOKS

1. Maurice J. Bach, “The Design of the Unix Operating System”, Prentice Hall of India, 2009.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH, 2006. Second Edition TMH

REFERENCES

1. Uresh Vahalia, “UNIX Internals: The New Frontiers”, Pearson Education Inc, 2008.
2. S. J. Leffler, M. K. Mckusick, M. J. Karels and J. S. Quarterman., “The Design and Implementation of the 4.3 BSD Unix Operating System”, Addison Wesley, 1998.
3. Daniel P. Bovet & Marco Cesati, “Understanding the Linux Kernel”, O’REILLY, Shroff Publishers & Distributors Pvt. Ltd, 2000.
4. <http://nptel.tvm.ernet.in>

13IT021

DATA WAREHOUSING AND MINING

3 0 0 3

OBJECTIVES

- To study the concept of data mining with in detail coverage of basic tasks, metrics, issues and implication.
- To learn the working behavior of data warehousing with special emphasis on architecture and design.
- To understand the different types of classification and clustering.
- To study the association rules and its applications.
- To learn about the recent trends in data mining and warehousing.

OUTCOMES

At the end of the course the student should be able to

- Analyze the concept of data mining and to use the architecture of data warehousing with special emphasis on architecture and design.

UNIT I INTRODUCTION AND DATA WAREHOUSING

9

Overview of Data Warehouse- Multidimensional Data Model- Data Warehouse Architecture- Implementation- Further Development- Data Warehousing to Data Mining.

UNIT II DATA PREPROCESSING, CONCEPT DESCRIPTION

9

Why Preprocessing- Cleaning- Integration- Transformation- Reduction- Discretization- Concept Hierarchy Generation- Data Mining Primitives- Query Language- Graphical User Interfaces- Architectures- Concept Description- Data Generalization- Characterizations- Class Comparisons- Descriptive Statistical Measures

UNIT III ASSOCIATION RULES

9

Association Rule Mining- Single-Dimensional Boolean Association Rules from Transactional Databases- Multi-Level Association Rules from Transaction Databases.

UNIT IV CLASSIFICATION AND CLUSTERING

9

Classification and Prediction- Issues- Decision Tree Induction- Bayesian Classification- Association Rule Based- Other Classification Methods- Prediction- Classifier Accuracy- Cluster Analysis- Types of data- Categorization of methods- Partitioning methods- Outlier Analysis.

UNIT V RECENT TRENDS

9

Multidimensional Analysis and Descriptive Mining of Complex Data Objects- Spatial Databases- Multimedia Databases- Time Series and Sequence Data- Text Databases-WEKA-Rapid miner-Orange

tool.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

ETL - Geographical data warehouse - Closed Cube Lattice - Closed Multidimensional Sequential Pattern-Support Vector Machines-Ant Colony Optimization.

TOTAL: 45

TEXT BOOKS

1. J. Han, M. Kamber, "Data mining: Concepts and Techniques", 3rd edition, Harcourt india / Morgan Kauffman, 2012.

REFERENCES

1. Sam anahory, Dennismurry, "Data warehousing in the real world", Pearson Education 2009.
2. David hand, Heikki manila, Padhraicsymth, "Principles of Data Mining", MIT Press, 2004.
3. <http://www.inf.unibz.it/dis/teaching/DWDM/>
4. <http://www.ifis.cs.tu-bs.de/teaching/ws-1011/dwh>

13IT024 FUNDAMENTALS OF OPEN SOURCE SOFTWARE 3 0 0 3

OBJECTIVES

- To understand the need and applications of open source software.
- To learn the open source database MySQL.
- To learn the different open source programming languages such as PHP, PERL and Python.

OUTCOMES

At the end of the course the student should be able to

- Analyze the open source software and operating system.
- Use MySQL database and connectivity in web.
- Use the open source programming languages such as PHP, PERL and Python.

UNIT I INTRODUCTION TO OPEN SOURCE 9

Need of Open Source– Advantages of Open Source– Application of Open Source- Open source operating systems: LINUX: Introduction – General Overview – Kernel Mode and user mode – Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux.

UNIT II OPEN SOURCE DATABASE 9

MySQL: Introduction – Setting up account – Starting, terminating and writing your own SQL programs – Record selection Technology – Working with strings – Date and Time– Sorting Query Results – Generating Summary – Working with metadata – Using sequences – MySQL and Web.

UNIT III OPEN SOURCE PROGRAMMING LANGUAGES 9

PHP: Introduction – Programming in web environment – variables – constants – data;types – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage – PHP and SQL database – PHP and LDAP – PHP Connectivity – Sending and receiving E-mails – Debugging and error handling – Security – Templates.

UNIT IV PYTHON 9

Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment.

UNIT V PERL 9

Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines, Packages, and Modules- Working with Files –Data Manipulation.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Open Source Web Server – Open Source Cloud Platforms –Open Source Mobile Platforms-Java Server Faces.

TOTAL: 45

TEXT BOOKS

1. Remy Card, Eric Dumas and Frank Mevel,” The Linux Kernel Book”, Wiley Publications, 2003.
2. Steve Suchring,” MySQL Bible”, John Wiley, 2002.
3. RasmusLerdorf and Levin Tatroe,” Programming PHP”, O’Reilly Publications, 2002.

REFERENCES

1. RasmusLerdorf and Levin Tatroe, “Programming PHP”, O’Reilly, 2013.
2. Wesley J. Chun, “Core Python Programming”, Prentice Hall, 2006.
3. Martin C. Brown,” Perl:The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4. Steven Holzner, “PHP: The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
5. VikramVaswani, “MYSQL: The Complete Reference”, 2nd Edition, Tata McGraw- Hill Publishing Company Limited, Indian Reprint 2009.

13IT025

BIG DATA

3 0 0 3

OBJECTIVES

- To understand the need for big data analytics.
- To learn the various big data analysis techniques.
- To learn the various big data frameworks and technologies.

OUTCOMES

At the end of the course the student should be able to

- Design the need for big data analytics for a domain.
- Use Hadoop, Map Reduce Framework.
- Apply big data analytics for a give problem.

UNIT I INTRODUCTION TO BIG DATA

9

Analytics – Nuances of big data – Value – Issues – Case for Big data – Big data options Team challenge – Big data sources – Acquisition – Nuts and Bolts of Big data. Features of Big Data - Security, Compliance, auditing and protection - Evolution of Big data – Best Practices for Big data Analytics - Big data characteristics - Volume, Veracity, Velocity, Variety – Data Appliance and Integration tools – Greenplum – Informatica.

UNIT II DATA ANALYSIS

9

Evolution of analytic scalability – Convergence – parallel processing systems – Cloud computing –grid computing – map reduce – enterprise analytic sand box – analytic data sets – Analytic methods –analytic tools – Cognos – Microstrategy - Pentaho. Analysis approaches – Statistical significance –business approaches – Analytic innovation – Traditional approaches – Iterative.

UNIT III STREAM COMPUTING

9

Basics of Streams Concepts – Stream data model and architecture - Stream Computing,Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime Analytics Platform(RTAP) applications IBM Infosphere – Big data at rest – Infosphere streams – Data stage – Statistical analysis– Intelligent scheduler – Infosphere Streams.

UNIT IV PREDICTIVE ANALYTICS AND VISUALIZATION 9

Predictive Analytics – Supervised – Unsupervised learning – Neural networks – Kohonen models – Normal – Deviations from normal patterns – Normal behaviours – Expert options – Variable entry - Mining Frequent itemsets - Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications.

UNIT V FRAMEWORKS AND APPLICATIONS 9

IBM for Big Data – Map Reduce Framework - Hadoop – Hive - – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Hbase – Impala – Analyzing big data with twitter – Big data for ECommerce– Big data for blogs.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Mapreduce-Scattergather-HADOOP –Pervasive-SQL analysis.

TOTAL: 45

TEXT BOOKS

1. Frank J Ohlhorst, “Big Data Analytics: Turning Big Data into Big Money”, Wiley and SAS BusinessSeries, 2012.
2. Colleen Mccue, “Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis”, Elsevier, 2007.
3. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.

REFERENCES

1. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, Wiley and SAS Business Series, 2012.
2. Paul Zikopoulos, Chris Eaton, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGraw Hill, 2011.
3. Paul Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch , James Giles, David Corrigan, “Harness the Power of Big data – The big data platform”, McGraw Hill, 2012.
4. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007.

13CS045 ADVANCED DATABASES 3 0 0 3

OBJECTIVES

- To identify the need for different databases.
- To know about different data models that can be used for these databases.
- To get familiarized with transaction management of the database
- To develop in-depth knowledge about web and intelligent database.
- To implement the way in which data can be stored in geographical information systems etc.

OUTCOMES

At the end of the course the student should be able to

- Design object oriented data model for real world problem domain
- Design a web database using XML query language.
- Analyze the effectiveness of various algorithms in mobile database application

UNIT I DISTRIBUTED DATABASES 9

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 Optimization - Distribution and Replication in Oracle.

UNIT II OBJECT ORIENTED DATABASES	9
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
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
Enhanced Data Models For Advanced Applications – Active Database Concepts And Triggers – Temporal Database Concepts – Deductive databases – Knowledge Databases.	
UNIT V TYPES OF DATABASES	9
Mobile Database – Geographic Information Systems – Genome Data Management – Multimedia Database – Parallel Database – Spatial Databases - Database administration – Data Warehousing and Data Mining.	
UNIT VI STATE OF ART/ADVANCES (NOT FOR EXAMINATION)	
Information Retrieval - Introduction to Information Retrieval - Indexing for Text Search - Temporal Database - Active and Deductive Databases	
	TOTAL: 45

TEXT BOOK

1. Thomas M. Connolly, Carolyn E. Begg, “Database Systems - A Practical Approach to Design, Implementation, and Management”, 5th Edition, Pearson Education, 2005.

REFERENCES

1. Ramez Elmasri & Shamkant B.Navathe, “Fundamentals of Database Systems”, 6th Edition, Pearson Education, 2010.
2. M.Tamer Ozsu, Patrick Ualdurriel, “Principles of Distributed Database Systems”, 2nd Edition, Pearson Education, 2003.
3. C.S.R.Prabhu, “Object Oriented Database Systems”, PHI, 2nd Edition, 2005.
4. Peter Rob and Corlos Coronel, “Database Systems – Design, Implementation and Management”, Thompson Learning, Course Technology, 5th Edition, 2003.
5. <http://nptel.tvm.ernet.in>

NETWORKING

13IT041 CLIENT SERVER COMPUTING 3 0 0 3

OBJECTIVES

- To study the basic roles of client and server in client-server environment.
- To understand the concepts of client-server systems over monolithic systems.
- To understand the client-server environment and its technologies.

OUTCOMES

At the end of the course the student should be able to

B TECH: INFORMATION TECHNOLOGY

- Analyse the client server support systems in computing.
- Analyse and apply the features of server in networking environment.
- Use client server and web technology for retrieving information.

UNIT I INTRODUCTION TO CLIENT SERVER COMPUTING 9

Basics of Client Server Computing- Benefits- Evolution of client server computing- Client Server Applications- Components- Classes of Client Server Computing – Categories of Client Server Computing

UNIT II CLIENT/SERVER OPERATING SYSTEMS 9

Dispelling the myths- Obstacles upfront and hidden- open systems and standards- factors needed for success. Standards setting organizations

UNIT III THE CLIENT 9

Client Hardware and software- Client components- Client Operating Systems- GUI- X windows and Windowing- Database Access Application Logic- Client Software Products- Client Requirements

UNIT IV THE SERVER 9

Server Hardware- Categories- Features classes of Server Machines- Server Environment- Network management environment- network Computing Environment- Network Operating Systems- Server requirements- Platform Independence- Transaction Processing- and Connectivity- Server Data Management and Access Tools

UNIT V CLIENT SERVER AND INTERNET 9

Client server and internet- Web client server- 3 tier client server web style- CGI - the server side of web- CGI and State- SQL database servers- Middleware and federated databases- data warehouses- EIS/DSS to data mining- GroupWare Server - what is GroupWare- components of GroupWare

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Virtualization-Cloud computing- Virtual Machine Migration-Cloud Client Architecture

TOTAL: 45

TEXT BOOKS

1. Dawna Travis Dewire, “ Client Server Computing”, Tata Mc-Graw Hill Education Pvt. Ltd., New Delhi, 2003
2. Robert Orfali, Dan Harkey& Jeri Edwards, “Essential Client/Server Survival Guide”, 3rd edition, John Wiley & Sons, Singapore, 2011

REFERENCES

1. Eric J Johnson, “A complete guide to Client / Server Computing”, first edition, Prentice Hall, New Delhi, 2001.
2. Smith &Guengerich, “Client /Server Computing”, Prentice Hall, New Delhi, 2011.
3. James E. Goldman, Phillip T. Rawles, Julie R. Mariga, “Client/Server Information Systems, A Business Oriented Approach”, John Wiley & Sons, Singapore, 2000.

13IT042

GRID COMPUTING

3 0 0 3

OBJECTIVES

- To understand resource sharing across networks.
- To integrate heterogeneous computing systems and data resources with the aim of providing a global computing space.
- To understand the technology and tool kits that facilitates the grid computing.

OUTCOMES

B TECH: INFORMATION TECHNOLOGY

At the end of the course the student should be able to

- Utilise grid computing and clustering middleware, such as Parallel Virtual Machine (PVM), Message Passing Interface (MPI), HPC Portals, and Peer-to-Peer networks for implementing virtual super computing resources
- Install a grid computing environment
- Design and implement Grid computing applications using Globus or similar toolkits

UNIT I CONCEPTS AND ARCHITECTURE 9

Introduction-Parallel and Distributed Computing-Cluster Computing-Grid Computing-Anatomy and Physiology of Grid-Review of Web Services-OGSA-WSRF.

UNIT II GRID MONITORING 9

Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems- GridICE- JAMM - MDS-Network Weather Service-R-GMA-Other Monitoring Systems- Ganglia and GridMon

UNIT III GRID SECURITY AND RESOURCE MANAGEMENT 9

Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management-Scheduling Paradigms- Working principles of Scheduling -A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

UNIT IV DATA MANAGEMENT AND GRID PORTALS 9

Data Management-Categories and Origins of Structured Data-Data Management Challenges-Architectural Approaches-Collective Data Management Services-Federation Services-Grid Portals-First Generation Grid Portals-Second Generation Grid Portals.

UNIT V GRID MIDDLEWARE 9

List of globally available grid Middlewares - Case Studies-Current version of Globus Toolkit and gLite – Architecture - Components and Features.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Genegrid - Open Molgrid Grid Middleware - ProActive - Unicore - Vishwa- Globus Tool Kit(GTK)- OpenStack,Open Compute

TOTAL: 45

TEXT BOOK

1. Maozhen Li, Mark Baker, The Grid: Core Technologies, John Wiley & Sons ,2005

REFERENCES

1. Joshy Joseph & Craig Fellenstein, “Grid Computing”, PHI, 2004.
2. Ahmar Abbas, “Grid Computing: A Practical Guide to technology and Applications”, Charles River media, 2005.
3. Ian Foster & Carl Kesselman, The Grid 2 – Blueprint for a New Computing Infrastructure , Morgan Kaufman – 2004
4. Fran Berman, Geoffrey Fox, Anthony J.G.Hey, Grid Computing: Making the Global Infrastructure a Reality”, John Wiley and Sons,2003
5. URLs : www.globus.org and glite.web.cern.ch (Unit V)
6. <http://www.cs.kent.edu/~farrell/grid06/lectures/index.html>.

13IT043

WIRELESS NETWORKS

3 0 0 3

OBJECTIVES

- To study the basics of Routing and protocols in Adhoc and Sensor Networks.
- To understand the overview of Wireless Broadband Networks technology,platforms and standards.

B TECH: INFORMATION TECHNOLOGY

- To understand the concepts of managing, testing and troubleshooting of Wireless Broadband networks.
- To learn the principles of advanced wireless networks.

OUTCOMES

At the end of the course the student should be able to

- Analyze the transmission and receiving algorithms.
- Analyze the error control methods in the wireless channels.
- Design and analyze the testing and troubleshooting of Wireless Broadband Networks.
- Analyze the advanced wireless networks.

UNIT I AD HOC NETWORKS

9

Characteristics and Applications of Ad hoc Networks–Routing – Need for routing and routing classifications, Table Driven Routing Protocols, Source Initiated On-Demand Routing Protocols, Hybrid Protocols – Zone Routing, Fisheye Routing, LANMAR for MANET with group mobility- Location Added Routing, Distance Routing Effects- Microdiscovery and Power Aware Routing.

UNIT II SENSOR NETWORKS

9

Wireless Sensor Networks - DARPA Efforts- Classification-Fundamentals of MAC- Flat routing – Directed Diffusion, SPIN, COGUR- Hierarchical Routing- Cluster base routing, Scalable Coordination, LEACH, TEEN, APTEEN - Adapting to the dynamic nature of Wireless Sensor Networks.

UNIT III MESH NETWORKS

9

Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture –Opportunistic routing – Self configuration and Auto configuration – Capacity Models –Fairness – Heterogeneous Mesh Networks – Vehicular Mesh Networks.

UNIT IV WIRELESS BROADBAND NETWORKS TECHNOLOGY OVERVIEW, PLATFORMS AND STANDARDS

9

Wireless broadband fundamentals and Fixed Wireless Broadband Systems,-Platforms- Enhanced Copper, Fiber Optic and HFC, 3G Cellular, Satellites, ATM and Relay Technologies- HiperLAN2 Standard- Global 3G CDMA Standard,-CDMA Harmonization - G3G Proposal for Protocol Layers.

UNIT V MANAGING WIRELESS NETWORKS AND TESTING

9

Managing Wireless Broadband Operations of LMDS Systems and their Application- Principles- LMDS Versus Other Access technologies,-Applications- Testing Wireless Satellite Networks and Fixed Wireless Broadband Networks.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Residential High speed Internet Wireless Broadband Satellite Systems- Next Generation Wireless Broadband Networks –Smart Dust

TOTAL: 45

TEXT BOOKS

1. John R. Vacca, “Wireless Broadband Networks Handbook 3G, LMDS and Wireless Internet” Tata McGraw-Hill, 2001.
2. D.P. Agrawal and Qing-An zeng, “Introduction to Wireless and Mobile Systems”, 3rd edition, Thomson Learning, 2010.
3. Thomas Krag and SebastinBuettrich, “Wireless Mesh Networking”, O’ReillyPublishers, 2007.

REFERENCES

1. MartynMallick, Mobile and Wireless Design Essentials, Wiley, 2008.
2. KavehPahlavan and PrashantKrishnamurty - “Principles of Wireless Networks – A unified Approach,2nd edition, Pearson Education, 2010.
3. C.K.Toth, “Ad Hoc Mobile Wireless Networks”, Pearson Education, 2007.

13IT044

SOFT COMPUTING

3 0 0 3

OBJECTIVES

- To study the concept of fuzzy sets, fuzzy logic and use of heuristics based on human experience
- To understand neural networks that can learn from available examples and generalize to form appropriate rules for inference systems
- To learn the mathematical background for carrying out the optimization associated with neural network learning
- To understand genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations
- To learn the case studies utilizing the above and illustrate the intelligent behavior of programs based on soft computing

OUTCOMES

At the end of the course the student should be able to

- Apply various soft computing techniques to solve engineering problems and to build intelligent systems.

UNIT I FUZZY SET THEORY**10**

Overview of Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT II OPTIMIZATION**8**

Derivative-based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton’s Method – Step Size Determination – Derivative-free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search

UNIT III NEURAL NETWORKS**10**

Supervised Learning Neural Networks – Perceptrons - Adaline – Backpropagation Mutilayer Perceptrons – Radial Basis Function Networks – Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning.

UNIT IV NEURO FUZZY MODELING**9**

Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum

UNIT V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE**8**

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction

UNIT VI STATE OF ART

Recurrent Neural Networks -Artificial Neural Networks(ANN) - Dynamic system(FDS)-Genetic fuzzy systems(GFS)-Fuzzy Linear Programming(FLP)

TOTAL: 45**TEXT BOOK**

1. J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI, 2004, Pearson Education 2004

REFERENCES

1. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hill, 1997.
2. Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, N.Y., 1989.
3. S. Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003.
4. R.Eberhart, P.Simpson and R.Dobbins, “Computational Intelligence - PC Tools”, AP Professional, Boston, 1996.

13IT045

PERVASIVE COMPUTING

3 0 0 3

OBJECTIVES

- To study the various trends and technologies in pervasive computing.
- To learn the web based application in pervasive computing
- To understand the authentication mechanisms and issues in pervasive computing.

OUTCOMES

At the end of the course the student should be able to

- Design web based applications in pervasive computing using various protocols.
- Design middleware components for smart card programming.
- Analyze the multiple platform user interface issues in pervasive computing.

UNIT I PERSVASIVE COMPUTING APPLICATION 9

Pervasive Computing devices and Interfaces – Device technology trends, Connecting issues and protocols, pervasive computing principles.

UNIT II PERSVASIVE COMPUTING AND WEB BASED APPLICATIONS 9

XML and its role in Pervasive Computing - Wireless Application Protocol (WAP) Architecture and Security – Wireless Mark-Up language (WML) – Introduction

UNIT III MIDDLEWARE COMPONENTS 9

Programming consumer devices, Smart card programming, messaging components, Database components

UNIT IV PDA IN PERSVASIVE COMPUTING 9

Introduction - PDA software Components, Standards, emerging trends - PDA Device characteristics - PDA Based Access Architecture.

UNIT V USER INTERFACE ISSUES IN PERSVASIVE COMPUTING 9

Architecture - Smart Card- based Authentication Mechanisms - Wearable computing Architecture

UNIT VI STATE OF THE ART(NOT FOR EXAMINATION)

Ubiquitous Computing-Parallel Processing in Pervasive Computing-Security Issues in Pervasive Computing.

TOTAL: 45

TEXT BOOKS

1. JochenBurkhardt, Horst Henn, Stefan Hepper, Thomas Schaec, Klaus Rindtorff,“Pervasive Computing Technology and Architecture of Mobile Internet Applications”, Addison Wesley, New Delhi, 2009.
2. UweHansman, LothatMerk, Martin S Nicklous, Thomas Stober, “Pervasive Computing - Handbook”, Springer- Verlag, New Delhi, 2003

REFERENCES

1. UweHansmann, LotharMerk, Martin StNicklous, Thomas Stober, “Principles of Mobile Computing”, 2nd edition, Springer- Verlag, New Delhi, 2008.

13CS046

PARALLEL COMPUTING

3 0 0 3

OBJECTIVES

3. To identify the scalability and clustering issues and the technology necessary for implementing them.
4. To understand the technologies enabling parallel computing.
5. To know about different types of interconnection networks.
6. To implement different parallel programming models.
7. To identify the software support needed for shared memory programming

OUTCOMES

At the end of the course the student should be able to

- Apply the concepts of a Parallel Computer Architecture by creating a parallel program that will maximize the performance of the parallel program
- Design Threads to execute and efficient class of parallel computer architecture
- Analysis the computer performance problems
- Use different Memory management
- Understand message passing concepts

UNIT I SCALABILITY AND PARALLEISM

9

Evolution of Computer Architecture – Dimensions of Scalability – Parallel Computer Models – Basic Concepts of Clustering – Scalable Design Principles – Parallel Programming Overview – Processes, Tasks and Threads – Parallelism Issues – Interaction / Communication Issues – Semantic Issues in Parallel Programs.

UNIT II HARDWARE TECHNOLOGIES

9

System Development Trends – Principles of Processor Design – Microprocessor Architecture Families – Hierarchical Memory Technology – Cache Coherence Protocols – Shared Memory Consistency – Distributed Cache Memory Architecture – Latency Tolerance Techniques – Multithreaded Latency Hiding.

UNIT III SYSTEM INTERCONNECTS

9

Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms.

UNIT IV PARALLEL PROGRAMMING

9

Paradigms and Programmability – Parallel Programming Models – Shared Memory Programming.

UNIT V MESSAGE PASSING PROGRAMMING

9

Message Passing Paradigm – Message Passing Interface – Parallel Virtual Machine.

UNIT VI STATE OF THE ART/ADVANCES(NOT FOR EXAMINATION)

Cloud and Grid computing - GPUS and Heterogeneous process - Message Passing Interface (MPI) - Single-core optimization.

TOTAL: 45

TEXT BOOK

1. Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw-Hill, New Delhi, 2003.

REFERENCES

1. David E. Culler & Jaswinder Pal Singh, "Parallel Computing Architecture: A Hardware/Software Approach", Morgan Kaufman Publishers, 2010.
2. Michael J. Quinn, "Parallel Programming in C with MPI & OpenMP", Tata McGraw-Hill, New Delhi, 2004.
3. Kai Hwang, "Advanced Computer Architecture" Tata McGraw-Hill, New Delhi, 2003.
4. http://www.ereading.co.uk/chapter.php/143358/205/Tanenbaum_Distributed_operating_systems.html

13IT047

HIGH SPEED NETWORKS

3 0 0 3

OBJECTIVES

- To understand different types of networks
- To know different TCP congestion control and traffic management
- To study and understand performance of networks
- To know and understand integrated and differentiated services
- To study protocols for QOS support.

OUTCOMES

At the end of the course the student should be able

1. To discuss the services of ATM(Asynchronous transfer mode)
2. To analyze different congestion control techniques
3. To analyze the need for integrated services
4. To compare the use of TCP protocol for different applications
5. To discuss different protocols used in the network

UNIT I HIGH SPEED NETWORKS

8

Frame Relay Networks –ATM Protocol Architecture, ATM logical Connection-ATM Cell – ATM Service Categories – AAL-High Speed LANs: Ethernet- Fibre Channel – Wireless LAN

UNIT II CONGESTION AND TRAFFIC MANAGEMENT

10

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 ISDN

11

Overview of ISDN – User interface , architecture and standards – Packet switched call over ISDN – B and D channels – Link access procedure (LAPD) – ISDN layered architecture – Signaling – Limitations of Narrow band ISDN(N-ISDN) and evolution of Broadband ISDN(B- ISDN).

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 NETWORK MANAGEMENT AND APPLICATION

8

Network management- choosing a configuration method-MIB-SNMP-XMLCORBA-COPS-VPNS- mobile IP-voice over IP.

UNIT VI STATE OF THE ART/ADVANCES(NOT FOR EXAMINATION)

A fairer and TCP friendlier congestion control protocol, fuzzy AR approach- Traffic modeling, prediction and congestion control-Fuzzy Q-learning flow control-Modified LMS algorithm in digital beam forming.

TEXT BOOKS

1. William Stallings, "High Speed Networks And Internet", Pearson Education, Fourth Edition, 2005.
2. Behrouz A. Forouzan, "Data Communications and Networking", 4th edition, Tata McGraw-Hill, 2005.
3. Adrian Farrel," The Internet And Its Protocols", Elsevier Publications,2011.

REFERENCES

1. William Stallings, "High Speed Networks And Internet", Pearson Education, 2nd Edition, 2002.
2. Warland & Pravin Varaiya, "High Performance Communication Networks", Jean Harcourt Asia Pvt. Ltd., 2nd Edition, 2001.
3. Irvan Pepelnjk, Jim Guichard and Jeff Apar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003
4. Stallings.W, "ISDN –B ISDN with Frame relay and ATM", Prentice Hall of India, 1995.

MANAGEMENT TECHNIQUES

13GE001

INTELLECTUAL PROPERTY RIGHTS

3 0 0 3

OBJECTIVES

- To learn about the patents and intellectual property rights
- To understand professional and ethical responsibility

OUTCOMES

At the end of the course the student should be able to

- Evaluate the various process for applying patents and intellectual property rights
- Use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Know the method of applying for patents, copyrights, trademarks.

UNIT I INTRODUCTION TO CREATIVITY/INTELLECTUAL PROPERTY 9

Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property (i. Movable Property ii. Immovable Property and iii. Intellectual Property).

UNIT II COMPONENTS 9

IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated Circuits – Protection of Geographical Indications at national and International levels – Application Procedures.

UNIT III POLICIES AND REGULATION 9

International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT).

UNIT IV LEGISLATIONS 9

Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition.

UNIT V CASE STUDIES 9

Case Studies on Patents, Copyright and related rights, Trade Marks, geographic indications, Protection against unfair competition (General and department specific) – Basmathi Case study

UNIT VI STATE-OF-THE-ART/ADVANCES (NOT FOR EXAMINATION)

Intellectual Property Trends and Developments in China - The Securitization of Intellectual Property Assets - Protecting Intellectual Property Rights in a Global Economy: Current Trends and Future

Challenges- IPR and Human Rights.

TOTAL: 45

TEXT BOOKS

1. Subbaram N.R, S.Viswanathan “Handbook of Indian Patent Law and Practice”, (Printers and Publishers) Pvt. Ltd., 1998.
2. Eli Whitney, United States Patent Number: 72X, Cotton Gin.

REFERENCES

1. Susan K.Sell, “Private power, public law: The globalization of intellectual property rights”, (Cambridge studies in International relations), Cambridge university press, 2003.
2. Dr.B.L.Wadehra, “Law relating to Intellectual property”, Edition 4, University law publishing company pvt ltd, 2010.

WEBSITES

1. ubiquity.acm.org
2. www.astratech.com
3. www.uspto.gov

13GE002

TOTAL QUALITY MANAGEMENT

3 0 0 3

OBJECTIVES

- To study various concepts of Quality Management.
- To understand the types of Quality management tools.
- To learn analyzing quality of organizations using Management tools and suggests implement able solutions to those.

OUTCOMES

At the end of the course the student should be able to

- Use quality management philosophies and frameworks in real world scenarios.
- Analyze and use various tools and techniques of quality management in both manufacturing and service industry
- Solve the quality management issues in the industry and organizations using the management tools.

UNIT I INTRODUCTION TO QUALITY MANAGEMENT

9

Need for Quality-Evaluation of Quality-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

Leadership, Strategic Quality Planning, Quality Statement, 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) -

B TECH: INFORMATION TECHNOLOGY

House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) - Concept, Improvement Needs and 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.

UNIT VI STATE OF THE ART /ADVANCES(NOT FOR EXAMINATION)

Pie charts – Histograms - Run chart - Pareto charts - Force field Analysis - Focus Groups - Brainstorming & Affinity Diagrams - Tree Diagrams - Flowcharts and modeling diagrams - Scatter diagrams - Relations Design - Root Cause Analysis - Fishbone Diagram

TOTAL: 45

TEXT BOOK

1. Dale H.Besterfield, et al., “Total Quality Management”, 3rd Edition, Pearson Education, Inc. 2011

REFERENCES

1. James R.Evans & William M.Lindsay, The Management and Control of Quality, 6th Edition, South-Western (Thomson Learning), 2010 (ISBN 0-324-06680-5).
2. V.Narayana and N.S.Sreenivasan, “Managing Quality: Concepts & Tasks”, 1st Edition, New Age International, 2005.
Feigenbaum.A.V. “Total Quality Management, 3rd edition,McGraw-Hill, 1991.
3. Oakland.J.S. “Total Quality Management text with testcases”,3rd edition, Butterworth Heinemann Oxford Ltd,2011.
4. Zeiri. “Total Quality Management for Engineers”, Wood Head Publishers, 1991.
5. www.learningace.com/doc/total-quality-management
6. freevidelectures.com/Course/2688/Human...Management
7. <http://www.school-for-champions.com/tqm/resources.htm>

13GE005

PROFESSIONAL ETHICS

3 0 0 3

OBJECTIVES

- To understand the importance of engineering ethics in an organizational setting.
- To learn the various ethics and human values in workplace.
- To understand the features of moral reasoning, moral explanations and the role of moral theories.

OUTCOMES

At the end of the course the student should be able to

- Analyze professional ethics and responsibilities.
- Practice professional responsibilities and rights.
- Solve moral dilemmas faced by professionals using ethical values.

UNIT I ENGINEERING ETHICS

9

Profession- Engineering and Professionalism- Two models of Professionalism - Three Types of Ethics or Morality – The Negative Face of Engineering Ethics - The Positive Face of Engineering Ethics - Responsibility in Engineering - Engineering Standards - The Standard Care – Blame- Responsibility and causation.

UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION

9

Engineering as Experimentation - Framing the Problem- Engineers as Responsible Experimenters – Research Ethics- Determining the Facts Codes of Ethics –Industrial Standard- A Balanced Outlook on Law - The Challenger Case Study.

UNIT III ENGINEER’S RESPONSIBILITY FOR SAFETY

9

B TECH: INFORMATION TECHNOLOGY

Safety and Risk-Assessment of Safety and Risk- Riysis-Reducing Risk-The Government Regulator's Approach to Risk-Chernobyl and Bhopal Case Study.

UNIT IV RESPONSIBILITIES AND RIGHTS 9

Collegiality and Loyalty-Respect for Authority-Collective Bargaining-Confidentiality Conflicts of interest-Occupational Crime-Professional Rights-Employee Rights-Intellectual Property Rights (IPR)-Discrimination.

UNIT V GLOBAL ISSUES 9

Multinational Corporations-Business Ethics-Environmental Ethics- Computer Ethics-Role in Technological Development-Weapons Development-Engineers as Managers - Consulting Engineers-Engineers as Expert witnesses and Advisors-Honesty-Moral Leadership-Sample code of conduct

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Electronics Product Environmental Assessment in IT Industry, ICT Code of Ethics.

TOTAL: 45

TEXT BOOKS

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York, 2005.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2007

REFERENCES

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2012.
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics - Concepts and Cases", Wadsworth Thompson Learning, United States, 2005
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2011.
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

13IT063

RESOURCE MANAGEMENT TECHNIQUES

3 0 0 3

OBJECTIVES

- To understand the need to conserve and managing resources.
- To learn the concepts of duality and networks in finding optimal solutions.
- To study the insights of complex problem genesis and conflict resolution

OUTCOMES

At the end of the course the student should be able to

- Analyze the networks and find the shortest route using resource allocation methods.
- Solve complex problems using dynamic programming.
- Use classic optimization and scheduling techniques to avoid traffic.

UNIT I LINEAR PROGRAMMING 9

Principal components of decision problem – Modeling phases – LP Formulation and graphic solution – Resource allocation problems – Simplex method – Sensitivity analysis

UNIT II DUALITY AND NETWORKS 9

Definition of dual problem – Primary – Dual relationships – Dual simplex methods – Post optimality analysis – Transportation and assignment model shortest route problem.

UNIT III INTEGER PROGRAMMING 9

Cutting plan algorithm – Branch and bound methods, Multistage (Dynamic) programming

UNIT IV CLASSICAL OPTIMISATION THEORY	9
Unconstrained external problems, Newton – Ralphson method – Equality constraints – Jacobean methods – Lagrangian method – Kuhn – Tucker conditions – Simple problems.	
UNIT V OBJECT SCHEDULING	9
Network diagram representation – Critical path method – Time charts and resource leveling – PERT.	
UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)	
Simulation Modeling in Resource Management-Project Appraisal using Resource Management Techniques.	

TOTAL: 45

TEXT BOOKS

1. Anderson, “Quantitative Methods for Business”, 11th Edition, Thomson Learning, 2009.
2. AnandSarma, “Operation Research”, December1,2010,Himalaya Publishing House, 2003.

REFERENCES

1. Winston ,“Operation Research: Applications & algorithms”, Thomson Learning, 2004.
2. H.A.Taha, “Operation Research : An introduction”,8th edition, Prentice Hall of India, 2008.
3. Vohra, “Quantitative Techniques in Management”,3rd edition, Tata McGraw Hill, 2007.

13IT64 MANAGEMENT INFORMATION SYSTEMS 3 0 0 3

OBJECTIVES

- To study the concepts of information and communications technology and its issues.
- To understand the role of finance and marketing in Information system.
- To understand the types of testing and auditing in analysis of the systems.
- To learn the concepts of DSS, EIS.

OUTCOMES

At the end of the course the student should be able to

- Analyze requirements for information systems.
- Analyze and use core knowledge in Management Information Systems (MIS).
- Design modern information system using structured methodologies.
- Use metrics and testing techniques to solve problems in an MIS context.

UNIT I INTRODUCTION	9
Information system – Establishing the Framework – Business model – Information System Architecture– Evolution of Information Systems- The role of system analyst - Data base management system	
UNIT II SYSTEM DEVELOPMENT	9
Modern Information System – System Development Life Cycle – Structured Methodologies – Designing Computer Based Method, Procedures Control, Designing Structured Programs	
UNIT III INFORMATION SYSTEM	9
Functional Areas, Finance, Marketing, Production, Personnel – Levels, Concepts of DSS, EIS, ES – Comparison, Concepts and Knowledge Representation – Managing International Information System	
UNIT IV IMPLEMENTATION AND CONTROL	9
Testing Security – Coding Techniques – Detection of Error – Validation – Cost Benefits Analysis – Assessing the Value and Risk Information Systems	
UNIT V SYSTEM AUDIT	9
Software Engineering Qualities – Design, Production, Service, Software Specification, Software Metrics, Software Quality Assurance – Systems Methodology – Objectives – Time and Logic, Knowledge and	

Human dimension – Software Life Cycle Models – Verification And Validation

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Information Security-Accounting Information Systems and Databases.

TOTAL: 45

TEXT BOOKS

1. Jane P. Laudon and Kenneth C. Laudon, “Management Information Systems”, 13th Edition, Pearson Education, Prentice Hall of India Pvt. Ltd., 2013.
2. James O Brien, George Marakas, “Management Information Systems”, 10th Edition, Tata McGraw – Hill Publishing Company Ltd., 2010.

REFERENCES

1. Ralph M. Stair and George W. Reynolds, “Principles of Information Systems”, 9th Edition, Cengage Learning India Pvt. Ltd., 2009.
2. M.Jaiswal and Monica Mittal, “Management Information System”, 1st Edition, Oxford University Press New York, 2005.
3. Jawadekar, “Management Information Systems”, 3rd Edition, Tata McGraw – Hill Publishing Company Ltd., 2008.

13IT065

E-LEARNING

3 0 0 3

OBJECTIVES

- To learn to develop a self-learning systems
- To attain knowledge in various learning techniques
- To acquire knowledge in designing a web based learning systems

OUTCOME

At the end of the course the student should be able to

- Apply E- learning method for designing web based courses.

UNIT I INTRODUCTION TO E-LEARNING

9

Definition – Benefits – Challenges & opportunities – ROI metrics & evaluation – E-Learning cycle – Learning strategy – Business drivers – E-learning strategy.

UNIT II DESIGN AND IMPLEMENTATION

9

Role of Tutor – Instructional design – Design issues – Types of Learning engagements – Blended learning – Team– Infra structure – Vendor relationships – Learning management systems – Testing.

UNIT III DELIVERY

9

Multi-channel delivery – Learner support – Developing curriculum – E-learning standards – Instructional design– Content development process – Case studies – Future directions

UNIT IV WEB BASED TRAINING

9

Definition – Need for WBT – Choosing an approach - Kind of courses – Technical standards – Metaphors –Course framework – registration – Running the course – resources – Feedback – Access.

UNIT V LEARNING METHODOLOGY

9

Organizing learning sequences – Common lesson structures – Creating building blocks – Designing learning sequences – Learning activities – Test and exercise learning – Planning tests – Selecting questions – Sequencing test questions – Feedback – Improve testing – Prevent cheating.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

TEXT BOOKS

1. John Gardner, Bryn Holmes, “E-Learning: Concepts and Practice”, SAGE Publications Ltd, 2006.
2. Don Morrison, “E-learning Strategies: How to get Implementation and Delivery Right First Time”, John Wiley and Sons Ltd, 2003.
3. William Horton, “Web-Based Training”, John Wiley & Sons Inc, 2000.

REFERENCES

1. M W Allen, “Michael Allen’s Guide to E-learning: Building Interactive, Fun and Effective Learning Program for any Company”, John Wiley & Sons Inc, 2003.
2. Marc J Rosenberg, “E-Learning: Strategies for Delivering Knowledge in the Digital Age”, McGraw-Hill Education, 2000.
3. Brandon Hall, “Web-Based Training Cookbook”, John Wiley & Sons, 1997

13IT066

E-COMMERCE

3 0 0 3

OBJECTIVES

- To describe E-Commerce Framework.
- To explain Electronic Systems for Payment.
- To make use of E-Commerce Advertising & Marketing.
- To understand business documents and Digital Library.
- To understand use of multimedia systems for E-Commerce.

OUTCOMES

At the end of the course the student should be able to

- Design an E-commerce application including e-payment system and multimedia systems

UNIT I E-COMMERCE 9

Overview of E-Commerce – Electronic Commerce Framework – The Anatomy of E-Commerce Applications. The Network Infrastructure for E-Commerce, The Internet as a Network Infrastructure.

UNIT II ELECTRONIC PAYMENT SYSTEMS 9

Electronic Payment Systems, Inter-organizational Commerce and EDI, EDI Implementation, MIME and Value – added Networks

UNIT III ADVERTISING ON THE INTERNET 9

Advertising and Marketing on the Internet, Computer Based Education and Training, Technological Components of Education on-Demand, Digital Copy rights and Electronic Commerce, Software Agent

UNIT IV THE CORPORATE DIGITAL LIBRARY 9

The Corporate Digital Library – Dimensions of Internal Electronics Commerce Systems, Making a Business case for a document Library, Types of Digital documents, Issues behind document Infrastructure, Corporate data warehouses, Documents Active / Compound document architecture.

UNIT V MULTIMEDIA AND DIGITAL VIDEO 9

Multimedia and Digital Video – Broad band Telecommunications – Mobile and Wireless Computing Fundamentals.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Advanced personalization method- Integration of face book-Integration as mobile application.

TEXT BOOK

1. "Frontiers of Electronic Commerce", Kalakota&Whinston, Pearson Education, 2009.

REFERENCES

1. Kamalesh K. Bajaj, "E-Commerce: The Cutting Edge & Business", 2nd edition, Tata McGraw-Hill, 2011.
2. Brenda Kienan, "Managing your E-Commerce Business", 2nd edition, PHI, 2001.
3. "Electronic Commerce from Vision to Fulfillment", 2nd edition, PHI, Elias M. Awad, 2007.
4. "Electronic Commerce – Framework, Technology and Application", 2nd edition TMH, Bharat Bhaskar, 2007
5. Efraim Turbam, "E-Commerce: A managerial perspective" 4th Edition", Pearson Education India, 2010.
6. www.radford.edu/~cshing/100/WebCT/PowerPoint/Chapter%2008.ppt

ADVANCED WEB TECHNOLOGY AND SOFTWARE DEVELOPMENT

13IT081

ADVANCED WEB PROGRAMMING

3 0 0 3

OBJECTIVES

- To understand the concepts of web programming.
- To study about the various types of web languages.
- To understand the types of CSS.
- To learn the concept of PERL, PYTHON, PHP.

OUTCOMES

At the end of the course the student should be able to

- Analyze and apply the web programming concepts.
- Solve the real time applications using web programming.

UNIT I INTRODUCTION TO WEB PROGRAMMING AND HTML 5 9

Understanding internet - Difference between web sites and web server - Internet technologies overview - Network infrastructure – HTML 5: Elements – Attributes – Heading – Paragraph – Formatting - Images - Tables - Lists - Blocks - Forms - Colors - Layouts - Frames

UNIT II CSS 9

Introduction to CSS – CSS Versions – Specification of CSS – Applying Style to a document – CSS Basics – Style inclusion – Color Values – CSS Properties – CSS Forms – CSS Frames - XHTML

UNIT III PHP 9

Data types – Variables – Operators – Flow Control Statements - Functions – Strings – Arrays – Objects – Web Techniques – Databases – Graphics – PHP on Windows

UNIT IV PERL 9

Scripting Language – Web Development – Understanding Cloud – Working with Strings and numbers – Scalar data and operators – List and Arrays – Working with hashes – Conditionals and Loops – Manipulating Lists and Strings – Creating Subroutines.

UNIT V PYTHON 9

Interpreter – Variables – Types and Objects – Operators and Expressions – Conditional flow – Functions and functional programming – Classes and Object Oriented Programming – Modules and Packages.

UNIT VI STATE OF THE ART/ADVANCES(NOT FOR EXAMINATION)

The Internet of Everything – SDx(Software Defined Anything) – Web Scale IT – IT As Service Broker.

TOTAL: 45

TEXT BOOKS

1. Thomas A Powell “The Complete Reference HTML & CSS” V Edition, Tata McGraw Hill, New Delhi, 2010.
2. Rasmus Lerdorf, Keving Tatroe, Peter Macintyre “Programming PHP” II Edition, Shroff Publishers, Mumbai, 2011.
3. Sams “Teach Yourself PERL in 21 Days” II Edition, Pearson Education, New Delhi, 2002.

REFERENCES

1. Deitel, Deitel & Nieto “Internet and World Wide Web - How to Program” IV Edition, Prentice Hall, New Delhi, 2008.
2. David M.Beazley “Python – Essential Reference” III Edition, Pearson Education, New Delhi, 2006
3. Steve Suehring “Beginning Perl Web Development” I Edition, Springer, New Delhi, 2006.

13IT082

SEMANTIC WEB

3 0 0 3

OBJECTIVES

- To learn basics of ontologies.
- To learn the various semantic web languages.
- To understand the ontology learning approaches.
- To learn the various semantic web tools.

OUTCOMES

At the end of the course the student should be able to

- Analyze the various ontologies.
- Build semantic web applications by applying ontologies.

UNIT I INTRODUCTION TO ONTOLOGIES

9

Components – Types – Ontological Commitments – Ontological Categories –Philosophical Background -Sample - Knowledge Representation Ontologies – Top Level Ontologies – Linguistic Ontologies – Domain Ontologies – Semantic Web – Need – Foundation – Layers – Architecture.

UNIT II LANGUAGES FOR SEMANTIC WEB AND ONTOLOGIES

9

Web Documents in XML – RDF - Schema – Web Resource Description using RDF- RDF Properties – Topic Maps and RDF – Overview – Syntax Structure – Semantics – Pragmatics - Traditional Ontology Languages – LOOM- OKBC – OCML – Flogic Ontology Markup Languages – SHOE – OIL - DAML + OIL- OWL.

UNIT III ONTOLOGY LEARNING FOR SEMANTIC WEB

9

Taxonomy for Ontology Learning – Layered Approach – Phases of Ontology Learning – Importing and Processing Ontologies and Documents – Ontology Learning Algorithms – Evaluation.

UNIT IV ONTOLOGY MANAGEMENT AND TOOLS

9

Overview – Need for Management – Development Process – Target Ontology – Ontology Mapping – Skills Management System – Ontological Class – Constraints – Issues. Volution– Development Of Tools and Tool Suites – Ontology Merge Tools – Ontology based Annotation Tools.

UNIT V APPLICATIONS

9

Web Services – Semantic Web Services - Case Study for specific domain – Security issues – current trends.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Sentiment Analysis - Natural Language Processing- Semantic Indexing of Unstructured Documents
Using Taxonomies and Ontologies-Voice over Customer(VOC).

TOTAL: 45

TEXT BOOK

1. Grigoris Antoniou, Frank van Harmelen, A Semantic Web Primer (Cooperative Information Systems), The MIT Press, 2004.

REFERENCES

1. Alexander Maedche, Ontology Learning for the Semantic Web, Springer; 1edition, 2002.
2. Asuncion Gomez-Perez, Oscar Corcho, Mariano Fernandez-Lopez, Ontological Engineering: with examples from the areas of Knowledge Management, e-Commerce and the Semantic Web, Springer, 2010.

13IT083

SOFTWARE PROJECT MANAGEMENT

3 0 0 3

OBJECTIVES

- To have an understanding of the techniques in project management that brings an idea to life.
- To have an idea about the demands made of the management sector.
- To be able to manipulate the technologies for his own ideas.

OUTCOMES

At the end of the course the student should be able to

- Use the various software activity planning methods.
- Analyze the software effort estimation methods.
- Evaluate a software project using various assessment techniques.

UNIT I SOFTWARE PROJECT MANAGEMENT

9

Need for Software Project Management – Software Project versus other projects – Overview of Project planning.

UNIT II PROJECT EVALUATION

9

Strategic assessment-Technical Assessment-Cost benefits Analysis-Cash flow forecasting,-Cost benefit Evaluation Techniques Risk Evaluation – Selection of appropriate project planning.

UNIT III ACTIVITY PLANNING

9

Objectives of activity planning- Project schedules- Projects and activities- Sequencing and scheduling activities- Network Planning models –Formulating network models- Using dummy activities- Identifying critical path- identifying critical activities-Risk Analysis and Management: Nature of risk- Managing risk- Risk identification- Risk analysis- reducing the risks- evaluating the risks.

UNIT IV SOFTWARE EFFORT ESTIMATION

9

Problems with over and under estimate- the basis for software estimation- software estimation Techniques-Expert judgments- Estimating by analogy- Function point analysis- Resource Allocation: Identifying resource requirements- Scheduling resources- Monitoring and control- Managing people and organization teams.

UNIT V PROJECT MANAGEMENT

9

Project Management in the Testing phase – Introduction- test scheduling- test types- issues- management structures for testing- metrics for testing phase- Project Management in the Management phase – Introduction- activities- management issues- configuration management- estimating size- effort and people resources- advantages- metrics.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Rolling-Wave Planning - Activity streams-Social Project Management-Agile Development.

TOTAL: 45

TEXT BOOKS

1. Bob huges, Mike cotterell, “Software Project Management”, Tata McGraw Hill, New Delhi, 2010.
2. Gopaldaswamy Ramesh, “Managing Global Software Projects”, Tata McGraw Hill, New Delhi, 2006.
3. Kelkar Sa, “Software Project Management”, PHI Learning, New Delhi, 2012.

REFERENCES

1. Roger S Pressman, “Software Engineering, A Practitioner’s Approach”, Tata McGraw Hill, New Delhi, 2007.
2. Kamna Malik, Praveen Choudary, “Software Quality, a practitioner’s Approach”, Tata McGraw Hill, New Delhi, 2008.

13IT084

SOFTWARE TESTING

3 0 0 3

OBJECTIVES

- To study the fundamental testing concepts and software testing techniques.
- To learn the working of automated test execution and automated tool.
- To understand the various verification process and dynamic comparisons.
- To learn the working skills on how to use modern software testing tools to support software testing projects.

OUTCOMES

At the end of the course the student should be able to

- Use various levels of testing techniques and approaches.
- Design and apply test cases for all types of testing.
- Analyze the testing tools to automate the test execution.
- Use various testing tools in commercial environments.

UNIT I INTRODUCTION TO TESTING

9

Perspective of Testing – Definition, Approaches, Testing during Development Life Cycle - Test Policy-Test Planning - Categories Of Defect, Configuration Management - Risk Analysis.

UNIT II TESTING TECHNIQUES

9

Levels of testing, Acceptance testing - Criticality of requirement - Special tests – Complexity, GUI, Compatibility, Security, Recovery, Installation, Error Handling, Smoke, Sanity, Parallel and Execution testing.

UNIT III TECHNIQUES FOR AUTOMATING TEST EXECUTION

9

Testing and test automation – The V model –Tool support for life-cycle testing –The promise of test automation, Common problems of test automation – Limitations of automating software testing-Script Preprocessing-Scripting Techniques.

UNIT IV TOOLS TO AUTOMATE TESTING

9

Selecting tools - Requirements - Tool market - Tool selection project – Tool selection team - Identifying requirements - Identifying constraints – Identifying tools availability in market - Evaluating the candidate tools - decision making, Testing Tools - WinRunner, SilkTest, LoadRunner, JMeter.

UNIT V AUTOMATED COMPARISON

9

Verification, Comparison, Automation – Comparators-Dynamic Comparison – Post-Execution Comparison Simple Comparison, Complex Comparison – Test Sensitivity – Comparing Different Types

B TECH: INFORMATION TECHNOLOGY

of Outcomes – Comparison Filters And Guidelines – Testware Architecture – Automating Pre And Post Processing – Building Maintainable Tests.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Cloud Testing-Cloud Testing Tools-Cross Browser Testing-Automated Tool.

TOTAL: 45

TEXT BOOKS

1. Limaye L G, “Software Testing – Principles, Techniques and Tools”, Tata Mc- Graw Hill Education Pvt. Ltd., New Delhi, 2009
2. Boris Beizer, “Software Testing Techniques”, 2nd edition, Dream Tech press, New Delhi, 2003

REFERENCES

1. Mark Fewster, Dorothy Graham., "Software Test Automation: Effective Use of Test Execution Tools", Addison Wesley, New Delhi, 1999.
2. William E Perry, “Effective Methods of Software Testing”, 3rd edition, John Wiley & sons, Singapore , 2012.

13IT030

WEB SERVICES

3 0 0 3

OBJECTIVES

- To learn the basics of XML technology.
- To understand the background of distributed information system.
- To analyze and design a web service based application.
- To learn the security features of web services and service composition.

OUTCOMES

At the end of the course the student should be able to

- Analyze the distributed information system.
- Use the various web service technologies and its architecture.
- Analyze the semantic based web services.
- Use the security features of web services and service composition.

UNIT I DISTRIBUTED INFORMATION SYSTEM

9

Distributed information system – Design of IB – Architecture of IB – Communication in an IS – Middleware RPC – TP monitors – Object brokers – Message oriented middleware – EAI – EAI Middleware – Workflow –Management – benefits and limitations – Web technologies for Application Integration.

UNIT II WEB SERVICES BUILDING BLOCK

9

Web Services – Definition – Web Services and EAI – Web Services Technologies – XML basics – web services Architecture – SOAP – WSDL – UDDI –WS – Addressing – WS – Routing – Web service implementation – Java based web services - .NET based web services.

UNIT III WEB SERVICE SECURITY

9

XML signature – XML Encryption – SAML - XKMS – WS- Security –WS Policy –Web service security framework – .NET and passport – UDDI and security - web service security in java – mobile web service security.

UNIT IV SEMANTIC WEB SERVICES

9

Semantic web service – architecture – RDF Data model – RDF schema – OWL – ontology – role of ontology in web services - semantic Web service implementation issues

UNIT V SERVICE COMPOSITION

9

Service Coordination and Composition coordination protocols – WS – Coordination – WS –transaction – WSCI – Service Composition – Service Composition Models – Dependencies between coordination and

B TECH: INFORMATION TECHNOLOGY

composition – BPEL – Current trends.

UNIT VI STATE OF THE ART/ADVANCES (NOT FOR EXAMINATION)

Web services interoperability - .NET Web Services – Ontology based web services.

TOTAL:45

TEXT BOOKS

1. Ron Schmelzeretal “XML and Web Services”, Pearson Education, 2002.
2. Sandeepchatterjee and jameswebber,” Developing Enterprise web services: An Architect’s and Guide”, Practice Hall, 2004.
3. Freunkp.coyle,” XML, web Services and the Data Revolution”, Pearson, 2002.

REFERENCES

1. Gystavo Alonso, Fabio casasi, Hareemikuno, vijaymachiraju, “web Services – concepts, Architecture and Applications”, Springer, 2004.
2. Jorge Cardoso,”Semantic Web Services, Processes and Applications”,Springer, 2006.
3. Dietelfensel, Federico Michale, Facca, Elena Simperl, Loan Toma, “Semantic web services”, springer,2011.