

PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018

(AUTONOMOUS)

B.Tech. INFORMATION TECHNOLOGY

CURRICULUM

CBCS REGULATIONS 2016

SEMESTER I

Course Code	Course Title	L	T	P	C
MA16101	Matrices and Calculus	3	2	0	4
EN16101	Technical English I	3	0	0	3
PH16101	Engineering Physics	3	0	0	3
CH16101	Engineering Chemistry I	3	0	0	3
CS16101	Computer Programming	3	0	0	3
EE16101	Basic Electrical and Electronics Engineering	3	0	0	3
PC16101	Physics and Chemistry Laboratory I	0	0	2	1
CS16102	Computer Programming Laboratory	0	0	2	1
GE16101	Engineering Practices Laboratory	0	0	4	2

SEMESTER II

Course Code	Course Title	L	T	P	C
MA16201	Differential Equations and Complex Analysis	3	2	0	4
EN16201	Technical English II	3	0	0	3
PH16201	Solid State Physics	3	0	0	3
CH16201	Engineering Chemistry II	3	0	0	3
ME16202	Engineering Graphics	3	2	0	4
CS16203	Data Structures and Algorithms	3	0	0	3
PC16201	Physics and Chemistry Laboratory II	0	0	2	1
CS16204	Data Structures and Algorithms Laboratory	0	0	2	1
EN16202	English Communication Skills Laboratory	0	0	2	1

COURSE OBJECTIVES

- To be familiar with the use of word processing software.
- To get exposure in presentation and visualization tools.
- To understand the problem solving techniques and flow charts.
- To use Arrays, strings, functions, structures and unions.

LIST OF EXERCISES**a) Word Processing****10**

1. Document creation, Text manipulation with Scientific notations.
2. Table creation, Table formatting and Conversion.
3. Mail merge and Letter preparation.
4. Drawing - flow Chart

b) Spread Sheet**10**

5. Chart - Line, XY, Bar and Pie.
6. Formula - formula editor.
7. Spread sheet - inclusion of object, Picture and graphics, protecting the document and sheet.
8. Sorting and Import / Export features.

C Programming**10**

9. Data types, Expression Evaluation, Condition Statements.
10. Arrays
11. Structures and Unions
12. Functions
13. File Handling
14. Pointers

COURSE OUTCOMES

At the end of this course, the students will be able to

- execute the word processing programs.
- execute C programs for simple applications.
- develop recursive programs.
- develop recursive programs.

TOTAL PERIODS: 30

Mapping of Course Outcomes with Programming Outcomes
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes(POs)												Programme Specific Outcomes (PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	3	-	-	-	-	-	-	-	3	3	3
CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3
CO3	2	3	1	-	-	-	1	-	-	-	-	2	3	3
CO4	3	3	3	3	-	-	-	-	-	-	-	2	1	3



COURSE OBJECTIVES

The students are able to

- study about the principles of electrochemistry.
- know the mechanism of corrosion and its control.
- learn the principles and generation of fuel cells and various storage batteries.
- embellish the usage of chemistry to exhibit engineering materials.
- study about the principles of chem -informatics and its applications.

UNIT I ELECTROCHEMISTRY**9**

Electrochemical cells-types- reversible and irreversible cells – EMF –measurement of emf-Single electrode potential – Nernst Equation (derivation and problem) – reference electrodes – standard hydrogen electrode - calomel electrode – Ion selective electrode – glass electrode – measurement of pH – electrochemical series – significance -potentiometric titrations (redox – Fe^{2+} Vs dichromate).

UNIT II CORROSION AND CORROSION CONTROL**9**

Corrosion-Causes-Types-Chemical corrosion - Pilling-Bedworth rule – electrochemical corrosion – mechanism - galvanic corrosion – differential aeration corrosion – factors influencing corrosion – corrosion control – sacrificial anode and impressed cathodic current methods – corrosion inhibitors – protective coatings – preliminary treatment –Metallic and Non metallic coatings-Varnish-Lacquer-Hot dipping-Metal Cladding-Electroplating(Au)-Galvanizing-Tinning-Electroless plating (Ni)– Paints – constituents and function .

UNIT III NONCONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES**9**

Nuclear energy-fission and fusion reaction and light water nuclear reactor for power generation (block diagram only)-breeder reactor-solar energy conversion-solar cells-wind energy-Fuels cells-hydrogen-oxygen fuel cell-batteries-alkaline batteries-lead acid-nickel cadmium, lithium batteries and Nano batteries.

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UNIT IV ENGINEERING MATERIALS**9**

Refractories – classification – acidic, basic and neutral refractories – properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling) – manufacture of alumina,

magnesite and zirconia bricks. Lubricants – mechanism of lubrication, liquid lubricants, - properties – viscosity index, flash and fire points, cloud and pour points, oiliness-Aniline point) – solid lubricants – graphite and molybdenum sulphide.

UNIT V CHEMINFORMATICS

9

Definition – coordinate –bonds –bond length – bond angles – torsional angles – chemical structure – definition - conformation – representation of structural information – linear format – SMILEYF notation – MOL format – PDB format – storage of structural data in a database - structural keys – finger print - canonical structure – similarity search –sub structure search - application of chem-informatics in drugs designing.

TOTAL : 45 PERIODS

COURSE OUTCOMES

- Understand the impact of engineering solutions in a global, economic, environmental and societal context .
- Knowing the rate of corrosion of a given metal in a given environment and identify appropriate control techniques to avoid corrosion.
- To recognize the energy densities of energy sources.
- Understand the Engineering materials and use these materials in various fields. Identify appropriate lubricant for different engineering applications.
- Understand the basics concept of dry designing by chem-informatics.

TEXT BOOKS

1. B. Sivasankar, “Engineering Chemistry”, Tata McGraw-Hill Pub. Co. Ltd., New Delhi (2008).
2. B.K. Sharma, “Engineering Chemistry”, Krishna Prakasam Media (P) Ltd., Meerut (2001).

REFERENCE BOOKS

1. P.C. Jain and Monica Jain, “Engineering Chemistry” DhanpatRai Pub. Co., New Delhi, 15th Edition, 2008(Revised Edition 2012).
2. Bahl B.S.,Tuli G.D. and ArunBahl., Essential of Physical Chemistry, S.Chand& Co. Ltd., New Delhi (2010).
3. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical chemistry, ShobanLalNagin Chand & Co., New Delhi (2008) .
4. R.Sivakumar and N.Sivakuamr, “Engineering Chemistry”, Tata McGraw-Hill publishing company limited, New Delhi, (2012).

5. RajarshiGuha and Andreas Bender “Computational approaches in chem-informatics and bioinformatics” Wiley Publishers, Cambridge (2011).

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COs	Programmes Outcomes (POs)													
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CO1	2	-	-	-	-	1	3	-	2	-	-	1	1	-
CO2	-	2	2	-	-	1	-	-	-	2	-	2	1	-
CO3	2	-	2	-	2	1	-	-	-	1	-	2	1	1
CO4	2	-	2	-	2	1	3	-	-	2	-	-	1	1
CO5	-	-	-	-	-	1	3	-	2	3	-	-	1	-



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(AUTONOMOUS)

B.Tech-INFORMATION TECHNOLOGY

CURRICULUM

REGULATION 2015

SEMESTER III

Course Code	Course Title	L	T	P	C
MA15301	Transforms and Boundary Value Problems	3	2	0	4
IT15301	Object Oriented Programming with C++	3	0	0	3
IT15302	Database Management Systems	3	0	0	3
IT15303	Design and Analysis of Algorithms	3	0	0	3
EC15308	Principles of Communication	3	0	0	3
EC15307	Digital Principles and System Design	3	0	0	3
IT15306	Database Management System Laboratory	0	0	4	2
IT15307	Object Oriented Programming with C++ Laboratory	0	0	4	2
EC15309	Digital Laboratory	0	0	4	2
EN15301	Business English Course Laboratory	0	0	2	1

SEMESTER IV

Course Code	Course Title	L	T	P	C
IT15401	Computer Architecture	3	0	0	3
IT15402	Software Engineering	3	0	0	3
IT15403	Operating Systems	3	0	0	3
EC15408	Microprocessor and Microcontroller	3	0	0	3
MA15404	Numerical Methods	3	0	0	3
IT15404	Java Programming and Applications	3	0	0	3
IT15405	Operating Systems Laboratory	0	0	4	2
EC15409	Microprocessor and Microcontroller Laboratory	0	0	4	2
IT15406	Java Programming Laboratory	0	0	4	2

COURSE OBJECTIVES

- To learn the basic concepts of Object Oriented Programming.
- To learn the basics of C++ language.
- To illustrates solution of different problems using C++.
- To apply the Object oriented concepts in generic programming.
- To know about master of OOP using C++.

UNIT I PRINCIPLES OF OOP**9**

Programming Paradigms- Basic concepts and benefits of OOP- Structure of C++ program – Applications of C++ - Tokens- Keywords- Identifiers-constants- Data types - Basic, User defined ,Derived - Dynamic initialization -Reference variables- Scope resolution operator-Member dereferencing operators- memory management operators- Type casting- Function Prototyping- call by value, call by reference- Inline function- Default arguments – Function overloading.

UNIT II CLASSES AND OBJECTS**9**

Class specification- Access qualifiers - Static data members and member functions - Array of objects- Objects as function arguments-Friend functions- Returning objects- Local classes - Constructors – Parameterized constructors- Overloaded Constructors- Constructors with default arguments-Copy constructors- Dynamic constructors-Dynamic initialization using constructors- Destructors - Operator Overloading: Operator function – Overloading unary and binary operator-Overloading the operator using friend function- Stream operator overloading -Type Conversion.

UNIT III INHERITANCE**9**

Basic Principle – Use of Inheritance-Defining Derived classes- Single Inheritance-Protected Data with private inheritance- Multiple Inheritance- Multi level inheritance- Hierarchical Inheritance- Hybrid Inheritance-Multipath inheritance- Need for virtual function- Pointer to derived class objects- Definition of virtual functions- Array of pointer to base class objects- Abstract classes- Virtual destructors – Dynamic Binding -Virtual Base Class- Constructors in derived and base class- Pointers- pointers to objects – this pointer.

UNIT IV STREAMS AND FILE HANDLING**9**

Stream classes- - Stream classes- Formatted and unformatted data -Formatted I/O- I/O Manipulators- User defined manipulators- File handling -File pointer and manipulation- File open and close- Sequential and random access.

UNIT V GENERIC PROGRAMMING WITH TEMPLATES**9**

Function templates, overloaded function templates, user defined template arguments, class templates - Exception Handling: Exception handling mechanism, multiple catch, nested try, re-throwing the exception – Namespaces – std namespace- Standard Template Library.

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student will be able to

- identify and apply object oriented concepts like abstraction, encapsulation, modularity, hierarchy, typing, concurrency and persistence.
- estimate various metrics specific to object oriented development.
- apply arrays, pointers and functions to write a C++ program.
- create and use data type, expression and functions in C++.
- use inheritance and templates in C++ program.

TEXT BOOKS

1. E.Balagurusamy, “Object Oriented Programming with C++”, Tata McGraw Hill, Sixth Edition, 2013.
2. B.Trivedi, “Programming with ANSI C++”, Oxford University Press, 2007.

REFERENCES

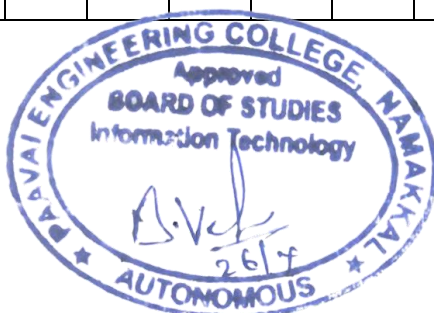
1. K.R.Venugopal, Rajkumar, T.Ravishankar, “Mastering C++”, Tata McGraw Hill, 2007.
2. Robert Lafore, “Object Oriented Programming in Turbo C++”, Galgotia Publications, 2006.
3. Bjarne Stroustrup, “The C++ Programming Language”, Pearson Education, Fourth Edition, 2013.
4. K.S. Easwarakumar, “Object Oriented Data Structures Using C++”, Vikas Publication House Pvt Ltd, First Edition, 2000.

WEB LINKS

1. http://www.tutorialspoint.com/cplusplus/cpp_object_oriented.htm.
2. https://www3.ntu.edu.sg/home/ehchua/programming/cpp/cp3_OOP.html.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of corelation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	2	3
CO2	3	2	-	-	-	-	-	-	1	1	-	-	2	3
CO3	3	2	-	-	-	-	-	-	1	1	-	-	2	2
CO4	3	2	-	-	-	-	-	-	1	1	-	-	2	3
CO5	3	2	-	-	-	-	-	-	1	1	-	-	2	2



COURSE OBJECTIVES

- To learn the fundamentals of Database Management Systems.
- To make the students understand the relational model.
- To familiarize the students with ER diagrams.
- To expose the students to SQL.
- To familiarize the students with the different types of databases.

UNIT I INTRODUCTION**9**

Purpose of Database System — Views of data — Data Models — Database Languages — Database System Architecture — Database users and Administrator — Entity-Relationship model (E-R model) — E-R Diagrams -- Introduction to relational databases.

UNIT II RELATIONAL MODEL**9**

The relational Model — The catalog- Types— Keys - Relational Algebra — Domain Relational Calculus — Tuple Relational Calculus - Fundamental operations — Additional I/O operations- SQL fundamentals - Integrity — Triggers - Security — Advanced SQL features —Embedded SQL— Dynamic SQL- Missing Information— Views — Introduction to Distributed Databases and Client/Server Databases.

UNIT III DATABASE DESIGN**9**

Functional Dependencies — Non-loss Decomposition — Functional Dependencies — First, Second, Third Normal Forms, Dependency Preservation — Boyce/ Code Normal Form-Multi-valued Dependencies and Fourth Normal Form — Join Dependencies and Fifth Normal Form.

UNIT IV TRANSACTIONS**9**

Transaction Concepts - Transaction Recovery — ACID Properties — System Recovery —Media Recovery — Two Phase Commit - Save Points — SQL Facilities for recovery —Concurrency — Need for Concurrency — Locking Protocols — Two Phase Locking —Intent Locking — Deadlock- Serializability — Recovery Isolation Levels — SQL Facilities for Concurrency.

UNIT V IMPLEMENTATION TECHNIQUES**9**

Overview of Physical Storage Media — Magnetic Disks — RAID — Tertiary storage — File Organization — Organization of Records in Files — Indexing and Hashing —Ordered Indices — B+ tree Index Files — B tree Index Files — Static Hashing — Dynamic Hashing —Query Processing Overview — Catalog Information for Cost Estimation — Selection Operation — Sorting — Join Operation — Database Tuning.

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student will be able to

- describe basic concepts of database system.
- design a data model and schemas in RDBMS.
- analyze functional dependencies for designing a robust database.
- apply SQL for business related problems.
- implement transactions, Concurrency control, and be able to do database recovery.

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, “Database System Concepts”, Sixth Edition ,Tata Mc Graw Hill,2011.
2. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”,Eighth Edition, Pearson Education, 2006.

REFERENCES

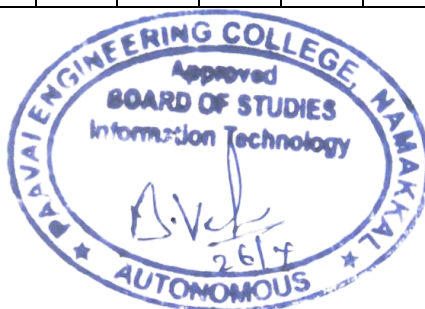
1. Elmasri R. and Shamkant B. Navathe, “Fundamentals of Database Systems”, 6th Edition, Addison Wesley , 2011.
2. Atul Kahate, “Introduction to Database Management Systems”, Pearson Education, New Delhi, 2006.
3. Raghu Ramakrishnan, “Database Management Systems”, Fourth Edition, Tata Mc Graw Hill, 2010.
4. G.K.Gupta, “Database Management Systems”, Tata Mc Graw Hill, 2011.
5. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, “Database Systems: The Complete Book”, Pearson Education, Second Edition, 2008.

WEB LINKS

1. <http://www.cs.helsinki.fi/u/laine/tikape/k03/material03.html>
2. <http://infolab.stanford.edu/~ullman/dscb.html>

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	-	-	-	-	-	-	-	-	2	-
CO2	1	2	3	2	-	-	-	-	-	-	-	-	1	2
CO3	1	3	2	2	1	-	-	-	-	-	-	-	1	2
CO4	1	2	2	2	1	-	-	-	-	-	-	-	1	2
CO5	1	2	2	1	2	-	-	-	-	-	-	-	1	2



COURSE OBJECTIVES

- To study the principles of algorithm design.
- To know the importance of computational complexity of the algorithm.
- To become familiar with Dynamic programming, divide and conquer, branch and bound and backtracking techniques.
- To understand the limitations of Algorithm power.
- To study about Notions of P, NP, NPC, and NP-hard.

UNIT I INTRODUCTION**9**

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms.

UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER**9**

Brute Force - Closest-Pair and Convex-Hull Problems-Exhaustive Search - Traveling Salesman Problem - Knapsack Problem - Assignment problem. Divide and conquer methodology – Merge sort – Quick sort – Binary search – Multiplication of Large Integers – Strassen's Matrix Multiplication-Closest-Pair and Convex-Hull Problems.

UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE**9**

Computing a Binomial Coefficient – Warshall's and Floyd's algorithm – Optimal Binary Search Trees – Knapsack Problem and Memory functions. Greedy Technique– Prim's algorithm- Kruskal's Algorithm- Dijkstra's Algorithm-Huffman Trees.

UNIT IV ITERATIVE IMPROVEMENT**9**

The Simplex Method-The Maximum-Flow Problem – Maxim Matching in Bipartite Graphs- the Stable marriage Problem.

UNIT V LIMITATIONS OF ALGORITHM POWER**9**

Limitations of Algorithm Power-Lower-Bound Arguments-Decision Trees-P, NP and NP-Complete Problems--Coping with the Limitations – Backtracking - n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem-Branch and Bound - Assignment problem – Knapsack Problem – Traveling Salesman Problem.

TOTAL: 45 PERIODS**COURSE OUTCOMES**

At the end of the course, the student will be able to

- discuss the significance of algorithms in problem solving process.
- analyze asymptotic runtime complexity of algorithms.
- describe and apply dynamic programming and divide and conquer algorithms.

- design efficient algorithms for new situations, using as building blocks the techniques learned.
- apply algorithm design techniques to solve certain NP-complete problems.

TEXT BOOK

1. Anany Levitin, “Introduction to the Design and Analysis of Algorithms”, Third Edition, Pearson Education, 2012.

REFERENCES

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, “Introduction to Algorithms”, Third Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson Education, Reprint 2006.
3. Donald E. Knuth, “The Art of Computer Programming”, Volumes 1& 3 Pearson Education, 2009.
4. Steven S. Skiena, “The Algorithm Design Manual”, Second Edition, Springer, 2008.

WEB LINKS

1. <http://nptel.ac.in/>
2. <http://freevideolectures.com/Course/2281/Design-and-Analysis-of-Algorithms>

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of corelation) 3-Strong,2-Medium,1-Weak														
COs	ProgrammeOutcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	2	1	-	2	1	1	1	2	3	1	-
CO2	3	3	1	2	2	-	2	-	-	-	2	3	2	-
CO3	3	3	1	2	2	-	2	-	-	-	2	3	2	2
CO4	3	3	1	2	2	-	2	-	-	-	2	3	2	1
CO5	3	3	1	2	2	-	2	-	-	-	2	3	2	1



COURSE OBJECTIVES

- To have understanding about different types of AM and FM Communication systems.
- To gain knowledge in different digital modulation techniques for digital transmission.
- To have knowledge of base band transmission ISI and distortion free base band transmission.
- To know the spread spectrum modulation techniques and different multiple access methods.
- To gain knowledge about Satellite and Optical Communication.

UNIT I ANALOG COMMUNICATION**9**

Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation.

UNIT II DIGITAL COMMUNICATION**9**

Introduction, 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.

UNIT III DIGITAL TRANSMISSION**9**

Introduction, Pulse modulation, PCM – PCM sampling, sampling rate, signal to quantization noise rate, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission – Inter symbol interference, eye patterns.

UNIT IV SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES**9**

Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK, processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and CDMA in wireless communication systems, source coding of speech for wireless communications.

UNIT V SATELLITE AND OPTICAL COMMUNICATION**9**

Satellite Communication Systems-Keplers Law, LEO and GEO Orbits, Link model-Optical Communication Systems-Elements of Optical Fiber Transmission link, Types, Losses, Sources and Detectors.

TOTAL: 45 PERIODS**COURSE OUTCOMES**

At the end of the course, the student will be able to

- understand about different types of am and fm communication systems .
- know about different digital modulation techniques for digital transmission.
- gain knowledge in base band transmission is distortion free base band transmission.
- know about spread spectrum modulation techniques and different multiple access methods.
- gain knowledge in satellite and optical communication.

TEXT BOOKS

1. Wayne Tomasi, "Advanced Electronic Communication Systems", Pearson Education, 2007.
2. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons., 2001.

REFERENCES

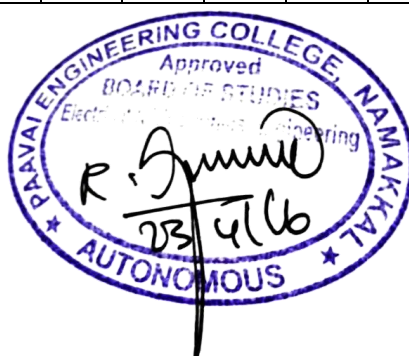
1. H.Taub, D L Schilling, G Saha, "Principles of Communication" 3/e, 2007.
2. B.P.Lathi, "Modern Analog And Digital Communication systems", 3/e, Oxford University Press, 2007
3. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
4. Martin S.Roden, "Analog and Digital Communication System", 3rd Edition, PHI, 2002.
5. B.Sklar, "Digital Communication Fundamentals and Applications" 2/e Pearson Education 2007.

WEB LINKS

1. <https://www.youtube.com/watch?v=TPm0XSPxld8>
2. www.nptel.ac.in/courses/106105080/pdf/M2L5.pdf

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CO4	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO5	3	3	3	2	-	-	-	-	2	-	-	3	3	3



COURSE OBJECTIVES

- To learn the basic concepts of Boolean algebra and logic gates.
- To know about the analysis and design procedure for combinational circuits.
- To familiarize the students with memory devices.
- To know about the analysis and design procedure for Asynchronous and synchronous sequential circuits.

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES

9

Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Implementation of Boolean functions using logic gates.

UNIT II COMBINATIONAL LOGIC

9

Combinational circuits - Analysis and design procedures - Circuits for arithmetic operations and Code conversion - Introduction to Hardware Description Language (HDL).

UNIT III DESIGN WITH MSI DEVICES

9

Encoder - decoder - Multiplexer - demultiplexer - HDL for combinational circuits - Memory and programmable logic.

UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC

9

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

UNIT V ASYNCHRONOUS SEQUENTIAL LOGIC

9

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

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student will be able to

- understand the basic concept of Boolean algebra and logic gates.
- design the combinational logic circuits.
- design MSI devices.
- know about memory and programmable logic.
- design the synchronous and asynchronous sequential logic circuits.

TEXT BOOK

1. M.Morris Mano, “Digital Design”, 3rd edition, Pearson Education, 2007.

REFERENCES

1. Charles H.Roth, Jr. "Fundamentals of Logic Design", 4th Edition, Jaico Publishing House, Cengage Earning, 5th ed, 2005.
2. Donald D.Givone, "Digital Principles and Design", Tata McGraw-Hill, 2007.

WEB LINKS

1. <http://nptel.ac.in/video.php?subjectid=117106086>
2. http://www.electronics-tutorials.ws/combination/comb_1.html

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CO2	3	3	3	2	-	-	-	-	2	-	-	-	3	3
CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
CO4	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO5	3	3	3	2	-	-	-	-	2	-	-	3	3	3



COURSE OBJECTIVES

- To learn to create and use a database.
- To be exposed to different types of database applications.
- To develop conceptual understanding of database management system.
- To understand how a real world problem can be mapped to schemas.
- To develop understanding of different applications and constructs of SQL PL/SQL.

LIST OF EXPERIMENTS

1. Data Definition, Table Creation, Constraints,
2. Insert, Select Commands, Update & Delete Commands.
3. Nested Queries & Join Queries
4. Views
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Front end tools
7. Forms
8. Triggers
9. Menu Design
10. Reports.
11. Database Design and implementation (Mini Project).
 - a) Personal Information System.
 - b) Web Based User Identification System.
 - c) Timetable Management System.
 - d) Hotel Management System

TOTAL: 60 PERIODS**COURSE OUTCOMES**

At the end of the course, the student will be able to

- design and implement a database schema for a given problem-domain.
- populate and query a database.
- create and maintain tables using PL /SQL.
- prepare forms and reports.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	1	1	-	-	-	-	-	-	-	1	2
CO2	1	1	2	1	-	-	-	-	-	-	-	-	1	2
CO3	2	1	2	1	2	-	-	-	-	-	-	-	1	2
CO4	1	2	2	1	-	-	-	-	-	-	-	-	1	2



COURSE OBJECTIVES

- To know the fundamental knowledge of object oriented programming.
- To develop skills required to become a proficient C++ programmer.
- To transforming the physical problem domain into a hierarchy of objects.
- To apply OOP to solve simple engineering problems.
- To development of solution for complex problems in the real world.

LIST OF EXPERIMENTS

1. Write C++ Programs using Classes and Objects.
2. Design C++ classes with static members, methods with default arguments, friend functions.
3. Develop C++ Programs using Operator Overloading.
4. Develop C++ Programs using constructor, destructor, and copy constructor.
5. Develop C++ Programs Overload the new and delete operators.
6. Develop C++ Programs using Inheritance, Polymorphism and its types.
7. Develop C++ Programs using Arrays and Pointers.
8. Develop C++ Programs using Dynamic memory allocation.
9. Develop C++ Programs using Templates and Exceptions.
10. Develop C++ Programs using Sequential and Random access files.

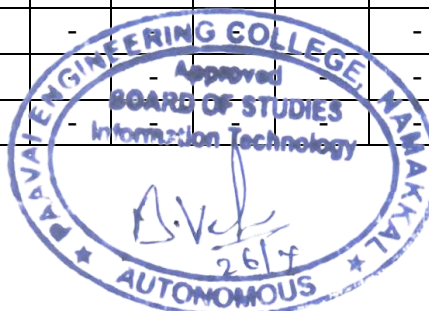
TOTAL: 60 PERIODS**COURSE OUTCOMES**

At the end of the course, the student will be able to

- design an object oriented program using classes and objects.
- apply inheritance to reuse the C++ code.
- apply polymorphism to extend the code and reduce the complexity of the program.
- implement files and streams in C++ programs.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	2	-	-	-	-	-	-	-	3	3
CO2	2	1	-	-	2	-	-	-	-	-	-	-	1	3
CO3	3	2	-	-	3	-	-	-	-	-	-	-	-	3
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	3



COURSE OBJECTIVES

- To understand the concept of Boolean theorems.
- To understand the concept combinational circuits using digital logic gates.
- To design & implement the concept of combinational circuits using MSI devices.
- To design & implement the sequential logic circuits.
- To simulate combinational & sequential logic circuits using VHDL/Verilog.

LIST OF EXPERIMENTS

1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of code converters (i) BCD to Excess-3 code and Excess-3 code to BCD, (ii) Binary to Gray code and Gray code to Binary.
3. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices
4. Design and implementation of parity generator / checker using basic gates and MSI devices
5. Design and implementation of magnitude comparator
6. Design and implementation of application using multiplexers/ Demultiplexers
7. Design and implementation of Shift registers
8. Design and implementation of Synchronous and Asynchronous counters
9. Simulation of combinational circuits using Hardware Description Language

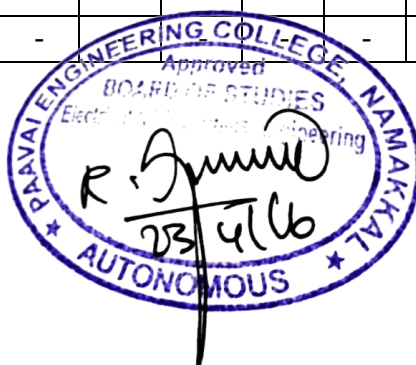
TOTAL: 60 PERIODS**COURSE OUTCOMES**

At the end of the course, the student will be able to

- design and implement the combinational and sequential circuits.
- simulate combinational and sequential circuits using VHDL/Verilog HDL.
- know about the Boolean theorems using logic gates.
- design various synchronous and asynchronous sequential circuits.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	-	-	-	-	2	-	-	3	3	3
CO2	3	3	3	2	-	-	-	-	2	-	-	-	3	3
CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
CO4	3	3	3	2	-	-	-	-	-	-	-	3	3	3



COURSE OBJECTIVES

- To make students understand the basic structure and operation of digital computer.
- To familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations.
- To expose the students to the concept of pipelining.
- To understand the concept of virtual and cache memory.
- To expose the students with different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface –Instruction set architecture – Addressing modes – RISC – CISC.

UNIT II BASIC PROCESSING UNIT & ALU OPERATIONS 9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization– Hardwired control – Micro programmed control – **ALU-Addition and subtraction–Multiplication–Division.**

UNIT III PIPELINING & PARALLELISM 9

Basic concepts – Data hazards – Instruction hazards – Structural Hazards-Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling- Instruction-level-parallelism – Parallel processing challenges – Flynn's classification – Hardware multithreading - Hardware support for exposing parallelism

UNIT IV MEMORY SYSTEM 9

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

UNIT V I/O ORGANIZATION 9

Accessing I/O devices – Programmed Input/ Output -Interrupts – Direct Memory Access– Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB), I/O devices and processors.

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student will be able to

- understand instruction and addressing modes.
- design arithmetic and logic unit.
- design and analyses pipelined control units.
- evaluate performance of memory systems.
- understand parallel processing architectures.

TEXT BOOKS

1. David A. Patterson and John L. Hennessey, "Computer organization and design", Morgan Kauffman / Elsevier, Fifth edition, 2014.
2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", Fifth Edition, Tata McGraw Hill, 2002.

REFERENCES

1. V. Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organisation", VITH edition, Mc Graw-Hill Inc, 2012.
2. William Stallings "Computer Organization and Architecture", Seventh Edition, Pearson Education, 2006.
3. Vincent P. Heuring, Harry F. Jordan, "Computer System Architecture", Second Edition, Pearson Education, 2005.
4. William Stallings, "Computer Organization and Architecture – Designing for Performance", Sixth Edition, Pearson Education, 2003.
5. John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata McGraw Hill, 1998.

WEB LINKS

1. <http://nptel.ac.in/>
2. <http://www.cis.upenn.edu/~milom/cse240-Fall05/>

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	-	-	-	-	-	-	-	2	2	2
CO2	3	2	2	3	2	-	-	-	-	-	-	2	2	2
CO3	3	2	1	2	2	-	-	-	-	2	-	2	-	2
CO4	3	3	2	3	2	-	-	-	-	2	-	3	-	2
CO5	2	3	2	3	2	-	-	-	-	2	-	3	2	2



COURSE OBJECTIVES

- To learn Software life cycle models and system engineering process for developing a system from scratch.
- To study the Software project management concepts.
- To know about Prototyping techniques for requirement engineering process and to analyze data, functional and behavioral model.
- To become familiar with Design levels of software engineering.
- To study Software testing and technical metrics for verifying and validating the software.

UNIT I SOFTWARE PROCESS**9**

The Evolving role of Software – Software – The changing Nature of Software – Legacy Software – A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment – Personal and Team Process Models. **Product and Process. Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – the Unified Process.**

UNIT II SOFTWARE REQUIREMENTS**9**

Software Engineering Practice – communication Practice – Planning practice modeling practice– Construction Practice –Deployment. Requirements Engineering - Requirements Engineering tasks – Initiating the requirements Engineering Process-Eliciting Requirements – Developing Use cases – Building the Analysis Models –Elements of the Analysis Model – Analysis pattern – Negotiating Requirements – Validating Requirements.

UNIT III REQUIREMENTS ANALYSIS**9**

Requirements Analysis – Analysis Modeling approaches – data modeling concepts – Object oriented Analysis – Scenario based modeling – Flow oriented Modeling – Class based modeling – creating a behavior model.

UNIT IV SOFTWARE DESIGN AND SOFTWARE TESTING**9**

Design Engineering – Design process -Design Quality-Design model-Agile Methods – Extreme Programming-Rapid Application development – Software Prototyping- Software Reuse – The Reuse Landscape – Design Patterns – Generator-Based Reuse –Application Frameworks – Application System Reuse - Software Evolution Program Evolution Dynamics – Software Maintenance – Evolution Processes – Legacy system evolution Planning -Verification and Validation – Software Inspections – Automated Static analysis – Verification and Formal methods - **Software Testing – System Testing – Component Testing – Test case Design –Test Automation.**

Software Cost Estimation – productivity – Estimation Techniques – Algorithmic Cost Modeling –Project Duration and Staffing - Process and Product Quality – Quality Assurance and Standards –Planning – Control- Software Measurement and Metrics - Process Improvement – Process Classification – Measurement –Analysis and Modeling –Change – The CMMI process improvement Framework - Configuration Management. –Planning Change Management – Version and Release Management – System Building – CASE tools for configuration management.

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student will be able to

- explore the strength and weakness of life cycle models such as water fall, incremental and spiral model.
- plan, schedule, identify the risk involved and track the development of project for ensuring the software quality.
- identify the functional and non-functional requirements for the project and use it to develop the project using life cycle model.
- apply design processes and concepts for architectural, data, software, user interface and real time systems design.
- verify, and validate the software applications using different types of testing like black box testing, structural testing, unit testing etc.

TEXT BOOK

1. Roger Pressman.S, —Software Engineering: A Practitioner’s Approach”, Seventh Edition, McGraw Hill, 2010.

REFERENCES

1. Ian Sommerville, “Software Engineering “, 9th Edition, Pearson Education Asia, 2011.
2. S.A. Kelkar, “Software Engineering, A Concise Study”, Prentice Hall of India, 2007
3. Richard E. Fairley, “Principles of Software Engineering”, IEEE computer society press, 2010.
4. Shari Pfleeger, Joanne Atlee, “Software Engineering: Theory and Practice”, Fourth Edition, Pearson Education, 2010.
5. Pankaj Jalote, “Software Engineering, A Precise Approach”, Wiley India, 2010.

WEB LINKS

1. <http://resources.sei.cmu.edu/library/asset-view.cfm?assetid=10793>
2. <http://www.softwaretestingtimes.com/2010/04/software-testing-tutorials-for.html>

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs)													
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CO1	3	2	3	2	-	-	-	-	-	-	-	1	-	3
CO2	2	3	3	2	3	-	-	-	-	-	-	2	3	2
CO3	3	2	2	1	2	-	-	-	-	-	2	1	3	3
CO4	2	3	2	2	-	-	-	2	-	-	-	-	-	1
CO5	3	2	3	2	-	-	-	1	-	-	-	2	2	2



COURSE OBJECTIVES

- To study the basic concepts and functions of operating systems.
- To understand the structure and functions of OS.
- To learn about Processes, Threads and Scheduling algorithms.
- To understand the principles of concurrency and Deadlocks.
- To learn various memory management schemes.

UNIT I INTRODUCTION**9**

Introduction: Computer system organization - Introduction to operating systems – operating system structures – services - system calls – system programs. Processes: Process concept – Process scheduling – Operations on processes –Cooperating processes – **Inter process communication – Communication in client-server systems. Threads: Multi-threading models – Threading issues.** Case Study: Pthreads library.

UNIT II PROCESS MANAGEMENT AND DEADLOCK**10**

CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation. Process Synchronization: The critical-section problem – Synchronization hardware – Semaphores – Classic problems of synchronization – Monitors. Deadlock: System model – Deadlock characterization –Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance –Deadlock detection – Recovery from deadlock. Case Study: Process scheduling in Linux.

UNIT III MEMORY MANAGEMENT**9**

Main Memory: Background – Swapping – Contiguous memory allocation –Paging – Segmentation – Segmentation with paging. Virtual Memory: Background –Demand paging – Page replacement – Allocation of frames –Thrashing. Case Study: Memory management in windows and Solaris.

UNIT IV FILE SYSTEMS**9**

File-System Interface: File concept – Access methods – Directory structure – File system mounting – File sharing - Protection. **File-System Implementation: Directory implementation –Allocation methods – Free-space management – efficiency and performance – recovery– Network file systems.** Case studies: File system in Windows XP.

UNIT V I/O SYSTEMS AND MASS STORAGE MANAGEMENT**8**

I/O Systems – I/O Hardware – Application I/O interface – kernel I/O subsystem –streams – performance. Mass-Storage Structure: Disk attachment - Disk scheduling – Disk management –Swap-space management – RAID — stable storage. Case study: I/O in Linux.

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student will be able to

- design various scheduling algorithms.
- apply the principles of concurrency.
- design deadlock, prevention and avoidance algorithms.
- compare and contrast various memory management schemes.
- schedule and manage the disk effectively .

TEXT BOOK

1. Silberschatz, Galvin, and Gagne, “Operating System Concepts”, Ninth Edition, Wiley India Pvt Ltd, 2013.

REFERENCES

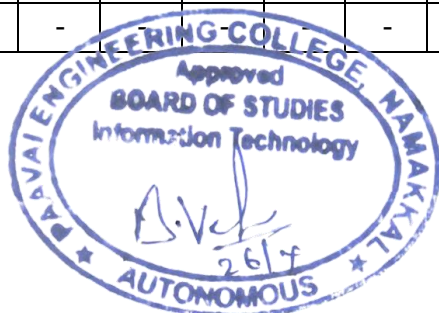
1. Andrew S. Tanenbaum, “Modern Operating Systems”, Fourth Edition, Pearson Education, 2014.
2. William Stallings, “Operating Systems – internals and design principles”, Prentice Hall, 7th Edition, 2011.
3. Harvey M. Deital, “Operating Systems”, Third Edition, Pearson Education, 2007.
4. Andrew S. Tannenbaum & Albert S. Woodhull, “Operating System Design and Implementation”, Prentice Hall, 3rd Edition, 2006.
5. Gary J. Nutt, “Operating Systems”, Pearson/Addison Wesley, 3rd Edition, 2004.

WEB LINKS

1. <http://courses.cs.vt.edu/csonline/OS/Lessons/>
2. <http://www.linux-tutorial.info/modules.php?name=MContent&pageid=4>

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	-	-	-	-	-	-	1	-	-	-	2	1
CO2	3	3	3	-	3	-	-	-	1	-	-	1	2	1
CO3	2	3	3	-	3	-	-	-	1	-	1	2	2	1
CO4	2	3	3	-	3	-	-	-	1	-	2	3	2	1
CO5	3	3	-	-	-	-	-	-	3	3	2	3	1	3



COURSE OBJECTIVES

- To study the Architecture of 8086 microprocessor.
- To study about programming of 8086 microprocessor.
- To learn the design aspects of I/O and Memory Interfacing circuits.
- To study the Architecture of 8051 microcontroller.
- To learn the concepts of system design using microcontroller.

UNIT I THE 8086 MICROPROCESSOR 9

Introduction to microprocessor, Bus-Address bus, Data bus and Control bus, Connecting Microprocessor to I/O devices, Introduction to 8086 – Microprocessor architecture, 8086 signals – Basic configurations and Interrupts.

UNIT II 16 BIT MICROPROCESSOR INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING 9

Addressing modes - Operand types- Instruction set and assembler directives – Assembly language programming.

UNIT III I/O INTERFACING 9

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller.

UNIT IV MICROCONTROLLER 9

Architecture of 8051 – Signals - Special Function Registers (SFRs) - I/O Ports – Memory-Interrupts - Instruction set - Addressing modes - Assembly language programming.

UNIT V SYSTEM DESIGN USING MICROCONTROLLER 9

Case studies – Traffic light control, washing machine control, DC & Stepper Motor & Keyboard Interfacing - ADC, DAC - External Memory Interface.

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student will be able to

- design and implement programs on 8086 microprocessor.
- analyze and design multiprocessor system.
- design I/O circuits.
- design memory interfacing circuits.
- design and implement 8051 microcontroller based systems.

TEXT BOOKS

1. Krishna Kant, “Microprocessors and Microcontrollers Architecture, programming and system design using 8085, 8086, 8051 and 8096”. PHI 2007.
2. Kenneth J.Ayala, “The 8051 Microcontroller Architecture, Programming and applications”, Second edition, Penram International.
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, Second Edition, Pearson Education, 2011.

REFERENCES

1. Douglas V.Hall, “Microprocessors and Interfacing, Programming and Hardware”, TMH.
2. A.K.Ray & K.M Bhurchandi, “Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing”, Tata Mc Graw Hill , 2006.

WEBLINKS

1. <http://nptel.ac.in/courses/106103068/47>
2. <http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/microcontrollers/chap2.pdf>

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO2	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO3	3	2	2	2	2	2	2	-	-	-	-	-	3	3
CO4	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO5	3	2	2	2	2	2	2	-	-	-	-	-	3	3



COURSE OBJECTIVES

- To solve any type of mathematical equations, integrations and differentiations of any functions using Numerical methods.
- To develop the skills of engineering students in the basis of complete procedure for solving different kinds of problems occur in engineering numerically.
- To develop efficient algorithms for solving problems in science, engineering and technology.
- The methods introduced in the solution of ordinary differential equations and partial differential equations will be useful in attempting any engineering problem.

UNIT I SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS 9

Solution of equation –Iteration method : Newton Raphson method – Solution of linear system by Gaussian elimination and Gauss - Jordan method – Iterative method – Gauss-Seidel method – Inverse of a matrix by Gauss Jordan method – Eigenvalue of a matrix by power method.

UNIT II INTERPOLATION AND APPROXIMATION 9

Lagrangian Polynomials – Divided differences – Newton's Divided Difference, Hermite Interpolation Polynomial and Interpolating with a cubic spline – Newton's forward and backward difference formulas.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9

Differentiation using interpolation formulae –Numerical integration by trapezoidal and Simpson's 1/3–Romberg's method – Two and Three point Gaussian quadrature formulas – Double integrals using trapezoidal and Simpsons' rule.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9

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

UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9

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

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student will be able to

- an ability to develop confidence for self-learning and life- long learning.
- manage resources like men, money, machinery and material with modern management tools.
- applications of numerical methods in computer field.
- the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values.
- acquire the computational procedure of the amount of heat emitted or transferred from an object.

TEXT BOOKS

1. Erwin Kreyszig., “ Advanced Engineering Mathematics ” 10th edition, Wiley Publications, 2010.
2. T. Veerarajan. and T .Ramachandran, “Numerical Methods with programming in C”, 2nd ed., Tata McGraw-Hill, 2006.
3. Sankar Rao K “ Numerical Methods For Scientists And Engineers –3rd Edition Prentice Hall of India Private, New Delhi, 2007.

REFERENCES

1. P. Kandasamy, K. Thilagavathy and K. Gunavathy, “Numerical Methods”, S.Chand Co. Ltd., New Delhi, 2003.
2. Gerald C.F. and Wheatley, P.O., “Applied Numerical Analysis” 6th Edition, Pearson Education Asia, New Delhi, 2002.
3. M.K.Jain , S.R.K. Iyengar , R.K.Jain , “Numerical Methods For Scientific & Engineering Computation” , New Age International (P) Ltd , New Delhi , 2005.

WEB LINKS

1. <http://nptel.ac.in/courses/122102009/>
2. <https://ece.uwaterloo.ca/~ece204/tutorials/t1.html>

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs)													
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CO4	3	3	3	2	-	-	-	2	-	-	1	-	2	2
CO5	3	3	3	2	-	-	-	-	-	-	-	1	3	2



COURSE OBJECTIVES

- To understand the concepts of Object Oriented Programming.
- To understand the concepts of inheritance.
- To develop an application in event driven programming.
- To develop an application in generic programming.
- To develop an application in concurrent programming.

UNIT I OBJECT-ORIENTED PROGRAMMING – FUNDAMENTALS 9

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

UNIT II	OBJECT-ORIENTED PROGRAMMING – INHERITANCE	10
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Inheritance – class hierarchy – polymorphism – dynamic binding – final keyword – abstract classes – the Object class – Reflection – interfaces – object cloning – inner classes – proxies.

UNIT III EVENT-DRIVEN PROGRAMMING 10

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

UNIT IV GENERIC PROGRAMMING 8

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

UNIT V CONCURRENT PROGRAMMING 8

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

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student will be able to

- understand the needs of object oriented programming.
- differentiate the functionalities of object oriented approach and procedural languages.
- demonstrate the concepts of event-driven programming.
- exhibit the concepts of generic programming using Java .
- perform the concepts of concurrent programming.

TEXT BOOKS

1. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals", Eighth Edition, Sun Microsystems Press, 2008.
2. Herbert Schildt, Java2-CompleteReference, Tata McGraw Hill, 2011.
3. Deitel & Deitel, Java How to Program, Prentice Hall of India, 2010.

REFERENCES

1. K. Arnold and J. Gosling, "The JAVA programming language", Third edition, Pearson Education, 2000.
2. Timothy Budd, "Understanding Object-oriented programming with Java", Updated Edition, Pearson Education, 2000.
3. C. Thomas Wu, "An introduction to Object-oriented programming with Java", Fourth Edition, Tata McGraw-Hill Publishing Company Ltd., 2006.
4. Gary Cornell and Cay S. Horstmann, Core Java Vol.1andVol.2,Sun Microsystems Press,2008
5. Herbert Schildt, Java, A Beginner's Guide, Tata McGraw Hill,2007

WEB LINKS

1. www.javatpoint.com/java-oops-concepts
2. www.w3resource.com/java.../java-object-oriented-programming.php

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1	-	-	-	-	-	-	-	-	2	1
CO2	2	1	1	2	-	-	-	-	-	-	-	-	1	2
CO3	2	1	2	2	3	-	-	-	-	-	-	-	1	2
CO4	1	2	2	1	1	-	-	-	-	-	-	-	1	2
CO5	1	1	2	1	-	-	-	-	-	-	-	-	-	2



COURSE OBJECTIVES

- To implement scheduling algorithms.
- To learn to use the file allocation and organization strategies.
- To be familiar with implementation of deadlock avoidance & detection algorithms.
- To implement page replacement algorithms.
- To be exposed to process creation and inter process communication.

LIST OF EXPERIMENTS

1. Simulate the following CPU scheduling algorithms: a) Round Robin b) SJF c) FCFS d) Priority.
2. Simulate all file allocation strategies: a) Sequential b) Indexed c) Linked.
3. Implement the producer – consumer problem using semaphores.
4. Simulate all File Organization Techniques:
a) Single level directory b) Two level c) Hierarchical d) DAG.
5. Simulate Bankers Algorithm for Dead Lock Avoidance.
6. Simulate an Algorithm for Dead Lock Detection.
7. Simulate all page replacement algorithms a) FIFO b) LRU c) Optimal.
8. Simulate Shared memory and IPC.
9. Simulate Paging Technique of memory management.
10. Implement Threading & Synchronization Applications.

TOTAL: 60 PERIODS**COURSE OUTCOMES**

At the end of the course, the student will be able to

- compare the performance of various CPU scheduling algorithm.
- implement file allocation & organization strategies.
- implement deadlock avoidance, and detection algorithms.
- critically analyze the performance of the various page replacement algorithms.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs))													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	1	1	-	-	-	1	-	-	-	2	1
CO2	3	3	3	1	3	-	-	-	1	-	-	1	2	1
CO3	3	3	3	1	3	-	-	-	1	-	1	2	2	1
CO4	3	3	3	1	3	-	-	-	1	-	2	3	2	1



COURSE OBJECTIVES

- To implement the assembly language programming of 8086 and 8051.
- To experiment the interface concepts of various peripheral device with the processor.
- To impart the knowledge about the instruction set.
- To understand the basic idea about the data transfer schemes and its applications.
- To develop skill in simple program writing for 8051 & 8086 and applications.

LIST OF EXPERIMENTS**Assembly Language programming using 8086 and MASM**

1. Basic arithmetic and Logical operations.
2. Move a data block without overlap.
3. Floating point operations, string manipulations, sorting and searching.
4. Counters and Time Delay.

Interfacing with 8086 microprocessor

5. Traffic light control.
6. Stepper motor control.
7. Digital clock.
8. Key board and Display.
9. Serial interface and Parallel interface.

Programming using 8051 microcontroller

10. Basic arithmetic and Logical operations.
11. Unpacked BCD to ASCII.

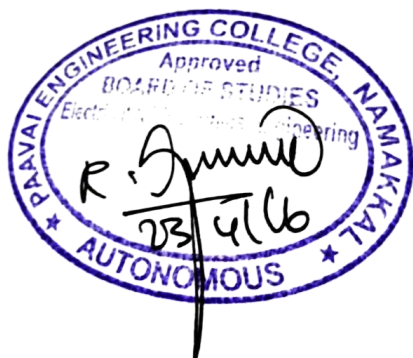
TOTAL: 60 PERIODS**COURSE OUTCOMES**

At the end of the course, the student will be able to

- write assembly language programmes for various applications.
- interface different peripherals with microprocessor.
- execute programs in 8051.
- explain the difference between simulator and emulator.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO2	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO3	3	2	2	2	2	2	2	-	-	-	-	-	3	3
CO4	3	2	2	2	2	-	-	-	-	-	-	-	3	3



COURSE OBJECTIVES

- To be familiar with core programming in java.
- To be familiar with Interface and Thread concepts.
- To design front end and back end connectivity.
- To know about GUI & Event driven programming.
- To understand the concepts of synchronization, multi-threading.

LIST OF EXPERIMENTS

1. Develop a Java package with simple Stack and Queue classes. Use Java Documents for documentation.
2. Design a class for Complex numbers in Java. In addition to methods for basic operations on complex numbers, provide a method to return the number of active objects created.
3. Design a Date class similar to the one provided in the java.util package.
4. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism.
5. Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both the implementations.
6. Write a Java program to read a file that contains DNA sequences of arbitrary length one per line (note that each DNA sequence is just a String). Your program should sort the sequences in descending order with respect to the number of 'TATA' sub sequences present. Finally write the sequences in sorted order into another file.
7. Develop a simple paint-like program that can draw basic graphical primitives indifferent dimensions and colors. Use appropriate menu and buttons.
8. Develop a scientific calculator using even-driven programming paradigm of Java.
9. Develop a template for linked-list class along with its methods in Java.
10. Design a thread-safe implementation of Queue class. Write a multi-threaded producer-consumer application that uses this Queue class.
11. Develop a multi-threaded GUI application of your choice.

TOTAL: 60 PERIODS**COURSE OUTCOMES**

At the end of the course, the student will be able to:

- develop core java programs and solving problems.
- implement multiple inheritance and multi thread programs.

- develop the data structures such as list, linked list.
- design AWT based applications using exceptional handling.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	2	-	1	-	-	-	-	-	1	2
CO2	3	2	2	1	2	-	2	-	-	-	-	-	1	2
CO3	3	3	2	2	2	-	1	-	-	-	-	-	1	2
CO4	2	2	3	1	2	-	2	-	-	-	-	-	1	2



ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
R-2013
B.TECH INFORMATION TECHNOLOGY
I - VIII SEMESTERS CURRICULUM AND SYLLABUS

SEMESTER I

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	HS6151	<u>Technical English – I</u>	3	1	0	4
2.	MA6151	<u>Mathematics – I</u>	3	1	0	4
3.	PH6151	<u>Engineering Physics – I</u>	3	0	0	3
4.	CY6151	<u>Engineering Chemistry – I</u>	3	0	0	3
5.	GE6151	<u>Computer Programming</u>	3	0	0	3
6.	GE6152	<u>Engineering Graphics</u>	2	0	3	4
PRACTICALS						
7.	GE6161	<u>Computer Practices Laboratory</u>	0	0	3	2
8.	GE6162	<u>Engineering Practices Laboratory</u>	0	0	3	2
9.	GE6163	<u>Physics and Chemistry Laboratory - I</u>	0	0	2	1
TOTAL			17	2	11	26

SEMESTER II

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	HS6251	Technical English – II	3	1	0	4
2.	MA6251	Mathematics – II	3	1	0	4
3.	PH6251	<u>Engineering Physics – II</u>	3	0	0	3
4.	CY6251	<u>Engineering Chemistry – II</u>	3	0	0	3
5.	CS6201	<u>Digital Principles and System Design</u>	3	0	0	3
	CS6202	<u>Programming and Data Structures I</u>	3	0	0	3
PRACTICALS						
7.	GE6262	<u>Physics and Chemistry Laboratory - II</u>	0	0	2	1
8.	IT6211	<u>Digital Laboratory</u>	0	0	3	2
9.	IT6212	<u>Programming and Data Structures Laboratory I</u>	0	0	3	2
TOTAL			18	2	8	25

SEMESTER III

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	MA6351	<u>Transforms and Partial Differential Equations</u>	3	1	0	4
2.	CS6301	<u>Programming and Data Structures II</u>	3	0	0	3
3.	CS6302	<u>Database Management Systems</u>	3	0	0	3
4.	CS6303	<u>Computer Architecture</u>	3	0	0	3
5.	CS6304	<u>Analog and Digital Communication</u>	3	0	0	3
6.	GE6351	<u>Environmental Science and Engineering</u>	3	0	0	3
PRACTICAL						
7.	IT6311	<u>Programming and Data Structures Laboratory II</u>	0	0	3	2
8.	IT6312	<u>Database Management Systems Laboratory</u>	0	0	3	2
9.	IT6313	<u>Digital Communication Laboratory</u>	0	0	3	2
TOTAL			18	1	9	25

SEMESTER IV

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	MA6453	<u>Probability and Queuing Theory</u>	3	1	0	4
2.	EC6504	<u>Microprocessor and Microcontroller</u>	3	0	0	3
3.	CS6402	<u>Design and Analysis of Algorithms</u>	3	0	0	3
4.	CS6401	<u>Operating Systems</u>	3	0	0	3
5.	CS6403	<u>Software Engineering</u>	3	0	0	3
PRACTICAL						
6.	IT6411	<u>Microprocessor and Microcontroller Laboratory</u>	0	0	3	2
7.	IT6412	<u>Operating Systems Laboratory</u>	0	0	3	2
8.	IT6413	<u>Software Engineering Laboratory</u>	0	0	3	2
TOTAL			15	1	9	22

SEMESTER V

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	CS6551	<u>Computer Networks</u>	3	0	0	3
2.	IT6501	<u>Graphics and Multimedia</u>	3	0	0	3
3.	CS6502	<u>Object Oriented Analysis and Design</u>	3	0	0	3
4.	IT6502	Digital Signal Processing	3	1	0	4
5.	IT6503	Web Programming	3	1	0	4
6.	EC6801	Wireless Communication	3	0	0	3
PRACTICAL						
7.	IT6511	<u>Networks Laboratory</u>	0	0	3	2
8.	IT6512	<u>Web Programming Laboratory</u>	0	0	3	2
9.	IT6513	<u>Case Tools Laboratory</u>	0	0	3	2
TOTAL			18	2	9	26

SEMESTER VI

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	CS6601	<u>Distributed Systems</u>	3	0	0	3
2.	IT6601	<u>Mobile Computing</u>	3	0	0	3
3.	CS6659	<u>Artificial Intelligence</u>	3	0	0	3
4.	CS6660	<u>Compiler Design</u>	3	0	0	3
5.	IT6602	<u>Software Architectures</u>	3	0	0	3
6.		Elective I	3	0	0	3
PRACTICAL						
7.	IT6611	<u>Mobile Application Development Laboratory</u>	0	0	3	2
8.	IT6612	<u>Compiler Laboratory</u>	0	0	3	2
9.	GE6674	<u>Communication and Soft Skills - Laboratory Based</u>	0	0	4	2
TOTAL			18	0	10	24

SEMESTER VII

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	IT6701	<u>Information Management</u>	3	0	0	3
2.	CS6701	<u>Cryptography and Network Security</u>	3	0	0	3
3.	IT6702	<u>Data Ware Housing and Data Mining</u>	3	0	0	3
4.	CS6703	<u>Grid and Cloud Computing</u>	3	0	0	3
5.		Elective II	3	0	0	3
PRACTICAL						
6.	IT6711	<u>Data Mining Laboratory</u>	0	0	3	2
7.	IT6712	<u>Security Laboratory</u>	0	0	3	2
8.	IT6713	<u>Grid and Cloud Computing Laboratory</u>	0	0	3	2
TOTAL			15	0	9	21

SEMESTER VIII

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	IT6801	Service Oriented Architecture	3	0	0	3
2.		Elective III	3	0	0	3
3.		Elective IV	3	0	0	3
		Elective V	3	0	0	3
PRACTICAL						
4.	IT6811	Project Work	0	0	12	6
TOTAL			12	0	12	18

TOTAL NO. OF CREDITS: 187

LIST OF ELECTIVES

SEMESTER VI – ELECTIVE I

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
1.	IT6001	Advanced Database Technology	3	0	0	3
2.	IT6002	Information Theory and Coding Techniques	3	0	0	3
3.	CS6001	C# and .Net Programming	3	0	0	3
4.	GE6757	Total Quality Management	3	0	0	3
5.	CS6012	Soft Computing	3	0	0	3
6.	GE6084	Human Rights	3	0	0	3

OUTCOMES:

Upon Completion of the course, the students should be able to:

- Use open source case tools to develop software.
- Analyze and design software requirements in efficient manner.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:**SOFTWARE:**

Argo UML / StarUML / UMLGraph / Topcased or Equivalent.

HARDWARE:

Standalone desktops 30 Nos

CS6551

COMPUTER NETWORKS

L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks
- Be exposed to the required functionality at each layer
- Learn the flow control and congestion control algorithms

UNIT I FUNDAMENTALS & LINK LAYER

9

Building a network – Requirements - Layering and protocols - Internet Architecture – Network software – Performance ; Link layer Services - Framing - Error Detection - Flow control

UNIT II MEDIA ACCESS & INTERNETWORKING

9

Media access control - Ethernet (802.3) - Wireless LANs – 802.11 – Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP, ICMP)

UNIT III ROUTING

9

Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast – addresses – multicast routing (DVMRP, PIM)

UNIT IV TRANSPORT LAYER

9

Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements

UNIT V APPLICATION LAYER

9

Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS - SNMP

TOTAL: 45 PERIODS

OUTCOMES:

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

- Identify the components required to build different types of networks
- Choose the required functionality at each layer for given application
- Identify solution for each functionality at each layer
- Trace the flow of information from one node to another node in the network

TEXT BOOK:

1. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A systems approach", Fifth Edition, Morgan Kaufmann Publishers, 2011.

REFERENCES:

1. James F. Kurose, Keith W. Ross, "Computer Networking - A Top-Down Approach Featuring the Internet", Fifth Edition, Pearson Education, 2009.
2. Nader. F. Mir, "Computer and Communication Networks", Pearson Prentice Hall Publishers, 2010.
3. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Computer Networks: An Open Source Approach", Mc Graw Hill Publisher, 2011.
4. Behrouz A. Forouzan, "Data communication and Networking", Fourth Edition, Tata McGraw – Hill, 2011.

IT6501**GRAPHICS AND MULTIMEDIA****L T P C
3 0 0 3****OBJECTIVES:****The student should be made to:**

- Develop an understanding and awareness of how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.
- Be familiar with various software programs used in the creation and implementation of multimedia (interactive, motion/animation, presentation, etc.).
- Be aware of current issues relative between new emerging electronic technologies and graphic design (i.e. social, cultural, cognitive, etc).
understand the relationship between critical analysis and the practical application of design.
- Appreciate the importance of technical ability and creativity within design practice.

UNIT I OUTPUT PRIMITIVES**9**

Basic – Line – Curve and ellipse drawing algorithms – Examples – Applications - Attributes – Two- Dimensional geometric transformations – Two-Dimensional clipping and viewing – Input techniques.

UNIT II THREE-DIMENSIONAL CONCEPTS**9**

Three-Dimensional object representations – Three-Dimensional geometric and modeling transformations – Three-Dimensional viewing – Hidden surface elimination
– Color models – Virtual reality - Animation.

UNIT III MULTIMEDIA SYSTEMS DESIGN**9**

Multimedia basics – 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 and decompression – Data and 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 and user interface – Hypermedia messaging – Mobile messaging – Hypermedia message component – **Creating hypermedia message – Integrated multimedia message standards – Integrated document management – Distributed multimedia systems.**

TOTAL: 45 PERIODS

OUTCOMES:

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

- Effectively and creatively solve a wide range of graphic design problems
- Form effective and compelling interactive experiences for a wide range of audiences.
- Use various software programs used in the creation and implementation of multi-media (interactive, motion/animation, presentation, etc.).
- Discuss issues related to emerging electronic technologies and graphic design

TEXT BOOKS:

1. Donald Hearn and M. Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003.
2. Andleigh, P. K and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003.

REFERENCES:

1. Judith Jeffcoate, "Multimedia in practice: Technology and Applications", PHI, 1998.
2. Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Practice", 2nd Edition, Pearson Education, 2003.

CS6502

OBJECT ORIENTED ANALYSIS AND DESIGN

L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Learn the basics of OO analysis and design skills
- Learn the UML design diagrams
- Learn to map design to code
- Be exposed to the various testing techniques.

UNIT I UML DIAGRAMS

9

Introduction to OOAD – **Unified Process - UML diagrams – Use Case – Class Diagrams– Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams**

UNIT II DESIGN PATTERNS

9

GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller - **Design Patterns** – creational - factory method - structural – Bridge – Adapter - behavioral – Strategy – observer

UNIT III CASE STUDY

9

Case study – the Next Gen POS system, Inception -Use case Modeling - Relating Use cases – include, extend and generalization - Elaboration - Domain Models - Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies - Aggregation and Composition

UNIT IV APPLYING DESIGN PATTERNS**9**

System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement - UML class diagrams - UML interaction diagrams - Applying GoF design patterns

UNIT V CODING AND TESTING**9**

Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing – GUI Testing – OO System Testing

TOTAL: 45 PERIODS**OUTCOMES:**

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

- Design and implement projects using OO concepts
- Use the UML analysis and design diagrams
- Apply appropriate design patterns
- Create code from design
- Compare and contrast various testing techniques

TEXT BOOK:

1. Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2005.

REFERENCES:

1. Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis and Design Using UML", Fourth Edition, Mc-Graw Hill Education, 2010.
2. Erich Gamma, and Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 1995.
3. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2003.
4. Paul C. Jorgensen, "Software Testing:- A Craftsman's Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2008.

IT6502**DIGITAL SIGNAL PROCESSING****L T P C
3 1 0 4****OBJECTIVES:**

- To introduce discrete Fourier transform and its applications.
- To teach the design of infinite and finite impulse response filters for filtering undesired signals.
- To introduce signal processing concepts in systems having more than one sampling frequency.

UNIT I SIGNALS AND SYSTEMS**9**

Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution – Correlation.

UNIT II FREQUENCY TRANSFORMATIONS**9**

Introduction to DFT – Properties of DFT – Circular Convolution - Filtering methods based on DFT – FFT Algorithms - Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT – Use and Application of DCT.

UNIT III IIR FILTER DESIGN**9**

Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (LPF, HPF, BPF, BRF) filter design using frequency translation.

UNIT IV FIR FILTER DESIGN**9**

Structures of FIR – Linear phase FIR filter – Fourier Series - Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques

UNIT V FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS**9**

Binary fixed point and floating point number representations – Comparison - Quantization noise – truncation and rounding – quantization noise power- input quantization error- coefficient quantization error – limit cycle oscillations-dead band- Overflow error-signal scaling.

TOTAL (L:45+T:15): 60 PERIODS**OUTCOMES:**

Upon completion of the course, students will be able to

- Perform frequency transforms for the signals.
- Design IIR and FIR filters.
- Finite word length effects in digital filters

TEXT BOOK:

1. John G. Proakis and Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth Edition, Pearson Education, Prentice Hall, 2007.

REFERENCES:

1. Emmanuel C.Ifeachor, and Barrie.W.Jervis, "Digital Signal Processing", Second Edition, Pearson Education, Prentice Hall, 2002.
2. Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", Third Edition, Tata Mc Graw Hill, 2007.
3. A.V.Oppenheim, R.W. Schafer and J.R. Buck, Discrete-Time Signal Processing, 8th Indian Reprint, Pearson, 2004.
4. Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill, 2006.

IT6503**WEB PROGRAMMING****L T P C
3 1 0 4****OBJECTIVES:**

The student should be made to:

- Understand the technologies used in Web Programming.
- Know the importance of object oriented aspects of Scripting.
- Understand creating database connectivity using JDBC.
- Learn the concepts of web based application using sockets.

UNIT I SCRIPTING.**9**

Web page Designing using HTML, Scripting basics- Client side and server side scripting. Java Script- Object, names, literals, operators and expressions- statements and features- events - windows - documents - frames - data types - built-in functions- Browser object model - Verifying forms.-HTML5- CSS3- HTML 5 canvas - Web site creation using tools.

UNIT II	JAVA	9
Introduction to object oriented programming-Features of Java – Data types, variables and arrays – Operators – Control statements – Classes and Methods – Inheritance. Packages and Interfaces – Exception Handling – Multithreaded Programming – Input/Output – Files – Utility Classes – String Handling.		
UNIT III	JDBC	9
JDBC Overview – JDBC implementation – Connection class – Statements - Catching Database Results, handling database Queries. Networking– InetAddress class – URL class- TCP sockets - UDP sockets, Java Beans –RMI.		
UNIT IV	APPLETS	9
Java applets- Life cycle of an applet – Adding images to an applet – Adding sound to an applet. Passing parameters to an applet. Event Handling. Introducing AWT: Working with Windows Graphics and Text. Using AWT Controls, Layout Managers and Menus. Servlet – life cycle of a servlet. The Servlet API, Handling HTTP Request and Response, using Cookies, Session Tracking. Introduction to JSP.		
UNIT V	XML AND WEB SERVICES	9
Xml – Introduction-Form Navigation-XML Documents- XSL – XSLT- Web services-UDDI-WSDL-Java web services – Web resources.		

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:

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

- Design web pages.
- Use technologies of Web Programming.
- Apply object oriented aspects to Scripting.
- Create databases with connectivity using JDBC.
- Build web based application using sockets.

TEXT BOOKS:

1. Harvey Deitel, Abbey Deitel, Internet and World Wide Web: How To Program 5th Edition.
2. Herbert Schildt, Java - The Complete Reference, 7th Edition. Tata McGraw- Hill Edition.
3. Michael Morrison XML Unleashed Tech media SAMS.

REFERENCES:

1. John Pollock, Javascript - A Beginners Guide, 3rd Edition -- Tata McGraw-Hill Edition.
2. Keyur Shah, Gateway to Java Programmer Sun Certification, Tata McGraw Hill, 2002.

EC6801	WIRELESS COMMUNICATION	L T P C
		3 0 0 3

OBJECTIVES:

The student should be made to:

- Know the characteristic of wireless channel
- Learn the various cellular architectures
- Understand the concepts behind various digital signaling schemes for fading channels
- Be familiar the various multipath mitigation techniques
- Understand the various multiple antenna systems

UNIT I	WIRELESS CHANNELS	9
Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budget design – Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters- Coherence bandwidth – Doppler spread & Coherence time, Fading due to Multipath time delay spread – flat fading – frequency selective fading – Fading due to Doppler spread – fast fading – slow fading.		
UNIT II	CELLULAR ARCHITECTURE	9
Multiple Access techniques - FDMA, TDMA, CDMA – Capacity calculations–Cellular concept- Frequency reuse - channel assignment- hand off- interference & system capacity- trunking & grade of service – Coverage and capacity improvement.		
UNIT III	DIGITAL SIGNALING FOR FADING CHANNELS	9
Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle – Cyclic prefix, Windowing, PAPR.		
UNIT IV	MULTIPATH MITIGATION TECHNIQUES	9
Equalisation – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS Algorithms. Diversity – Micro and Macrodiversity, Diversity combining techniques, Error probability in fading channels with diversity reception, Rake receiver,		
UNIT V	MULTIPLE ANTENNA TECHNIQUES	9
MIMO systems – spatial multiplexing -System model -Pre-coding - Beam forming - transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels.		

TOTAL : 45 PERIODS

OUTCOMES:

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

- Characterize wireless channels
- Design and implement various signaling schemes for fading channels
- Design a cellular system
- Compare multipath mitigation techniques and analyze their performance
- Design and implement systems with transmit/receive diversity and MIMO systems and analyze their performance

TEXTBOOKS:

1. Rappaport, T.S., "Wireless communications", Second Edition, Pearson Education, 2010.
2. Andreas.F. Molisch, "Wireless Communications", John Wiley – India, 2006.

REFERENCES:

1. David Tse and Pramod Viswanath, "Fundamentals of Wireless Communication", Cambridge University Press, 2005.
2. Upena Dalal, "Wireless Communication", Oxford University Press, 2009.
3. Van Nee, R. and Ramji Prasad, "OFDM for wireless multimedia communications", Artech House, 2000.

OBJECTIVES:**The student should be made to:**

- Learn socket programming.
- Be familiar with simulation tools.
- Have hands on experience on various networking protocols.

LIST OF EXPERIMENTS:

1. Implementation of Stop and Wait Protocol and Sliding Window Protocol.
2. Study of Socket Programming and Client – Server model
3. Write a code simulating ARP /RARP protocols.
4. Write a code simulating PING and TRACEROUTE commands
5. Create a socket for HTTP for web page upload and download.
6. Write a program to implement RPC (Remote Procedure Call)
7. Implementation of Subnetting .
8. Applications using TCP Sockets like
 - a. Echo client and echo server
 - b. Chat
 - c. File Transfer
9. Applications using TCP and UDP Sockets like
 - d. DNS
 - e. SNMP
 - f. File Transfer
10. Study of Network simulator (NS).and Simulation of Congestion Control Algorithms using NS
11. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
 - i. Link State routing
 - ii. Flooding
 - iii. Distance vector

TOTAL: 45 PERIODS**REFERENCE:**spoken-tutorial.org**OUTCOMES:****At the end of the course, the student should be able to**

- Use simulation tools
- Implement the various protocols.
- Analyse the performance of the protocols in different layers.
- Analyze various routing algorithms

LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS**SOFTWARE**

- | | |
|--|----|
| • C / C++ / Java / Equivalent Compiler | 30 |
| • Network simulator like NS2/Glomosim/OPNET/
Equivalent | |

HARDWARE

Standalone desktops	30 Nos
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LAB EXERCISES

(For IT branch)

OBJECTIVES:**The student should be made to:**

- Be familiar with Web page design using HTML / DHTML and style sheets
- Be exposed to creation of user interfaces using Java frames and applets.
- Learn to create dynamic web pages using server side scripting.
- Learn to write PHP database functions.
- Learn .Net frame work and RMI

LIST OF EXPERIMENTS:

1. Write a html program for Creation of web site with forms, frames, links, tables etc
2. Design a web site using HTML and DHTML. Use Basic text Formatting, Images,
3. Create a script that asks the user for a name, then greets the user with "Hello" and the user name on the page
4. Create a script that collects numbers from a page and then adds them up and prints them to a blank field on the page.
5. Create a script that prompts the user for a number and then counts from 1 to that number displaying only the odd numbers.
6. Create a script that will check the field in Assignment 1 for data and alert the user if it is blank. This script should run from a button.
7. Using CSS for creating web sites
8. Creating simple application to access data base using JDBC Formatting HTML with CSS.
9. Program for manipulating Databases and SQL.
10. Program using PHP database functions.
11. Write a web application that functions as a simple hand calculator, but also keeps a "paper trail" of all your previous work
12. Install Tomcat and use JSP and link it with any of the assignments above
13. Reading and Writing the files using .Net
14. Write a program to implement web service for calculator application
15. Implement RMI concept for building any remote method of your choice.

TOTAL: 45 PERIODS**OUTCOMES:****At the end of the course, the student should be able to**

- Design Web pages using HTML/DHTML and style sheets
- Design and Implement database applications.
- Create dynamic web pages using server side scripting.
- Write Client Server applications.

LAB REQUIREMENTS FOR A BATCH OF 30 STUDENTS:**SOFTWARE:**

Java, Dream Weaver or Equivalent, MySQL or Equivalent, Apache Server

HARDWARE:

Standalone desktops

30 Nos

OBJECTIVES:

The student should be made to:

- Learn the basics of OO analysis and design skills.
- Be exposed to the UML design diagrams.
- Learn to map design to code.
- Be familiar with the various testing techniques

LIST OF EXPERIMENTS:

To develop a mini-project by following the 9 exercises listed below.

1. To develop a problem statement.
2. Identify Use Cases and develop the Use Case model.
3. Identify the conceptual classes and develop a domain model with UML Class diagram.
4. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence diagrams.
5. Draw relevant state charts and activity diagrams.
6. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
7. Develop and test the Technical services layer.
8. Develop and test the Domain objects layer.
9. Develop and test the User interface layer.

Suggested domains for Mini-Project:

1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management System
14. Library Management System
15. Student Information System

TOTAL: 45 PERIODS

OUTCOMES:

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

- Design and implement projects using OO concepts.
- Use the UML analysis and design diagrams.
- Apply appropriate design patterns.
- Create code from design.
- Compare and contrast various testing techniques

LAB EQUIPMENTS FOR A BATCH OF 30 STUDENTS:**SUGGESTED SOFTWARE TOOLS:**

Rational Suite (or) Argo UML (or) equivalent, Eclipse IDE and Junit

SOFTWARE TOOLS

30 user License

Rational Suite

Open Source Alternatives: ArgoUML, Visual Paradigm

Eclipse IDE and JUnit

PCs

30

CS6601

DISTRIBUTED SYSTEMS

L T P C

3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand foundations of Distributed Systems
- Introduce the idea of peer to peer services and file system
- Understand in detail the system level and support required for distributed system
- Understand the issues involved in studying process and resource management

UNIT I INTRODUCTION

7

Introduction – Examples of Distributed Systems–Trends in Distributed Systems – Focus on resource sharing – Challenges. **Case study:** World Wide Web.

UNIT II COMMUNICATION IN DISTRIBUTED SYSTEM

10

System Model – Inter process Communication - the API for internet protocols – External data representation and Multicast communication. **Network virtualization:** Overlay networks. **Case study:** MPI **Remote Method Invocation And Objects:** Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote method invocation. **Case study:** Java RMI - Group communication - Publish-subscribe systems - Message queues - Shared memory approaches - Distributed objects - Case study: Enterprise Java Beans -from objects to components

UNIT III PEER TO PEER SERVICES AND FILE SYSTEM

10

Peer-to-peer Systems – Introduction - Napster and its legacy - Peer-to-peer – Middleware - Routing overlays. **Overlay case studies:** Pastry, Tapestry- Distributed File Systems –Introduction - File service architecture – Andrew File system. **File System:** Features-File model -File accessing models - File sharing semantics **Naming:** Identifiers, Addresses, Name Resolution – Name Space Implementation – Name Caches – LDAP.

UNIT IV SYNCHRONIZATION AND REPLICATION

9

Introduction - Clocks, events and process states - Synchronizing physical clocks- Logical time and logical clocks - Global states – Coordination and Agreement – Introduction - Distributed mutual exclusion – Elections – Transactions and Concurrency Control– Transactions -Nested transactions – Locks – Optimistic concurrency control - Timestamp ordering – Atomic Commit protocols -Distributed deadlocks – Replication – Case study – Coda.

UNIT V PROCESS & RESOURCE MANAGEMENT

9

Process Management: Process Migration: Features, Mechanism - Threads: Models, Issues, Implementation. **Resource Management:** Introduction- Features of Scheduling Algorithms –Task Assignment Approach – Load Balancing Approach – Load Sharing Approach.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Discuss trends in Distributed Systems.
- Apply network virtualization.
- Apply remote method invocation and objects.
- Design process and resource management systems.

TEXT BOOK:

1. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012.

REFERENCES:

1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.
2. Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Pearson Education, 2007.
3. Liu M.L., "Distributed Computing, Principles and Applications", Pearson Education, 2004.
4. Nancy A Lynch, "Distributed Algorithms", Morgan Kaufman Publishers, USA, 2003.

IT6601**MOBILE COMPUTING****L T P C**
3 0 0 3**OBJECTIVES:**

The student should be made to:

- Understand the basic concepts of mobile computing.
- Be familiar with the network protocol stack.
- Learn the basics of mobile telecommunication system.
- Be exposed to Ad-Hoc networks.
- Gain knowledge about different mobile platforms and application development .

UNIT I INTRODUCTION**9**

Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.

UNIT II MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER**9**

Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance.

UNIT III MOBILE TELECOMMUNICATION SYSTEM**9**

Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS).

UNIT IV MOBILE AD-HOC NETWORKS**9**

Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols –Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET Vs VANET – Security .

UNIT II REPRESENTATION OF KNOWLEDGE	9
Game playing - Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.	
UNIT III KNOWLEDGE INFERENCE	9
Knowledge representation -Production based system, Frame based system. Inference - Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning - Certainty factors, Bayesian Theory-Bayesian Network-Dempster - Shafer theory.	
UNIT IV PLANNING AND MACHINE LEARNING	9
Basic plan generation systems - Strips -Advanced plan generation systems – K strips -Strategic explanations -Why, Why not and how explanations. Learning- Machine learning, adaptive Learning.	
UNIT V EXPERT SYSTEMS	9
Expert systems - Architecture of expert systems, Roles of expert systems - Knowledge Acquisition – Meta knowledge, Heuristics. Typical expert systems - MYCIN, DART, XOON, Expert systems shells.	

TOTAL: 45 PERIODS

OUTCOMES:

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

- Identify problems that are amenable to solution by AI methods.
- Identify appropriate AI methods to solve a given problem.
- Formalise a given problem in the language/framework of different AI methods.
- Implement basic AI algorithms.
- Design and carry out an empirical evaluation of different algorithms on a problem formalisation, and state the conclusions that the evaluation supports.

TEXT BOOKS:

1. Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", McGraw Hill- 2008. (Unit-1,2,4,5).
2. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007. (Unit-III)

REFERENCES:

1. Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, 2007.
2. Stuart Russel and Peter Norvig "AI – A Modern Approach", 2nd Edition, Pearson Education 2007.
3. Deepak Khemani "Artificial Intelligence", Tata Mc Graw Hill Education 2013.
4. <http://nptel.ac.in/>

CS6660

COMPILER DESIGN

L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Learn the design principles of a Compiler.
- Learn the various parsing techniques and different levels of translation.
- Learn how to optimize and effectively generate machine codes.

UNIT I	INTRODUCTION TO COMPILERS	5
Translators-Compilation and Interpretation-Language processors -The Phases of Compiler-Errors Encountered in Different Phases-The Grouping of Phases-Compiler Construction Tools - Programming Language basics.		
UNIT II	LEXICAL ANALYSIS	9
Need and Role of Lexical Analyzer-Lexical Errors-Expressing Tokens by Regular Expressions-Converting Regular Expression to DFA- Minimization of DFA-Language for Specifying Lexical Analyzers-LEX-Design of Lexical Analyzer for a sample Language.		
UNIT III	SYNTAX ANALYSIS	10
Need and Role of the Parser-Context Free Grammars -Top Down Parsing -General Strategies-Recursive Descent Parser Predictive Parser-LL(1) Parser-Shift Reduce Parser-LR Parser-LR (0)Item-Construction of SLR Parsing Table -Introduction to LALR Parser - Error Handling and Recovery in Syntax Analyzer-YACC-Design of a syntax Analyzer for a Sample Language .		
UNIT IV	SYNTAX DIRECTED TRANSLATION & RUN TIME ENVIRONMENT	12
Syntax directed Definitions-Construction of Syntax Tree-Bottom-up Evaluation of S-Attribute Definitions- Design of predictive translator - Type Systems-Specification of a simple type checker-Equivalence of Type Expressions-Type Conversions.		
RUN-TIME ENVIRONMENT: Source Language Issues-Storage Organization-Storage Allocation-Parameter Passing-Symbol Tables-Dynamic Storage Allocation-Storage Allocation in FORTAN.		
UNIT V	CODE OPTIMIZATION AND CODE GENERATION	9
Principal Sources of Optimization-DAG- Optimization of Basic Blocks-Global Data Flow Analysis-Efficient Data Flow Algorithms-Issues in Design of a Code Generator - A Simple Code Generator Algorithm.		
		TOTAL: 45 PERIODS

OUTCOMES:

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

- Design and implement a prototype compiler.
- Apply the various optimization techniques.
- Use the different compiler construction tools.

TEXTBOOK:

1. Alfred V Aho, Monica S. Lam, Ravi Sethi and Jeffrey D Ullman, "Compilers – Principles, Techniques and Tools", 2nd Edition, Pearson Education, 2007.

REFERENCES:

1. Randy Allen, Ken Kennedy, "Optimizing Compilers for Modern Architectures: A Dependence-based Approach", Morgan Kaufmann Publishers, 2002.
2. Steven S. Muchnick, "Advanced Compiler Design and Implementation", Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.
3. Keith D Cooper and Linda Torczon, "Engineering a Compiler", Morgan Kaufmann Publishers Elsevier Science, 2004.
4. Charles N. Fischer, Richard. J. LeBlanc, "Crafting a Compiler with C", Pearson Education, 2008.

OBJECTIVES:

- Understand software architectural requirements and drivers
- Be exposed to architectural styles and views
- Be familiar with architectures for emerging technologies

UNIT I INTRODUCTION AND ARCHITECTURAL DRIVERS 9

Introduction – What is software architecture? – Standard Definitions – Architectural structures – Influence of software architecture on organization-both business and technical – Architecture Business Cycle- Introduction – Functional requirements – Technical constraints – Quality Attributes.

UNIT II QUALITY ATTRIBUTE WORKSHOP 9

Quality Attribute Workshop – Documenting Quality Attributes – Six part scenarios – Case studies.

UNIT III ARCHITECTURAL VIEWS 9

Introduction – Standard Definitions for views – Structures and views - Representing views-available notations – Standard views – 4+1 view of RUP, Siemens 4 views, SEI's perspectives and views – Case studies

UNIT IV ARCHITECTURAL STYLES 9

Introduction – Data flow styles – Call-return styles – Shared Information styles - Event styles – Case studies for each style.

UNIT V DOCUMENTING THE ARCHITECTURE 9

Good practices – Documenting the Views using UML – Merits and Demerits of using visual languages – Need for formal languages - Architectural Description Languages – ACME – Case studies. Special topics: SOA and Web services – Cloud Computing – Adaptive structures

OUTCOMES:

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

- Explain influence of software architecture on business and technical activities
- Identify key architectural structures
- Use styles and views to specify architecture
- Design document for a given architecture

TEXT BOOKS:

1. Len Bass, Paul Clements, and Rick Kazman, "Software Architectures Principles and Practices", 2nd Edition, Addison-Wesley, 2003.
2. Anthony J Lattanze, "Architecting Software Intensive System. A Practitioner's Guide", Auerbach Publications, 2010.

REFERENCES:

- Paul Clements, Felix Bachmann, Len Bass, David Garlan, James Ivers, Reed Little, Paulo Merson, Robert Nord, and Judith Stafford, "Documenting Software Architectures. Views and Beyond", 2nd Edition, Addison-Wesley, 2010.
- Paul Clements, Rick Kazman, and Mark Klein, "Evaluating software architectures: Methods and case studies. Addison-Wesley, 2001.
- Rajkumar Buyya, James Broberg, and Andrzej Goscinski, "Cloud Computing. Principles and Paradigms", John Wiley & Sons, 2011
- Mark Hansen, "SOA Using Java Web Services", Prentice Hall, 2007

- David Garlan, Bradley Schmerl, and Shang-Wen Cheng, "Software Architecture-Based Self-Adaptation," 31-56. Mieso K Denko, Laurence Tianruo Yang, and Yan Zang (eds.), "Autonomic Computing and Networking". Springer Verlag, 2009

IT6611

MOBILE APPLICATION DEVELOPMENT LABORATORY

L T P C
0 0 3 2

OBJECTIVES:

The student should be made to:

- Know the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
- Understand how to work with various mobile application development frameworks.
- Learn the basic and important design concepts and issues of development of mobile applications.
- Understand the capabilities and limitations of mobile devices.

LIST OF EXPERIMENTS

- Develop an application that uses GUI components, Font and Colours
- Develop an application that uses Layout Managers and event listeners.
- Develop a native calculator application.
- Write an application that draws basic graphical primitives on the screen.
- Develop an application that makes use of database.
- Develop an application that makes use of RSS Feed.
- Implement an application that implements Multi threading
- Develop a native application that uses GPS location information.
- Implement an application that writes data to the SD card.
- Implement an application that creates an alert upon receiving a message.
- Write a mobile application that creates alarm clock

TOTAL: 45 PERIODS

OUTCOMES:

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

- Design and Implement various mobile applications using emulators.
- Deploy applications to hand-held devices

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

Standalone desktops with Windows or Android or
iOS or Equivalent Mobile Application Development
Tools with appropriate emulators and debuggers - 30 Nos.

IT6612

COMPILER LABORATORY

L T P C
0 0 3 2

OBJECTIVES:

The student should be made to:

- Be exposed to compiler writing tools.
- Learn to implement the different Phases of compiler
- Be familiar with control flow and data flow analysis
- Learn simple optimization techniques

LIST OF EXPERIMENTS:

1. Implementation of Symbol Table
2. Develop a lexical analyzer to recognize a few patterns in C.
(Ex. identifiers, constants, comments, operators etc.)
3. Implementation of Lexical Analyzer using Lex Tool
4. Generate YACC specification for a few syntactic categories.
 - a) Program to recognize a valid arithmetic expression that uses operator +, -, * and /.
 - b) Program to recognize a valid variable which starts with a letter followed by any number of letters or digits.
 - d) Implementation of Calculator using LEX and YACC
5. Convert the BNF rules into Yacc form and write code to generate Abstract Syntax Tree.
6. Implement type checking
7. Implement control flow analysis and Data flow Analysis
8. Implement any one storage allocation strategies (Heap, Stack, Static)
9. Construction of DAG
10. Implement the back end of the compiler which takes the three address code and produces the 8086 assembly language instructions that can be assembled and run using a 8086 assembler. The target assembly instructions can be simple move, add, sub, jump. Also simple addressing modes are used.
11. Implementation of Simple Code Optimization Techniques (Constant Folding., etc.)

TOTAL: 45 PERIODS

OUTCOMES:

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

- Implement the different Phases of compiler using tools
- Analyze the control flow and data flow of a typical program
- Optimize a given program
- Generate an assembly language program equivalent to a source language program

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

Standalone desktops with C / C++ compiler and Compiler writing tools 30 Nos.

(or)

Server with C / C++ compiler and Compiler writing tools supporting 30 terminals or more.

LEX and YACC

GE6674 COMMUNICATION AND SOFT SKILLS- LABORATORY COURSE

**L T P C
0 0 4 2**

OBJECTIVES:

To enable learners to,

- Develop their communicative competence in English with specific reference to speaking and listening
- Enhance their ability to communicate effectively in interviews.
- Strengthen their prospects of success in competitive examinations.

UNIT I	LISTENING AND SPEAKING SKILLS	12
Conversational skills (formal and informal)- group discussion- making effective presentations using computers, listening/watching interviews conversations, documentaries. Listening to lectures, discussions from TV/ Radio/ Podcast.		
UNIT II	READING AND WRITING SKILLS	12
Reading different genres of texts ranging from newspapers to creative writing. Writing job applications- cover letter- resume- emails- letters- memos- reports. Writing abstracts- summaries- interpreting visual texts.		
UNIT III	ENGLISH FOR NATIONAL AND INTERNATIONAL EXAMINATIONS AND PLACEMENTS	12
International English Language Testing System (IELTS) - Test of English as a Foreign Language (TOEFL) - Civil Service(Language related)- Verbal Ability.		
UNIT IV	INTERVIEW SKILLS	12
Different types of Interview format- answering questions- offering information- mock interviews-body language(paralinguistic features)- articulation of sounds- intonation.		
UNIT V	SOFT SKILLS	12
Motivation- emotional intelligence-Multiple intelligences- emotional intelligence- managing changes-time management-stress management-leadership traits-team work- career planning - intercultural communication- creative and critical thinking		

TOTAL: 60 PERIODS

Teaching Methods:

1. To be totally learner-centric with minimum teacher intervention as the course revolves around practice.
2. Suitable audio/video samples from Podcast/YouTube to be used for illustrative purposes.
3. Portfolio approach for writing to be followed. Learners are to be encouraged to blog, tweet, text and email employing appropriate language.
4. GD/Interview/Role Play/Debate could be conducted off the laboratory (in a regular classroom) but learners are to be exposed to telephonic interview and video conferencing.
5. Learners are to be assigned to read/write/listen/view materials outside the classroom as well for gaining proficiency and better participation in the class.

Lab Infrastructure:

S. No.	Description of Equipment (minimum configuration)	Qty Required
1	Server	1 No.
	• PIV System	
	• 1 GB RAM / 40 GB HDD	
	• OS: Win 2000 server	
	• Audio card with headphones	
	• JRE 1.3	

2	Client Systems	60 Nos.
	• PIII or above	
	• 256 or 512 MB RAM / 40 GB HDD	
	• OS: Win 2000	
	• Audio card with headphones	
	• JRE 1.3	
3	Handicam	1 No.
4	Television 46"	1 No.
5	Collar mike	1 No.
6	Cordless mike	1 No.
7	Audio Mixer	1 No.
8	DVD recorder/player	1 No.
9	LCD Projector with MP3/CD/DVD provision for Audio/video facility	1 No.

Evaluation:

Internal: 20 marks

Record maintenance: Students should write a report on a regular basis on the activities conducted, focusing on the details such as the description of the activity, ideas emerged, learning outcomes and so on. At the end of the semester records can be evaluated out of 20 marks.

External: 80 marks

Online Test	- 35 marks
Interview	- 15 marks
Presentation	- 15 marks
Group Discussion	- 15 marks

Note on Internal and External Evaluation:

1. Interview – mock interview can be conducted on one-on-one basis.
2. Speaking – example for role play:
 - a. Marketing engineer convincing a customer to buy his product.
 - b. Telephonic conversation- fixing an official appointment / placing an order / enquiring and so on.
3. Presentation – should be extempore on simple topics.
4. Discussion – topics of different kinds; general topics, and case studies.

OUTCOMES:

At the end of the course, learners should be able to

- Take international examination such as IELTS and TOEFL
- Make presentations and Participate in Group Discussions.
- Successfully answer questions in interviews.

REFERENCES:

1. **Business English Certificate Materials**, Cambridge University Press.
2. **Graded Examinations in Spoken English and Spoken English for Work** downloadable materials from Trinity College, London.
3. **International English Language Testing System** Practice Tests, Cambridge University Press.
4. Interactive Multimedia Programs on **Managing Time and Stress**.
5. **Personality Development** (CD-ROM), Times Multimedia, Mumbai.
6. Robert M Sherfield and et al. **“Developing Soft Skills”** 4th edition, New Delhi: Pearson Education, 2009.

Web Sources:

<http://www.slideshare.net/rohitjsh/presentation-on-group-discussion>

http://www.washington.edu/doit/TeamN/present_tips.html

<http://www.oxforddictionaries.com/words/writing-job-applications>

<http://www.kent.ac.uk/careers/cv/coveringletters.htm>

http://www.mindtools.com/pages/article/newCDV_34.htm

IT6701**INFORMATION MANAGEMENT****L T P C****3 0 0 3****OBJECTIVES:**

- To expose students with the basics of managing the information
- To explore the various aspects of database design and modelling,
- To examine the basic issues in information governance and information integration
- To understand the overview of information architecture.

UNIT I DATABASE MODELLING, MANAGEMENT AND DEVELOPMENT 9

Database design and modelling - Business Rules and Relationship; Java database Connectivity (JDBC), Database connection Manager, Stored Procedures. Trends in Big Data systems including NoSQL - Hadoop HDFS, MapReduce, Hive, and enhancements.

UNIT II DATA SECURITY AND PRIVACY 9

Program Security, Malicious code and controls against threats; OS level protection; Security – Firewalls, Network Security Intrusion detection systems. Data Privacy principles. Data Privacy Laws and compliance.

UNIT III INFORMATION GOVERNANCE 9

Master Data Management (MDM) – Overview, Need for MDM, Privacy, regulatory requirements and compliance. Data Governance – Synchronization and data quality management.

UNIT IV INFORMATION ARCHITECTURE 9

Principles of Information architecture and framework, Organizing information, Navigation systems and Labelling systems, Conceptual design, Granularity of Content.

UNIT V INFORMATION LIFECYCLE MANAGEMENT 9

Data retention policies; Confidential and Sensitive data handling, lifecycle management costs. Archive data using Hadoop; Testing and delivering big data applications for performance and functionality; Challenges with data administration;

TOTAL: 45 PERIODS**OUTCOMES:**

At the end of the course the students will be able to:

- Cover core relational database topics including logical and physical design and modeling
- Design and implement a complex information system that meets regulatory requirements; define and manage an organization's key master data entities
- Design, Create and maintain data warehouses.
- Learn recent advances in NOSQL , Big Data and related tools.

TEXT BOOKS:

1. Alex Berson, Larry Dubov MASTER DATA MANAGEMENT AND DATA GOVERNANCE, 2/E, Tata McGraw Hill, 2011
2. Security in Computing, 4/E, Charles P. Pfleeger, Shari Lawrence Pfleeger, Prentice Hall; 2006
3. Information Architecture for the World Wide Web; Peter Morville, Louis Rosenfeld ; O'Reilly Media; 1998

REFERENCES:

1. Jeffrey A. Hoffer, Heikki Topi, V Ramesh - MODERN DATABASE MANAGEMENT, 10 Edition, PEARSON, 2012
2. <http://nosql-database.org/> Next Gen databases that are distributed, open source and scalable.
3. <http://ibm.com/big-data> - Four dimensions of big data and other ebooks on Big Data Analytics
4. Inside Cyber Warfare: Mapping the Cyber Underworld- Jeffrey Carr, O'Reilly Media; Second Edition 2011

CS6701

CRYPTOGRAPHY AND NETWORK SECURITY

L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand OSI security architecture and classical encryption techniques.
- Acquire fundamental knowledge on the concepts of finite fields and number theory.
- Understand various block cipher and stream cipher models.
- Describe the principles of public key cryptosystems, hash functions and digital signature.

UNIT I INTRODUCTION & NUMBER THEORY

10

Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid's algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat's and Euler's theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms.

UNIT II BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY

10

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT III HASH FUNCTIONS AND DIGITAL SIGNATURES

8

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS – El Gamal – Schnorr.

UNIT IV SECURITY PRACTICE & SYSTEM SECURITY

8

Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

UNIT V E-MAIL, IP & WEB SECURITY

9

E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. **IP Security:** Overview of IPsec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). **Web Security:** SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSL Attacks fixed in v3-Exportability-Encoding-Secure Electronic Transaction (SET).

TOTAL: 45 PERIODS

OUTCOMES:

Upon Completion of the course, the students should be able to:

- Compare various Cryptographic Techniques
- Design Secure applications
- Inject secure coding in the developed applications

TEXT BOOKS:

1. William Stallings, Cryptography and Network Security, 6th Edition, Pearson Education, March 2013. (UNIT I,II,III,IV).
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002. (UNIT V).

REFERENCES:

1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007.
2. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
3. Charles Pfleeger, "Security in Computing", 4th Edition, Prentice Hall of India, 2006.
4. Ulysess Black, "Internet Security Protocols", Pearson Education Asia, 2000.
5. Charlie Kaufman and Radia Perlman, Mike Speciner, "Network Security, Second Edition, Private Communication in Public World", PHI 2002.
6. Bruce Schneier and Neils Ferguson, "Practical Cryptography", First Edition, Wiley Dreamtech India Pvt Ltd, 2003.
7. Douglas R Simson "Cryptography – Theory and practice", First Edition, CRC Press, 1995.
8. <http://nptel.ac.in/>.

IT6702

DATA WAREHOUSING AND DATA MINING

L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Be familiar with the concepts of data warehouse and data mining,
- Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.

UNIT I DATA WAREHOUSING

9

Data warehousing Components –Building a Data warehouse — Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

UNIT II	BUSINESS ANALYSIS	9
Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and the Internet.		
UNIT III	DATA MINING	9
Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.		
UNIT IV	ASSOCIATION RULE MINING AND CLASSIFICATION	9
Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.		
UNIT V	CLUSTERING AND TRENDS IN DATA MINING	9
Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – K-means– Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.		
		TOTAL: 45 PERIODS

OUTCOMES:

After completing this course, the student will be able to:

- Apply data mining techniques and methods to large data sets.
- Use data mining tools.
- Compare and contrast the various classifiers.

TEXT BOOKS:

1. Alex Berson and Stephen J.Smith, “Data Warehousing, Data Mining and OLAP”, Tata McGraw – Hill Edition, Thirteenth Reprint 2008.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Third Edition, Elsevier, 2012.

REFERENCES:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction to Data Mining”, Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Aja, “Insight into Data Mining Theory and Practice”, Eastern Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, “Introduction to Data Mining with Case Studies”, Eastern Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, “Data Mining Methods and Models”, Wiley-Interscience, 2006.

OBJECTIVES:

The student should be made to:

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

UNIT I INTRODUCTION**9**

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

UNIT II GRID SERVICES**9**

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

UNIT III VIRTUALIZATION**9**

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

UNIT IV PROGRAMMING MODEL**9**

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

UNIT V SECURITY**9**

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

TOTAL: 45 PERIODS**OUTCOMES:**

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

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

TEXT BOOK:

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

REFERENCES:

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

IT6711

DATA MINING LABORATORY

L T P C
0 0 3 2

OBJECTIVES:

The student should be made to:

- Be familiar with the algorithms of data mining,
- Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.
- Be exposed to web mining and text mining

LIST OF EXPERIMENTS:

1. Creation of a Data Warehouse.
2. Apriori Algorithm.
3. FP-Growth Algorithm.
4. K-means clustering.
5. One Hierarchical clustering algorithm.
6. Bayesian Classification.
7. Decision Tree.
8. Support Vector Machines.
9. Applications of classification for web mining.
10. Case Study on Text Mining or any commercial application.

TOTAL : 45 PERIODS

OUTCOMES:

After completing this course, the student will be able to:

- Apply data mining techniques and methods to large data sets.
- Use data mining tools.
- Compare and contrast the various classifiers.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:

SOFTWARE:

WEKA, RapidMiner, DB Miner or Equivalent

HARDWARE

Standalone desktops 30 Nos

OBJECTIVES:

The student should be made to:

- Be exposed to the different cipher techniques
- Learn to implement the algorithms DES, RSA, MD5, SHA-1
- Learn to use tools like GnuPG, KF sensor, Net Strumbler

LIST OF EXPERIMENTS

1. Implement the following SUBSTITUTION & TRANSPOSITION TECHNIQUES concepts:
 - a) Caesar Cipher
 - b) Playfair Cipher
 - c) Hill Cipher
 - d) Vigenere Cipher
 - e) Rail fence – row & Column Transformation
2. Implement the following algorithms
 - a) DES
 - b) RSA Algorithm
 - c) Diffie-Hellman
 - d) MD5
 - e) SHA-1
3. Implement the SIGNATURE SCHEME - Digital Signature Standard
4. Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG).
5. Setup a honeypot and monitor the honeypot on network (KF Sensor)
6. Installation of rootkits and study about the variety of options
7. Perform wireless audit on an access point or a router and decrypt WEP and WPA. (Net Stumbler)
8. Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

TOTAL: 45 PERIODS

OUTCOMES:

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

- Implement the cipher techniques
- Develop the various security algorithms
- Use different open source tools for network security and analysis

LAB EQUIPMENTS FOR A BATCH OF 30 STUDENTS:**SOFTWARE:**

C / C++ / Java or equivalent compiler

GnuPG, KF Sensor or Equivalent, Snort, Net Stumbler or Equivalent

HARDWARE:

Standalone desktops -30 Nos.

(or)

Server supporting 30 terminals or more.

OBJECTIVES:

The student should be made to:

- Be exposed to tool kits for grid and cloud environment.
- Be familiar with developing web services/Applications in grid framework
- Learn to run virtual machines of different configuration.
- Learn to use Hadoop

LIST OF EXPERIMENTS:**GRID COMPUTING LAB:**

Use Globus Toolkit or equivalent and do the following:

1. Develop a new Web Service for Calculator.
2. Develop new OGSA-compliant Web Service.
3. Using Apache Axis develop a Grid Service.
4. Develop applications using Java or C/C++ Grid APIs
5. Develop secured applications using basic security mechanisms available in Globus Toolkit.
6. Develop a Grid portal, where user can submit a job and get the result. Implement it with and without GRAM concept.

CLOUD COMPUTING LAB:

Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.

1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
2. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
3. Install a C compiler in the virtual machine and execute a sample program.
4. Show the virtual machine migration based on the certain condition from one node to the other.
5. Find procedure to install storage controller and interact with it.
6. Find procedure to set up the one node Hadoop cluster.
7. Mount the one node Hadoop cluster using FUSE.
8. Write a program to use the API's of Hadoop to interact with it.
9. Write a word count program to demonstrate the use of Map and Reduce tasks.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Use the grid and cloud tool kits.
- Design and implement applications on the Grid.
- Design and Implement applications on the Cloud.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:**SOFTWARE:**

Globus Toolkit or equivalent

Eucalyptus or Open Nebula or equivalent to

HARDWARE

Standalone desktops

30 Nos

OBJECTIVES:

The student should be made to:

- Learn XML fundamentals.
- Be exposed to build applications based on XML.
- Understand the key principles behind SOA.
- Be familiar with the web services technology elements for realizing SOA.
- Learn the various web service standards.

UNIT I INTRODUCTION TO XML**9**

XML document structure – Well formed and valid documents – Namespaces – DTD – XML Schema – X-Files.

UNIT II BUILDING XML- BASED APPLICATIONS**9**

Parsing XML – using DOM, SAX – XML Transformation and XSL – XSL Formatting – Modeling Databases in XML.

UNIT III SERVICE ORIENTED ARCHITECTURE**9**

Characteristics of SOA, Comparing SOA with Client-Server and Distributed architectures – Benefits of SOA -- Principles of Service orientation – Service layers.

UNIT IV WEB SERVICES**9**

Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Message Exchange Patterns – Orchestration – Choreography – WS Transactions.

UNIT V BUILDING SOA-BASED APPLICATIONS**9**

Service Oriented Analysis and Design – Service Modeling – Design standards and guidelines -- Composition – WS-BPEL – WS-Coordination – WS-Policy – WS-Security – SOA support in J2EE.

TOTAL: 45 PERIODS**OUTCOMES:**

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

- Build applications based on XML.
- Develop web services using technology elements.
- Build SOA-based applications for intra-enterprise and inter-enterprise applications.

TEXTBOOKS:

1. Ron Schmelzer et al. “XML and Web Services”, Pearson Education, 2002
2. Thomas Erl, “Service Oriented Architecture: Concepts, Technology, and Design”, Pearson Education, 2005.

REFERENCES:

1. Frank P.Coyle, “XML, Web Services and the Data Revolution”, Pearson Education, 2002.
2. Eric Newcomer, Greg Lomow, “Understanding SOA with Web Services”, Pearson Education, 2005.
3. Sandeep Chatterjee and James Webber, “Developing Enterprise Web Services: An Architect's Guide”, Prentice Hall, 2004.
4. James McGovern, Sameer Tyagi, Michael E.Stevens, Sunil Mathew, ”Java Web. Services Architecture”, Morgan Kaufmann Publishers, 2003.

IT6811**PROJECT WORK****L T P C**
0 0 12 6**OBJECTIVES:**

- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. **The progress of the project is evaluated based on a minimum of three reviews.** The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. **The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.**

TOTAL: 180 PERIODS**OUTCOMES:**

- On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

IT6001**ADVANCED DATABASE TECHNOLOGY****L T P C**
3 0 0 3**OBJECTIVES:****The student should be made to:**

- Be familiar with a commercial relational database system (Oracle) by writing SQL using the system.
- Be familiar with the relational database theory, and be able to write relational algebra expressions for queries.

UNIT I PARALLEL AND DISTRIBUTED DATABASES**9**

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – **Inter and Intra operation Parallelism – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture- Case Studies.**

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES**9**

Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems : Object Relational features in SQL / Oracle – Case Studies.

UNIT III XML DATABASES**9**

XML Databases: XML Data Model – DTD - XML Schema - XML Querying – Web Databases – JDBC – Information Retrieval – Data Warehousing – Data Mining.

UNIT IV MOBILE DATABASES**9**

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - **Concurrency Control - Transaction Commit Protocols- Mobile Database Recovery Schemes.**

UNIT V INTELLIGENT DATABASES

9

Active databases – Deductive Databases – Knowledge bases – Multimedia Databases- Multidimensional Data Structures – Image Databases – Text/Document Databases- Video Databases – Audio Databases – Multimedia Database Design.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Apply query evaluation techniques and query optimization techniques.
- Develop transaction processing systems with concurrency control.
- Design and develop a database application system as part of a team.

REFERENCES:

1. Henry F Korth, Abraham Silberschatz and S. Sudharshan, "Database System Concepts", Sixth Edition, McGraw Hill, 2011.
2. C.J.Date, A.Kannan and S.Swamynathan,"An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
3. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison Wesley, 2007.
4. Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education, 2007.
5. Subramaniam, "Multimedia Databases", Morgan Kauffman Publishers, 2008.

CS6001

C# AND .NET PROGRAMMING

L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the foundations of CLR execution
- Learn the technologies of the .NET framework
- Know the object oriented aspects of C#
- Be aware of application development in .NET
- Learn web based applications on .NET(ASP.NET)

UNIT I INTRODUCTION TO C#

9

Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators, checked and unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations, boxing and unboxing.

UNIT II OBJECT ORIENTED ASPECTS OF C#

9

Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading, polymorphism, sealed class and methods, interface, abstract class, abstract and interface, operator overloading, delegates, events, errors and exception, Threading.

UNIT III APPLICATION DEVELOPMENT ON .NET**9**

Building windows application, Creating our own window forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog Box(Modal and Modeless), accessing data with ADO.NET, DataSet, typed dataset, Data Adapter, updating database using stored procedures, SQL Server with ADO.NET, handling exceptions, validating controls, windows application configuration.

UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET**9**

Programming web application with web forms, ASP.NET introduction, working with XML and .NET, Creating Virtual Directory and Web Application, session management techniques, web.config, web services, passing datasets, returning datasets from web services, handling transaction, handling exceptions, returning exceptions from SQL Server.

UNIT V CLR AND .NET FRAMEWORK**9**

Assemblies, Versioning, Attributes, reflection, viewing meta data, type discovery, reflection on type, marshalling, remoting, security in .NET

TOTAL: 45 PERIODS**OUTCOMES:**

After completing this course, the student will be able to:

- List the major elements of the .NET frame work
- Explain how C# fits into the .NET platform.
- Analyze the basic structure of a C# application
- Debug, compile, and run a simple application.
- Develop programs using C# on .NET
- Design and develop Web based applications on .NET
- Discuss CLR.

TEXT BOOKS:

1. Herbert Schildt, "The Complete Reference: C# 4.0", Tata McGraw Hill, 2012.
2. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India, 2012.

REFERENCES:

1. Andrew Troelsen , "Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010.
2. Ian Griffiths, Matthew Adams, Jesse Liberty, "Programming C# 4.0", Sixth Edition, O'Reilly, 2010.

IT6002**INFORMATION THEORY AND CODING TECHNIQUES****L T P C
3 0 0 3****OBJECTIVES:**

The student should be made to:

- Understand error-control coding.
- Understand encoding and decoding of digital data streams.
- Be familiar with the methods for the generation of these codes and their decoding techniques.
- Be aware of compression and decompression techniques.
- Learn the concepts of multimedia communication.

UNIT I	INFORMATION ENTROPY FUNDAMENTALS	9
Uncertainty, Information and Entropy – Source coding Theorem – Huffman coding – Shannon Fano coding – Discrete Memory less channels – channel capacity – channel coding Theorem – Channel capacity Theorem.		
UNIT II	DATA AND VOICE CODING	9
Differential Pulse code Modulation – Adaptive Differential Pulse Code Modulation – Adaptive subband coding – Delta Modulation – Adaptive Delta Modulation – Coding of speech signal at low bit rates (Vocoders, LPC).		
UNIT III	ERROR CONTROL CODING	9
Linear Block codes – Syndrome Decoding – Minimum distance consideration – cyclic codes – Generator Polynomial – Parity check polynomial – Encoder for cyclic codes – calculation of syndrome – Convolutional codes.		
UNIT IV	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 V	AUDIO AND VIDEO CODING	9
Linear Predictive coding – code excited LPC – Perceptual coding, MPEG audio coders – Dolby audio coders – Video compression – Principles – Introduction to H.261 & MPEG Video standards.		

TOTAL : 45 PERIODS

OUTCOMES:

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

- Design an application with error-control.
- Use compression and decompression techniques.
- Apply the concepts of multimedia communication

TEXT BOOKS:

1. Simon Haykin, "Communication Systems", 4th Edition, John Wiley and Sons, 2001.
2. Fred Halsall, "Multimedia Communications, Applications Networks Protocols and Standards", Pearson Education, Asia 2002; Chapters: 3,4,5.

REFERENCES:

1. Mark Nelson, "Data Compression Book", BPB Publication 1992.
2. Watkinson J, "Compression in Video and Audio", Focal Press, London, 1995.

GE6757	TOTAL QUALITY MANAGEMENT	L T P C
		3 0 0 3

OBJECTIVES :

- To facilitate the understanding of Quality Management principles and process.

UNIT I	INTRODUCTION	9
Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Costs of quality.		

UNIT II TQM PRINCIPLES 9
 Leadership - Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS AND TECHNIQUES I 9
 The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNIT IV TQM TOOLS AND TECHNIQUES II 9
 Control Charts - Process Capability - Concepts of Six Sigma - Quality Function Development (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

UNIT V QUALITY SYSTEMS 9
 Need for ISO 9000 - ISO 9001-2008 Quality System - Elements, Documentation, Quality Auditing - QS 9000 - ISO 14000 - Concepts, Requirements and Benefits - TQM Implementation in manufacturing and service sectors..

TOTAL: 45 PERIODS

OUTCOMES:

- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

TEXTBOOK:

1. Dale H. Besterfield, et al., "Total quality Management", Pearson Education Asia, Third Edition, Indian Reprint 2006.

REFERENCES:

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th Edition, First Indian Edition, Cengage Learning, 2012.
2. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006.
3. Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.

CS6012

SOFT COMPUTING

L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Learn the various soft computing frame works.
- Be familiar with design of various neural networks.
- Be exposed to fuzzy logic.
- Learn genetic programming.
- Be exposed to hybrid systems.

UNIT I INTRODUCTION

9

Artificial neural network: Introduction, characteristics- learning methods – taxonomy – Evolution of neural networks- basic models - important technologies - applications.

Fuzzy logic: Introduction - crisp sets- fuzzy sets - crisp relations and fuzzy relations: cartesian product of relation - classical relation, fuzzy relations, tolerance and equivalence relations, non-iterative fuzzy sets. Genetic algorithm- Introduction - biological background - traditional optimization and search techniques - Genetic basic concepts.

UNIT II NEURAL NETWORKS

9

McCulloch-Pitts neuron - linear separability - hebb network - supervised learning network: perceptron networks - adaptive linear neuron, multiple adaptive linear neuron, BPN, RBF, TDNN- associative memory network: auto-associative memory network, hetero-associative memory network, BAM, hopfield networks, iterative autoassociative memory network & iterative associative memory network –unsupervised learning networks: Kohonen self organizing feature maps, LVQ – CP networks, ART network.

UNIT III FUZZY LOGIC

9

Membership functions: features, fuzzification, methods of membership value assignments- Defuzzification: lambda cuts - methods - fuzzy arithmetic and fuzzy measures: fuzzy arithmetic - extension principle - fuzzy measures - measures of fuzziness -fuzzy integrals - fuzzy rule base and approximate reasoning : truth values and tables, fuzzy propositions, formation of rules-decomposition of rules, aggregation of fuzzy rules, fuzzy reasoning-fuzzy inference systems-overview of fuzzy expert system-fuzzy decision making.

UNIT IV GENETIC ALGORITHM

9

Genetic algorithm and search space - general genetic algorithm – operators - Generational cycle - stopping condition – constraints - classification - genetic programming – multilevel optimization – real life problem- advances in GA.

UNIT V HYBRID SOFT COMPUTING TECHNIQUES & APPLICATIONS

9

Neuro-fuzzy hybrid systems - genetic neuro hybrid systems - genetic fuzzy hybrid and fuzzy genetic hybrid systems - simplified fuzzy ARTMAP - Applications: A fusion approach of multispectral images with SAR, optimization of traveling salesman problem using genetic algorithm approach, soft computing based hybrid fuzzy controllers.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Apply various soft computing frame works.
- Design of various neural networks.
- Use fuzzy logic.
- Apply genetic programming.
- Discuss hybrid soft computing.

TEXT BOOKS:

1. J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI / Pearson Education 2004.
2. S.N.Sivanandam and S.N.Deepa, "Principles of Soft Computing", Wiley India Pvt Ltd, 2011.

REFERENCES:

1. S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis & Applications", Prentice-Hall of India Pvt. Ltd., 2006.
2. George J. Klir, Ute St. Clair, Bo Yuan, "Fuzzy Set Theory: Foundations and Applications" Prentice Hall, 1997.
3. David E. Goldberg, "Genetic Algorithm in Search Optimization and Machine Learning" Pearson Education India, 2013.
4. James A. Freeman, David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques, Pearson Education India, 1991.
5. Simon Haykin, "Neural Networks Comprehensive Foundation" Second Edition, Pearson Education, 2005.

GE6084

HUMAN RIGHTS

L T P C
3 0 0 3

OBJECTIVES :

- To sensitize the Engineering students to various aspects of Human Rights.

UNIT I

9

Human Rights – Meaning, origin and Development. Notion and classification of Rights – Natural, Moral and Legal Rights. **Civil and Political Rights, Economic, Social and Cultural Rights; collective / Solidarity Rights.**

UNIT II

9

Evolution of the concept of Human Rights Magna carta – Geneva convention of 1864. Universal Declaration of Human Rights, 1948. Theories of Human Rights.

UNIT III

9

Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

UNIT IV

9

Human Rights in India – Constitutional Provisions / Guarantees.

UNIT V

9

Human Rights of Disadvantaged People – Women, Children, Displaced persons and Disabled persons, including Aged and HIV Infected People. Implementation of Human Rights – National and State Human Rights Commission – Judiciary – **Role of NGO's, Media, Educational Institutions, Social Movements.**

TOTAL : 45 PERIODS

OUTCOMES:

- Engineering students will acquire the basic knowledge of human rights.

REFERENCES:

1. Kapoor S.K., "Human Rights under International law and Indian Laws", Central Law Agency, Allahabad, 2014.
2. Chandra U., "Human Rights", Allahabad Law Agency, Allahabad, 2014.
3. Upendra Baxi, The Future of Human Rights, Oxford University Press, New Delhi.

OBJECTIVES:

The student should be made to:

- Understand error–control coding.
- Understand encoding and decoding of digital data streams.
- Be familiar with the methods for the generation of these codes and their decoding techniques.
- Be aware of compression and decompression techniques.
- Learn the concepts of multimedia communication.

UNIT I MULTIMEDIA COMPONENTS**9**

Introduction - Multimedia skills - Multimedia components and their characteristics - Text, sound, images, graphics, animation, video, hardware.

UNIT II AUDIO AND VIDEO COMPRESSION**9**

Audio compression–DPCM-Adaptive PCM –adaptive predictive coding-linear Predictive coding-code excited LPC-perpetual coding Video compression –principles-H.261-H.263-MPEG 1, 2, and 4.

UNIT III TEXT AND IMAGE COMPRESSION**9**

Compression principles-source encoders and destination encoders-lossless and lossy compression-entropy encoding –source encoding -text compression – static Huffman coding dynamic coding – arithmetic coding –Lempel Ziv-Welsh Compression-image compression.

UNIT IV VOIP TECHNOLOGY**9**

Basics of IP transport, VoIP challenges, H.323/ SIP –Network Architecture, Protocols, Call establishment and release, VoIP and SS7, Quality of Service- CODEC Methods- VOIP applicability.

UNIT V MULTIMEDIA NETWORKING**9**

Multimedia networking -Applications-streamed stored and audio-making the best Effort service-protocols for real time interactive Applications-distributing multimedia-beyond best effort service-secluding and policing Mechanisms-integrated services-differentiated Services-RSVP.

TOTAL: 45 PERIODS**OUTCOMES:**

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

- Design an application with error–control.
- Use compression and decompression techniques.
- Apply the concepts of multimedia communication.

TEXT BOOKS:

1. Fred Halshall "Multimedia Communication - Applications, Networks, Protocols and Standards", Pearson Education, 2007.
2. Tay Vaughan, "Multideai: Making it Work", 7th Edition, TMH 2008 98.
3. Kurose and W.Ross" Computer Networking "a Top down Approach, Pearson Education 2005.

REFERENCES:

1. Marcus Goncalves "Voice over IP Networks", Mc Graw Hill 1999.
2. KR. Rao,Z S Bojkovic, D A Milovanovic, "Multimedia Communication Systems: Techniques, Standards, and Networks", Pearson Education 2007.
3. R. Steimnetz, K. Nahrstedt, "Multimedia Computing, Communications and Applications", Pearson Education Ranjan Parekh, "Principles of Multimedia", TMH 2007.

OBJECTIVES:

The student should be made to:

- Expose the criteria for test cases.
- Learn the design of test cases.
- Be familiar with test management and test automation techniques.
- Be exposed to test metrics and measurements.

UNIT I INTRODUCTION**9**

Testing as an Engineering Activity – Testing as a Process – Testing axioms – Basic definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support of Developing a Defect Repository – Defect Prevention strategies.

UNIT II TEST CASE DESIGN**9**

Test case Design Strategies – Using Black Box Approach to Test Case Design – Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning – State-based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Evaluating Test Adequacy Criteria.

UNIT III LEVELS OF TESTING**9**

The need for Levers of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation – Website testing.

UNIT IV TEST AMANAGEMENT**9**

People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

UNIT V TEST AUTOMATION**9**

Software test automation – skill needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements – project, progress and productivity metrics.

TOTAL: 45 PERIODS**OUTCOMES:**

At the end of the course the students will be able to

- Design test cases suitable for a software development for different domains.
- Identify suitable tests to be carried out.
- Prepare test planning based on the document.
- Document test plans and test cases designed.
- Use of automatic testing tools.
- Develop and validate a test plan.

TEXT BOOKS:

1. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2006.
2. Ron Patton, "Software Testing", Second Edition, Sams Publishing, Pearson Education, 2007.

REFERENCES:

1. Ilene Burnstein, "Practical Software Testing", Springer International Edition, 2003.
2. Edward Kit, "Software Testing in the Real World – Improving the Process", Pearson Education, 1995.
3. Boris Beizer, "Software Testing Techniques" – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4. Aditya P. Mathur, "Foundations of Software Testing _ Fundamental Algorithms and Techniques", Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

IT6005**DIGITAL IMAGE PROCESSING****L T P C
3 0 0 3****OBJECTIVES:****The student should be made to:**

- Learn digital image fundamentals
- Be exposed to simple image processing techniques
- Be familiar with image compression and segmentation techniques
- Learn to represent image in form of features

UNIT I DIGITAL IMAGE FUNDAMENTALS**8**

Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - color models

UNIT II IMAGE ENHANCEMENT**10**

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering – **Frequency Domain:** Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters

UNIT III IMAGE RESTORATION AND SEGMENTATION**9**

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering **Segmentation:** Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation- Morphological processing- erosion and dilation

UNIT IV WAVELETS AND IMAGE COMPRESSION**9**

Wavelets – Subband coding - Multiresolution expansions - **Compression:** Fundamentals – Image Compression models – Error Free Compression – Variable Length Coding – Bit-Plane Coding – **Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards**

UNIT V IMAGE REPRESENTATION AND RECOGNITION**9**

Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description – Shape number – Fourier Descriptor, moments- Regional Descriptors – Topological feature, Texture - **Patterns and Pattern classes - Recognition based on matching.**

TOTAL: 45 PERIODS

OUTCOMES:

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

- Discuss digital image fundamentals
- Apply image enhancement and restoration techniques
- Use image compression and segmentation Techniques
- Represent features of images

TEXT BOOK:

1. Rafael C. Gonzales, Richard E. Woods, "Digital Image Processing", Third Edition, Pearson Education, 2010.

REFERENCES:

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", Third Edition Tata McGraw Hill Pvt. Ltd., 2011.
2. Anil Jain K. "Fundamentals of Digital Image Processing", PHI Learning Pvt. Ltd., 2011.
3. William K Pratt, "Digital Image Processing", John Willey, 2002.
4. Malay K. Pakhira, "Digital Image Processing and Pattern Recognition", First Edition, PHI Learning Pvt. Ltd., 2011.
5. <http://eeweb.poly.edu/~onur/lectures/lectures.html>
6. <http://www.caen.uiowa.edu/~dip/LECTURE/lecture.html>

CS6003

AD HOC AND SENSOR NETWORKS

L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

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

UNIT I INTRODUCTION

9

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

UNIT II MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS

9

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

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

9

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

UNIT IV WIRELESS SENSOR NETWORKS (WSNS) AND MAC PROTOCOLS 9
single node architecture: hardware and software components of a sensor node - WSN Network architecture: typical network architectures-data relaying and aggregation strategies -MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.

UNIT V WSN ROUTING, LOCALIZATION & QOS 9
Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues.

TOTAL: 45 PERIODS

OUTCOMES:

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

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

TEXT BOOK:

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

REFERENCES:

1. Carlos De Moraes Cordeiro, Dharma Prakash Agrawal "Ad Hoc & Sensor Networks: Theory and Applications", World Scientific Publishing Company, 2006.
2. Feng Zhao and Leonides Guibas, "Wireless Sensor Networks", Elsevier Publication – 2002.
3. Holger Karl and Andreas Willig "Protocols and Architectures for Wireless Sensor Networks", Wiley, 2005
3. Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor Networks-Technology, Protocols, and Applications", John Wiley, 2007.
4. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003.

IT6006

DATA ANALYTICS

**L T P C
3 0 0 3**

OBJECTIVES:

The Student should be made to:

- Be exposed to big data
- Learn the different ways of Data Analysis
- Be familiar with data streams
- Learn the mining and clustering
- Be familiar with the visualization

UNIT I INTRODUCTION TO BIG DATA 8
Introduction to Big Data Platform – Challenges of conventional systems - Web data – Evolution of Analytic scalability, analytic processes and tools, Analysis vs reporting - Modern data analytic tools, Stastical concepts: Sampling distributions, resampling, statistical inference, prediction error.

UNIT II	DATA ANALYSIS	12
Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods, Analysis of time series: linear systems analysis, nonlinear dynamics - Rule induction - Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods.		
UNIT III	MINING DATA STREAMS	8
Introduction to 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 - case studies - real time sentiment analysis, stock market predictions.		
UNIT IV	FREQUENT ITEMSETS AND CLUSTERING	9
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 – CLIQUE and PROCLUS – Frequent pattern based clustering methods – Clustering in non-euclidean space – Clustering for streams and Parallelism.		
UNIT V	FRAMEWORKS AND VISUALIZATION	8
MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications:		

TOTAL: 45 PERIODS

OUTCOMES:

The student should be made to:

- Apply the statistical analysis methods.
- Compare and contrast various soft computing frameworks.
- Design distributed file systems.
- Apply Stream data model.
- Use Visualisation techniques

TEXT BOOKS:

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.

REFERENCES:

1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2012.
2. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O'Reilly, 2011.
3. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.

OBJECTIVES:**The student should be made to:**

- Be exposed to the context and operation of free and open source software (FOSS) communities and associated software projects.
- Be familiar with participating in a FOSS project
- Learn scripting language like Python or Perl
- Learn programming language like Ruby
- Learn some important FOSS tools and techniques

UNIT I PHILOSOPHY**9**

Notion of Community--Guidelines for effectively working with FOSS community--, Benefits of Community based Software Development --Requirements for being open, free software, open source software --Four degrees of freedom - FOSS Licensing Models - FOSS Licenses – GPL- AGPL- LGPL - FDL - Implications – FOSS examples.

UNIT II LINUX**9**

Linux Installation and Hardware Configuration – Boot Process-The Linux Loader (LILO) - The Grand Unified Bootloader (GRUB) - Dual-Booting Linux and other Operating System - Boot-Time Kernel Options- X Windows System Configuration-System Administration – Backup and Restore Procedures- Strategies for keeping a Secure Server.

UNIT III PROGRAMMING LANGUAGES**9**

Programming using languages like Python or Perl or Ruby

UNIT IV PROGRAMMING TOOLS AND TECHNIQUES**9**

Usage of design Tools like Argo UML or equivalent, Version Control Systems like Git or equivalent, – Bug Tracking Systems- Package Management Systems

UNIT V FOSS CASE STUDIES**9**

Open Source Software Development - Case Study – Libreoffice -Samba

TOTAL: 45 PERIODS**OUTCOMES:****Upon completion of the course, the student should be able to:**

- Install and run open-source operating systems.
- Gather information about Free and Open Source Software projects from software releases and from sites on the internet.
- Build and modify one or more Free and Open Source Software packages.
- Use a version control system.
- Contribute software to and interact with Free and Open Source Software development projects.

TEXT BOOK:

1. Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, “Linux in a Nutshell”, Sixth Edition, OReilly Media, 2009.

REFERENCES:

1. Philosophy of GNU URL: <http://www.gnu.org/philosophy/>.
2. Linux Administration URL: <http://www.tldp.org/LDP/lame/LAME/linux-admin-made-easy/>.
3. The Python Tutorial available at <http://docs.python.org/2/tutorial/>.
4. Perl Programming book at <http://www.perl.org/books/beginning-perl/>.
5. Ruby programming book at <http://ruby-doc.com/docs/ProgrammingRuby/>.
6. Version control system URL: <http://git-scm.com/>.
7. Samba: URL : <http://www.samba.org/>.
8. Libre office: <http://www.libreoffice.org/>.

OBJECTIVES:**The student should be made to:**

- Learn the basics of socket programming using TCP Sockets.
- Learn about Socket Options.
- Learn to develop Macros for including Objects In MIB Structure.
- Understand SNMPv1, v2 and v3 protocols & practical issues.

UNIT I SOCKETS AND APPLICATION DEVELOPMENT**9**

Introduction to Socket Programming - System Calls - Address conversion functions - POSIX Signal Handling - Server with multiple clients - Boundary conditions - Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown - I/O Multiplexing - I/O Models - TCP echo client/server with I/O Multiplexing

UNIT II SOCKET OPTIONS**9**

Socket options - getsockopt and setsockopt functions - Generic socket options - IP socket options - ICMP socket options - TCP socket options - Multiplexing TCP and UDP sockets - SCTP Sockets - SCTP Client/server - Streaming Example - Domain name system - gethostbyname, gethostbyaddr, getservbyname and getservbyport functions - Protocol Independent functions in TCP Client/Server Scenario

UNIT III ADVANCED SOCKETS**9**

IPv4 and IPv6 interoperability - Threaded servers - Thread creation and termination - TCP echo server using threads - Mutex - Condition variables - Raw sockets - Raw socket creation - Raw socket output - Raw socket input - ping program - traceroute program

UNIT IV SIMPLE NETWORK MANAGEMENT**9**

SNMP network management concepts - SNMPv1 - Management information - MIB Structure - Object syntax - Standard MIB's - MIB-II Groups - SNMPv1 protocol and Practical issues.

UNIT V SNMP V2, V3 AND RMO**9**

Introduction to SNMPv2 - SMI for SNMPv2 - Protocol - SNMPv3 - Architecture and applications - Security and access control model - Overview of RMON.

TOTAL: 45 PERIODS**OUTCOMES:****Upon completion of the course, the student should be able to:**

Develop programs using TCP Sockets.

- Use Socket Options.
- Develop Macros for including Objects In MIB Structure.
- Use SNMPv1, v2 and v3 protocols.

TEXT BOOKS:

1. W. Richard Stevens, "UNIX Network Programming Vol-I", Third Edition, PHI Pearson Education, 2003.
2. William Stallings, "SNMP, SNMPv2, SNMPv3 and RMON 1 and 2", Third Edition, Pearson Edition, 2009.

REFERENCE:

1. D.E. Comer, "Internetworking with TCP/IP Vol- III: Client-Server Programming and Application BSD Sockets Version", Second Edition, Pearson Edition, 2003.

OBJECTIVES:

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

UNIT I HUMAN VALUES**10**

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

UNIT II ENGINEERING ETHICS**9**

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

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION**9**

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

UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS**9**

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

UNIT V GLOBAL ISSUES**8**

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility

TOTAL: 45 PERIODS**OUTCOMES :**

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

TEXTBOOKS:

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

REFERENCES:

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

Web sources:

1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org

CS6503**THEORY OF COMPUTATION**
L T P C
3 0 0 3
OBJECTIVES:**The student should be made to:**

- Understand various Computing models like Finite State Machine, Pushdown Automata, and Turing Machine.
- Be aware of Decidability and Un-decidability of various problems.
- Learn types of grammars

UNIT I FINITE AUTOMATA**9**

Introduction- Basic Mathematical Notation and techniques- Finite State systems – Basic Definitions – Finite Automaton – DFA & NDFA – Finite Automaton with ϵ - moves – Regular Languages- Regular Expression – Equivalence of NFA and DFA – Equivalence of NDFA's with and without ϵ -moves – Equivalence of finite Automaton and regular expressions –Minimization of DFA- - Pumping Lemma for Regular sets – Problems based on Pumping Lemma.

UNIT II GRAMMARS**9**

Grammar Introduction– Types of Grammar - Context Free Grammars and Languages– Derivations and Languages – Ambiguity- Relationship between derivation and derivation trees – Simplification of CFG – Elimination of Useless symbols - Unit productions - Null productions – Greiback Normal form – Chomsky normal form – Problems related to CNF and GNF

UNIT III PUSHDOWN AUTOMATA**9**

Pushdown Automata- Definitions – Moves – Instantaneous descriptions – Deterministic pushdown automata – Equivalence of Pushdown automata and CFL - pumping lemma for CFL – problems based on pumping Lemma.

UNIT IV TURING MACHINES**9**

Definitions of Turing machines – Models – Computable languages and functions –Techniques for Turing machine construction – Multi head and Multi tape Turing Machines - The Halting problem – Partial Solvability – Problems about Turing machine- Chomskian hierarchy of languages.

UNIT V UNSOLVABLE PROBLEMS AND COMPUTABLE FUNCTIONS**9**

Unsolvable Problems and Computable Functions – Primitive recursive functions – Recursive and recursively enumerable languages – Universal Turing machine. MEASURING AND CLASSIFYING COMPLEXITY: Tractable and Intractable problems- Tractable and possibly intractable problems - P and NP completeness - Polynomial time reductions.

TOTAL: 45 PERIODS**OUTCOMES:****At the end of the course, the student should be able to:**

- Design Finite State Machine, Pushdown Automata, and Turing Machine.
- Explain the Decidability or Undecidability of various problems

TEXT BOOKS:

1. Hopcroft J.E., Motwani R. and Ullman J.D, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2008. (UNIT 1,2,3).
2. John C Martin, "Introduction to Languages and the Theory of Computation", Tata McGraw Hill Publishing Company, New Delhi, Third Edition, 2007. (UNIT 4,5).

REFERENCES:

1. Mishra K L P and Chandrasekaran N, "Theory of Computer Science - Automata, Languages and Computation", Third Edition, Prentice Hall of India, 2004.
2. Harry R Lewis and Christos H Papadimitriou, "Elements of the Theory of Computation", Second Edition, Prentice Hall of India, Pearson Education, New Delhi, 2003.
3. Peter Linz, "An Introduction to Formal Language and Automata", Third Edition, Narosa Publishers, New Delhi, 2002.
4. Kamala Krithivasan and Rama. R, "Introduction to Formal Languages, Automata Theory and Computation", Pearson Education 2009.

IT6009**WEB ENGINEERING****L T P C****3 0 0 3****OBJECTIVES:****The student should be made to:**

- Understand the characteristics of web applications
- Learn to Model web applications
- Be aware of Systematic methods
- Be familiar with the testing techniques for web applications

UNIT I INTRODUCTION TO WEB ENGINEERING AND REQUIREMENTS ENGINEERING**9**

Motivation, Categories of Web Applications, Characteristics of Web Applications, Product-related Characteristics, Usage related Characteristics, Development-related Characteristic, Evolution of web engineering - Requirements Engineering Activities RE Specifics in Web Engineering, Principles for RE of Web Applications, Adapting RE Methods to Web Application Development, Requirement Types, Notations, Tools

UNIT II WEB APPLICATION ARCHITECTURES & MODELLING WEB APPLICATIONS**10**

Introduction- Categorizing Architectures, Specifics of Web Application Architectures, Components of a Generic Web Application Architecture, Layered Architectures, 2-Layer Architectures, N-Layer Architectures Data-aspect Architectures, Database-centric Architectures, Architectures for Web Document Management, Architectures for Multimedia Data Modeling Specifics in Web Engineering, Levels, Aspects, Phases Customization, Modeling Requirements, Hypertext Modeling, Hypertext Structure Modeling Concepts, Access Modeling Concepts, Relation to Content Modeling, Presentation Modeling, Relation to Hypertext Modeling, Customization Modeling, Relation to Content, Hypertext, and Presentation Modeling

UNIT III WEB APPLICATION DESIGN**10**

Introduction, Web Design from an Evolutionary Perspective, Information Design, Software Design: A Programming Activity, Merging Information Design and Software Design, Problems and Restrictions in Integrated Web Design, A Proposed Structural Approach, Presentation Design, Presentation of Nodes and Meshes, Device-independent Development, Approaches, Inter action Design, User Interaction User Interface Organization, Navigation Design, Designing a Link Representation, Designing Link Internals, Navigation and Orientation, Structured Dialog for Complex Activities, Interplay with Technology and Architecture, Functional Design.

UNIT IV TESTING WEB APPLICATIONS

8

Introduction, Fundamentals, Terminology, Quality Characteristics, Test Objectives, Test Levels, Role of the Tester, Test Specifics in Web Engineering, Test Approaches, Conventional Approaches, Agile Approaches, Test Scheme, Three Test Dimensions, Applying the Scheme to Web Applications, Test Methods and Techniques, Link Testing, Browser Testing, Usability Testing, Load, Stress, and Continuous Testing, Testing Security, Test-driven Development, Test Automation, Benefits and Drawbacks of Automated Test, Test Tools.

UNIT V WEB PROJECT MANAGEMENT

8

Understanding Scope, Refining Framework Activities, Building a Web Team, Managing Risk, Developing a Schedule, Managing Quality, Managing Change, Tracking the Project. Introduction to node JS - web sockets.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Apply the characteristics of web applications.
- Model web applications.
- Design web applications.
- Test web applications.

TEXT BOOKS:

1. Gerti Kappel, Birgit Proll, "Web Engineering", John Wiley and Sons Ltd, 2006.
2. Roger S. Pressman, David Lowe, "Web Engineering", Tata McGraw Hill Publication, 2007.
3. Guy W. Lecky-Thompson, "Web Programming", Cengage Learning, 2008.

REFERENCES:

1. Chris Bates, "Web Programming: Building Internet Applications", Third Edition, Wiley India Edition, 2007
2. John Paul Mueller, "Web Development with Microsoft Visual Studio 2005", Wiley Dream tech, 2006.

GE6083

DISASTER MANAGEMENT

L T P C

3 0 0 3

OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

UNIT I INTRODUCTION TO DISASTERS

9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9
 Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processess and Framework at State and Central Level- **State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.**

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9
 Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9
 Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – **Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.**

UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS 9
Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TOTAL: 45 PERIODS

OUTCOMES:

The students will be able to

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management

TEXTBOOK:

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. **ISBN-10:** 1259007367, **ISBN-13:** 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.

REFERENCES

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

OBJECTIVES:

The student should be made to:

- Exposed to the need for Bioinformatics technologies.
- Be familiar with the modeling techniques.
- Learn microarray analysis.
- Exposed to Pattern Matching and Visualization.

UNIT I INTRODUCTION**9**

Need for Bioinformatics technologies – Overview of Bioinformatics technologies Structural bioinformatics – Data format and processing – Secondary resources and applications – Role of Structural bioinformatics - Biological Data Integration System.

UNIT II DATAWAREHOUSING AND DATAMINING IN BIOINFORMATICS**9**

Bioinformatics data – Data warehousing architecture – data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architecture and applications in bioinformatics.

UNIT III MODELING FOR BIOINFORMATICS**9**

Hidden markov modeling for biological data analysis – Sequence identification –Sequence classification – multiple alignment generation – Comparative modeling –Protein modeling – genomic modeling – Probabilistic modeling – Bayesian networks – Boolean networks - Molecular modeling – Computer programs for molecular modeling.

UNIT IV PATTERN MATCHING AND VISUALIZATION**9**

Gene regulation – motif recognition – motif detection – strategies for motif detection – Visualization – Fractal analysis – DNA walk models – one dimension – two dimension – higher dimension – Game representation of Biological sequences – DNA, Protein, Amino acid sequences.

UNIT V MICROARRAY ANALYSIS**9**

Microarray technology for genome expression study – image analysis for data extraction – preprocessing – segmentation – gridding – spot extraction – normalization, filtering – cluster analysis – gene network analysis – Compared Evaluation of Scientific Data Management Systems – Cost Matrix – Evaluation model - Benchmark – Tradeoffs.

TOTAL: 45 PERIODS**OUTCOMES:**

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

- Develop models for biological data
- Apply pattern matching techniques to bioinformatics data – protein data genomic data.
- Apply micro array technology for genomic expression study

TEXT BOOK:

1. Yi-Ping Phoebe Chen (Ed), "Bioinformatics Technologies", First Indian Reprint, Springer Verlag, 2007.

REFERENCES:

1. Bryan Bergeron, "Bio Informatics Computing", Second Edition, Pearson Education, 2003.
2. Arthur M Lesk, "Introduction to Bioinformatics", Second Edition, Oxford University Press, 2005

OBJECTIVES:

The student should be made to:

- Learn the security issues network layer and transport layer.
- Be exposed to security issues of the application layer.
- Learn computer forensics.
- Be familiar with forensics tools.
- Learn to analyze and validate forensics data.

UNIT I NETWORK LAYER SECURITY & TRANSPORT LAYER SECURITY 9

IPSec Protocol - IP Authentication Header - IP ESP - Key Management Protocol for IPSec. Transport layer Security: SSL protocol, Cryptographic Computations – TLS Protocol.

UNIT II E-MAIL SECURITY & FIREWALLS 9

PGP - S/MIME - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions.

UNIT III INTRODUCTION TO COMPUTER FORENSICS 9

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

UNIT IV EVIDENCE COLLECTION AND FORENSICS TOOLS 9

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

UNIT V ANALYSIS AND VALIDATION 9

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

TOTAL: 45 PERIODS

OUTCOMES:

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

- Discuss the security issues network layer and transport layer.
- Apply security principles in the application layer.
- Explain computer forensics.
- Use forensics tools.
- Analyze and validate forensics data.

TEXT BOOKS:

1. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
2. Nelson, Phillips, Enfinger, Steuart, "Computer Forensics and Investigations", Cengage Learning, India Edition, 2008.

REFERENCES:

1. John R.Vacca, "Computer Forensics", Cengage Learning, 2005
2. Richard E.Smith, "Internet Cryptography", 3rd Edition Pearson Education, 2008.
3. Marjie T.Britz, "Computer Forensics and Cyber Crime": An Introduction", 3rd Edition, Prentice Hall, 2013.

OBJECTIVES:

The student should be made to:

- Be familiar with the most fundamental Graph Theory topics and results.
- Be exposed to the techniques of proofs and analysis.

UNIT I INTRODUCTION

9

Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits – Connectedness – Components – Euler graphs – Hamiltonian paths and circuits – Trees – Properties of trees – Distance and centers in tree – Rooted and binary trees.

UNIT II TREES, CONNECTIVITY & PLANARITY

9

Spanning trees – Fundamental circuits – Spanning trees in a weighted graph – cut sets – Properties of cut set – All cut sets – Fundamental circuits and cut sets – Connectivity and separability – Network flows – 1-Isomorphism – 2-Isomorphism – Combinational and geometric graphs – Planer graphs – Different representation of a planer graph.

UNIT III MATRICES, COLOURING AND DIRECTED GRAPH

8

Chromatic number – Chromatic partitioning – Chromatic polynomial – Matching – Covering – Four color problem – Directed graphs – Types of directed graphs – Digraphs and binary relations – Directed paths and connectedness – Euler graphs.

UNIT IV PERMUTATIONS & COMBINATIONS

9

Fundamental principles of counting - Permutations and combinations - Binomial theorem - combinations with repetition - Combinatorial numbers - Principle of inclusion and exclusion - Derangements - Arrangements with forbidden positions.

UNIT V GENERATING FUNCTIONS

10

Generating functions - Partitions of integers - Exponential generating function – Summation operator - Recurrence relations - First order and second order – Non-homogeneous recurrence relations - Method of generating functions.

TOTAL: 45 PERIODS**OUTCOMES:**

Upon Completion of the course, the students should be able to:

- Write precise and accurate mathematical definitions of objects in graph theory.
- Use mathematical definitions to identify and construct examples and to distinguish examples from non-examples.
- Validate and critically assess a mathematical proof.
- Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theory.
- Reason from definitions to construct mathematical proofs.

TEXT BOOKS:

1. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.
2. Grimaldi R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", Addison Wesley, 1994.

REFERENCES:

1. Clark J. and Holton D.A, "A First Look at Graph Theory", Allied Publishers, 1995.
2. Mott J.L., Kandel A. and Baker T.P. "Discrete Mathematics for Computer Scientists and Mathematicians", Prentice Hall of India, 1996.
3. Liu C.L., "Elements of Discrete Mathematics", McGraw Hill, 1985.
4. Rosen K.H., "Discrete Mathematics and Its Applications", McGraw Hill, 2007.

CS6010

SOCIAL NETWORK ANALYSIS

L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the concept of semantic web and related applications.
- Learn knowledge representation using ontology.
- Understand human behaviour in social web and related communities
- Learn visualization of social networks.

UNIT I INTRODUCTION

9

Introduction to Semantic Web: Limitations of current Web - Development of Semantic Web - Emergence of the Social Web - Social Network analysis: Development of Social Network Analysis - Key concepts and measures in network analysis - Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities - Web-based networks - Applications of Social Network Analysis.

UNIT II MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION

9

Ontology and their role in the Semantic Web: Ontology-based knowledge Representation - Ontology languages for the Semantic Web: Resource Description Framework - Web Ontology Language - Modelling and aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals - Ontological representation of social relationships - Aggregating and reasoning with social network data - Advanced representations.

UNIT III EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS

9

Extracting evolution of Web Community from a Series of Web Archive - Detecting communities in social networks - Definition of community - Evaluating communities - Methods for community detection and mining - Applications of community mining algorithms - Tools for detecting communities social network infrastructures and communities - Decentralized online social networks - Multi-Relational characterization of dynamic social network communities.

UNIT IV PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES

9

Understanding and predicting human behaviour for social communities - User data management - Inference and Distribution - Enabling new human experiences - Reality mining - Context - Awareness - Privacy in online social networks - Trust in online environment - Trust models based on subjective logic - Trust network analysis - Trust transitivity analysis - Combining trust and reputation - Trust derivation based on trust comparisons - Attack spectrum and countermeasures.

UNIT V VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS

9

Graph theory - Centrality - Clustering - Node-Edge Diagrams - Matrix representation - Visualizing online social networks, Visualizing social networks with matrix-based representations - **Matrix and Node-Link Diagrams - Hybrid representations - Applications** - Cover networks - Community welfare - Collaboration networks - Co-Citation networks.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Develop semantic web related applications.
- Represent knowledge using ontology.
- Predict human behaviour in social web and related communities.
- Visualize social networks.

TEXT BOOKS:

1. Peter Mika, "Social Networks and the Semantic Web", , First Edition, Springer 2007.
2. Borko Furht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer, 2010.

REFERENCES:

1. Guandong Xu ,Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and applications", First Edition Springer, 2011.
2. Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", IGI Global Snippet, 2008.
3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, "Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling", IGI Global Snippet, 2009.
4. John G. Breslin, Alexandre Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.

IT6010

BUSINESS INTELLIGENCE

L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Be exposed with the basic rudiments of business intelligence system
- understand the modeling aspects behind Business Intelligence
- understand of the business intelligence life cycle and the techniques used in it
- Be exposed with different data analysis tools and techniques

UNIT I BUSINESS INTELLIGENCE

9

Effective and timely decisions – Data, information and knowledge – Role of mathematical models – **Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects** – Development of a business intelligence system – Ethics and business intelligence.

UNIT II KNOWLEDGE DELIVERY

9

The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications, **Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations**: Optimizing the Presentation for the Right Message.

UNIT III	EFFICIENCY	9
Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models. Pattern matching – cluster analysis, outlier analysis		
UNIT IV	BUSINESS INTELLIGENCE APPLICATIONS	9
Marketing models – Logistic and Production models – Case studies.		
UNIT V	FUTURE OF BUSINESS INTELLIGENCE	9
Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.		

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the students will be able to

- Explain the fundamentals of business intelligence.
- Link data mining with business intelligence.
- Apply various modeling techniques.
- Explain the data analysis and knowledge delivery stages.
- Apply business intelligence methods to various situations.
- Decide on appropriate technique.

TEXT BOOK:

1. Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2013.

REFERENCES:

2. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003.
3. Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
4. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager's Guide", Second Edition, 2012.
5. Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill, 2007.
6. Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, "The Data Warehouse Lifecycle Toolkit", Wiley Publication Inc.,2007.

CS6013	FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT	L T P C
		3 0 0 3

OBJECTIVE:

This program can be offered with all Undergraduate programs/courses for all engineering streams. The FSIPD program aims to improve student's awareness and understanding of the basic concepts involved in Integrated product Development (IPD) by providing exposure to the key product development concepts. Students, who complete this program, will stand a better chance to be considered for jobs in the Engineering industry.

COURSE OBJECTIVES:

After completing this program, the student will be able to obtain the technical skills needed to effectively play the entry level design engineer role in an engineering organization.

The student will be able to:

- Understand the global trends and development methodologies of various types of products and services
- Conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems
- Understand requirement engineering and know how to collect, analyze and arrive at requirements for new product development and convert them in to design specification
- Understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
- Gain knowledge of the Innovation & Product Development process in the Business Context

UNIT I FUNDAMENTALS OF PRODUCT DEVELOPMENT 9

Global Trends Analysis and Product decision - Social Trends - Technical Trends- Economical Trends - Environmental Trends - Political/Policy Trends - Introduction to Product Development Methodologies and Management - Overview of Products and Services - Types of Product Development - Overview of Product Development methodologies - Product Life Cycle - Product Development Planning and Management

UNIT II REQUIREMENTS AND SYSTEM DESIGN 9

Requirement Engineering - Types of Requirements - Requirement Engineering - Traceability Matrix and Analysis - Requirement Management - System Design & Modeling - Introduction to System Modeling - System Optimization - System Specification - Sub-System Design - Interface Design

UNIT III DESIGN AND TESTING 9

Conceptualization - Industrial Design and User Interface Design - Introduction to Concept generation Techniques – Challenges in Integration of Engineering Disciplines - Concept Screening & Evaluation - Detailed Design - Component Design and Verification – Mechanical, Electronics and Software Subsystems - High Level Design/Low Level Design of S/W Program - Types of Prototypes, S/W Testing- Hardware Schematic, Component design, Layout and Hardware Testing – Prototyping - Introduction to Rapid Prototyping and Rapid Manufacturing - System Integration, Testing, Certification and Documentation

UNIT IV SUSTENANCE ENGINEERING AND END-OF-LIFE (EOL)SUPPORT 9

Introduction to Product verification processes and stages - Introduction to Product validation processes and stages - Product Testing standards and Certification - Product Documentation - Sustenance - Maintenance and Repair – Enhancements - Product EoL - Obsolescence Management - Configuration Management - EoL Disposal

UNIT V BUSINESS DYNAMICS ENGINEERING SERVICES INDUSTRY 9

The Industry - Engineering Services Industry - Product development in Industry versus Academia - The IPD Essentials - Introduction to vertical specific product development processes - Manufacturing/Purchase and Assembly of Systems - Integration of Mechanical, Embedded and S/W systems – Product development Trade-offs - Intellectual Property Rights and Confidentiality - Security and configuration management.

TOTAL: 45 PERIODS

COURSE OUTCOMES:**The students will be able to**

- Define, formulate and analyze a problem
- Solve specific problems independently or as part of a team
- Develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineering customer
- Work independently as well as in teams
- Manage a project from start to finish

COURSE MATERIAL AND PEDAGOGY:

- NASSCOM has agreed to prepare / revise the course materials [selected teachers Anna University from major disciplines will be included in the process] as PPT slides for all the UNITS. The PPTs can be printed and given to each student if necessary at a Nominal Fee. This is the best possible material for this special course.
- NASSCOM will train the teachers of Anna University to enable them to teach this course. A training programme for nearly 3500 teachers needs to be organized. The team is exploring use of technology including the EDUSAT facility at Anna University.
- The course is to be offered as an elective to all UG Students both in the Constituent Colleges and Affiliated colleges of Anna University.

TEXT BOOKS [INDIAN ECONOMY EDITIONS]:

1. Karl T Ulrich and Stephen D Eppinger, "Product Design and Development", TataMcGraw Hill, Fifth Edition, New Delhi, 2011
2. John W Newstorm and Keith Davis, "Organizational Behavior", Tata McGraw Hill, Eleventh Edition, New Delhi, 2005.

REFERENCES:

1. Hiriappa B, "Corporate Strategy – Managing the Business", Authorhouse, USA, 2013
2. Peter F Drucker, "People and Performance", Butterworth – Heinemann [Elsevier], Oxford, UK, 2004.
3. Vinod Kumar Garg and Venkitakrishnan N K, "Enterprise Resource Planning – Concepts and Practice", Prentice Hall India, New Delhi, 2003
4. Mark S Sanders and Ernest J McCormick, "Human Factors in Engineering and Design", McGraw Hill Education, Seventh Edition, New Delhi, 2013.

IT6011**KNOWLEDGE MANAGEMENT****L T P C****3 0 0 3****OBJECTIVES:****The student should be made to:**

- Learn the Evolution of Knowledge management.
- Be familiar with tools.
- Be exposed to Applications.
- Be familiar with some case studies.

UNIT I	INTRODUCTION	9
Introduction: An Introduction to Knowledge Management - The foundations of knowledge management- including cultural issues- technology applications organizational concepts and processes- management aspects- and decision support systems. The Evolution of Knowledge management: From Information Management to Knowledge Management - Key Challenges Facing the Evolution of Knowledge Management - Ethics for Knowledge Management.		
UNIT II	CREATING THE CULTURE OF LEARNING AND KNOWLEDGE SHARING	8
Organization and Knowledge Management - Building the Learning Organization. Knowledge Markets: Cooperation among Distributed Technical Specialists – Tacit Knowledge and Quality Assurance.		
UNIT III	KNOWLEDGE MANAGEMENT-THE TOOLS	10
Telecommunications and Networks in Knowledge Management - Internet Search Engines and Knowledge Management - Information Technology in Support of Knowledge Management - Knowledge Management and Vocabulary Control - Information Mapping in Information Retrieval - Information Coding in the Internet Environment - Repackaging Information.		
UNIT IV	KNOWLEDGEMANAGEMENT-APPLICATION	9
Components of a Knowledge Strategy - Case Studies (From Library to Knowledge Center, Knowledge Management in the Health Sciences, Knowledge Management in Developing Countries).		
UNIT V	FUTURE TRENDS AND CASE STUDIES	9
Advanced topics and case studies in knowledge management - Development of a knowledge management map/plan that is integrated with an organization's strategic and business plan - A case study on Corporate Memories for supporting various aspects in the process life -cycles of an organization.		
		TOTAL: 45 PERIODS

OUTCOMES:

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

- Use the knowledge management tools.
- Develop knowledge management Applications.
- Design and develop enterprise applications.

TEXT BOOK:

1. Srikantaiah, T.K., Koenig, M., "Knowledge Management for the Information Professional" Information Today, Inc., 2000.

REFERENCE:

1. Nonaka, I., Takeuchi, H., "The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation", Oxford University Press, 1995.

OBJECTIVES:**The student should be made to:**

- Understand the IP addressing schemes .
- Understand the fundamentals of network design and implementation
- Understand the design and implementation of TCP/IP networks
- Understand on network management issues
- Learn to design and implement network applications.

UNIT I INTRODUCTION**9**

Internetworking concepts and architecture model – classful Internet address – CIDR – Subnetting and Supernetting – AARP – RARP- IP- IP Routing – ICMP – IPV6.

UNIT II TCP**9**

Services – header – connection establishment and termination – interactive data flow – bulk data flow – timeout and retransmission – persist timer – keep alive timer – futures and performance.

UNIT III IP IMPLEMENTATION**9**

IP global software organization –routing table–routing algorithms – fragmentation and reassembly – error processing (ICMP) – Multicast Processing (IGMP).

UNIT IV TCP IMPLEMENTATION I**9**

Data structure and input processing – transmission control blocks – segment format – comparison– finite state machine implementation – Output processing – mutual exclusion –computing the computing the TCP Data length.

UNIT V TCP IMPLEMENTATION II**9**

Timers – events and messages – timer process – deleting and inserting timer event – flow control and adaptive retransmission– congestion avoidance and control – urgent data processing and push function.

TOTAL: 45 PERIODS**OUTCOMES:****Upon completion of the course, the student should be able to:**

- Design and implement TCP/IP networks.
- Explain network management issues.
- Design and implement network applications.
- Develop data structures for basic protocol functions of TCP/IP.
- Apply the members in the respective structures.
- Design and implement data structures for maintaining multiple local and global timers.

TEXT BOOKS

1. Douglas E Comer, "Internetworking with TCP/IP Principles, Protocols and Architecture", Vol 1, Vth Edition 2006 and Vol 2, III^d Edition, 1999.
2. W.Richard Stevens "TCP/IP Illustrated" Vol 1. Pearson Education, 2003.

REFERENCES

1. Forouzan, "TCP/IP Protocol Suite" Second Edition, Tata MC Graw Hill, 2003.
2. W.Richard Stevens "TCP/IP Illustrated" Volume 2, Pearson Education 2003

OBJECTIVES:

The student should be made to:

- Learn the foundations of Human Computer Interaction
- Be familiar with the design technologies for individuals and persons with disabilities
- Be aware of mobile HCI
- Learn the guidelines for user interface.

UNIT I FOUNDATIONS OF HCI**9**

The Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.

UNIT II DESIGN & SOFTWARE PROCESS**9**

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

UNIT III MODELS AND THEORIES**9**

Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models-**Hypertext, Multimedia and WWW.**

UNIT IV MOBILE HCI**9**

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

UNIT V WEB INTERFACE DESIGN**9**

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.

TOTAL: 45 PERIODS**OUTCOMES:**

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

- Design effective dialog for HCI.
- Design effective HCI for individuals and persons with disabilities.
- Assess the importance of user feedback.
- Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.
- Develop meaningful user interface.

TEXT BOOKS:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, “Human Computer Interaction”, 3rd Edition, Pearson Education, 2004 (UNIT I , II & III)
2. Brian Fling, “Mobile Design and Development”, First Edition , O’Reilly Media Inc., 2009 (UNIT –IV)
3. Bill Scott and Theresa Neil, “Designing Web Interfaces”, First Edition, O’Reilly, 2009.(UNIT-V)

OBJECTIVES:**The student should be made to:**

- Understand the basic tenets of software quality and quality factors.
- Be exposed to the Software Quality Assurance (SQA) architecture and the details of SQA components.
- Understand of how the SQA components can be integrated into the project life cycle.
- Be familiar with the software quality infrastructure.
- Be exposed to the management components of software quality.

UNIT I INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE 9

Need for Software quality – Quality challenges – Software quality assurance (SQA) – Definition and objectives – Software quality factors- McCall's quality model – SQA system and architecture – Software Project life cycle Components – Pre project quality components – Development and quality plans.

UNIT II SQA COMPONENTS AND PROJECT LIFE CYCLE 9

Software Development methodologies – Quality assurance activities in the development process- Verification & Validation – Reviews – Software Testing – Software Testing implementations – Quality of software maintenance – Pre-Maintenance of software quality components – Quality assurance tools – CASE tools for software quality – Software maintenance quality – Project Management.

UNIT III SOFTWARE QUALITY INFRASTRUCTURE 9

Procedures and work instructions - Templates - Checklists – 3S developmenting - Staff training and certification Corrective and preventive actions – Configuration management – Software change control – Configuration management audit -Documentation control – Storage and retrieval.

UNIT IV SOFTWARE QUALITY MANAGEMENT & METRICS 9

Project process control – Computerized tools - Software quality metrics – Objectives of quality measurement – Process metrics – Product metrics – Implementation – Limitations of software metrics – Cost of software quality – Classical quality cost model – Extended model – Application of Cost model.

UNIT V STANDARDS, CERTIFICATIONS & ASSESSMENTS 9

Quality management standards – ISO 9001 and ISO 9000-3 – capability Maturity Models – CMM and CMMI assessment methodologies - Bootstrap methodology – SPICE Project – SQA project process standards – IEEE st 1012 & 1028 – Organization of Quality Assurance – Department management responsibilities – Project management responsibilities – SQA units and other actors in SQA systems.

TOTAL: 45 PERIODS**OUTCOMES:****At the end of the course the students will be able to:**

- Utilize the concepts in software development life cycle.
- Demonstrate their capability to adopt quality standards.
- Assess the quality of software product.
- Apply the concepts in preparing the quality plan & documents.

TEXT BOOK:

1. Daniel Galin, "Software Quality Assurance", Pearson Publication, 2009.

REFERENCES:

1. Alan C. Gillies, "Software Quality: Theory and Management", International Thomson Computer Press, 1997.
2. Mordechai Ben-Menachem "Software Quality: Producing Practical Consistent Software", International Thompson Computer Press, 1997.

MG6088**SOFTWARE PROJECT MANAGEMENT****L T P C
3 0 0 3****OBJECTIVES:**

- To outline the need for Software Project Management
- To highlight different techniques for software cost estimation and activity planning.

UNIT I PROJECT EVALUATION AND PROJECT PLANNING**9**

Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT II PROJECT LIFE CYCLE AND EFFORT ESTIMATION**9**

Software process and Process Models – Choice of Process models - mental delivery – Rapid Application development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II A Parametric Productivity Model - Staffing Pattern.

UNIT III ACTIVITY PLANNING AND RISK MANAGEMENT**9**

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Monitoring – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical patterns – Cost schedules.

UNIT IV PROJECT MANAGEMENT AND CONTROL**9**

Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.

UNIT V STAFFING IN SOFTWARE PROJECTS**9**

Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans.

TOTAL: 45 PERIODS**OUTCOMES:**

- At the end of the course the students will be able to practice Project Management principles while developing a software.

TEXTBOOK:

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCES:

1. Robert K. Wysocki “Effective Software Project Management” – Wiley Publication, 2011.
2. Walker Royce: “Software Project Management” - Addison-Wesley, 1998.
3. Gopalaswamy Ramesh, “Managing Global Software Projects” – McGraw Hill Education (India), Fourteenth Reprint 2013.