

ANNA UNIVERSITY :: CHENNAI 600 025

UNIVERSITY DEPARTMENTS

REGULATIONS – 2008

CURRICULUM FROM III TO VIII SEMESTERS AND ELECTIVES FOR
B.TECH. INFORMATION TECHNOLOGY

SEMESTER III

CODE NO	COURSE TITLE	L	T	P	C
THEORY					
MA9211	Mathematics III	3	1	0	4
EC9212	Communication Techniques	3	0	0	3
CS9202	Database Management Systems	3	0	0	3
IT9201	Computer Organization	3	1	0	4
CS9203	Programming and Data Structures II	3	0	0	3
CS9201	Design and Analysis of Algorithms	3	0	0	3
PRACTICAL					
CS9205	Database Management Systems Laboratory	0	0	3	2
CS9206	Programming and Data Structures Laboratory II	0	0	3	2
CS9207	Algorithms Laboratory	0	0	3	2
	TOTAL	18	2	9	26

SEMESTER IV

CODE NO	COURSE TITLE	L	T	P	C
THEORY					
MA9265	Discrete Mathematics	3	1	0	4
IT9251	Formal Languages and Automata	3	0	0	3
IT9252	Embedded Systems	3	0	0	3
CS9252	Operating Systems	3	0	0	3
CS9253	Web Technology	3	0	0	3
CS9254	Software Engineering	3	0	0	3
PRACTICAL					
IT9253	Embedded Laboratory	0	0	3	2
CS9256	Web Technology Laboratory	0	0	3	2
CS9257	Operating Systems Laboratory	0	0	3	2
	TOTAL	18	1	9	25

SEMESTER V

CODE NO	COURSE TITLE	L	T	P	C
THEORY					
IT9301	Software Project Management	3	0	0	3
CS9301	Object Oriented Analysis and Design	3	0	0	3
IT9302	Multimedia Systems	3	0	0	3
IT9303	Computer Networks	3	0	0	3
IT9304	Distributed Systems	3	0	0	3
	Elective I	3	0	0	3
PRACTICAL					
CS9306	Computer Networks Laboratory	0	0	3	2
CS9307	Case Tools Laboratory	0	0	3	2
GE9371	Communication Skills and Soft Skills lab	0	0	2	1
	TOTAL	18	0	8	23

SEMESTER VI

CODE NO	COURSE TITLE	L	T	P	C
THEORY					
IT9351	Service Oriented Architecture	3	0	0	3
IT9352	Wireless Networks	3	0	0	3
MA9267	Statistics and Linear Programming	3	1	0	4
IT9354	Grid Computing	3	0	0	3
GE9261	Environmental Science and Engineering	3	0	0	3
	Elective II	3	0	0	3
PRACTICAL					
IT9355	Mobile Computing Lab	0	0	3	2
IT9356	Service Oriented Architecture Lab	0	0	3	2
CS9356	Free and Open Source Software Lab	0	0	3	2
	TOTAL	18	1	9	25

SEMESTER VII

CODE NO	COURSE TITLE	L	T	P	C
THEORY					
IT9401	Software Testing	3	0	0	3
IT9402	Cryptography and Security	3	0	0	3
MG9401	Principles of Management	3	0	0	3
	Elective III	3	0	0	3
	Elective IV	3	0	0	3
	Elective V	3	0	0	3
PRACTICAL					
IT9403	Software Testing Laboratory	0	0	3	2
IT9404	Security Laboratory	0	0	3	2
IT9405	Comprehension	0	0	2	1
	TOTAL	18	0	8	23

SEMESTER VIII

CODE NO	COURSE TITLE	L	T	P	C
THEORY					
	Elective VI	3	0	0	3
	Elective VII	3	0	0	3
PRACTICAL					
IT9451	Project Work	0	0	12	6
	TOTAL	6	0	12	12

TOTAL CREDITS: 186

LIST OF ELECTIVES FOR B.TECH. INFORMATION TECHNOLOGY

SEMESTER V

CODE NO	COURSE TITLE	L	T	P	C
CS9351	<u>Digital Signal Processing</u>	3	0	0	3
CS9022	<u>Internet Programming</u>	3	0	0	3
CS9024	<u>Advanced Database Technology</u>	3	0	0	3
CS9023	<u>Unix Internals</u>	3	0	0	3

SEMESTER VI

CODE NO	COURSE TITLE	L	T	P	C
IT9021	<u>Visual Programming</u>	3	0	0	3
CS9027	<u>Data Ware housing and Data Mining</u>	3	0	0	3
CS9029	<u>Net and C# Programming</u>	3	0	0	3
IT9022	<u>Computational Linguistics</u>	3	0	0	3
IT9023	<u>Artificial Intelligence</u>	3	0	0	3
CS9031	<u>Cyber Forensics</u>	3	0	0	3
IT9024	<u>Digital Image Processing</u>	3	0	0	3
CS9032	<u>Graph theory</u>	3	0	0	3
CS9035	<u>Free/Open Source Software</u>	3	0	0	3

SEMESTER VII

CODE NO	COURSE TITLE	L	T	P	C
CS9074	<u>Software Agents</u>	3	0	0	3
CS9047	<u>Adhoc and Sensor Networks</u>	3	0	0	3
IT9025	<u>Routers and Network Processors</u>	3	0	0	3
IT9026	<u>TCP/IP Design and Implementation</u>	3	0	0	3
IT9027	<u>Software Metrics</u>	3	0	0	3
GE9021	<u>Professional Ethics in Engineering</u>	3	0	0	3
GE9022	<u>Total Quality Management</u>	3	0	0	3
GE9023	<u>Fundamentals of Nanoscience</u>	3	0	0	3
IT9028	<u>User Interface Design</u>	3	0	0	3
IT9029	<u>Software Quality Assurance</u>	3	0	0	3
IT9030	<u>Knowledge Engineering</u>	3	0	0	3
CS9043	<u>Multi-Core Programming</u>	3	0	0	3
CS9045	<u>Programming In .Net</u>	3	0	0	3
IT9031	<u>Network Programming and Management</u>	3	0	0	3

SEMESTER VIII

CODE NO	COURSE TITLE	L	T	P	C
IT9032	<u>Enterprise Resource Planning</u>	3	0	0	3
IT9033	<u>Software Design and Architecture</u>	3	0	0	3
IT9034	<u>Business Process Model</u>	3	0	0	3
IT9035	<u>Soft Computing</u>	3	0	0	3
CS9044	<u>Bio Informatics</u>	3	0	0	3
IT9036	<u>Management Information Systems</u>	3	0	0	3
IT9038	<u>Computer Graphics</u>	3	0	0	3
IT9039	<u>Wireless Communications</u>	3	0	0	3
IT9040	<u>Multimedia Networks</u>	3	0	0	3
IT9041	<u>Domain Engineering</u>	3	0	0	3

MA9211 **MATHEMATICS III** **L T P C**
(Common to all branches of BE / B.Tech Programmes) **3 1 0 4**

AIM:

To facilitate the understanding of the principles and to cultivate the art of formulating physical problems in the language of mathematics.

OBJECTIVES:

- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems
- To acquaint the student with Fourier transform techniques used in wide variety of situations in which the functions used are not periodic
- To introduce the effective mathematical tools for the solutions of partial differential equations that model physical processes
- To develop Z- transform techniques which will perform the same task for discrete time systems as Laplace Transform, a valuable aid in analysis of continuous time systems

UNIT I FOURIER SERIES 9+3

Dirichlet's conditions – General Fourier series – Odd and even functions – Half-range Sine and Cosine series – Complex form of Fourier series – Parseval's identity – Harmonic Analysis.

UNIT II FOURIER TRANSFORM 9+3

Fourier integral theorem – Fourier transform pair-Sine and Cosine transforms – Properties – Transform of elementary functions – Convolution theorem – Parseval's identity.

UNIT III PARTIAL DIFFERENTIAL EQUATIONS 9+3

Formation – Solutions of first order equations – Standard types and Equations reducible to standard types – Singular solutions – Lagrange's Linear equation – Integral surface passing through a given curve – Solution of linear equations of higher order with constant coefficients.

UNIT IV APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS 9+3

Method of separation of Variables – Solutions of one dimensional wave equation and one-dimensional heat equation – Steady state solution of two-dimensional heat equation – Fourier series solutions in Cartesian coordinates.

UNIT V Z – TRANSFORM AND DIFFERENCE EQUATIONS 9+3

Z-transform – Elementary properties – Inverse Z-transform – Convolution theorem – Initial and Final value theorems – Formation of difference equation – Solution of difference equation using Z-transform.

L: 45, T: 15, TOTAL: 60 PERIODS

TEXT BOOKS:

1. Grewal, B.S. "Higher Engineering Mathematics", Khanna Publications (2007)

REFERENCES:

1. Glyn James, "Advanced Modern Engineering Mathematics, Pearson Education (2007)
2. Ramana, B.V. "Higher Engineering Mathematics" Tata McGraw Hill (2007).
3. Bali, N.P. and Manish Goyal, "A Text Book of Engineering 7th Edition (2007) Lakshmi Publications (P) Limited, New Delhi.

UNIT I ANALOG MODULATION 9

Amplitude Modulation – AM, DSBSC, SSBSC, VSB – PSD, modulators and demodulators – Angle modulation – PM and FM – PSD, modulators and demodulators – Superheterodyne receivers

UNIT II DIGITISATION 9

Low pass sampling theorem – Quantisation - PAM – Line coding - PCM, DPCM, DM, ADPCM and ADM, Channel Vocoder,– Time Division Multiplexing, frequency Division Multiplexing

UNIT III DIGITAL MODULATION AND TRANSMISSION 9

Phase shift keying – BPSK, DPSK, QPSK - Principles of M-ary signaling M-ary PSK & QAM – Comparison, ISI – Pulse shaping – Duo binary encoding - Cosine filters – Eye pattern, equalizers

UNIT IV INFORMATION THEORY AND CODING 9

Measure of information – Entropy – Source coding theorem - Shannon-Fano coding, Huffman Coding, LZ Coding– Channel capacity – Shannon-Hartley law – Shannon's limit- Error control Codes – Cyclic codes, Syndrome calculation – Convolutional Coding, Sequential and Viterbi decoding

UNIT V SPREAD SPECTRUM AND MULTIPLE ACCESS 9

PN sequences – properties – m-sequence –DSSS –Processing gain, Jamming – FHSS –Synchronisation and tracking - Multiple Access – FDMA, TDMA, CDMA

TOTAL: 45 PERIODS**TEXT BOOKS:**

1. H Taub, D L Schilling, G Saha, "Principles of Communication Systems" 3/e, TMH 2007
2. S. Haykin "Digital Communications" John Wiley 2005

REFERENCES:

1. B.P.Lathi, "Modern Digital and Analog Communication Systems", 3/e, Oxford University Press,2007
2. H P Hsu, Schaum Outline Series - "Analog and Digital Communications" TMH 2006
3. B.Sklar, "Digital Communications Fundamentals and Applications" 2/e Pearson Education 2007

AIM:

To provide a strong foundation in database technology and an introduction to the current trends in this field.

OBJECTIVES:

- To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.
- To make a study of SQL and relational database design.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To have an introductory knowledge about the Storage and Query processing techniques

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 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 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/Codd 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

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Fifth Edition, Tata McGraw Hill, 2006 (Unit I and Unit-V) .
2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.(Unit II, III and IV)

REFERENCES:

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fourth Edition, Pearson / Addison Wesley, 2007.
2. Raghu Ramakrishnan, "Database Management Systems", Third Edition, McGraw Hill, 2003.
3. S.K.Singh, "Database Systems Concepts, Design and Applications", First Edition, Pearson Education, 2006.

IT9201

COMPUTER ORGANIZATION

LT P C
3 1 0 4

AIM:

To understand the basics of digital design, the design of various components of the computer system and its organization.

OBJECTIVES:

- To understand the fundamentals of Boolean logic and functions.
- To design and realize these functions with basic gates, and other components using combinational and sequential logic.
- To understand the design and organization of a von-neumann computer system.
- To comprehend the importance of the hardware-software interface.

UNIT I DIGITAL FUNDAMENTALS

9 +3

Number systems and conversions – Boolean algebra and simplification – Minimization Of Boolean functions – Karnaugh map – Quine McCluskey tabulation method – Logic gates – NAND – NOR implementation.

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS

9 +3

Design of combinational circuits – Adder / Subtractor – Encoder – Decoder – Mux / Demux – Comparators – Flip Flops – Triggering – Master – Slave Flip Flop – State diagrams and minimization – Counters – Registers.

UNIT III BASIC STRUCTURE OF COMPUTERS

9 +3

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

UNIT IV PROCESSOR DESIGN

9 +3

Fundamental concepts – Execution of a complete instruction – Hardwired control – Micro programmed control. Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations

UNIT V MEMORY AND I/O SYSTEMS**9 +3**

Memory Technology – Memory hierarchy – Cache Memory – Design Methods – Virtual Memory – Input/Output System – Programmed I/O – DMA and Interrupts – Functions of I/O devices and interfaces.

L: 45, T: 15, TOTAL:60 PERIODS**TEXT BOOKS**

1. Morris Mano, "Digital Design", Third Edition, Pearson Education, 2002.
2. Carl Hamacher, Zvonko Vranesic And Safwat Zaky, "Computer Organization", Fifth Edition, Tata McGraw Hill, 2002.

REFERENCES

1. Charles H. Roth, Jr., "Fundamentals of Logic Design", Fifth Edition, Jaico Publishing House, 2003.
2. William Stallings, "Computer Organization and Architecture – Designing for Performance", Sixth Edition, Pearson Education, 2003.
3. David A. Patterson And John L. Hennessy, "Computer Organization and Design: The Hardware/Software Interface", Third Edition, Elsevier, 2005.
4. John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata McGraw Hill, 1998.

CS9203**PROGRAMMING AND DATA STRUCTURES II****L T P C
3 0 0 3****AIM:**

The aim is to introduce the concepts Object Oriented Programming and analysis the implementation of Advanced Data Structures using Object Oriented Programming Language.

OBJECTIVES:

- To introduce the concepts of Object Oriented Programming language.
- To introduce the concepts of Templates and Error Handling.
- To introduce the concepts of Advanced Data Structures.

UNIT I**9**

Introduction – Learning C++ - Design of C++ - History and Use – Programming Paradigms – Standard Library – Types and Declaration – Pointers, Arrays, Structures – Expressions and Statements – Functions – Namespaces and Exceptions – Source Files and Programs – Classes – User-Defined Types – Objects – Operator Overloading – Operator Functions – Complex Number

UNIT II**9**

Type Conversion Operators – Friends – Large Objects – Essential Operators – Subscripting – Function Call – Dereferencing – Increment and Decrement – String Class – Derived Classes – Abstract Classes – Design of Class Hierarchies

UNIT III **9**
Templates – Function Templates – Error Handling – Grouping of Exceptions –
Catching Exceptions – Resource Management – Multiple Inheritance – Access Control
– Run Time Type Information

UNIT IV **9**
OO Perspective of List, Stack, Queue, and Search Tree ADTs – AVL Trees – Red
Black Trees – Splay Trees – B-trees – Priority Queues (Heaps)

UNIT V **9**
Disjoint Set ADT – Graph Algorithms – Topological Sort – Shortest-Path Algorithm –
Network Flow Problems – Minimum Spanning Tree – Applications of Depth-First
Search

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Bjarne Stroustrup, “The C++ Programming Language”, 3rd ed., Pearson Education, 2007. (Units 1,2,3)
2. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, 2nd ed., Pearson Education, 2005. (Units 4,5)

REFERENCES:

1. Ira Pohl, “Object-Oriented Programming using C++”, 2nd ed., Pearson Education, 1997.
2. Goodrich, Michael T., Roberto Tamassia, David Mount. Data Structures and Algorithms in C++. 7th ed, Wiley. 2004.

CS9201 **DESIGN AND ANALYSIS OF ALGORITHMS** **L T P C**
3 0 0 3

AIM:

The aim is to introduce the basics of algorithm design paradigms and analysis to enable designing of efficient algorithms.

OBJECTIVES:

- To introduce the basic concepts of algorithm analysis
- To introduce the design paradigms for algorithm design
- To introduce the basic complexity theory.

UNIT I **9**
The Role of Algorithms in Computing-Getting Started-Growth of Functions –
Recurrences-The Substitution Method- The Recurrence Tree Method-The Master
Method -Probabilistic Analysis and Randomized Algorithms-The Hiring Problem-
Random Variables-Randomized Algorithms.

UNIT II **9**
Quicksort-Description-Performance-Randomized version-Analysis.Sorting in linear
time-Lower bounds for sorting-Counting sort-Medians and order statistics-Minimum
and maximum-Selection in expected linear time- Selection in worst-case linear time-
Dynamic Programming – Matrix chain multiplication –Elements of Dynamic
programming- Longest common sequences.

UNIT III **9**
Greedy Algorithms-Activity selection problem-Elements of Greedy Strategy-Huffman code.Matrix Operations-Properties of matrices-Strassen's algorithm-Solving systems of linear equations-Inverting matrices.

UNIT IV **9**
Linear Programming-Standard and slack forms-Formulating problems-Simplex algorithm-Duality-Initial basic feasible solution - String Matching-Naive string matching algorithm-Knuth-Morris-Pratt algorithm.

UNIT V **9**
NP-completeness-Polynomial time-Polynomial-time verification-NP-completeness and reducibility-NP-completeness proofs - NP-completeness problems. Approximation Algorithms-The vertex-cover problem-The traveling-salesman problem.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", Second Edition, Prentice Hall of India, 2007.

REFERENCES

1. Jon Kleinberg, Eva Tardos, "Algorithm Design", Pearson Education, 2006.
2. Michael T. Goodrich, Toberto Tamassisa, "Algorithm Design: Foundations, Analysis and Internet Examples", Wiley Student Edition, 2007.
3. Anany Levitin, "Introduction to Design and Analysis of Algorithms", Pearson Education, 2003.

CS9205

DBMS LAB

L T P C
0 0 3 2

EXPERIMENTS IN THE FOLLOWING TOPICS:

1. Data Definition, Manipulation of base tables and views
2. High level programming language extensions.
3. Front end tools
4. Forms
5. Triggers
6. Menu Design
7. Importing/ Exporting Data
8. Reports.
9. Database Design and implementation (Mini Project).

TOTAL: 45 PERIODS

CS9206

PROGRAMMING AND DATA STRUCTURES LAB II

L T P C
0 0 3 2

EXPERIMENTS IN THE FOLLOWING:

1. Data abstraction, Implementation of any one of the following List, Stack, Queue ADTs, using Header files, Separate compilation of implementation and application. Search ADT, Binary Search Tree., Header files, Separate compilation.
2. Use of Standard Template Library: Strings, Containers
3. Use of STL: Iterators
4. Operator Overloading
5. Templates,
6. Exception handling, Class Hierarchies
7. AVL Tree
8. Splay Tree
9. B Tree
10. Graph algorithms

TOTAL:45 PERIODS

CS9207

ALGORITHMS LAB

L T P C
0 0 3 2

1. Implementing simple recursive programs like Towers of Hanoi ,Generating Permutations.
2. Implementation of simple sort algorithms.
3. Implementation of randomized quicksort algorithms.
4. Implementation of algorithms like merge sort using Divide and Conquer approach.
5. Implementation of Huffman code using Greedy Approach.
6. Implementation of Dynamic Programming – Floyd's Algorithm.
7. Solving Simplex Method.
8. Implement String matching algorithms.
9. Implementation of programs Study of Benchmarking and analysis of Algorithms for simple programs.
10. Study of Algorithms Tools like LEDA (Library of Efficient Data types and Algorithms).

TOTAL: 45 PERIODS

AIM:

To extend student's Logical and Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

OBJECTIVES:

At the end of the course, students would

- Have knowledge of the concepts needed to test the logic of a program.
- Have an understanding in identifying structures on many levels.
- Be aware of a class of functions which transform a finite set into another finite set which relates to input output functions in computer science.
- Be aware of the counting principles
- Be exposed to concepts and properties of algebraic structures such as semi groups, monoids and groups.

UNIT I LOGIC AND PROOFS 12

Propositional Logic – Propositional equivalences-Predicates and quantifiers – Nested Quantifiers – Rules of inference-introduction to proofs – proof methods and strategy.

UNIT II COMBINATORY 12

Mathematical induction – Strong induction and well ordering – The basics of counting - The pigeonhole principle – Permutations and combinations – Recurrence relations-Solving linear recurrence relations-generating functions – Inclusion and exclusion and applications.

UNIT III GRAPHS 12

Graphs and graph models – Graph terminology and special types of graphs – Representing graphs and graph isomorphism – connectivity – Euler and Hamilton paths.

UNIT IV ALGEBRAIC STRUCTURES 12

Algebraic systems – Semi groups and monoids – Groups-Subgroups and homomorphisms – Cosets and Lagrange's theorem – Ring & Fields.

UNIT V LATTICES AND BOOLEAN ALGEBRA 12

Partial ordering – Posets – Lattices as Posets – Properties of lattices-Lattices as algebraic systems – Sub lattices – direct product and Homomorphism – Some special lattices – Boolean algebra

L: 45, T: 15, TOTAL: 60 PERIODS

TEXT BOOKS:

1. Kenneth H.Rosen, "Discrete Mathematics and its Applications", 6th Edition, Special Indian edition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, (2007).
2. Trembly J.P. and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 30th Re-print (2007).

REFERENCES:

1. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Fourth Edition, Pearson Education Asia, Delhi, (2002).
2. Thomas Koshy, "Discrete Mathematics with Applications", Elsevier Publications, (2006).
3. Seymour Lipschutz and Mark Lipson, "Discrete Mathematics", Schaum's Outlines, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2007, Second edition, Fifth reprint, (2007).

IT9251

FORMAL LANGUAGES AND AUTOMATA

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

AIM:

To get fundamental idea on Automata and Languages

OBJECTIVES:

- A study of the formal relationships between machines, languages and grammar.

UNIT I AUTOMATA 9

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

UNIT II REGULAR EXPRESSIONS AND LANGUAGES 9

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

UNIT III CONTEXT - FREE GRAMMARS AND LANGUAGES 9

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

UNIT IV PROPERTIES OF CONTEXT-FREE LANGUAGES 9

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

UNIT V DETERMINISTIC PARSING 9

Parsing : The graph of a grammar – A top-down parser – Reductions and Bottom-up Parsing – A Bottom-up Parser – LL(k) Grammars : Lookahead in CFG – FIRST, FOLLOW, Lookahead sets – Strong LL(k) Grammars – Construction of FIRST_k, FOLLOW_k sets – LR(k) Grammars : LR(0) contexts – An LR(0) Parser – LR(0) Machine.

TOTAL:45 PERIODS

TEXT BOOKS:

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", second Edition, Pearson Education, 2003.
2. Thomas A. Sudkamp, "An Introduction to the Theory of Computer Science, Languages and Machines". 3rd Edition, Pearson Education, 2007.

REFERENCES:

1. H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Second Edition, Pearson Education, 2003.
2. J. Martin, "Introduction to Languages and the Theory of Computation", Third Edition, Tata Mc Graw Hill, 2003.
3. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.

IT9252

EMBEDDED SYSTEMS

L T P C
3 0 0 3

AIM:

To understand hardware and the software aspects of embedded systems.

OBJECTIVES:

- To understand the architecture of embedded processors, microcontrollers, and peripheral devices.
- To appreciate the nuances of programming micro-controllers in assembly for embedded systems.
- To understand the challenges in developing operating systems for embedded systems.
- To learn about programming these systems in high-level languages such as C.

UNIT I	EMBEDDED COMPUTING	9
Challenges of Embedded Systems – Embedded system design process. Embedded processors – 8051 Microcontroller, ARM processor – Architecture, Instruction sets and programming.		
UNIT II	MEMORY AND INPUT / OUTPUT MANAGEMENT	9
Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing – Interrupt handling.		
UNIT III	PROCESSES AND OPERATING SYSTEMS	9
Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Performance issues.		
UNIT IV	EMBEDDED C PROGRAMMING	9
Programming embedded systems in C – C-looping structures – Register allocation – Function calls – Pointer aliasing – structure arrangement – bit fields – unaligned data and endianness – inline functions and inline assembly – portability issues.		
UNIT V	EMBEDDED SYSTEM DEVELOPMENT	9
Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers. Design issues – Design methodologies – Case studies – Complete design of example embedded systems.		

TOTAL: 45 PERIODS

TEXT BOOKS

1. Wayne Wolf, "Computers as Components: Principles of Embedded Computer System Design", Elsevier, 2006.
2. Muhammed Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, "The 8051 Microcontroller and Embedded Systems", Pearson Education, Second edition, 2007 (unit 1)
3. Andrew N Sloss, D. Symes, C. Wright, "Arm system developers guide", Morgan Kaufman/ Elsevier, 2006. (unit 4)

REFERENCES

1. Michael J. Pont, "Embedded C", Pearson Education, 2007.
2. Steve Heath, "Embedded System Design", Elsevier, 2005.

CS9252

OPERATING SYSTEMS

L T P C
3 0 0 3

AIM:

The course introduces the students to the basic principles of operating systems.

OBJECTIVES:

- To be aware of the evolution of operating systems
- To learn what processes are, how processes communicate, how process synchronization is done and how to manage processes
- To have an understanding of the main memory and secondary memory management techniques.
- To understand the I/O Subsystem
- To have an exposure to Linux and Windows 2000 operating systems

UNIT I OPERATING SYSTEMS OVERVIEW 9

Operating system – Types of Computer Systems – Computer-system operation – I/O structure – Hardware Protection – System components – System calls – System programs – System structure – Process concept – Process scheduling – Operations on processes – Cooperating processes – Interprocess communication – Communication in client-server systems – Multithreading models – Threading issues – Pthreads.

UNIT II PROCESS MANAGEMENT 10

Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation – Process Scheduling Models - The critical-section problem – Synchronization hardware – Semaphores – Classic problems of synchronization – Critical regions – Monitors – System model – Deadlock characterization – Methods for handling deadlocks – Recovery from deadlock

UNIT III STORAGE MANAGEMENT 9

Memory Management – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging. Virtual Memory: Background – Demand paging – Process creation – Page replacement – Allocation of frames – Thrashing.

UNIT IV I/O SYSTEMS 9
File concept – Access methods – Directory structure – File-system mounting – Protection – Directory implementation – Allocation methods – Free-space management – Disk scheduling – Disk management – Swap-space management.

UNIT V CASE STUDY 8
The Linux System – History – Design Principles – Kernel Modules – Process Management – Scheduling – Memory management – File systems – Input and Output – Inter-process Communication – Network Structure – Security – Windows 2000 – History – Design Principles – System Components – Environmental subsystems – File system – Networking.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Silberschatz, Galvin and Gagne, "Operating System Concepts", Sixth Edition, John Wiley & Sons Inc 2003.

REFERENCES:

1. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001.
2. Gary Nutt, "Operating Systems", Second Edition, Addison Wesley, 2003.
3. H M Deital, P J Deital and D R Choffnes, "Operating Systems", Pearson Education, 2004.

**CS9253 WEB TECHNOLOGY L T P C
3 0 0 3**

AIM:

To provide an introduction to Java and basic Web concepts and enable the student to create simple Web based applications.

OBJECTIVES:

- To introduce the features of object oriented programming languages using Java
- To design and create user interfaces using Java frames and applets
- To have a basic idea about network programming using Java
- To create simple Web pages and provide client side validation
- To create dynamic web pages using server side scripting

UNIT I 9
Java fundamentals – Class, Object – Inheritance – Polymorphism – Packages – Interfaces – Exception handling

UNIT II 9
I/O – AWT – Event handling – Introduction to Threads - Basics of Networking – TCP and UDP sockets – Connecting to the Web

UNIT III	9
Applets – JDBC – Swings – Remote Method Invocation	
UNIT IV	9
World Wide Web – HTML – List – Tables – Frames – Forms – HTTP commands – XML – DTD, Schema – XSLT – XML Parser – Client side scripting	
UNIT V	9
Server side scripting – JSP – Servlets – Session management – Cookies	

TOTAL:45 PERIODS

TEXT BOOKS

1. Deitel and Deitel, “Java – How to program”, 3rd ed., Pearson Education, 2001.
2. Robert W. Sebesta, “Programming the World Wide Web”, 3rd ed., Pearson Education, 2006. (Units 4,5)

REFERENCES

1. Herbert Schildt, “Java – The Complete Reference”, 7th ed., Tata McGraw Hill, 2007.
2. Chris Bates, “Web Programming”, 3rd ed., Wiley, 2006.
3. Black Book, “Java 6 Programming”, Dreamtech Press, 2007.
4. Deitel, “Java How to Program”, Pearson Education, 2003.
5. W Clay Richardson, et al, “Professional Java JDK 6 Edition”, Wrox, 2007.

CS9254	SOFTWARE ENGINEERING	L T P C
		3 0 0 3

AIM:

The course is intended to give Software Engineering principles in classical sense.

OBJECTIVES:

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

UNIT I	9
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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 **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 **9**
Requirements Analysis – Analysis Modeling approaches – data modeling concepts – Object oriented Analysis – Scenario based modeling – Flow oriented Modeling – Class based modeling – creating a behaviour model.

UNIT IV **9**
Design Engineering – Design process -Design Quality-Design model-User interface Design – Testing strategies- strategies Issues for conventional and object oriented software-validation testing –system testing –Art of debugging – Project management

UNIT V **9**
Software evolution - Verification and Validation -Critical Systems Validation – Metrics for Process, Project and Product-Quality Management -Process Improvement –Risk Management- Configuration Management

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Roger S.Pressman, Software Engineering: A Practitioner’s Approach, McGraw Hill International edition, Sixth edition, 2005.
2. Ian Sommerville, Software Engineering, 8th Edition, Pearson Education, 2008(UNIT V)

REFERENCES:

1. Stephan Schach, Software Engineering, Tata McGraw Hill, 2007.
2. Pfleeger and Lawrence Software Engineering: Theory and Practice, Pearson Education, second edition, 2001

IT9253

EMBEDDED LABORATORY

L T P C
0 0 3 2

AIM:

To get a feel of programming and developing an embedded system

OBJECTIVES:

- To write programs in micro-controller assembly language.
 - To learn to interface various peripheral devices with microcontrollers.
 - To understand real-time aspects of embedded systems.
1. 8051 Microcontroller based experiments- assembly language programs -2 experiments
 2. 8051 Microcontroller based experiments- Control applications
 3. 8051 Microcontroller based I/O interfacing - 3 experiments
 4. Testing RTOS Environment and System Programming (embedded C) KEIL software example programs – 3 experiments
 5. Real time systems program – 2 experiments

TOTAL:45 PERIODS

CS9256

WEB TECHNOLOGY LABORATORY

L T P C
0 0 3 2

AIM:

To enable the students to program in Java and to create simple Web based applications.

OBJECTIVES:

- To write simple programs using Java
- To design and create user interfaces using Java frames and applets
- To write I/O and network related programs using Java
- To create simple Web pages and provide client side validation
- To create dynamic web pages using server side scripting

EXPERIMENTS IN THE FOLLOWING:

1. Java Fundamentals, Classes, Objects
2. Inheritance, Polymorphism
3. Interfaces, Exception handling
4. I/O, AWT
5. Socket Programming
6. Applets, Swings
7. Database connectivity
8. RMI
9. XML, Style sheet, Parser
10. Client side scripting
11. JSP, Servlets
12. Session Management

TOTAL: 45 PERIODS

CS9257

OPERATING SYSTEMS LABORATORY

L T P C
0 0 3 2

1. Basic UNIX commands.
2. Shell Programming.
3. Grep, sed, awk.
4. File system related system calls.
5. Process management – Fork, Exec.
6. Message queues.
7. Pipe, FIFO's.
8. Signals.
9. Shared memory.
10. Semaphores.

TOTAL:45 PERIODS

AIM

This course aims at the role of software developers in getting exposure on planning and controlling aspect of software development

OBJECTIVES

- To understand the roles of the project manager
- To understand the threats and opportunities in project management
- To gain Expertise in size, effort and cost estimation techniques
- To understand the techniques available with which a project's aims and objectives, timetable, activities, resources and risks can be kept under control
- To understand the social and political problems a project will encounter--against which the technical problems pale into insignificance--and to begin to understand how to approach non-technical problems
- To Appreciate of other management issues like team structure, group dynamics
- To understand communication

UNIT I INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT 9

Project Definition – Contract Management – Activities Covered by Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

UNIT II PROJECT EVALUATION 9

Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation. – software effort estimation

UNIT III ACTIVITY PLANNING 9

Objectives – Project Schedule – Sequencing and Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning and Control.

UNIT IV MONITORING AND CONTROL 9

Resource allocation - identifying and scheduling resources – publishing resource and cost schedule – scheduling sequence - Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT V MANAGING PEOPLE AND ORGANIZING TEAMS 9

Introduction – Understanding Behavior – Organizational Behaviour - Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress – Health And Safety – Case Studies.

TOTAL:45 PERIODS**TEXT BOOK:**

1. Bob Hughes, Mikecoterrell, "Software Project Management", Third Edition, Tata McGraw Hill, 2004.

UNIT V MULTIMEDIA NETWORKS 9
 Protocol - QOS Issues - RTP, RTCP, RTSP, SIP, Multimedia over ATM Networks -
 Media on demand –ITV - STB Broad cast Schemes for VoD Buffer Management -
 Multimedia over wireless networks.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Ralf Steinmetz and Klara, “Multimedia Computing, Communications and Applications”, Pearson Education, 2004.
2. K.Andleigh, Kiran Thakrar , Multimedia Systems Design, PHI, 2007.

REFERENCES:

1. Ze Nian Li, S. Drew, “Fundamentals of Multimedia” , PHI,2006.
2. Fred Halsall, “Multimedia Communications- Applications, Networks, Protocols and Standards , Pearson Education, 2007.

IT9303 COMPUTER NETWORKS L T P C
3 0 0 3

AIM:

To understands the concepts of computer networks

OBJECTIVES:

- To understand the layering concepts in computer networks
- To understand the functions of each layer
- To have knowledge in different applications that use computer networks

UNIT I 7
 Network architecture – Layers – Physical links – Channel access on links – SDMA –
 TDMA – FDMA – CDMA – Hybrid multiple access techniques - Issues in the data link
 layer - Framing – Error correction and detection – Link-level flow control

UNIT II 7
 Medium access – Ethernet – Token ring – FDDI – Wireless LAN – Bridges and
 Switches

UNIT III 11
 Circuit switching – Packet switching – Virtual circuit switching – IP – ARP – RARP –
 DHCP – ICMP – Routing algorithms – RIP – OSPF – Subnetting – CIDR –
 Interdomain routing – BGP – IPv6 – Multicasting – Congestion avoidance in network
 layer

UNIT IV 10
 UDP – TCP – Flow control – Congestion control – Queueing discipline – Congestion
 avoidance – QoS – RPC

UNIT V**10**

Email (SMTP, MIME, POP3, IMAP) – HTTP – DNS- SNMP – Telnet – FTP – TFTP

TOTAL:45 PERIODS**TEXT BOOKS:**

1. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fourth Edition, Morgan Kaufmann Publishers Inc., 2007.
2. James F. Kurose, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Third Edition, Addison Wesley, 2005.

REFERENCES:

1. Nader F. Mir, "Computer and Communication Networks", First Edition, Pearson Education, 2007
2. Douglas E. Comer, "Computer Networks and Internets with Internet Applications", Fourth Edition, Pearson Education, 2003.
3. Andrew S. Tanenbaum, "Computer Networks", Fourth Edition, Pearson Education, 2002.
4. William Stallings, "Data and Computer Communication", Eighth Edition, Pearson Education, 2007.

IT9304**DISTRIBUTED SYSTEMS****L T P C
3 0 0 3****AIM:**

The aim of the course is to convey an insight into the fundamental concepts, principles, and state-of-the-art practice underlying the design of distributed systems.

OBJECTIVES:

- To understand the importance of communication in distributed environment and the actual implementation of various communication mechanisms
- To study how a distributed operating system works and how it differs from the single processor OS.
- To learn how to manage the resources in a distributed environment
- To learn how to make a distributed systems fault tolerant
- To study how the above-mentioned techniques have been used in actual, real-life distributed systems.

UNIT I**COMMUNICATION IN DISTRIBUTED ENVIRONMENT****8**

Introduction – Various Paradigms in Distributed Applications – Remote Procedure Call – Remote Object Invocation – Message-Oriented Communication – Unicasting, Multicasting and Broadcasting – Group Communication.

UNIT II**DISTRIBUTED OPERATING SYSTEMS****12**

Issues in Distributed Operating System – Threads in Distributed Systems – Clock Synchronization – Causal Ordering – Global States – Election Algorithms – Distributed Mutual Exclusion – Distributed Transactions – Distributed Deadlock – Agreement Protocols .

3. Applications using Raw Sockets like
 - a. Ping
 - b. Traceroute
4. RPC
5. Experiments using simulators like OPNET:
 - a. Performance comparison of MAC protocols
 - b. Performance comparison of Routing protocols
 - c. Study of TCP/UDP performance

TOTAL:45 PERIODS

CS9307

CASE TOOLS LAB

L T P C
0 0 3 2

AIM:

Scope of this lab is to understand the application of case tools, which focuses on the following software engineering activities:

- Software requirements analysis and specification
- Software design
- Software implementation
- Software testing and maintenance
- Communication skills and teamwork
- Modeling techniques and CASE tools
- Software project planning and management

1. Study of case tools such as rational rose or equivalent tools
2. Requirements
Implementation of requirements engineering activities such as elicitation, validation, management using case tools
3. Analysis and design
Implementation of analysis and design using case tools.
4. Study and usage of software project management tools such cost estimates and scheduling
5. Documentation generators - Study and practice of Documentation generators.
6. Data modeling using automated tools.
7. Practice reverse engineering and re engineering using tools.
8. Exposure towards test plan generators, test case generators, test coverage and software metrics.
9. Meta modeling and software life cycle management.

TOTAL:45 PERIODS

AIM:

To enhance the overall capability of students and to equip them with the necessary Communication Skills and Soft Skills that would help them excel in their profession.

OBJECTIVES:

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

A. Viewing and discussing audio-visual materials (6 periods)

- 1. Resume / Report Preparation / Letter Writing: (2)**
Letter writing – Job application with Resume - Project report - Email etiquette.
- 2. Presentation skills: (1)**
Elements of effective presentation – Structure of presentation - Presentation tools – Body language.
- 3. Soft Skills: (1)**
Time management – Stress management – Assertiveness – Negotiation strategies.
- 4. Group Discussion: (1)**
Group discussion as part of selection process, Structure of group discussion – Strategies in group discussion – Mock group discussions.
- 5. Interview Skills: (1)**
Kinds of interviews – Interview techniques – Corporate culture – Mock interviews.
(Career Lab Software may be used for this section).

Note: Career Lab software may be used to learn the skills, to be applied in the practice session.

B. Practice session (24 periods)

- 1. Resume / Report Preparation / Letter writing:** Students prepare their own resume and report. (4)
- 2. Presentation Skills:** Students make presentations on given topics. (8)
- 3. Group Discussion:** Students participate in group discussions. (6)
- 4. Interview Skills:** Students participate in Mock Interviews (6)

TOTAL; 45 PERIODS

REFERENCES:

1. Anderson, P.V, **Technical Communication**, Thomson Wadsworth, Sixth Edition, New Delhi, 2007.
2. Prakash P, **Verbal and Non-Verbal Reasoning**, Macmillan India Ltd., Second Edition, New Delhi, 2004.
3. John Seely, **The Oxford Guide to Writing and Speaking**, Oxford University Press, New Delhi 2004.
4. David Evans, **Decisionmaker**, Cambridge University Press, 1997.
5. Thorpe, E and Thorpe, S **Objective English**, Pearson Education, Second Edition, New Delhi 2007.
6. Turton, N.D and Heaton, J.B, **Dictionary of Common Errors**, Addison Wesley Longman Ltd., Indian reprint 1998.

IT9351

SERVICE ORIENTED ARCHITECTURE

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

AIM:

To provide an overview of Service Oriented Architecture and enable the student to create applications in a collaborative environment.

OBJECTIVES:

- To study the importance of Service Oriented Architecture.
- Implementation of SOA in the Java and .NET frameworks.
- To study the advanced features of SOA.

UNIT I

9

Introduction – Service Oriented Enterprise – Service Oriented Architecture (SOA) – SOA and Web Services – Multi-Channel Access – Business Process management – Extended Web Services Specifications – Overview of SOA – Concepts – Key Service Characteristics – Technical Benefits – Business Benefits

UNIT II

9

SOA and Web Services – Web Services Platform – Service Contracts – Service-Level Data Model – Service Discovery – Service-Level Security – Service-Level Interaction patterns – Atomic Services and Composite Services – Proxies and Skeletons – Communication – Integration Overview – XML and Web Services - .NET and J2EE Interoperability – Service-Enabling Legacy Systems – Enterprise Service Bus Pattern

UNIT III

9

Multi-Channel Access – Business Benefits – SOA for Multi Channel Access – Tiers – Business Process Management – Concepts – BPM, SOA and Web Services – WS-BPEL – Web Services Composition

UNIT IV

9

Java Web Services – JAX APIs – JAXP – JAX-RPC – JAXM – JAXR – JAXB

UNIT V

9

Metadata Management – Web Services Security – Advanced Messaging – Transaction Management

TOTAL: 45 PERIODS

TEXTBOOKS:

1. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
2. James McGovern, Sameer Tyagi, Michael E Stevens, Sunil Mathew, "Java Web Services Architecture", Elsevier, 2003. (Unit 4)

REFERENCES:

1. Thomas Erl, "Service Oriented Architecture", Pearson Education, 2005.
2. Frank Cohen, "FastSOA", Elsevier, 2007.
3. Scott Campbell, Vamsi Mohun, "Mastering Enterprise SOA", Wiley, 2007.
4. Eric Pulier, Hugh Taylor, "Understanding Enterprise SOA", Dreamtech Press, 2007.
5. Jeff Davies, "The Definitive Guide to SOA", Apress, 2007.
7. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.

IT9352**WIRELESS NETWORKS****L T P C
3 0 0 3****AIM:**

To introduce the concepts of Wireless Communication to explore the various types of existing Wireless Networks and to learn programming in Wireless environment.

OBJECTIVES:

- To understand the concepts of Wireless Communication
- To discuss the features of IEEE 802.11 Wireless LANs
- To learn the various types of cellular telephone systems
- To explain the role of TCP/IP in Mobile networks
- To understand the WAP framework

UNIT I WIRELESS COMMUNICATION 7
Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation - MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks

UNIT II WIRELESS LAN 9
IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - Wireless Local Loop

UNIT III MOBILE COMMUNICATION SYSTEMS 11
GSM-architecture-Location tracking and call setup- Mobility management- Handover-Security-GSM SMS –International roaming for GSM- call recording functions-subscriber and service data mgt –Mobile Number portability -VoIP service for Mobile Networks –GPRS –Architecture-GPRS procedures-attach and detach procedures-PDP context procedure-combined RA/LA update procedures-Billing

UNIT IV MOBILE NETWORK AND TRANSPORT LAYERS 9
Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective Retransmission – Transaction Oriented TCP- TCP over 2.5 / 3G wireless Networks

UNIT V APPLICATION LAYER**9**

WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile- caching model-wireless bearers for WAP - WML – WMLScripts - WTA - iMode- SyncML

TOTAL: 45 PERIODS**TEXT BOOKS:**

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2003.
2. William Stallings, "Wireless Communications and Networks", Pearson Education, 2002.

REFERENCES:

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", First Edition, Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.
3. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.

MA9267**STATISTICS AND LINEAR PROGRAMMING****L T P C
3 1 0 4****AIM:**

To provide the required skill to apply the statistical and Linear Programming tools for engineering problems.

OBJECTIVES:

To make the students acquire a fundamental knowledge in Statistical inference and Linear programming tools for engineering applications.

UNIT I TESTING OF HYPOTHESIS**12**

Sampling distributions - Tests for single mean , proportion and difference of means (large and small samples) – Tests for single variance and equality of variances – χ^2 -test for goodness of fit – Independence of attributes – Non-parametric tests: Test for Randomness and Rank-sum test (Wilcoxon test).

UNIT II DESIGN OF EXPERIMENTS**12**

Completely randomized design – Randomized block design – Latin square design - 2^2 - factorial design.

UNIT III STATISTICAL QUALITY CONTROL**12**

Control charts for measurements (\bar{X} and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling

UNIT IV LINEAR PROGRAMMING 12
Formulation – Graphical solution – Simplex method – Big-M method - Transportation and Assignment models

UNIT V ADVANCED LINEAR PROGRAMMING 12
Duality – Dual simplex method – Integer programming – Cutting-plane method.

L: 45, T: 15, TOTAL:60 PERIODS

TEXT BOOKS

1. Johnson, R.A. and Gupta, C.B., “Miller and Freund’s Probability and Statistics for Engineers”, Pearson Education, Asia, 7th edition, (2007).
2. Taha, H.A., “Operations Research”, Pearson Education, Asia, 8th edition, (2007).

REFERENCES

1. Walpole, R.E., Myers, R.H., Myers, S.L. and Ye, K., “Probability and Statistics for Engineers and Scientists”, Pearson Education, Asia, 8th edition, (2007).
2. Devore, J.L., “Probability and Statistics for Engineering and the Sciences”, Thomson Brooks/Cole, International Student Edition, 7th edition, (2008).
3. Winston, W.L., “Operations Research – Applications and Algorithms”, Thomson, 1st Indian Reprint, 4th edition, (2007).

IT9354

GRID COMPUTING

L T P C
3 0 0 3

AIM:

To understand the latest advances in the field of computation to optimize the utilization of resources.

OBJECTIVES:

- To enable resource sharing across networks.
- To integrate heterogeneous computing systems and data Resources with the aim of providing a global computing Space.
- To manage and schedule the resources in grid environments.
- To know the standards and protocols used.
- To Know the middleware in grid computing.

UNIT I CONCEPTS AND ARCHITECTURE 9
Introduction-Parallel and Distributed Computing-Cluster Computing-Grid Computing-Anatomy and Physiology of Grid-Review of Web Services-OGSA-WSRF.

UNIT II GRID MONITORING 9
Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems-GridICE – JAMM -MDS-Network Weather Service-R-GMA-Other Monitoring Systems-Ganglia and GridMon

UNIT III GRID SECURITY AND RESOURCE MANAGEMENT 9
Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management-Scheduling Paradigms- Working principles of Scheduling -A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

UNIT IV DATA MANAGEMENT AND GRID PORTALS 9
Data Management-Categories and Origins of Structured Data-Data Management Challenges-Architectural Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals.

UNIT V GRID MIDDLEWARE 9
List of globally available grid Middlewares - Case Studies-Current version of Globus Toolkit and gLite - Architecture, Components and Features.

TOTAL: 45 PERIODS

TEXT BOOKS:

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

REFERENCES:

1. Ian Foster & Carl Kesselman, "The Grid 2 – Blueprint for a New Computing Infrastructure" , Morgan Kaufman – 2004.
2. Joshy Joseph & Craig Fellenstein, "Grid Computing", Pearson Education 2004.
3. Fran Berman, Geoffrey Fox, Anthony J.G.Hey,"Grid Computing: Making the Global Infrastructure a Reality", John Wiley and Sons, 2003
3. URLs : www.globus.org and glite.web.cern.ch (Unit V)

GE9261 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C
(Common to all branches) 3 0 0 3

AIM:

To create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make them sensitive to the environment problems in every professional endeavour that they participates.

OBJECTIVE:

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession

– food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds. Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL:45 PERIODS

TEXT BOOKS:

1. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 2nd edition, Pearson Education (2004).
2. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, (2006).

REFERENCES:

1. R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press (2005)

IT9355**MOBILE COMPUTING LAB****L T P C
0 0 3 2**

1. Simulation of application using J2ME simulator
 - a. Midlet and other basic UI items.
 - b. Bluetooth API
 - c. Implementation of Wireless Messaging
 - d. MMAPI
2. Simulation of applications to access web sites using Microsoft Windows Mobile .net environment
3. Simulation of Implementation of playing games and photo sharing applications using BREW (Binary Runtime Environment for Wireless Toolkit)
4. Simulation of Infotainment (news, weather forecasts etc) using WAP
5. Simulation of applications using symbian OS

TOTAL:45 PERIODS**IT9356****SERVICE ORIENTED ARCHITECTURE LAB****L T P C
0 0 3 2****AIM:**

To enable the student to use Service Oriented Architecture and related technologies.

OBJECTIVES:

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

EXPERIMENTS IN THE FOLLOWING TOPICS:

1. Creation of XML files, and validating it using DTD and XML Schema
2. Parsing and XML document using DOM and SAX parsers
3. XSLT
4. Working with JAXP APIs
5. XML – RPC Implementation
6. Creating Web Services in Java and .Net
7. Web service Composition
8. Web Service Security
9. Mobile Web Services

TOTAL: 45 PERIODS

**CS9356 FREE AND OPEN SOURCE SOFTWARE LABORATORY L T P C
0 0 3 2**

AIM:

The student will get exposure to operating system and networking concepts at source code level.

OBJECTIVES:

- To learn the setting up gnu/Linux-based servers and workstation
 - To learn shell programming
 - To learn to configure application and server software
 - To learn to perform system administration tasks
 - To learn to use free and open source components.
1. GNU/Linux OS installation (provide details of how to detect hardware, configure disk partitions & filesystems and successfully install a GNU/Linux distribution)
 2. Basic shell commands - logging in, listing files, editing files, copying/moving files, viewing file contents, changing file modes and permissions, process management
 3. User and group management, file ownerships and permissions, PAM authentication, Introduction to common system configuration files & log files
 4. Configuring networking, basics of TCP/IP networking and routing, connecting to the Internet (through dialup, DSL, ethernet, leased line)
 5. Configuring additional hardware - sound cards, displays & display cards, network cards, modems, usb drives, CD writers

6. Performing every day tasks using GNU/Linux - accessing the Internet, playing music, editing documents and spreadsheets, sending and receiving email, copy files from disks and over the network, playing games, writing CDs
7. Setting up email servers - using postfix (for SMTP services), courier (for IMAP & POP3 services), squirrelmail (for webmail services)
8. Setting up web servers - using Apache (for HTTP services), Setting up proxy services, printer services, firewall
9. Using the GNU Compiler Collection - getting acquainted with the the GNU compiler tools - the C preprocessor (cpp), the C compiler (gcc) and the C++ compiler (g++), and the assembler (gas)
10. Understanding build systems - constructing makefiles and using make, using autoconf and autogen to automatically generate makefiles tailored for different development environments, Using flex (lex) and bison (yacc) to design parsers

TOTAL: 45 PERIODS

IT9401

SOFTWARE TESTING

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

AIM:

The course looks at the role of developers in areas such as test planning, implementation, and defect tracking. It explains how to review and manage test requirements and how to incorporate testing into the software development life cycle.

OBJECTIVES:

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

UNIT I INTRODUCTION

8

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 for Developing a Defect Repository – Defect Prevention Strategies

UNIT II TEST CASE DESIGN

11

Test Case Design Strategies – Using Black Box Approach to Test Case Design - Random Testing – Requirements based testing – Boundary Value Analysis – Decision tables - Equivalence Class Partitioning - State-based testing – Cause-effect graphing – Error guessing - Compatibility testing – User documentation testing – Domain testing

AIM:

To introduce the fundamentals of Cryptography and its application to security.

OBJECTIVES:

- To understand the mathematics behind Cryptography
- To understand the standard algorithms used to provide confidentiality provide integrity and authenticity.
- To get a working knowledge of network security, data base security and DS security issues in order to build secure systems.

UNIT I**9**

Security trends – Attacks and services – Classical crypto systems – Different types of ciphers – LFSR sequences – Basic Number theory – Congruences – Chinese Remainder theorem – Modular exponentiation – Fermat and Euler's theorem – Legendre and Jacobi symbols – Finite fields – continued fractions.

UNIT II**9**

Simple DES – Differential cryptoanalysis – DES – Modes of operation – Triple DES – AES – RC5, RC4 – RSA – Attacks – Primality test – factoring.

UNIT III**9**

Discrete Logarithms – Computing discrete logs – Diffie-Hellman key exchange – Elliptic curve cryptography Key exchange - ElGamal Public key cryptosystems – Message Authentication codes - Hash functions – Hash algorithms - Secure Hash – Birthday attacks - MD5 – Authentication protocols - Digital signatures – RSA, ElGamal, DSA.

UNIT IV**9**

Authentication applications – Kerberos, X.509, PKI – Electronic Mail security – PGP, S/MIME – IP security – Web Security – SSL, TLS, SET – system security.

UNIT V**9**

Trusted Operating systems – security models – designing trusted OS – assurance – Data base security – multi-level databases – multi-level security.

TOTAL: 45 PERIODS**TEXT BOOKS**

- 1 Wade Trappe, Lawrence C Washington, “ Introduction to Cryptography with coding theory”, 2nd ed, Pearson, 2007.
- 2 William Stallings, “Cryptography and Network security Principles and Practices”, Pearson/PHI, 4th ed, 2006.
- 3 PFleeger and Pfleeger, “Security in computing”, 3rd ed, PHI/Pearson, 2003.

REFERENCES

1. Wenbo Mao, “Modern Cryptography Theory and Practice”, Pearson 2004.

UNIT I OVERVIEW OF MANAGEMENT 9

Organization - Management - Role of managers - Evolution of Management thought - Organization and the environmental factors - Managing globally - Strategies for International Business.

UNIT II PLANNING 9

Nature and purpose of planning - Planning process - Types of plans – Objectives - - Managing by objective (MBO) Strategies - Types of strategies - Policies - Decision Making - Types of decision - Decision Making Process - Rational Decision Making Process - Decision Making under different conditions.

UNIT III ORGANIZING 9

Nature and purpose of organizing - Organization structure - Formal and informal groups / organization - Line and Staff authority - Departmentation - Span of control - Centralization and Decentralization - Delegation of authority - Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training - - Performance Appraisal.

UNIT IV DIRECTING 9

Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership - Leadership theories - Communication - Hurdles to effective communication - Organization Culture - Elements and types of culture - Managing cultural diversity.

UNIT V CONTROLLING 9

Process of controlling - Types of control - Budgetary and non-budgetary control techniques - Managing Productivity - Cost Control - Purchase Control - Maintenance Control - Quality Control - Planning operations.

TOTAL: 45 PERIODS**TEXT BOOKS:**

1. Hellriegel, Slocum & Jackson, ' Management - A Competency Based Approach', Thomson South Western, 10th edition, 2007.
2. Harold Koontz, Heinz Wehrich and Mark V Cannice, 'Management - A global & Entrepreneurial Perspective', Tata Mcgraw Hill, 12th edition, 2007.
3. Stephen P. Robbins and Mary Coulter, 'Management', Prentice Hall of India, 8th edition.
4. Charles W L Hill, Steven L McShane, 'Principles of Management', Mcgraw Hill Education, Special Indian Edition, 2007.
5. Andrew J. Dubrin, 'Essentials of Management', Thomson Southwestern, 7th edition, 2007.

AIM:

To understand the various testing tools and their use with various testing methodologies

OBJECTIVES:

- to study the working of testing tools
 - to apply the fundamental testing techniques associated with software project development
 - to automate various testing strategies in specific domains
1. Study of various tools for software testing such as WinRunner, LoadRunner, Rational Rose Test Suite etc.,
 2. Performing the following testing using the testing tools
 1. Requirements testing
 2. use-case scenario testing
 3. Design testing
 4. code testing
 5. Path testing
 6. Code coverage testing
 7. Data-flow testing
 8. Load testing
 9. Regression testing
 10. Documentation testing
 3. mini-project: developing an automated test-case generation tool for domains such as :
 - a. web-site development
 - b. inventory management
 - c. shopping cart
 - d. finance management
 - e. health-care

TOTAL: 45 PERIODS

1. Write programs to implement the following **number theory** concept
 - Prime and Relatively Prime Numbers
 - Arithmetic Modulo 8 and Multiplication Modulo 8
 - Fermat's Theorem and Euler's Totient Function
2. Write programs to implement the following **cryptography algorithms**
 - Playfair cipher and Hill cipher
 - Simplified DES algorithm
 - RSA algorithm
3. Write programs to implement the following **hash algorithms**
 - MD5
 - SHA-1
4. Write programs to implement the following **Authentication**
 - Digital Signature and Digital Certificate
 - Kerberos System
 - X.509
5. Write programs to implement the following **Trusted OS** issues
 - Write a program to implement a set of rules combining the secrecy controls of the Bell-La Padula with integrity controls of the Biba model.
 - Write a program to implement UNIX operating system structure files by using a tree. Each file is at a leaf of the tree, and the unique path from the root of the leaf identifies the file. Each interior node is sub directory, which specifies the names of the paths leading form that node. A user can block access through a node by restricting access to the sub directory. Device a method that uses this structure to implement discretionary access policy.
6. Write a program to implement the following database security issues.
 - Cryptography in databases.
 - Access Control list.
 - Two phase locking technique.
7. Write a program to implement Hacking windows.
 - BIOS Passwords.
 - Windows login password
 - Internet explorer users
 - Changing windows visuals
 - Accessing restricted drives.

TOTAL: 45 PERIODS

AIM:

To give an understanding on the study that deals with the representation of signals as ordered sequences of numbers and how to process those ordered sequences.

OBJECTIVES:

- To understand the basics of signals and system by analyzing the various transformations available and determine their use to DSP
- To study on the various digital filtering techniques and how to apply to DSP
- To study on the ways to estimate signal parameters, and transform a signal into a form that is more informative.
- To give students a flavour on the applications of DSP in the areas of speech and image

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 (linear and circular) – Correlation.

UNIT II FREQUENCY TRANSFORMATIONS 9

Introduction to DFT – Properties of DFT – Filtering methods based on DFT – FFT Algorithms - Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – 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 – (HPF, BPF, BRF) filter design using frequency translation

UNIT IV FIR FILTER DESIGN 9

Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

UNIT V APPLICATIONS 9

Multirate signal processing – Speech compression – Adaptive filter – Musical sound processing – Image enhancement.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. John G. Proakis & Dimitris G.Manolakis, “Digital Signal Processing – Principles, Algorithms & Applications”, Fourth edition, Pearson education / Prentice Hall, 2007.
2. Emmanuel C..Ifeachor, & Barrie.W.Jervis, “Digital Signal Processing”, Second edition, Pearson Education / Prentice Hall, 2002.

REFERENCES:

1. Sanjit K. Mitra, “Digital Signal Processing – A Computer Based Approach” ,Tata McGraw Hill, Fourth Edition, 2007 .
2. Alan V.Oppenheim, Ronald W. Jchafer & Hohn. R.Back, “Discrete Time Signal Processing”, Pearson Education, Second Edition, 2001.
3. Andreas Antoniou, “Digital Signal Processing”, Tata McGraw Hill

AIM:

To provide an overview of 3-tier architecture and enable the student to create enterprise applications.

OBJECTIVES:

- To introduce the feature of the J2EE framework and the usage of MVC architecture.
- To design and create user interfaces using JSP.
- To write the business logic for the middle tier.
- To provide transaction and security support for enterprise applications.
- To study the features of other frameworks.

UNIT I **9**

Introduction – 3 tier architecture – working with model-view-controller – JCP – J2EE XML based APIs – Application servers

UNIT II **9**

Presentation tier and EIS tier – servlet programming – JSP – Java Mail – JMS – Java transactions – JNDI – Java authentication and authorization services – Java cryptography (9)

UNIT III **9**

Service Tier and Data tier – EJB architecture – session beans – entity beans – message driven beans – JDBC – J2EE connector architecture

UNIT IV **9**

Web Services – J2EE Web Services – patterns – presentation, service tier and Data tier patterns – J2ME

UNIT V **9**

AJAX - Struts – JSF – Hibernate – Spring

TOTAL: 45 PERIODS

TEXT BOOKS

1. McGovern et al, "J2EE 1.4 Bible", Wiley India, 2007.
2. Black Book, "Java Server Programming", Dreamtech Press, 2007. (Unit V)

REFERENCES

1. Cay S Horstmann, Gary Cornell, "Core Java 2" Vol II, 7th ed, Pearson Education, 2005.
2. W Clay Richardson, et al, "Professional Java JDK 6 Edition", Wrox, 2007

AIM:

Advanced database aims at providing an understanding of the principles used in the design of different kinds of data models. It is also deals with the Transaction management of these different databases.

OBJECTIVES:

- To understand about different data models that can be used for specialized applications
- To make the students to get familiarized with transaction management of advanced database models
- To develop in-depth knowledge about web and intelligent database systems.
- To provide an introductory concept about the way in which data can be stored in multimedia databases.

UNIT I RELATIONAL MODEL ISSUES 9

ER Model - Normalization – Query Processing – Query Optimization - Transaction Processing - Concurrency Control – Recovery - Database Tuning.

UNIT II DISTRIBUTED DATABASES 9

Parallel Databases – Inter and Intra Query Parallelism – Distributed Database Features – Distributed Database Architecture – Fragmentation – Distributed Query Processing – Distributed Transactions Processing – Concurrency Control – Recovery – Commit Protocols.

UNIT III OBJECT ORIENTED DATABASES 9

Introduction to Object Oriented Data Bases - Approaches – Modeling and Design - Persistence – Query Languages - Transaction - Concurrency – Multi Version Locks – Recovery – POSTGRES – JASMINE –GEMSTONE - ODMG Model.

UNIT IV EMERGING SYSTEMS 9

Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases- XML and Web Databases.

UNIT V CURRENT ISSUES 9

Rules - Knowledge Bases - Active and Deductive Databases - Multimedia Databases– Multimedia Data Structures – Multimedia Query languages - Spatial Databases.

TOTAL: 45 PERIODS**TEXT BOOKS:**

1. Thomas Connolly and Carlolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education 2003.

REFERENCES:

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2006.
2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Fifth Edition, Tata McGraw Hill, 2006.
3. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.

AIM:

To understand about the file system, system calls, process, memory management and I/O in Unix.

OBJECTIVES:

- To introduce the architecture of the Unix Operating System.
- To understand the buffer structure
- To introduce inodes
- To know what is super block
- To cover various system calls
- To study system boot and the Init process
- To introduce process states
- To introduce signals
- To understand memory management
- To study IPC mechanisms

UNIT I OVERVIEW 8

General Overview of the System: History – System structure – User perspective – Operating system services – Assumptions about hardware. Introduction to the Kernel : Architecture of the UNIX operating system – Introduction to system concepts. The Buffer Cache: Buffer headers – Structure of the buffer pool – Scenarios for retrieval of a buffer – Reading and writing disk blocks – Advantages and disadvantages of the buffer cache.

UNIT II FILE SUBSYSTEM 8

Internal representation of files: Inodes – Structure of a regular file – Directories – Conversion of a path name to an Inode – Super block – Inode assignment to a new file – Allocation of disk blocks.

UNIT III SYSTEM CALLS FOR THE FILE SYSTEM 10

Open – Read – Write – File and record locking – Adjusting the position of file I/O – Lseek – Close – File creation – Creation of special files – Changing directory, root, owner, mode – stat and fstat – Pipes – Dup – Mounting and unmounting file systems – link – unlink.

UNIT IV PROCESSES 10

Process states and transitions – Layout of system memory – The context of a process – Saving the context of a process – Manipulation of the process address space - Sleep. Process Control : Process creation – Signals – Process termination – Awaiting process termination – Invoking other programs – user id of a process – Changing the size of a process - Shell – System boot and the INIT process– Process Scheduling.

UNIT V MEMORY MANAGEMENT AND I/O 9

Memory Management Policies : Swapping – Demand paging. The I/O Subsystem : Driver Interface – Disk Drivers – Terminal Drivers– Streams – Inter process communication.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Maurice J. Bach, "The Design of the Unix Operating System", First Edition, Pearson Education, 1999.

REFERENCES:

1. B. Goodheart, J. Cox, "The Magic Garden Explained", Prentice Hall of India, 1986.
2. S. J. Leffler, M. K. Mckusick, M. J. .Karels and J. S. Quarterman., "The Design And Implementation of the 4.3 BSD Unix Operating System", Addison Wesley, 1998.
3. Uresh Vahalia, "Unix Internals: The New Frontiers", Pearson Education, 1996.

IT9021**VISUAL PROGRAMMING****L T P C
3 0 0 3****AIM:**

To introduce windows programming and to cover visual C++ in detail.

OBJECTIVES:

- To introduce event driven programming
- To develop and display a window
- To illustrate the working of message loop
- To introduce window messages
- To illustrate the data types
- To program using Bitmaps
- To develop dialog based applications
- To use static controls
- To use dynamic controls
- To understand document view architecture
- To understand modal and modeless dialogs
- To develop DLL.

UNIT I**8**

The windows programming Model- Event driven programming- GUI concepts – Overview of Windows programming – Creating the window – Displaying the window – message Loop – windows procedure – WM_PAINT message – WM_DESTROY message – Data types – Resources - An Introduction to GDI – Device context- Text output- Scroll Bars – Keyboard – Mouse – Menus.

UNIT II**10**

Visual C++ components – Introduction to Microsoft Foundation Classes Library – Getting started with AppWizard – Class Wizard – Event handling – Keyboard and Mouse events - Graphics Device Interface, Colors, Fonts, Pen, Brush, Single and Multiple document interface - Reading and Writing documents – WM – SIZE, WM-CHAR messages. Resources – Bitmaps creation, usage of BMP and displaying a file existing as a BMP.

UNIT III **9**
Dialog Based Applications, controls – Animate control, List Box, Combo Box, Label , Edit box , Radio button, frame, command button , image list, CRect tracker, Tree control , CtabControl - Dynamic controls – slider control , progress control. Inheriting CTreeView – CrichteditView

UNIT IV **9**
Document view Architecture, Serialization - Multithreading. Menus – Keyboard Accelerators – Tool bars – Tool tip - property sheet. Modal Dialog, Modeless Dialog - CColorDialog, CfileDialog

UNIT V **9**
Status bars – To display in existing status bar, creating new status bar - splitter windows and multiple views – Dynamic Link Library – Data base Management with ODBC, TCP/IP, Winsock and WinInet, ActiveX control – creation and usage, Container class, Exception handling and MFC debugging support.

TOTAL:45 PERIODS

TEXT BOOKS:

1. Charles Petzold, “Programming Windows”, Microsoft press, 1998.
2. David Kruglinski.J, “Programming Microsoft Visual C++”, Fifth Edition, Microsoft press, 1998.

REFERENCES:

1. Steve Holzner, “Visual C++ 6 programming”, Wiley Dreamtech India Pvt. Ltd.,2003.
2. Kate Gregory “Microsoft Visual C++ .Net”, Que, 2003 .
3. Herbert Schildt , “ MFC programming from the GroundUp” , Second Edition, Osborne/Tata McGraw – Hill, 1998.
4. Pappara and Murray, “Visual C++ : The Complete Reference”, Tata McGraw – Hill, 2000

CS9027 **DATA WAREHOUSING AND DATA MINING** **L T P C**
3 0 0 3

AIM:

To serve as an introductory course to under graduate students with an emphasis on the design aspects of Data Mining and Data Warehousing

OBJECTIVE:

This course has been designed with the following objectives:

- To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules are exhaustively dealt with.
- To introduce the concept of data warehousing with special emphasis on architecture and design.

UNIT I **DATA WAREHOUSING** **10**
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 8
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 8
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 11
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 Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Prediction

UNIT V CLUSTERING AND APPLICATIONS AND TRENDS IN DATA MINING 8
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

TEXT BOOKS:

1. Alex Berson and Stephen J. Smith, “ Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, 2007.

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. Ajay “, Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, “ Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
4. Soumendra Mohanty, “Data Warehousing Design, Development and Best Practices”, Tata McGraw – Hill Edition, 2006.

AIM:

To provide an introduction to the .NET framework and enable the student to program in C#.

OBJECTIVES:

- To study basic and advanced features of the C# language
- To create form based and web based applications
- To study the internals of the .NET framework

UNIT I**9**

C# and the .NET framework – C# basics – Objects and types – Inheritance – Arrays – Operators and casts – Indexers

UNIT II**9**

Delegates and events – Strings and regular expressions – Generics – Collections – Memory management and pointers – Errors and exceptions

UNIT III**9**

Tracing and events - threading and synchronization - .Net security – localization – Manipulating XML - Managing the file system – basic network programming

UNIT IV**9**

Window based applications – Data access with .NET – basics of ASP .NET - Introduction to web services

UNIT V**9**

Architecture – Assemblies – shared assemblies – CLR hosting – Appdomains – Reflection

TOTAL: 45 PERIODS**TEXT BOOK:**

1. Christian Nagel et al. "Professional C# 2005 with .NET 3.0", Wiley India , 2007

REFERENCES:

1. Jesse Liberty, "Programming C#", O'Reilly, 2001.
2. Andrew Troelson, "Pro C# with .NET 3.0", Apress, 2007.
3. Kevin Hoffman, "Visual C# 2005", Pearson Education, 2006.
4. S. Thamarai Selvi, R. Murugesan, "A Text Book on C#", Pearson Education, 2003.

AIM:

The aim of this course is to understand the issues and challenges in tackling natural language and the use of statistical approaches in this challenging area.

OBJECTIVES:

- To study the features of natural languages including Indian Languages
- To grasp Morphology and Parts-of-Speech and its processing
- To understand Probabilistic Models for language processing
- To comprehend the models for Syntax analysis
- To understand Semantics and Pragmatics of natural language

UNIT I INTRODUCTION 9

Issues – Motivation – Theory of Language -Features of Indian Languages – Issues in Font – Coding Techniques – sorting & searching issues.

UNIT II MORPHOLOGY AND PARTS-OF-SPEECH 9

Phonology – Computational Phonology - Words and Morphemes – Segmentation – Categorization and Lemmatisation – Word Form Recognition – Valency - Agreement - Regular Expressions and Automata – Morphology- Morphological issues of Indian Languages – Transliteration.

UNIT III PROBABILISTIC MODELS 9

Probabilistic Models of Pronunciation and Spelling – Weighted Automata – N- Grams – Corpus Analysis – Smoothing – Entropy - Parts-of-Speech – Taggers – Rule based models – Hidden Markov Models – Speech Recognition

UNIT IV SYNTAX 9

Basic Concepts of Syntax – Parsing Techniques – General Grammar rules for Indian Languages – Context Free Grammar – Parsing with Context Free Grammars – Top Down Parser – Earley Algorithm – Features and Unification - Lexicalised and Probabilistic Parsing.

UNIT V SEMANTICS AND PRAGMATICS 9

Representing Meaning – Computational Representation – Meaning Structure of Language – Semantic Analysis – Lexical Semantics – WordNet – Pragmatics – Discourse – Reference Resolution – Text Coherence – Dialogue Conversational Agents.

TOTAL:45 PERIODS**TEXT BOOKS:**

1. Daniel Jurafsky and James H. Martin “Speech and Language Processing”, Prentice Hall, 2000.
2. Ronald Hausser “Foundations of Computational Linguistics”, Springer-Verleg, 1999.

REFERENCES:

1. James Allen “Natural Language Understanding”, Benjamin/Cummings Publishing Co. 1995.
2. Steve Young and Gerrit Bloothoof “Corpus – Based Methods in Language and Speech Processing”, Kluwer Academic Publishers, 1997.

AIM:

The aim of this course is to provide an introduction to some basic issues and algorithms in artificial intelligence (AI). The course also provides an overview of intelligent agent design, where agents perceive their environment and act rationally to fulfill their goals. The course approaches AI from an algorithmic, computer science-centric perspective.

OBJECTIVES:

- To be familiar with the history of AI, philosophical debates, and be able to discuss the potential and limitations of the subject in its current form.
- To identify the kind of problems that can be solved using AI techniques; to know the relation between AI and other areas of computer science
- To have knowledge of generic problem-solving methods in AI.
- To understand the basic techniques of knowledge representation and their use.
- To know what the basic components of an intelligent agent are, and how this relates to other advanced subjects such as information retrieval, database systems, computer vision, robotics, human-computer interaction, reactive systems etc.
- To be able to implement basic decision making algorithms, including search-based problem solving techniques, and first-order logic.
- To know the basic issues in machine learning, and be able to apply straightforward techniques to learn from observed data.
- To be able to explain the difficulty of computer perception with examples from different modalities, and be able to show how perception affects intelligent systems design.

UNIT I INTRODUCTION 9

Intelligent Agents –Environments – Behavior – Structure – Artificial Intelligence – Present and Future - Problem Solving –agents – examples– uninformed search strategies – Avoiding repeated states – searching with partial information.

UNIT II SEARCHING TECHNIQUES 9

Informed search strategies –greedy – best first – A* - local search algorithms and optimization – local search in continuous spaces – Constraint satisfaction problems (CSP) – Backtracking search and Local search – Structure – Adversarial Search – Games – Optimal decisions in games – Alpha – Beta Pruning – imperfect real-time decision games – elements of chance -

UNIT III KNOWLEDGE REPRESENTATION AND REASONING 9

Logical Agents – Wumpus world - Propositional logic - First order logic - syntax and semantics – Using first order logic – Inference – forward chaining – backward chaining– Knowledge representation – Ontological Engineering – Categories and objects – Actions – Simulation and events – Mental events and mental objects.
Reasoning with Default Information – Truth Maintenance Systems – Reasoning with Uncertain Information – Axioms of Probability – Independence – Bayes' Rule and its use

UNIT IV LEARNING 9

Learning from observations – forms of learning – Inductive learning - Learning decision trees – Ensemble learning – Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information - Reinforcement learning – Passive reinforcement learning – Active reinforcement learning – Generalization in reinforcement learning.

UNIT V APPLICATIONS 9
Communication – Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation - Perception – image Formation – Image Processing – Object Recognition – Robotics – Robotic Perception – Planning –Moving –Robotic Software Architecture.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Stuart Russell, Peter Norvig, “Artificial Intelligence – A Modern Approach”, Second Edition, Pearson Education, 2004.

REFERENCES:

1. Nils J. Nilsson, “Artificial Intelligence: A new Synthesis”, Harcourt Asia Pvt. Ltd., 2000.
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, Second Edition, Tata McGraw Hill, 2003.
3. George F. Luger, “Artificial Intelligence-Structures And Strategies For Complex Problem Solving”, Pearson Education, 2002.

CS9031 CYBER FORENSICS L T P C
3 0 0 3

AIM:

To study different types of Cyberforensic technologies and enable the student to have a foundation in this emerging area.

OBJECTIVES:

- To study the fundamentals of computer forensics
- To have an overview of techniques for Data Recovery and Evidence Collection
- To study various threats associated with security and information warfare
- To study the tools and tactics associated with cyberforensics.

UNIT I 9
Computer Forensics Fundamentals – Types of Computer Forensics Technology – Types of Vendor and Computer Forensics Services

UNIT II 9
Data Recovery – Evidence Collection and Data Seizure – Duplication and Preservation of Digital Evidence – Computer Image Verification and Authentication

UNIT III 9
Discover of Electronic Evidence – Identification of Data – Reconstructing Past Events – Networks

UNIT IV 9
Fighting against Macro Threats – Information Warfare Arsenal – Tactics of the Military – Tactics of Terrorist and Rogues – Tactics of Private Companies

UNIT V **9**
The Future – Arsenal – Surveillance Tools – Victims and Refugees – Advanced
Computer Forensics

TOTAL: 45 PERIODS

TEXTBOOK:

1. John R. Vacca, "Computer Forensics", Firewall Media, 2004.

REFERENCES:

1. Chad Steel, "Windows Forensics", Wiley India, 2006.
2. Majid Yar, "Cybercrime and Society", Sage Publications, 2006.
3. Robert M Slade, "Software Forensics", Tata McGrawHill, 2004.

IT9024 **DIGITAL IMAGE PROCESSING** **L T P C**
3 0 0 3

AIM:

The aim is to inculcate a basic training in the processing of images for practical applications in the domain of medical, remoting sessions and in general.

OBJECTIVES:

- To introduce basic concepts in acquiring, storage and Process of images
- To introduce for enhancing the quality of images.
- To introduce techniques for extraction and processing of region of interest
- To introduce case studies of Image Processing.

UNIT I **FUNDAMENTALS OF IMAGE PROCESSING** **9**

Introduction – Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Colour Fundamentals and Models, File Formats, Image operations – Arithmetic, Geometric and Morphological.

UNIT II **IMAGE ENHANCEMENT** **9**

Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening. Frequency Domain : Filtering in Frequency Domain – DFT, FFT, DCT – Smoothing and Sharpening filters – Homomorphic Filtering.

UNIT III **IMAGE SEGMENTATION AND FEATURE ANALYSIS** **9**

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Morphological WaterSheds – Motion Segmentation, Feature Analysis and Extraction.

UNIT IV **MULTI RESOLUTION ANALYSIS AND COMPRESSIONS** **9**

Multi Resolution Analysis : Image Pyramids – Multi resolution expansion – Wavelet Transforms. Image Compression : Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards.

UNIT V **APPLICATIONS OF IMAGE PROCESSING** **9**

Image Classification – Image Recognition – Image Understanding – Video Motion Analysis – Image Fusion – Steganography – Digital Compositing – Mosaics – Colour Image Processing..

TOTAL: 45 PERIOD

TEXT BOOKS:

1. Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing" Second Edition, Pearson Education, 2003.

REFERENCES:

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Second Edition, Thomson Learning, 2001
2. Anil K.Jain, "Fundamentals of Digital Image Processing", PHI, 2006.
3. Sanjit K. Mitra, & Giovanni L. Sicuranza, "Non Linear Image Processing", Elsevier, 2007.
4. Richard O. Duda, Peter E. HOF, David G. Stork, "Pattern Classification" Wiley Student Edition, 2006.

CS9032**GRAPH THEORY****L T P C
3 0 0 3****AIM:**

Knowledge of basic Graph Theory and development of skills in problem solving.

OBJECTIVES:

- Acquiring knowledge of the basic tools in Graph Theory. Some advanced topics including some algorithms.

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 9

Incidence matrix – Submatrices – Circuit Matrix – Path Matrix – Adjacency Matrix – 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 – Adjacency Matrix of a Digraph.

UNIT IV ALGORITHMS 9

Algorithms: Connectedness and Components – Spanning tree – Finding all Spanning Trees of a Graph – Set of Fundamental Circuits – Cut Vertices and Separability – Directed Circuits.

UNIT V ALGORITHMS 9

Algorithms: Shortest Path Algorithm – DFS – Planarity Testing – Isomorphism.

TOTAL:45 PERIODS

TEXT BOOKS:

1. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.

REFERENCES:

1. R.J. Wilson, "Introduction to Graph Theory", Fourth Edition, Pearson Education, 2003.

CS9035**FREE/OPEN SOURCE SOFTWARE****L T P C****3 0 0 3****AIM:**

To understand the FOSS Philosophy and use a Linux distribution to learn installation, administration and programming in this environment

OBJECTIVES:

- To impart a first hand knowledge on the FOSS philosophy and methodology
- To enable the students to install and use Linux distribution
- To train the students in Linux desktop usage and some commonly used programs
- To encourage students to apply OSS philosophy and migrate to FOSS in their own domains
- To develop application programs using FOSS

UNIT I HISTORY AND OVERVIEW OF GNU/LINUX AND FOSS 3

Definition of FOSS & GNU, History of GNU/Linux and the Free Software Movement, Advantages of Free Software and GNU/Linux, FOSS usage , trends and potential—global and Indian.

UNIT II SYSTEM ADMINISTRATION 10

GNU/Linux OS installation--detect hardware, configure disk partitions & file systems and install a GNU/Linux distribution ; Basic shell commands -logging in, listing files, editing files, copying/moving files, viewing file contents, changing file modes and permissions, process management ; User and group management, file ownerships and permissions, PAM authentication ; Introduction to common system configuration files & log files ; Configuring networking, basics of TCP/IP networking and routing, connecting to the Internet (through dialup, DSL, Ethernet, leased line) ; Configuring additional hardware -sound cards, displays & display cards, network cards, modems, USB drives, CD writers ; Understanding the OS boot up process ; Performing every day tasks using gnu/Linux --accessing the Internet, playing music, editing documents and spreadsheets, sending and receiving email, copy files from disks and over the network, playing games, writing CDs ; X Window system configuration and utilities--configure X windows, detect display devices ; Installing software from source code as well as using binary packages

UNIT III SERVER SETUP AND CONFIGURATION 10

Setting up email servers--using postfix (SMTP services), courier (IMAP & POP3 services), squirrel mail (web mail services) ; Setting up web servers --using apache (HTTP services), php (server-side scripting), perl (CGI support) ; Setting up file services --using samba (file and authentication services for windows networks), using NFS (file services for gnu/Linux / Unix networks) ; Setting up proxy services --using squid (http / ftp / https proxy services) ; Setting up printer services -using CUPS (print spooler), foomatic (printer database) ; Setting up a firewall -Using netfilter and iptables

UNIT IV PROGRAMMING TOOLS**12**

Using the GNU Compiler Collection --GNU compiler tools ; the C preprocessor (cpp), the C compiler (gcc) and the C++ compiler (g++), assembler (gas) ; Understanding build systems --constructing make files and using make, using autoconf and autogen to automatically generate make files tailored for different development environments ; Using source code versioning and management tools --using cvs to manage source code revisions, patch & diff ; Understanding the GNU Libc libraries and linker -linking against object archives (.a libraries) and dynamic shared object libraries (.so libraries), generating statically linked binaries and libraries, generating dynamically linked libraries ; Using the GNU debugging tools --gdb to debug programs, graphical debuggers like ddd, memory debugging / profiling libraries mpatrol and valgrind ; Review of common programming practices and guidelines for GNU/Linux and FOSS ; Introduction to Bash, sed & awk scripting

UNIT V APPLICATION PROGRAMMING**10**

Basics of the X Windows server architecture ; Qt Programming ; Gtk+ Programming ; Python Programming ; Programming GUI applications with localisation support.

TOTAL:45 PERIODS**REFERENCES:**

- 1 N. B. Venkateshwarlu (Ed); Introduction to Linux: Installation and Programming, B S Publishers; 2005.
- 2 Matt Welsh, Matthias Kalle Dalheimer, Terry Dawson, and Lar Kaufman, Running Linux, Fourth Edition, O'Reilly Publishers, 2002.
3. Carla Schroder, Linux Cookbook, First Edition, O'Reilly Cookbooks Series, 2004.

ON-LINE MATERIAL:

1. Open Sources: Voices from the Open Source Revolution, First Edition, January 1999, ISBN: 1-56592-582-3. URL: <http://www.oreilly.com/catalog/opensources/book/toc.html>
2. The Linux Cookbook: Tips and Techniques for Everyday Use, First Edition, Michael Stutz, 2001. URL: http://dsl.org/cookbook/cookbook_toc.html
3. The Linux System Administrators' Guide, Lars Wirzenius, Joanna Oja, Stephen Stafford, and Alex Weeks, December 2003. URL: <http://www.tldp.org/guides.html>
4. Using GCC, Richard Stallman et al. URL: <http://www.gnu.org/doc/using.html>
5. An Introduction to GCC, Brian Gough. URL: <http://www.network-theory.co.uk/docs/gccintro/>
6. GNU Autoconf, Automake and Libtool, Gary V. Vaughan, Ben Elliston, Tom Tromey and Ian Lance Taylor. URL: <http://sources.redhat.com/autobook/>
7. Open Source Development with CVS, Third Edition, Karl Fogel and Moshe Bar. URL: <http://cvsbook.red-bean.com/>
8. Advanced Bash Scripting Guide, Mendel Cooper, June 2005. URL: <http://www.tldp.org/guides.html>
9. GTK+/GNOME Application Development, Havoc Pennington. URL: <http://developer.gnome.org/doc/GGAD>
10. Python Tutorial, Guido van Rossum, Fred L. Drake, Jr., Editor. URL: <http://www.python.org/doc/current/tut/tut.html>

AIM:

This course aims at providing sufficient in depth knowledge in Software agents.

OBJECTIVES:

1. The student can well understand the philosophy and psychology of both human agents and software agents regarding co ordinations operation and communication.
2. Intelligent / Cognitive aspects are dealt with software knowledge support.

UNIT I AGENTS – OVERVIEW**9**

Agent Definition – Agent Programming Paradigms – Agent Vs Object – Aglet – Mobile Agents – Agent Frameworks – Agent Reasoning.

UNIT II JAVA AGENTS**9**

Processes – Threads- FIPA – ACL – DIA GAL– Daemons – Components – Java Beans – ActiveX – Sockets – RPCs – Distributed Computing – Aglets Programming – Jini Architecture – Actors and Agents – Typed and proactive messages.

UNIT III MULTIAGENT SYSTEMS**9**

Reasoning about Multi agent Interaction between agents – Reactive English Agents Dutch – Combinational Spectrum – Cognitive Agents – Interaction protocols – Agent coordination – Agent negotiation – Agent Cooperation – Agent Organization – Self-Interested agents in Electronic Commerce Applications – Probabilistic Agents – Temporal Agents.

UNIT IV INTELLIGENT SOFTWARE AGENTS**9**

Interface Agents – Agent Communication Languages – Agent Knowledge Representation – Agent Adaptability – Belief Desire Intension – Mobile Agent Applications- Argumentaic and Knowledge Sharing Agent.

UNIT V AGENTS AND SECURITY**9**

Agent Security Issues – Mobile Agents Security – Protecting Agents against Malicious Hosts – Untrusted Agent – Black Box Security – Authentication for agents – Security issues for Aglets.

TOTAL:45 PERIODS**TEXT BOOKS:**

1. Bigus & Bigus, " Constructing Intelligent agents with Java ", Wiley, 1997.
2. Bradshaw, " Software Agents ", MIT Press, 2000.

REFERENCES:

1. Russel, Norvig, "Artificial Intelligence: A Modern Approach", Second Edition, Pearson Education, 2003.
2. Richard Murch, Tony Johnson, "Intelligent Software Agents", Prentice Hall, 2000.
3. Gerhard Weiss, "Multi Agent Systems – A Modern Approach to Distributed Artificial Intelligence", MIT Press, 2000.

AIM:

To understand the internals of a router and get an experience of designing such systems.

OBJECTIVES:

- To learn the functions of a router, and its architecture.
- To learn about Network processors – their architecture, programming issues, and design issues.

UNIT I ROUTING IN IP NETWORKS 9

Static Routes – Dynamic Routes – RIP v1, RIP v2 – IGRP – EIGRP – SPF – Integrated IS-IS – IP Traffic engineering – Traffic, Stochasticity, Delay and Utilization – Application view – Architecture Framework – EGP, BGP routing.

UNIT II ROUTER ARCHITECTURE 9

Function of Router – Types – Elements – Packet flow – Packet Processing - Algorithms And Data Structures (packet buffer allocation, etc) - Packet processing functions (Bridge Algorithm, Table Lookup And Hashing, etc)- Protocol Software (threads, Interrupts, etc) - Hardware Architectures For Protocol Processing - Classification And Forwarding – Switching Fabrics.

UNIT III NETWORK PROCESSORS 9

Scalability With Parallelism And Pipelining - Complexity Of Network Processor Design (packet processing, ingress & egress processing, Macroscopic Data Pipelining And Heterogeneity etc) - Network Processor Architectures : architectural variety, Primary architectural characteristics, Packet Flow, Clock Rates, software architecture, Assigning Functionality To The Processor Hierarchy.

UNIT IV NP ARCHITECTURES 9

Issues In Scaling A Network Processor (processing hierarchy and scaling)– examples of commercial Network Processors : Multi-Chip Pipeline, Augmented RISC Processor, Embedded Processor Plus Coprocessors, etc. - Design Tradeoffs and consequences (Programmability Vs. Processing Speed , speed vs functionality. etc).

UNIT V CASE STUDY – NP ARCHITECTURE AND PROGRAMMING 9

Intel NP - Multithreaded Architecture Overview – Basic Features, External Connections, Internal components – Embedded RISC processor (instruction set, internal peripheral unit, User And Kernel Mode Operation) -Packet Processor Hardware (microsequencing, instruction set, etc) – memory interfaces – system and control interface components – Bus interface -Software Development Kit – IXP instruction set – MicroEngine Programming - thread synchronization – developing sample applications.

TOTAL:45 PERIODS**TEXT BOOKS:**

1. Douglas E. Comer "Network System Design using Network Processors" Prentice Hall, 2006.
2. Deepankar Medhi, Karthikeyan Ramasamy, "Network Routing : Algorithms, Protocols, and Architecture", Elsevier, 2007.

REFERENCES:

1. Patrick Crowley, M A Franklin, H Hadimioglu, PZ Onufryk, "Network Processor Design, Issues and Practices Vol - I", Morgan Kauffman, 2002.
2. <http://www.npforum.org/>
3. <http://www.intel.com/design/network/products/npfamily/>

AIM:

To study about the internetworking concepts and functionalities of TCP and IP software and to design data structures for implementing those functionalities.

OBJECTIVES:

- To understand the IP addressing schemes which provides the base for Layer 2 and Layer 3 header field detection, error reporting and dynamic address mapping.
- To develop data structures for basic protocol functions of TCP/IP and to understand and use the various members in the respective structures.
- To design and implement data structures for maintaining multiple local and global timers that will govern over various modules of TCP and IP software.

UNIT I INTRODUCTION 9

Internetworking concepts and architecture model – classful Internet address – CIDR – Subnetting and Supernetting – ARP – 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 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

TEXT BOOKS

1. Douglas E Comer, "Internetworking with TCP/IP Principles, Protocols and Architecture", Vol 1 V edition 2006 and Vol 2, III 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

AIM:

To provide some fundamental concepts in Software measurement and Metrics.

OBJECTIVE

- To be aware of Core metrics for product, quality, process
- To familiarize with the concepts of Software quality and tools for quality metrics
- To learn more about software reliability
- To understand important concepts of complexity metrics and OO metrics

UNIT I**9**

IT Organization – the need for Metrics – Interpreting the Metrics – Managing the data – Acquiring IT Metrics Information – Limitations – Analysis of Old Data Vs New Data – Graphical Analysis – Core of Software Planning – Measuring Core Metrics (Product, Quality, Process Productivity) Work Output Measurements.

UNIT II**9**

Software Development Process Models – Clean Room Methodology – Defect Prevention Process – Software Productivity Research Assessment- Malcolm Bridge Assessment – ISO 9000 – Software Quality Metrics – Defect Density – Customer Satisfaction Metrics – In Process Quality Metrics.

UNIT III**9**

Metrics for Software Maintenance – Ishikawa's seven basic tools – Their Use in Software Development – Defect Removal Effectiveness – Quality Planning – Cost Effectiveness of Phase Defect Removal – Quality Management Models – Rayleigh Model – Reliability Growth Model.

UNIT IV**9**

Process Metrics for Software Testing – Test Progress Scurve Testing Defect Arrivals, backup, Overtime – CPU Utilization during test – Possible Metrics for Acceptance - Testing to Evaluate.

UNIT V**9**

Complexity Metrics and Models – Lines of Code – Halstead Software Metrics – Cyclomatic Complexity – Syntactic Constructs – Structure Metrics – OO Metrics – CK OO Metric Suit – Productivity Metrics – Quality and Quality Management Metrics.

TOTAL: 45 PERIODS**TEXT BOOKS:**

1. Stephen H. Kan, " Metrics and Models In Software Quality Engineering", First Edition, Pearson Education, 2003.
2. IT Measurement – A Practical Advice from the Experts", International Function Point Users Group, Pearson Education, Asia,2002 (Unit I).

AIM:

To sensitize the engineering students on blending both technical and ethical

OBJECTIVES:

- Identify the core values that shape the ethical behavior of an engineer
- Utilize opportunities to explore one's own values in ethical issues
- Become aware of ethical concerns and conflicts
- Enhance familiarity with codes of conduct
- Increase the ability to recognize and resolve ethical dilemmas

UNIT I 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 – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories

UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study

UNIT III ENGINEER'S RESPONSIBILITY FOR SAFETY 9

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

UNIT IV RESPONSIBILITIES AND RIGHTS 9

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

UNIT V GLOBAL ISSUES 9

Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics - Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty – Moral Leadership – Sample Code of Conduct

TOTAL:45 PERIODS**TEXT BOOKS:**

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York (2005).
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Thompson Learning, (2000).

REFERENCES:

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, (1999).
2. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, (2003)
3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, (2001)
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics – An Indian Perspective", Biztantra, New Delhi, (2004)
5. David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press, (2003)

AIM :

To Provide comprehensive knowledges about the principles, practices, tools and techniques of Total Quality Management

OBJECTIVES :

- To Understand the various principles, practices of TQM to achieve quality
- To learn the various statistical approaches for quality control
- To understand the TQM tools for continuous process improvement
- To learn the important of ISO and Quality systems

UNIT I INTRODUCTION 9

Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of manufacturing and service quality - Basic concepts of TQM - Definition of TQM – TQM Framework - Contributions of Deming, Juran and Crosby – Barriers to TQM.

UNIT II TQM PRINCIPLES 9

Leadership – Strategic quality planning, Quality statements - Customer focus Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement – PDSA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS & 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 & TECHNIQUES II 9

Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Cost of Quality – Performance measures.

UNIT V QUALITY SYSTEMS 9

Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, Quality auditing- QS 9000 – ISO 14000 – Concepts, Requirements and Benefits – Case studies of TQM implementation in manufacturing and service sectors including IT.

TOTAL:45 PERIODS

TEXT BOOK:

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", 6th Edition, South-Western (Thomson Learning), 2005.
2. Oakland, J.S. "TQM – Text with Cases", Butterworth – Heinemann Ltd., Oxford, 3rd Edition, 2003.
3. Suganthi,L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd.,2006.
4. Janakiraman,B and Gopal, R.K, "Total Quality Management – Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006

AIM:

To make the Students understand the importance, relevance and potentialities of this emerging field of study

OBJECTIVES:

- Study the basic nano technology and Nanoscience.
- Understand interdisciplinary nature of this field
- Understand the important role of physics, chemistry, biology
- Recognize that the rules of nano science are fundamentally different than those we experience
- Study the basic fabrication strategies of nano science

UNIT I INTRODUCTION**10**

Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only)

UNIT II PREPARATION METHODS**10**

Bottom-up Synthesis-Top-down Approach: Precipitation, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III PATTERNING AND LITHOGRAPHY FOR NANOSCALE DEVICES**5**

Introduction to optical/UV electron beam and X-ray Lithography systems and processes, Wet etching, dry (Plasma /reactive ion) etching, Etch resists-dip pen lithography

UNIT IV PREPARATION ENVIRONMENTS**10**

Clean rooms: specifications and design, air and water purity, requirements for particular processes, Vibration free environments: Services and facilities required. Working practices, sample cleaning, Chemical purification, chemical and biological contamination, Safety issues, flammable and toxic hazards, biohazards.

UNIT V CHARACTERISATION TECHNIQUES**10**

X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation

TOTAL:45 PERIODS**TEXT BOOKS:**

1. A.S. Edelstein and R.C. Cammearata, eds., "Nanomaterials: Synthesis, Properties and Applications", Institute of Physics Publishing, Bristol and Philadelphia, 1996.
2. N John Dinardo, "Nanoscale characterisation of surfaces & Interfaces", 2nd Edition, Weinheim Cambridge, Wiley-VCH, 2000

REFERENCES:

1. G Timp (Editor), "Nanotechnology", AIP press/Springer, 1999
2. Akhlesh Lakhtakia (Editor), "The Hand Book of Nano Technology, Nanometer Structure", Theory, Modeling and Simulations", Prentice-Hall of India (P) Ltd, New Delhi, 2007.

AIM:

To understand that User Interface Design is as important as Functionality Design to study the basic principles User-Centered Design

OBJECTIVES:

- To study the basic characteristics of graphics and web interfaces
- To study the basics of Human Computer Interaction
- To study the basics of WIMP interfaces
- To study the multimedia interfaces for the web
- To study the principles of evaluating interfaces

UNIT I INTRODUCTION 8

Human – Computer Interface – Characteristics Of Graphics Interface – Direct Manipulation Graphical System – Web User Interface –Popularity –Characteristic & Principles.

UNIT II HUMAN COMPUTER INTERACTION 7

User Interface Design Process – Obstacles –Usability –Human Characteristics In Design – Human Interaction Speed –Business Functions –Requirement Analysis – Direct – Indirect Methods – Basic Business Functions – Design Standards – General Design Principles – Conceptual Model Design – Conceptual Model Mock-Ups

UNIT III WINDOWS 12

Characteristics– Components– Presentation Styles– Types– Managements– Organizations– Operations– Web Systems– System Timings - Device– Based Controls Characteristics– Screen – Based Controls — Human Consideration In Screen Design – Structures Of Menus – Functions Of Menus– Contents Of Menu– Formatting – Phrasing The Menu – Selecting Menu Choice– Navigating Menus– Graphical Menus. Operate Control – Text Boxes– Selection Control– Combination Control– Custom Control– Presentation Control.

UNIT IV MULTIMEDIA 9

Text For Web Pages – Effective Feedback– Guidance & Assistance– Internationalization– Accessibility– Icons– Image– Multimedia – Coloring.

UNIT V EVALUATION 9

Conceptual Model Evaluation – Design Standards Evaluation – Detailed User Interface Design Evaluation

TOTAL:45 PERIODS**TEXT BOOKS:**

1. Wilbent. O. Galitz ,“The Essential Guide To User Interface Design”, John Wiley & Sons, 2001.
2. Deborah Mayhew, “The Usability Engineering Lifecycle”, Morgan Kaufmann, 1999 (UNIT II and V)

REFERENCES:

1. Ben Sheiderman, “Design The User Interface”, Pearson Education, 1998.
2. Alan Cooper, “The Essential Of User Interface Design”, Wiley – Dream Tech Ltd., 2002.
3. Sharp, Rogers, Preece, ‘Interaction Design’, Wiley India Edition, 2007

AIM:

To learn the importance of Software Quality Assurance.

OBJECTIVES:

- To study the concepts of Software Quality Assurance
- To learn about Managing Software Quality
- To study and learn how to apply Software Quality Assurance metrics and analysis techniques
- To study Software Quality Program and Planning
- To get acquainted with Software Quality Assurance Standardization

UNIT I FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE 9

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management

UNIT II MANAGING SOFTWARE QUALITY 9

Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management

UNIT III SOFTWARE QUALITY ASSURANCE METRICS 9

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis

UNIT IV SOFTWARE QUALITY PROGRAM 9

Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning – An Overview – Purpose & Scope.

UNIT V SOFTWARE QUALITY ASSURANCE STANDARDIZATION 9

Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's CMM

TOTAL:45 PERIODS

TEXT BOOKS:

1. Mordechai Ben-Menachem / Garry S Marliss, "Software Quality", Vikas Publishing House, Pvt, Ltd., New Delhi.(UNIT III to V)
2. Watts S Humphrey, "Managing the Software Process", Pearson Education Inc.(UNIT I and II)

REFERENCES:

1. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", Third Edition, Artech House Publishers 2007
2. Nina S Godbole, "Software Quality Assurance: Principles and Practice", Alpha Science International, Ltd, 2004

UNIT I INTRODUCTION 9

Knowledge Representation and Reasoning – First order Logic – Syntax, Semantics Pragmatics – Expressing Knowledge – Levels of Representation – Knowledge Acquisition and Sharing – Sharing Ontologies – Language Ontologies –Language Patterns – Tools for Knowledge Acquisition

UNIT II RESOLUTION AND REASONING 9

Proportional Case – Handling Variables and Qualifies – Dealing with Intractability – Reasoning with Horn Clauses - Procedural Control of Reasoning – Rules in Production – Description Logic - Issues in Engineering -Vivid Knowledge – Beyond Vivid.

UNIT III REPRESENTATION 9

Object Oriented Representations – Frame Formalism – Structured Descriptions – Meaning and Entailment - Taxonomies and Classification – Inheritance – Networks – Strategies for Defeasible Inheritance – Formal Account of Inheritance Networks.

UNIT IV DEFAULTS, UNCERTAINTY AND EXPRESSIVENESS 9

Defaults – Introduction – Closed World Reasoning – Circumscription – Default Logic Limitations of Logic – Fuzzy Logic – Nonmonotonic Logic – Theories and World – Semiotics – Auto epistemic Logic - Vagueness – Uncertainty and Degrees of Belief – Noncategorical Reasoning – Objective and Subjective Probability.

UNIT V ACTIONS AND PLANNING 9

Explanation and Diagnosis – Purpose – Syntax, Semantics of Context – First Order Reasoning – Modal Reasoning in Context – Encapsulating Objects in Context – Agents – Actions – Situational Calculus – Frame Problem – Complex Actions – Planning – Strips – Planning as Reasoning – Hierarchical and Conditional Planning.

TOTAL:45 PERIODS**TEXT BOOKS:**

1. Ronald Brachman, Hector Levesque “Knowledge Representation and Reasoning”, The Morgan Kaufmann Series in Artificial Intelligence 2004
2. John F. Sowa, “ Knowledge Representation: Logical, Philosophical, and Computational Foundations”, 2000

REFERENCE:

1. Arthur B. Markman, “Knowledge Representation”, Lawrence Erlbaum Associates, 1998

AIM:

To learn about the techniques useful for programming parallel architectures in general and multi-core processors in particular.

OBJECTIVES:

- To realize the difference between programming for serial processors and parallel processors.
- To understand the challenges in parallel and multi-threaded programming.
- To learn about the various parallel programming paradigms, and solutions.

UNIT I INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY ISSUES 9

Scalable design principles – Principles of processor design – Instruction Level Parallelism, Thread level parallelism. Parallel computer models – Symmetric and distributed shared memory architectures – Performance Issues – Multi-core Architectures - Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture.

UNIT II PARALLEL PROGRAMMING 9

Fundamental concepts – Designing for threads. Threading and parallel programming constructs – Synchronization – Critical sections – Deadlock. Threading APIs.

UNIT III OPENMP PROGRAMMING 9

OpenMP – Threading a loop – Thread overheads – Performance issues – Library functions. Solutions to parallel programming problems – Data races, deadlocks and livelocks – Non-blocking algorithms – Memory and cache related issues.

UNIT IV MPI PROGRAMMING 9

MPI Model – collective communication – data decomposition – communicators and topologies – point-to-point communication – MPI Library.

UNIT V MULTITHREADED APPLICATION DEVELOPMENT 9

Algorithms, program development and performance tuning.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Shameem Akhter and Jason Roberts, "Multi-core Programming", Intel Press, 2006.
2. Michael J Quinn, Parallel programming in C with MPI and OpenMP, Tata Mcgraw Hill, 2003.

REFERENCES:

1. John L. Hennessey and David A. Patterson, "Computer architecture – A quantitative approach", Morgan Kaufmann/Elsevier Publishers, 4th. edition, 2007.
2. David E. Culler, Jaswinder Pal Singh, "Parallel computing architecture : A hardware/ software approach" , Morgan Kaufmann/Elsevier Publishers, 1999.

AIM:

To enable the student to use the advanced features of C# programming in the .NET framework.

OBJECTIVES:

- To study and implement applications using the Presentation Foundation.
- To study the features associated with enterprise services.
- To create distributed applications using Web services and remoting.
- To study the features of the Workflow Foundation
- To introduce the concepts of the Compact Framework.

UNIT I**9**

Windows Presentation Foundation – Overview – Event Handling – Data Binding – Windows Forms Integration – ASP.NET Introduction - ADO.NET and Data Binding – ASP.NET Development - Custom Controls – Master Pages – Site Navigation – Security – Themes – Web Parts - ASP.NET AJAX

UNIT II**9**

Communication – Web Services with ASP.NET – SOAP, WSDL, Web Services - .NET Remoting - .NET Remoting Architecture - .NET Remoting Features – Mobile Web Services

UNIT III**9**

Enterprise Services – Overview – COM+ Application – Message Queuing

UNIT IV**9**

Windows Workflow Foundation – Activities – Custom Activities – Workflows – Workflow Services – Hosting Workflows – Directory Services – Architecture – Administration Tools

UNIT V**9**

.NET Compact Framework – Compact Edition Data Stores – Errors, Testing and Debugging – Optimizing performance – Packaging and Deployment – Networking and Mobile Devices – Security

TOTAL:45 PERIODS**TEXT BOOKS:**

1. Christian Nagel et al. "Professional C# 2005 with .NET 3.0", Wiley India , 2007
2. Andy Wigley, Daniel Moth, Peter Foot, "Mobile Development Handbook", Microsoft Press, 2007.

REFERENCES:

1. Andrew Troelson, "Pro C# with .NET 3.0", Apress, 2007.
2. Kevin Hoffman, "Visual C# 2005", Pearson Education, 2006.
3. Justin Smith, "Inside Windows Communication Foundation", Microsoft Press, 2007.

AIM:

To understand the features of network sockets and to learn socket programming.

OBJECTIVES:

- To introduce TCP and UDP Sockets
- To explain the issues in the development of server software
- To discuss routing sockets, raw sockets and other advanced sockets
- To develop standard network applications
- To develop network management utilities in Layer 2 and Layer 3

UNIT I INTRODUCTION 9

Overview of TCP/IP – Client/Server Paradigm – Program Interface to Protocols – Socket Abstraction and Address Structure – Construction of messages – Byte ordering and Address conversion functions – Client software design – Issues in Server Design – I/O Multiplexing – Select and Poll functions – TCP and UDP Sockets

UNIT II CLIENT/SERVER DESIGN 9

Simple Client/Server Applications using TCP and UDP sockets – Echo, Daytime, Time applications – Iterative Servers using TCP and UDP sockets – Process Structure – Concurrent Connection Oriented Servers – Concurrent UDP servers – Multiprotocol and Multiservice servers

UNIT III ADVANCED SOCKETS 9

Routing Sockets – Broadcasting and Multicasting – Advanced UDP sockets – Out of band data – Threads, Threaded servers – Raw Sockets – Signal driven I/O – IPv4 and IPv6 Interoperability – Daemon processes – Advanced I/O functions – Non blocking I/O – Mutexes and Condition variables

UNIT IV APPLICATION DEVELOPMENT 9

Application Level Gateways – Remote Procedure Call – Distributed Program Generation – Network File System – Mail server and client – TELNET – FTP client/server – Web Server – Simple DNS Application

UNIT V NETWORK MANAGEMENT 9

DNS MX client application – Development of Ping Utility – WHOIS query – IP level network tapping – Layer 2 Network Tapping

TOTAL:45 PERIODS

TEXT BOOKS:

1. W. Richard Stevens, "Unix Network Programming – Vol I", Second Edition, Pearson Education, 1998
2. D.E Comer and David L Stevens, "TCP/IP Illustrated – Vol III", Second Edition, Pearson Education, 1996.

AIM:

The student understands the basic concepts of Enterprise Resource Planning and its role in improving the business dynamics.

OBJECTIVES:

- To provide an integrated view of various facets of business, including planning, manufacturing, sales, finance and marketing.
- To understand the development of software to integrate business activities such as inventory management and control, order tracking, customer service, finance and human resources.
- To become aware of the software applications and tools that are available to business to use to drive out costs and improve efficiency.
- To understand the paths and pitfalls of the implementation process

UNIT I INTRODUCTION TO ERP 9

Overview – Benefits of ERP – ERP and Related Technologies – Business Process Reengineering – Data Warehousing – Data Mining – On-line Analytical Processing – Supply Chain Management.

UNIT II ERP IMPLEMENTATION 9

Implementation Life Cycle – Implementation Methodology – Hidden Costs – Organizing Implementation – Vendors, Consultants and Users – Contracts – Project Management and Monitoring.

UNIT III BUSINESS MODULES 9

Business Modules in an ERP Package – Finance – Manufacturing – Human Resource – Plant Maintenance – Materials Management – Quality Management – Sales and Distribution.

UNIT IV ERP MARKET 9

ERP Market Place – SAP AG – PeopleSoft – Baan Company – JD Edwards World Solutions Company – Oracle Corporation – QAD – System Software Associates.

UNIT V ERP – PRESENT AND FUTURE 9

Turbo Charge the ERP System – EIA – ERP and E-Commerce – ERP and Internet – Future Directions in ERP.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Alexis Leon, "ERP Demystified", Tata McGraw Hill, 1999.
2. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, "Concepts in Enterprise Resource Planning", Thomson Learning, 2001.

REFERENCES:

1. Vinod Kumar Garg and N.K .Venkata Krishnan, "Enterprise Resource Planning – concepts and Planning", Prentice Hall, 1998.
2. Jose Antonio Fernandez, " The SAP R /3 Hand book", Tata McGraw Hill, 1998.
3. Fu, "SAP BW: A Step by Step Guide", First Edition, Pearson Education, 2003.

AIM:

To provide an overview of Service Oriented Architecture and enable the student to create applications in a collaborative environment.

OBJECTIVES:

- To study the importance of Service Oriented Architecture.
- Implementation of SOA in the Java and .NET frameworks.
- To study the advanced features of SOA.

UNIT I**9**

Nature of design process – Characteristics of design activities, Essential elements of design-Factors affecting design quality - Design Quality models – Design principles – Notion of Software architecture – Simple case studies.

UNIT II**9**

Description of software Architectures – Architectural design space – Scenario based analysis and evaluation – SAAM and ATAM methods - formalizing the architectural styles – Tools for architectural design.

UNIT III**9**

Describing the detailed design – Design representations – rationale for software design methods- Design process – Simple design Practices – Stepwise refinement, Incremental design.

UNIT IV**9**

Structured system analysis and Structured design – Jackson structured Programming and Development.

UNIT V**9**

Object concept – Component based development – Formal approach to design – Design patterns- Design Review.

TOTAL:45 PERIODS**TEXT BOOKS:**

1. Hong Zhu, “Software Design Methodology – From principles to Architectural styles”, Elsevier, 2006.
2. Mary Shaw and David Garlan, 'Software Architecture – Perspectives on an emerging Discipline”, PHI, 2003. (UNIT I and II)
3. David Budgen, “Software Design”, Pearson Education, 2004. (UNIT –III to V)
4. Bass, L., Clements P. and Kazman, R., “Software Architecture in Practice, Addison Wesley, 1998.

AIM:

To understand the way the dynamics of a business are modeled with processes

OBJECTIVES:

- To understand the internal business processes
- To understand the external business processes
- To study the basics of business process modeling
- To understand the nature of large processes
- To study the methods for managing the process

UNIT I UNDERSTANDING BUSINESS PROCESS 9
Organizations as Systems, Effective Operations Management, Adding Value, Competing on Capabilities, Value Chain and Competitive Advantage

UNIT II CUSTOMER AND MATERIALS PROCESSING 9
Marketing in a Changing World, Relationship Marketing, Purchasing, Concept of a Manufacturing System, Logistics and Competitive Strategy, Reverse Logistics, The triumph of Process

UNIT III PROCESS MODELING 9
Process Modeller's Needs, Basic Concepts in Process Modeling, Modeling with RADS, Animating a Process

UNIT IV LARGE PROCESSES 9
Micro-Modeling of Processes, Modeling Large Processes, Process Patterns.

UNIT V MANAGING THE MODELING 9
Modeling the Materials in the Process, Analyzing a Process Model, Managing the Modeling

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Davis Barnes (Editor), "Understanding Business: Process", Routledge, USA, 2000 [UNITS 1, 2]
2. Martyn A Ould, "Business Processes: Modelling and Analysis for Re-Engineering and Improvement", John Wiley & Sons, USA, 1995 UNITS 3, 4, 5]

REFERENCES:

1. Howard Smith and Peter Fingar, "Business Process Management (BPM): The Third Wave", Meghan-Kiffer Press, USA, 2003
2. Roger Burlton, "Business Process Management: Profiting from Process", SAMS, USA, 2001
3. Mike Jacka J, Paulette J Keller, "Business Process Mapping: Improving Customer Satisfaction", John Wiley & Sons, USA, 2001
4. Faisal Haque, "e-Enterprise: Business Models, Architecture and Components", Cambridge University Press, UK, 2000.
5. Ulric J Gelinias, Steve G Sutton and Jane Fedorowicz, "Business Processes and Information Technology", Thompson Learning, India, 2004

AIM:

To give an overall understanding on the theories that are available to solve hard real-world problems

OBJECTIVES:

- To give the students an overall knowledge of soft computing theories and fundamentals
- To give an understanding on the fundamentals of non-traditional technologies and approaches to solving hard real-world problems
- Fundamentals of artificial neural networks, fuzzy sets and fuzzy logic and genetic algorithms.
- Use of ANN, Fuzzy sets to solve hard real-world problems
- To given an overview of Genetic algorithms and machine learning techniques to solving hard real-world problems
- To study about the applications of these areas

UNIT I INTRODUCTION 9

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence – Neural Networks - Scope and Evolution – Models of Neural Networks – Feed forward Networks – Supervised Learning Neural Networks – Associative memory networks – Unsupervised learning networks – Special Networks

UNIT II FUZZY SETS AND FUZZY LOGIC 9

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations - Fuzzy Rules Non – interactive fuzzy sets – Fuzzification– Intuition , inference, Rank ordering – uzzification – Max-membership principle, centroid method, center of sums, center of largest area.

UNIT III FUZZY MEASURES AND REASONING 9

Fuzzy arithmetic and measures – Fuzzy reasoning – approximate reasoning – categorical, qualitative, syllogistic, dispositional – Fuzzy inference systems – fuzzy decision making – individual, multiperson, multi objective, Bayesian – fuzzy logic control system – architecture, model and application

UNIT IV MACHINE LEARNING AND GENETIC ALGORITHM 9

Machine Learning Techniques – Machine Learning Using Neural Nets – Genetic Algorithms (GA) – Simple and General GA – Classification of Genetic Algorithm – Messy, Adaptive, Hybrid, Parallel – Holland Classifier System

UNIT V APPLICATION AND IMPLEMENTATION SOFT COMPUTING 9

Genetic algorithms -. Traveling Salesperson Problem, Internet Search Techniques – Fuzzy Controllers – Bayesian Belief networks for Rocket Engine Control - Neural Network, Genetic algorithm and Fuzzy logic implementation in C++ and Matlab

TOTAL:45 PERIODS**TEXT BOOKS:**

1. S.N. Sivanandam and S.N. Deepa, "Principles of Soft Computing", Wiley India Ltd., First Indian Edition, 2007

REFERENCES:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
2. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.
3. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
4. Amit Konar, "Artificial Intelligence and Soft Computing", First Edition, CRC Press, 2000.
5. Simon Haykin, "Neural Networks: A Comprehensive Foundation", Second Edition Prentice Hall, 1999.
6. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
7. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.

CS9044

BIO INFORMATICS

L T P C
3 0 0 3

AIM:

By using the well-tested and successful approach of problem-based learning, students will learn through applying the strategies and tools used in bioinformatics to topical problems drawn from ongoing research and applications in a variety of fields.

OBJECTIVES:

- To emphasize how to use the computer as a tool for biomedical research.
- To understand the use of Databases and Data mining concepts in the field of biology
- To study and understand the various modeling techniques that are used for modeling biological data
- To explore visualization techniques for DNA and RNA molecules
- To be aware of the microarray technology for genome expression study

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 – Datawarehousing 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 IV INFORMATION SYSTEM APPLICATION 9
 Transaction Processing Applications – Basic Accounting Application – Applications for Budgeting and Planning – Other use of Information Technology: Automation – Word Processing – Electronic Mail – Evaluation Remote Conferencing and Graphics – System and Selection – Cost Benefit – Centralized versus Decentralized Allocation Mechanism.

UNIT V DEVELOPMENT AND MAINTENANCE OF INFORMATION SYSTEMS 9
 Systems analysis and design – System development life cycle – Limitation – End User Development – Managing End Users – off- the shelf software packages – Outsourcing – Comparison of different methodologies.

TOTAL:45 PERIODS

TEXT BOOKS:

1. Laudon K.C, Laudon J.P, Brabston M.E, “Management Information Systems - Managing the digital firm”, Pearson Education, 2004.

REFERENCES:

1. Turban E.F, Potter R.E, “Introduction to Information Technology”; Wiley, 2004.
2. Jeffrey A.Hoffer, Joey F.George, Joseph S. Valachich, “Modern Systems Analysis and Design”, Third Edition, Prentice Hall, 2002.

IT9038

COMPUTER GRAPHICS

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

AIM:

Introduce concepts of low level imaging and Graphics primitives
 Introduce students to the theory implementation and application of modern computer graphics techniques
 Introduce application of computer graphics techniques to selected problems in Modeling, Rendering, Interaction and Animation

OBJECTIVES:

The students will be able to understand all graphics primitives, two dimensional and three dimensional object creation and manipulation techniques
 Students will have clear knowledge about Graphics programming concepts
 Students will gain knowledge on Fractal based objects and Shading, Shadowing and Rendering Techniques.

UNIT I 2D PRIMITIVES 9
 Output primitives – Line, Circle and Ellipse drawing algorithms - Attributes of output primitives – Two dimensional Geometric transformation - Two dimensional viewing – Line, Polygon, Curve and Text clipping algorithms

UNIT II 3D CONCEPTS 9
 Parallel and Perspective projections - Three dimensional object representation – Polygons, Curved lines, Splines, Quadric Surfaces,- Visualization of data sets - 3D transformations – Viewing -Visible surface identification.

UNIT II **9**
Modulation techniques and spread spectrum- Spreading techniques- Codes- Channel coding – Wideband CDMA air interface- Protocol stack- Media Access Control (MAC)- Radio Link control (RLC)- Radio Resource Control (RRC) – User plane – PDC protocol- Data protocols.

UNIT III **9**
UMTS network structure- Core network- UMTS Radio access network – GSM Radio access network- Interfaces – Network Protocols.New concepts in UMTS Network – Location services-Opportunity driven multiple access – Multimedia Messaging services – Gateway location register – Support of localized service area.

UNIT IV **9**
3G services – Service categories – Tele services Bearer services – Supplementary services – Service capabilities – QoS classes – 3G Applications.Introduction to IMS, Architecture – CSCF – Media gateway – Application Servers – IMS Protocols: SIP, RTP/RTCP and other IMS protocols – IMS Services.

UNIT V **9**
Introduction to 4G networks - DVB-H - Wireless Local Loop (WLL) WLL Architecture, WLL Technologies and frequency spectrum, WLL products, LMDS

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Juha Korhonen, "Introduction to 3G Mobile communications", Artech House, 2001, (Unit 1,2,3)
2. Miikka Poikselka, Aki Niemi, Hisham Khartabil, Georg Mayer, The IMS: IP Multimedia Concepts and Services, 2nd Edition John Wiley & Sons 2006, (Unit 4)
3. Jeffrey G. Andrews Fundamentals of WiMAX: Understanding Broadband Wireless Networking, Prentice Hall, 2007, (Unit 5)

REFERENCES:

1. Clint Smith, Daniel Collins, Daniel Collins, 3G Wireless Networks, McGraw-Hill Companies, 2006
2. Garg.V.K "IS-95 CDMA and cdma 2000", first Indian reprint 2002, Pearson Education
3. Heikki Kaaranen, Siamäk Naghian, Lauri Laitinen, Ari Ahtiainen , Valtteri Niemi, UMTS Networks: Architecture, Mobility and Services, John Wiley & Sons; 1st edition 2001
4. Frank Ohrtman, WiMAX Handbook, McGraw-Hill Professional; 1 edition 2005

AIM:

To understand the methods and tools for identifying and Representing the commonalities across different domains

OBJECTIVES:

- To study the basic principle sof domain analysis and scoping
- To understand some domain engineering methods
- To understand the principles of modeling the features
- To understand the concepts of generative programming
- To study the languages and tools used for domain engineering

UNIT I DOMAIN ANALYSIS AND SCOPING 9

Domain Analysis. Domain Design and Domain Implementation. Application Engineering. Product-Line Practices. Key Domain Engineering Concepts. Domain. Domain Scope and Scoping. Relationships between Domains. Features and Feature Models. Method Tailoring and Specialization. Survey of Domain Analysis and Domain Engineering Methods

UNIT II DOMAIN ENGINEERING METHODS 9

Feature-Oriented Domain Analysis (FODA). FODA Process. Organization Domain Modeling (ODM). The ODM Process. Draco. Capture. Domain Analysis and Reuse Environment (DARE). Domain-Specific Software Architecture (DSSA) Approach, Algebraic Approach. Other Approaches. Domain Engineering and Related Approaches.

UNIT III FEATURE MODELING 9

Feature Modeling. Feature Models. Feature Diagrams. Mandatory Features. Optional Features. Alternative Features. Or-Features. Normalized Feature Diagrams. Expressing Commonality in Feature Diagrams. Expressing Variability in Feature Diagrams. Other Infon-nation Associated with Feature Diagrams in a Feature Model. Assigning Priorities to Variable Features. Availability Sites, Binding Sites, and Binding Modes. Sites. Availability Sites. Binding Sites and Binding Modes. Relationship between Optimizations and Availability Sites, Binding Sites, and Binding Modes.

UNIT IV GENERATIVE PROGRAMMING 9

Generative Domain Models. Main Development Steps in Generative Programming. dapping Domain Engineering for Generative Programming. Domain-Specific Languages. DEMRAL: Example of a Domain Engineering Method for Generative Programming. Outline of DEMRAL. Domain Analysis. Domain Definition. Domain Modeling. Identification of Key Concepts. Feature Modeling. Feature Starter Set for ADTs. Feature Starter Set for Algorithms. Domain Design. Scope Domain Model for Implementation. Identify Packages.

UNIT V LANGUAGES AND TOOLS 9

Hume, DSL Paradigm, Stratego/XT, Run-time Code Generation in C++.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Czarnecki Krzysztof, Eisenecker Ulrich, Generative programming: methods, tools and applications, Lavoisier, 2000.
2. C. Lengauer, Domain- Specific Program Generation, Springer, 2004