ANNA UNIVERSITY, CHENNAI 600 025

UNIVERSITY DEPARTMENTS

R- 2013

B.TECH. INFORMATION TECHNOLOGY (PART TIME)

I – VII SEMESTERS CURRICULUM

SEMESTER I

S.NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	PTIT8101	Programming and Data Structures I	3	0	0	3
2.	PTGE8151	Computing Techniques	3	0	0	3
3.	PTMA8151	Applied Mathematics	3	0	0	3
4.	PTPH8153	Physics for Information Science	3	0	0	3
PRACTICAL						
5.	PTIT8111	Programming and Data Structures I Lab	0	0	3	2
		TOTAL	**12**	**0**	**3**	**14**

SEMESTER II

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	PTIT8201	Computer Organisation	3	0	0	3
2.	PTIT8202	Programming and Data Structures II	3	0	0	3
3.	PTIT8203	Database Systems Concepts	3	0	0	3
4.	PTMA8201	Probability and Queuing Theory	3	0	0	3
PRACTICAL						
5.	PTIT8211	Database Management Systems Lab	0	0	3	2
		TOTAL	**12**	**0**	**3**	**14**

SEMESTER III

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	PTCS8351	Operating Systems	3	0	0	3
2.	PTGE8251	Environmental Science and Engineering	3	0	0	3
3.	PTIT8351	Web Technology	3	0	0	3
4.	PTMA8351	Discrete Mathematics	3	0	0	3
PRACTICAL						
5.	PTIT8311	Web Technology Lab	0	0	3	2
		TOTAL	**12**	**0**	**3**	**14**

SEMESTER IV

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	PTCS8352	Software Engineering	3	0	0	3
2.	PTIT8401	Computer Networks	3	0	0	3
3.	PTIT8402	Distributed Systems	3	0	0	3
4.	PTIT8403	Integrated Programming	3	0	0	3
PRACTICAL						
5.	PTIT8411	Computer Networks Lab	0	0	3	2
		TOTAL	**12**	**0**	**3**	**14**

SEMESTER V

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	PTCS8451	Object Oriented Analysis And Design	3	0	0	3
2.	PTIT8501	Mobile Computing	3	0	0	3
3.	E1	Elective I	3	0	0	3
4.	E2	Elective II	3	0	0	3
PRACTICAL						
5.	PTIT8511	Mobile Computing Lab	0	0	3	2
		TOTAL	**12**	**0**	**3**	**14**

SEMESTER VI

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	PTIT8601	Data Analytics	3	0	0	3
2.	PTIT8602	Information Management	3	0	0	3
3.	PTIT8603	Principles of Human Computer Interaction	3	0	0	3
4.	E3	Elective III	3	0	0	3
PRACTICAL						
5.	PTIT8611	Human Computer Interaction Lab	0	0	3	2
		TOTAL	**12**	**0**	**3**	**14**

SEMESTER VII

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	PTIT8701	Information Security	3	0	0	3
2.	E4	Elective IV	3	0	0	3
3.	E5	Elective V	3	0	0	3
PRACTICALS						
4.	PTIT8711	Project Work	0	0	9	6
		TOTAL	**12**	**0**	**9**	**15**

TOTAL NO OF CREDITS: 99

ELECTIVES

COURSE CODE	COURSE TITLE	L	T	P	C
PTCS8021	Digital Signal Processing- Algorithms and Application	3	0	0	3
PTCS8071	Cyber Forensics	3	0	0	3
PTCS8072	Game Programming	3	0	0	3
PTCS8073	Semantic Web	3	0	0	3
PTCS8075	Unix Internals	3	0	0	3
PTIT8001	Advanced Database Technology	3	0	0	3
PTIT8002	Advanced Networks	3	0	0	3
PTIT8003	Agent based Intelligent system	3	0	0	3
PTIT8005	C# and .Net Programming	3	0	0	3
PTIT8006	Cloud Computing	3	0	0	3
PTIT8007	Compiler Design	3	0	0	3
PTIT8008	Computational Linguistics	3	0	0	3
PTIT8012	Graph Theory	3	0	0	3
PTIT8014	Intellectual Property Rights	3	0	0	3
PTIT8015	Knowledge Engineering	3	0	0	3
PTIT8017	Mobile Application Development	3	0	0	3
PTIT8019	Network Programming & Management	3	0	0	3
PTIT8023	Service Oriented Architecture Concepts and Design	3	0	0	3
PTIT8024	Social Network Analysis	3	0	0	3
PTIT8025	Soft Computing	3	0	0	3
PTIT8028	Software Project Management	3	0	0	3
PTIT8031	Software Testing	3	0	0	3
PTIT8033	Wireless Sensor and Mesh Networks	3	0	0	3
PTIT8071	Digital Image Processing	3	0	0	3
PTIT8072	Free and Open Source Software	3	0	0	3
PTIT8073	TCP/IP Design and Implementation	3	0	0	3
PTMA8001	Algebra Number Theory	3	0	0	3
PTMA8251	Numerical Methods	3	0	0	3
PTMG8651	Total Quality Management	3	0	0	3
PTCS8075	Foundation Skills in Integrated Product Development	3	0	0	3
PTGE8071	Disaster Management	3	0	0	3
PTGE8072	Human Rights	3	0	0	3

PTMA8151 **APPLIED MATHEMATICS** **L T P C**
(Common to all branches of B.E / B.Tech (PT) Programmes) 3 0 0 3

OBJECTIVE:

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

UNIT I MATRICES 9

Characteristic equation – Eigenvalues and Eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors – Cayley-Hamilton Theorem – Diagonalization of matrices - Reduction of a quadratic form to canonical form by orthogonal transformation.

UNIT II FUNCTIONS OF SEVERAL VARIABLES 9

Partial derivatives – Homogeneous functions and Euler's theorem – Total derivative – Differentiation of implicit functions – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables - Maxima and minima of functions of two variables.

UNIT III ANALYTIC FUNCTION 9

Analytic functions – Necessary and sufficient conditions for analyticity – Properties – Harmonic conjugates – Construction of analytic function – Conformal Mapping – Mapping by functions w = a + z , az, 1/z, **-** Bilinear transformation.

UNIT IV COMPLEX INTEGRATION 9

Line Integral – Cauchy's theorem and integral formula – Taylor's and Laurent's Series – Singularities – Residues – Residue theorem – Application of Residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

UNIT V LAPLACE TRANSFORMS 9

Existence conditions – Transforms of elementary functions – Basic properties – Transforms of derivatives and integrals –Inverse transforms – Convolution theorem – Transform of periodic functions – Application to solution of linear ordinary differential equations with constant coefficients.

TOTAL: 45 PERIODS

OUTCOMES:

- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

BOOKS FOR STUDY

1. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, Forty Second Edition, Delhi, 2012.
2. Ramana, B.V. Higher Engineering Mathematics" Tata McGraw Hill Publishing Company, 2008.

REFERENCES:

1. Glyn James, Advanced Modern Engineering Mathematics, Prentice Hall of India, Fouth Edition, 2011.
2. Veerarajan, T., Engineering Mathematics (For First Year), Tata McGraw-Hill Pub. Pvt. Ltd., New Delhi, 2007.

PTPH8153	PHYSICS FOR INFORMATION SCIENCE	L	T	P	C
	(Common to Computer Science and Information Technology Branches)	3	0	0	3

OBJECTIVE:

To understand the essential principles of Physics of semiconductor device and Electron transport properties. Become proficient in magnetic and optical properties of materials and Nano electronic devices.

UNIT I ELECTRICAL PROPERTIES OF MATERIALS 9

Electrical conduction – Classification of conducting materials – Free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Wiedemann-Franz law – Ohm's law – Classical free electron theory (advantages and drawbacks) - Quantum free electron theory – Schrodinger wave equation – Applications of Schrodinger wave equation (Particle in infinite potential well, Particle in a box, Reflection and transmission of electron waves) – degenerate states – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids – Electron effective mass.

UNIT II SEMICONDUCTORS AND TRANSPORT PHYSICS 9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – Carrier transport in Semiconductors: Drift, mobility and diffusion – Hall effect and devices – Ohmic contacts – Schottky diode.

UNIT III MAGNETIC PROPERTIES OF MATERIALS 9

Classification of magnetic materials – Quantum numbers – Magnetic moment – Classical theory of diamagnetism (Langevin theory) – Theory of paramagnetism – Ferromagnetism (Weiss theory) – Antiferromagnetic materials – Ferrites – Hard soft magnetic materials – Magnetic recording materials – Bubble memory – Magnetic principle in computer data storage – Magnetic tape – Floppy disc – Magnetic hard disc.

UNIT IV OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – Absorption in metals, insulators & Semiconductors - LED's – Organic LED's – Polymer light emitting materials – Plasma light emitting devices – LCD's – Laser diodes – Optical data storage techniques (including DVD, Blue -ray disc, Holographic data storage).

UNIT V NANO DEVICES 9

The density of state for solids – Electron density in a conductor – Significance between Fermi energy and Volume of the material – Quantum confinement – Quantum structures – Metal-to-insulator transition – Confining excitons – Band gap of nanomaterials –Tunneling – Resonant Tunneling Diodes (RTD's) – Single electron phenomena – Single electron Transistor – Quantum cellular automata (QCA) – Carbon nanotubes – Molecular electronic structures – Spintronics.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Understand the electrical, magnetic and optical properties of semiconductor materials
- Understand the concepts and applications of semiconductor devices

TEXT BOOKS:

1. P.K. Palanisamy, “Materials Science”, Scitech, (2003).
2. S.O. Kasap, “Principles of Electronic Materials and Devices”, Tata McGraw-Hill, (2007).
3. R.F. Pierret, “Semiconductor Device Fundamentals”, Pearson, (1996).

REFERENCES:

1. N. Garcia and A. Damask, “Physics for Computer Science Students”, Springer-Verlag,1991.
2. S. Datta, “Quantum Transport: Atom to Transistor”, Cambridge University Press, 2005.

PTGE8151 COMPUTING TECHNIQUES L T P C

3 0 0 3

OBJECTIVES:

The students should be made to:

- Learn the organization of a digital computer.
- Be exposed to the number systems.
- Learn to think logically and write pseudo code or draw flow charts for problems.
- Be exposed to the syntax of C.
- Be familiar with programming in C.
- Learn to use arrays, strings, functions, pointers, structures and unions in C.

UNIT I INTRODUCTION 8

Generation and Classification of Computers- Basic Organization of a Computer –Number System – Binary – Decimal – Conversion – Problems. Need for logical analysis and thinking – Algorithm – Pseudo code – Flow Chart.

UNIT II C PROGRAMMING BASICS 10

Problem formulation – Problem Solving - Introduction to ‘ C’ programming –fundamentals – structure of a ‘C’ program – compilation and linking processes – Constants, Variables – Data Types – Expressions using operators in ‘C’ – Managing Input and Output operations – Decision Making and Branching – Looping statements – solving simple scientific and statistical problems.

UNIT III ARRAYS AND STRINGS 9

Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays. String- String operations – String Arrays. Simple programs- sorting- searching – matrix operations.

UNIT IV FUNCTIONS AND POINTERS 9

Function – definition of function – Declaration of function – Pass by value – Pass by reference – Recursion – Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays- Example Problems.

UNIT V STRUCTURES AND UNIONS 9

Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions – Storage classes, Pre-processor directives.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Design C Programs for problems.
- Write and execute C programs for simple applications

TEXTBOOKS:

1. Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition, Oxford University Press, 2009
2. Ashok N. Kamthane, "Computer programming", Pearson Education, 2007.
3. Yashavant P. Kanetkar. " Let Us C", BPB Publications, 2011.

REFERENCES:

1. Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006
2. Byron S Gottfried, " Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill, 2006.
3. R.G. Dromey, "How to Solve it by Computer", Pearson Education, Fourth Reprint, 2007

PTIT8101 PROGRAMMING AND DATA STRUCTURES I L T P C
3 0 0 3

AIM:

The aim is to review the basics of C programming and to introduce the concepts of Data Structures.

OBJECTIVES:

- To introduce the basics of C programming language.
- To introduce the advanced concepts of C programming language.
- To learn the concepts of Abstract Data Types
- To understand the operations of linear and nonlinear data structures.
- To provide the concepts of Hashing, Sorting and Searching.

UNIT I C PROGRAMMING FUNDAMENTALS 9

Data types – Variables – Operations - Expression and Statements – Conditional statements – Control statements – Functions – Arrays - Preprocessor

UNIT II C PROGRAMMING ADVANCED FEATURES 9

Pointers - Variation in pointer declarations – Function Pointers – Function with Variable number of arguments - Structures and Unions - File handling concepts

UNIT III LINEAR DATA STRUCTURES – LIST, STACK AND QUEUE 9

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation – cursor-based linked lists – doubly-linked lists – applications of lists – Polynomial Manipulation – Stack ADT – Evaluating arithmetic expressions- Queue ADT – circular queue implementation – Double ended Queues

UNIT IV NON-LINEAR DATA STRUCTURES - TREES 9

Trees: Preliminaries – Binary Trees – Types of Binary Trees – Linked and non-linked implementation of Binary trees – Tree traversals – Application of Trees - Hashing: Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing

UNIT V SORTING AND SEARCHING TECHNIQUES 9

Sorting algorithms: Insertion sort - Selection sort - Shell sort - Bubble sort - Quick sort - Heap sort - Merge sort - Radix sort – Searching: Linear search - Binary search - Search Tree ADT - Binary Search Trees - Indexed search techniques

TOTAL: 45 PERIODS

OUTCOMES:

- To explore the basics of C programming.
- To apply knowledge to solve computer science and information technology problems using the basics of C programming and the concepts of Data Structures.
- To describe and use the linear data structures.
- To examine and use the non-linear data structures.
- To apply different hashing, searching and sorting algorithms.

TEXT BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, “The C Programming Language”, 2nd edition, Pearson Education, 1988.
2. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, 2nd edition, Pearson Education, 1997.

REFERENCES:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, “Introduction to Algorithms", Second Edition, Mcgraw Hill, 2002.
2. Reema Thareja, “Data Structures Using C”, Oxford University Press, 2011
3. Aho, Hopcroft and Ullman, “Data Structures and Algorithms”, Pearson Education,1983.
4. Stephen G. Kochan, “Programming in C”, 3rd edition, Pearson Ed.,

PTIT8111 PROGRAMMING AND DATA STRUCTURES LABORATORY I L T P C
0 0 3 2

AIM:

The aim is to introduce the concepts of structured Programming and the implementation of primitive Data Structures using structured Programming Language.

OBJECTIVES:

1. To introduce the concepts of structured Programming language.
2. To provide the concepts of pointers and files.
3. To understand the concepts of primitive and advanced Data Structures.
4. To lean to implement different hashing, searching and sorting algorithms.
5. C Programs using Conditional and Control Statements
6. C Programs using Arrays, Strings and Pointers and Functions
7. Representation of records using Structures in C – Creation of Linked List – Manipulation of records in a Linked List
8. File Handling in C – Sequential access – Random Access

9. Operations on a Stack and Queue – infix to postfix – simple expression evaluation using stacks - Linked Stack Implementation – Linked Queue Implementation
10. Creation of Binary Trees – Expression Trees – Tree Traversals – Linked Representation of Binary Trees
11. Implementation of Sorting algorithms
12. Implementation of Linear search – Binary Search – Indexed Search

TOTAL: 45 PERIODS

OUTCOMES:

- To solve simple problems using C programming concepts.
- To explore pointers and files in complex problems.
- To expose and implement the concept abstract data types.
- To develop real time applications using linear and nonlinear data structures.
- To implement hashing, sorting and searching algorithms.

PTIT8201 COMPUTER ORGANIZATION L T P C
3 0 0 3

OBJECTIVES :

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

- Perform arithmetic operations in any number system
- Use boolean simplification techniques to design a combinational hardware circuit
- Analyze a given digital circuit – combinational and sequential
- Identify different functional units in a digital computer system
- Trace execution of instruction sequence in a processor
- Explain the implementation of each functional unit

UNIT I DIGITAL FUNDAMENTALS 9

Number systems and conversions – Boolean algebra and simplification – Minimization Of Boolean functions – Karnaugh map – Logic gates – NAND-NOR implementation

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS 9

Design of combinational circuits – Adder / Subtractor – Encoder – Decoder – Mux / Demux – Comparators – Flip Flops – Designing sequential circuits - State diagrams and minimization – Counters – Registers - PLDs

UNIT III BASIC STRUCTURE OF COMPUTERS 9

Functional units – Basic operational concepts – Instruction set architecture – Hardware/Software Interface – Addressing modes – RISC – CISC - Performance metrics - ALU design – multiplier and divider circuits

UNIT IV PROCESSOR DESIGN 9

Fundamental concepts – Execution of a complete instruction – Hardwired control – Micro programmed control -- Pipelining – Basic concepts – Data hazards – Instruction hazards – Control hazards

UNIT V MEMORY AND I/O SYSTEMS 9

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

TOTAL: 45 PERIODS

OUTCOMES:

- Understand the fundamentals of Boolean logic and functions.
- Apply the functions to design components with gates and combinational or sequential logic.
- Explain the basic structure of computers and processing unit.
- Identify the need for pipelining.
- Create memory and I/O devices.

TEXT BOOKS:

1. M. Morris Mano and Michael D. Ciletti, “Digital Design”, Fourth Edition, Pearson Education, 2008.
2. David A. Patterson And John L. Hennessy, “Computer Organization and Design: The Hardware/Software Interface”, Fourth Edition, Elsevier, 2010.

REFERENCES:

1. Carl Hamacher, Zvonko Vranesic And Safwat Zaky, “Computer Organization”, Sixth Edition,Tata McGraw Hill, 2010.
2. Behrooz Parhami, “Computer Architecture: From Microprocessors to Supercomputers”, Oxford University Press, 2007.
3. William Stallings, “Computer Organization and Architecture: Designing for Performance”, Sixth Edition, Pearson Education, 2003.

PTIT8202 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 the implementation of Advanced Data Structures using Object Oriented Programming Language.

OBJECTIVES:

- To introduce the concepts of Object Oriented Programming language.
- To teach efficient storage mechanisms of data for an easy access.
- To design and implementation of various basic and advanced data structures.
- To introduce various techniques for representation of the data in the real world.
- To develop application using data structures.

UNIT I OBJECT ORIENTED PROGRAMMING FUNDAMENTALS 9

C++ Programming features - Data Abstraction - Encapsulation - class - object - constructors - static members – constant members – member functions – pointers – references - Role of this pointer – Storage classes – function as arguments

UNIT II OBJECT ORIENTED PROGRAMMING CONCEPTS 9

String Handling – Copy Constructor - Polymorphism – compile time and run time polymorphisms – function overloading – operators overloading – dynamic memory allocation - Nested classes - Inheritance – virtual functions

UNIT III C++ PROGRAMMING ADVANCED FEATURES 9

Abstract class – Exception handling - Standard libraries - Generic Programming - templates – class template - function template – STL – containers – iterators – function adaptors – allocators - Parameterizing the class - File handling concepts

UNIT IV ADVANCED NON-LINEAR DATA STRUCTURES 9

AVL trees – B-Trees – Red-Black trees – Splay trees - Binomial Heaps – Fibonacci Heaps – Disjoint Sets – Amortized Analysis – accounting method – potential method – aggregate analysis.

UNIT V GRAPHS 9

Representation of Graphs – Breadth-first search – Depth-first search – Topological sort – Minimum Spanning Trees – Kruskal and Prim algorithm – Shortest path algorithm – Dijkstra's algorithm – Bellman-Ford algorithm – Floyd-Warshall algorithm

TOTAL: 45 PERIODS

OUTCOMES:

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

- Apply the concepts of data abstraction, encapsulation and inheritance for problem solutions.
- Use the control structures of C++ appropriately.

TEXT BOOKS:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", Second Edition, Mcgraw Hill, 2002.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", 2nd edition, Pearson Education, 2005.
3. Bjarne Stroustrup, "The C++ Programming Language", 3rd edition, Pearson Education, 2007.

REFERENCES:

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

PTIT8203 DATABASE SYSTEM CONCEPTS L T P C
3 0 0 3

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 RELATIONAL DATABASES 9

Purpose of Database System -– Views of data – Data Models – Database System Architecture –Entity-Relationship model – E-R Diagrams -- Introduction to relational databases - Relational Model: Keys -- Relational Algebra – Relational Calculus

UNIT II APPLICATION DEVELOPMENT WITH SQL 9

SQL fundamentals - Advanced SQL features – High level language extension- Iteration selection - Procedures - Functions – Parameter passing -- Triggers- Embedded SQL– Dynamic SQL -- Database connectivity

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 –– Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Recovery Isolation Levels – Distributed databases- Data warehouse and mining.

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

TOTAL: 45 PERIODS

OUTCOMES:

- Understand data models, schemas, instances and entity-relationship (ER) model.
- Understand storage organizations concepts.
- Understand database languages and interfaces and the database system environment.
- Understand the concepts of constraints and relational algebra operations.
- Implement SQL: Data definition, constraints, schema, queries and operations in SQL Produce well structured database using functional dependencies and normalization. Build, design and tune databases while doing projects.
- Understand the fundamentals of database concepts,transaction processing,concurrency control,recovery procedure and applications.

TEXT BOOKS:

1 Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Sixth Edition, Tata McGraw Hill, 2011

2 C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.

REFERENCES:

1. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2008.
2. Raghu Ramakrishnan, Johannes Gehrke “Database Management Systems”, Fourth Edition, Tata McGraw Hill, 2010.
3. G.K.Gupta, “Database Management Systems”, Tata McGraw Hill, 2011.
4. Carlos Coronel, Steven Morris, Peter Rob, “Database Systems: Design, Implementation and Management”, Ninth Edition, Cengage Learning, 2011

PTMA8201	PROBABILITY AND QUEUEING THEORY (Branch specific course)	L T P C 3 0 0 3

OBJECTIVES:

- To provide the required fundamental concepts in probability and queueing models and apply these techniques in networks, image processing etc.
- Acquire skills in analyzing queueing models.

UNIT I RANDOM VARIABLES 9

Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable.

UNIT II TWO-DIMENSIONAL RANDOM VARIABLES 9

Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III RANDOM PROCESSES 9

Classification – Stationary process – Markov process - Poisson process – Discrete parameter Markov chain – Chapman Kolmogorov equations – Limiting distributions.

UNIT IV QUEUEING THEORY 9

Markovian queues – Birth and Death processes – Single and multiple server queueing models – Little's formula - Queues with finite waiting rooms – Finite source models.

UNIT V NON-MARKOVIAN QUEUES AND QUEUEING NETWORKS 9

M/G/1 queue – Pollaczek Khinchin formula - M/D/1 and $M/E_K/1$ as special cases – Series queues – Open and closed Jackson networks.

TOTAL : 45 PERIODS

OUTCOMES:

- The students will have a fundamental knowledge of the probability concepts.
- Acquire skills in analyzing queueing models.
  It also helps to understand and characterize phenomenon which evolve with respect to time in a probabilistic manner

TEXT BOOKS:

1. Ibe, O.C. "Fundamentals of Applied Probability and Random Processes", Elsevier, U.P., 1st Indian Reprint, 2007.
2. Gross, D. and Harris, C.M., "Fundamentals of Queueing Theory", Wiley Student, 3rd Edition, New Jersy, 2004.

REFERENCES:

1. Allen, A.O., "Probability, Statistics and Queueing Theory with Computer Applications", Elsevier, California, 2nd Edition, 2005.
2. Taha, H.A., "Operations Research", Pearson Education, Asia, 8th Edition, 2007.
3. Trivedi, K.S., "Probability and Statistics with Reliability, Queueing and Computer Science Applications", PHI, New Delhi, 2nd Edition, 2009.
4. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw Hill, New Delhi, 9th Reprint, 2010.

PTIT8211 DATABASE MANAGEMENT SYSTEMS LABORATORY L T P C
0 0 3 2

AIM:

The aim of this laboratory is to inculcate the abilities of applying the principles of the database management systems. The course aims to prepare the students for projects where a proper implementation of databases will be required.

OBJECTIVES:

The students will be able to create a database file
The students will be able to query a database file
The students will be able to append and update a database file

- Data Definition, Manipulation of Tables and Views
- Database Querying – Simple queries, Nested queries, Sub queries and Joins
- Triggers
- Transaction Control
- Embedded SQL
- Database Connectivity with Front End Tools
- Front End Tools / Programming Languages
- High level language extensions - PL/SQL Basics
- Procedures and Functions
- Database Design and Implementation (Case Study)

TOTAL: 45 PERIODS

OUTCOMES:

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

- Demonstrate query facilities to formulate queries and manipulate the database e.g. Structured
- Query Language (SQL), Query by Example (QBE).
- Understand the usage of DBMS query language in embedded programming (SQL/PLSQL).
- Understand how to apply appropriate development methodologies of data analysis, design and use appropriate modelling techniques for databases.
- Understand the design of databases for applications and to develop projects.

PTCS8351 OPERATING SYSTEMS L T P C
(Common to CSE,IT &EEE branches) 3 0 0 3

OBJECTIVES:

Gives an idea about process synchronization, inter-process communication, scheduling, deadlock handling, and memory management.

UNIT I OPERATING SYSTEMS OVERVIEW 9

Introduction to operating systems – Computer system organization, architecture – Operating system structure, operations – Process, memory, storage management – Protection and security – Distributed systems – Computing Environments – Open-source operating systems – OS services – User operating-system interface – System calls – Types – System programs – OS structure – OS generation – System Boot – Process concept, scheduling – Operations on processes – Cooperating processes – Inter-process communication – Examples – Multithreading models – Thread Libraries – Threading issues – OS examples

UNIT II PROCESS MANAGEMENT 9

Basic concepts – Scheduling criteria – Scheduling algorithms – Thread scheduling – Multiple-processor scheduling – Operating system examples – Algorithm Evaluation – The critical-section problem – Peterson's solution – Synchronization hardware – Semaphores – Classic problems of synchronization – Critical regions – Monitors – Synchronization examples – Deadlocks – System model – Deadlock characterization – Methods for handling deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock detection – Recovery from deadlock

UNIT III STORAGE MANAGEMENT 9

Memory Management – Swapping – Contiguous memory allocation – Paging –Segmentation – Example: The Intel Pentium - Virtual Memory: Background – Demand paging – Copy on write – 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 – Protection

UNIT V CASE STUDY 9

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 7 – History – Design Principles – System Components – Terminal Services and Fast User – File system – Networking.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Understand the basic concepts of operating system.
- Understand the structure of operating system, Inter process communication, and scheduling and deadlock characterization.

TEXT BOOK:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts Essentials", John Wiley & Sons Inc., 2010.

REFERENCES:

1. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001.
2. Charles Crowley, "Operating Systems: A Design-Oriented Approach", Tata McGraw Hill Education", 1996.
3. D M Dhamdhere, "Operating Systems: A Concept-based Approach", Second Edition, Tata McGraw-Hill Education, 2007.
4. William Stallings, "Operating Systems: Internals and Design Principles", Seventh Edition, Prentice Hall, 2011.

PTGE8251 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C
(Common to Manufacturing, Mechanical, Printing ,Production, Civil, CSE, IT, EEE, Industrial, chemical, & Textile) 3 0 0 3

OBJECTIVES:

To the study of nature and the facts about environment:

- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

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

OUTCOMES:

Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.

- Public awareness of environmental is at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions.
- Development and improvement in std. of living has lead to serious environmental disasters

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 PVTLTD,New Delhi, 2007.

4 Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press (2005)

PTIT8351 **WEB TECHNOLOGY** **L T P C**
(Common to CSE & IT Programmes) **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 JAVA FUNDAMENTALS 9

Java Data types – Class – Object – I / O Streams – File Handling concepts – Threads – Applets – Swing Framework – Reflection

UNIT II JAVA NETWORKING FUNDAMENTALS 9

Overview of Java Networking - TCP - UDP - InetAddress and Ports - Socket Programming - Working with URLs - Internet Protocols simulation - HTTP - SMTP - POP - FTP - Remote Method Invocation - Multithreading Concepts

UNIT III CLIENT SIDE TECHNOLOGIES 9

XML - Document Type Definition - XML Schema - Document Object Model - Presenting XML - Using XML Parsers: DOM and SAX – JavaScript Fundamentals - Evolution of AJAX - AJAX Framework - Web applications with AJAX - AJAX with PHP - AJAX with Databases

UNIT IV SERVER SIDE TECHNOLOGIES 9

Servlet Overview - Life cycle of a Servlet - Handling HTTP request and response - Using Cookies - Session tracking - Java Server Pages - Anatomy of JSP - Implicit JSP Objects – JDBC - Java Beans - Advantages - Enterprise Java Beans - EJB Architecture - Types of Beans - EJB Transactions

UNIT V APPLICATION DEVELOPMENT ENVIRONMENT 9

Overview of MVC architecture - Java Server Faces: Features - Components - Tags - **Struts:** Working principle of Struts - Building model components - View components - Controller components - Forms with Struts - Presentation tags - Developing Web applications - **Hibernate:** Configuration Settings - Mapping persistent classes - Working with persistent objects - Concurrency - Transactions - Caching - Queries for retrieval of objects - **Spring:** Framework - Controllers - Developing simple applications

TOTAL: 45 PERIODS

OUTCOMES:

Able to program in Java and create simple Web based applications.

TEXT BOOK:

1. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education, 2006.

REFERENCES:

1. Marty Hall and Larry Brown, “Core Servlets And Javaserver Pages”, Second Edition
2. Bryan Basham, Kathy Siegra, Bert Bates, “Head First Servlets and JSP”, Second Edition
3. Uttam K Roy, “Web Technologies”, Oxford University Press, 2011.

PTMA8351	DISCRETE MATHEMATICS	L T P C
	(BRANCH SPECIFIC COURSE)	3 0 0 3

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 9

Propositional Logic – Propositional equivalences - Predicates and Quantifiers – Nested Quantifiers – Rules of inference - Introduction to proofs – Proof methods and strategy.

UNIT II COMBINATORICS 9

Mathematical induction – Strong induction and well ordering – The basics of counting - The pigeonhole principle – Permutations and Combinations – Recurrence relations -Solving linear recurrence relations using generating functions – Inclusion - Exclusion Principle and its applications.

UNIT III GRAPHS 9

Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.

UNIT IV ALGEBRAIC STRUCTURES 9

Algebraic systems – Semi groups and monoids – Groups - Subgroups - Homomorphisms – Normal subgroup and coset - Lagrange's theorem – Definitions and examples of Rings and Fields.

UNIT V LATTICES AND BOOLEAN ALGEBRA 9

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

TOTAL : 45 PERIODS

OUTCOMES:

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 and output functions in computer science.
- Be aware of the counting principles.
- Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

TEXT BOOKS:

1 Kenneth H.Rosen, "Discrete Mathematics and its Applications", Tata McGraw Hill Pub. Co. Ltd., New Delhi, 7th Edition, Special Indian edition, 2011.

2 Tremblay J.P. and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.

REFERENCES:

1 Ralph. P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, Pearson Education Asia, Delhi, 4th Edition, 2007.
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, 3rd Edition, 2010.

PTIT8311 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

1. Creating applications using Applets – Swing Framework - Method invocation programs using Reflection – File handling applications – Random access - Serialization - Simple Thread applications
2. Client – Server model implementation – HTTP server simulation – Sending E-mails with SMTP and POP implementation – FTP simulation – Remote Method Invocation – Singleton and Single Call models – Activation model
3. Simple JavaScript programs – Cascading Style Sheets – XML Generation and Parser – Applications using AJAX – AJAX with PHP scripting – AJAX with database applications
4. Implementation of Servlets and JSPs – JDBC applications with JSPs - Session management – EJB implementation
5. Creation of Web Enabled applications using Struts Framework – Simple Hibernate applications – Persistence classes - Representation of Servlets and RMI using Spring framework

TOTAL: 45 PERIODS

OUTCOME:

Able to program in Java and create simple Web based applications.

PTCS8352 SOFTWARE ENGINEERING L T P C
(Common to CSE & IT Programmes) 3 0 0 3

OBJECTIVE

This course is intended to provide the students with an overall view over Software Engineering discipline and with insight into the processes of software development.

UNIT I SOFTWARE PROCESS MODELS 9

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

UNIT II REQUIREMENT ENGINEERING 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 ANALYSIS MODELLING 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 DESIGN & TESTING 9

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

UNIT V QUALITY & MAINTENANCE 9

Software evolution - Verification and Validation -Critical Systems Validation – Metrics for Process, Project and Product-Quality Management -Process Improvement –Risk Management- Configuration Management – Software Cost Estimation

TOTAL: 45 PERIODS

OUTCOMES:

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

- Appreciate the wider engineering issues that form the background to developing complex and evolving software-intensive systems.
- Plan and deliver an effective software engineering process, based on knowledge of widely used development lifecycle models.
- Employ group working skills including general organization, planning and time management and inter-group negotiation.
- Capture, document and analyse requirements.
- Translate a requirements specification into an implementable design, following a structured and organised process.
- Formulate a testing strategy for a software system, employing techniques such as unit testing, test driven development and functional testing.
- Evaluate the quality of the requirements, analysis and design work done during the module.

TEXT BOOKS:

1. Roger S.Pressman, Software Engineering: A Practitioner’s Approach, McGraw Hill International edition, Seventh edition, 2009.
2. Ian Sommerville, Software Engineering, 8th Edition, Pearson Education, 2008.

REFERENCES:

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

PTIT8401 COMPUTER NETWORKS L T P C
3 0 0 3

OBJECTIVES:

- Trace the flow of information from one node to another node in the network
- Identify the component required to build different types of networks
- Understand the division of network functionalities into layers.
- Identify solution for each functionality at each layer
- Choose the required functionality at each layer for given application

UNIT I FUNDAMENTALS 9

Building a network - Network edge and core - Layering and protocols - Internet Architecture - Networking devices: Modems, Routers, Switches, Gateways - Needs/Principles of Application Layer Protocols - Web and HTTP - FTP - Electronic Mail (SMTP, POP3, IMAP, MIME) - DNS - SNMP

UNIT II TRANSPORT LAYER 9

Overview of Transport layer - UDP - TCP - Reliable byte stream - Connection management - Flow control - Retransmission - Congestion control - Congestion avoidance

UNIT III NETWORK AND ROUTING 9

Circuit switching - Packet switching - Virtual circuit switching - Routing - IP - Global Address - Datagram Forwarding - Subnetting - CIDR - ARP - DHCP - RIP - OSPF - BGP - ICMP - IPv6 - Multicasting - PIM

UNIT IV DATA LINK LAYER AND LAN 9

Link layer services - Framing - Error control - Flow control - Media access control - Ethernet - CSMA/CD - Token Ring - FDDI - Wireless LANs - CSMA/CA

UNIT V DATA COMMUNICATION 9

Signal characteristics - Data transmission - Physical links and transmission media - Signal encoding techniques - Channel access techniques - TDM - FDM

TOTAL: 45 PERIODS

OUTCOMES:

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

- analyze the requirements for a given organizational structure and select the most
- appropriate networking architecture and technologies;
- specify and identify deficiencies in existing protocols, and then go onto formulate new
- and better protocols;
- analyze, specify and design the topological and routing strategies for an IP based
- networking infrastructure
- Have a working knowledge of datagram and internet socket programming

TEXT BOOKS:

1. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A systems approach”, Fifth Edition, Morgan Kaufmann Publishers, 2010.
2. James F. Kurose, Keith W. Ross, “Computer Networking - A Top-Down Approach Featuring the Internet”, Fifth Edition, Pearson Education, 2009.

REFERENCE:

1. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, “Computer Networks: An Open Source Approach”, McGraw Hill Publisher, 2011.
2. Nader. F. Mir, “Computer and Communication Networks”, Pearson Prentice Hall Publishers, 2010.
3. Andrew. S. Tanenbaum, “Computer Networks”, Fourth Edition, Pearson, 2004.

PT IT8402 **DISTRIBUTED SYSTEMS** **L T P C**
3 0 0 3

AIM:

- To provide knowledge on principles and practice underlying the design of distributed systems and to explain the importance of the theory of distributed systems. It is intended to provide an understanding of the *concepts* of distributed systems, through several existing examples.
- The student will appreciate that the design and implementation of effective distributed systems is complex: issues related to “imperfect" computation and communication makes it substantially more difficult than designing centralized algorithms. These will be highlighted in specific distributed environments such as grid and cloud.
- The subject deals with IPC and Remote invocation in distributed environment, distributed objects, distributed file system, and Distributed operating system issues, distributed transactions and security in distributed environment.

OBJECTIVES:

- To lay the foundations of Distributed Systems.
- To introduce the idea of distributed architecture and related issues.
- To introduce the idea of distributed operating system and related issues.
- To understand in detail the system level and support required.
- To study and learn how the principles are applied in grid and cloud environment.

UNIT I COMMUNICATION IN DISTRIBUTED ENVIRONMENT 8

Fundamental – Various Paradigms in Distributed Applications – Remote Procedure Call – Remote Object Invocation – Group Communication – Threads in Distributed Systems – Virtual Machines

UNIT II DISTRIBUTED OPERATING SYSTEMS 10

Issues in Distributed Operating System – Clock Synchronization – Causal Ordering – Global States – Election Algorithms – Distributed Mutual Exclusion – Distributed Deadlock

UNIT III DISTRIBUTED RESOURCE MANAGEMENT 10

Distributed Shared Memory – Data-Centric Consistency Models – Distributed Scheduling – VM Scheduling – XEN – Meta scheduling Local Resource Manager – Distributed Load Balancing – Process Migration – Distributed File Systems – Sun NFS – Map Reduce – Hadoop

UNIT IV FAULT TOLERANCE AND CONSENSUS 8

Introduction to Fault Tolerance – Byzantine Fault Tolerance – Impossibilities in Fault Tolerance – Agreement Protocols – Distributed Transactions – Distributed Commit Protocols

UNIT V CASE STUDIES 9

Distributed Object Based System – CORBA – Distributed Virtualization System – VMWare

TOTAL: 45 PERIODS

OUTCOMES:

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

- Understand the concepts of distributed systems, through several existing examples
- Understand the complete overview of process management, memory management, database management, distributed file system, distributed objects in Distributed system.
- Ability to understand and demonstrate the Mutual exclusion, Deadlock detection and agreement protocols, security of Distributed operating system.
- Develop projects and applications in distributed environments such as grid and cloud.

TEXT BOOKS:

1 George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design”, Third Edition, Pearson Education Asia, 2002.
2 Mukesh Singhal, “Advanced Concepts In Operating Systems”, McGraw Hill Series in Computer Science, 1994.
3 Cloud Computing, A Practical Approach by Toby Velte, Anthony Velte, Robert Elsenpeter, TMH, 2009.

REFERENCES:

1. A.S.Tanenbaum, M.Van Steen, “Distributed Systems”, Pearson Education, 2004.
2. M.L.Liu, “Distributed Computing Principles and Applications”, Pearson Addison Wesley, 2004.
3. Tom White, “Hadoop: The Definitive Guide”, O'REILLY Media, 2009.

PTIT8403 INTEGRATED PROGRAMMING L T P C
3 0 0 3

OBJECTIVE*:*

- To know the essentials of XML Programming
- To understand programming concepts of distributed and wireless environments
- To understand the programming practices behind coordinating Distributed Architecture

UNIT I INTRODUCTION 9

Overview of Middleware Components - Distributed programming - XML in Web Programming - JINI fundamentals

UNIT II WORKING WITH XML 9

XML annotations - Custom annotations - Functions to Control XML - XML parsers - XML data sources - XML Validation - XSLT transformation and programming -XML processing using PHP

UNIT III DISTRIBUTED PROGRAMMING 9

Multithreaded Programming - Synchronization techniques - Java Threading model - Multiple process programming: Sockets - Messaging - Client-Server model - RPC - CORBA and DCOM models of RPC - Reusable Programming Techniques

UNIT IV PROGRAMMING THE WIRELESS DEVICES 9

J2ME - Connected Limited Device Configuration - Mobile Information Device Profile - UI controls - Event Handling - Persistent Storage - Network Midlets - Wireless Messaging

UNIT V JINI PROGRAMMING 9

Plug-and-Work model - Lookup Services - Discovery Protocol - Proxy Objects - Leases - Attributes - Groups - JINI with RMI - JINI with J2ME

TOTAL: 45 PERIODS

OUTCOMES:

On completion of this course the student should be able to:

- Validate XML documents with the use of Document Type Definitions and schemas according to industry standards.
- Work on Java Messaging Service
- Develop mobile applications using J2ME, CLDC and MIDP
- Understand the basic principles of Jini programming and able to create a simple application in JINI.

TEXT BOOKS:

1. Keith Edwards .W, 2000, Core Jini, Second Edition, Prentice Hall PTR, ISBN 0130894087.
2. Sing Li, Mile Burmeijer, Jerome Scheuring, 2000, Professional Jini, Wrox Press, ISBN 1861003552.
3. Jan Newmarch, 2006, Foundations of Jini 2 Programming, First Edition, Apress, ISBN 1590597168.

REFERENCES:

1. Dale Rogerson, 1997, Inside Com (Microsoft Programming Series), Microsoft Press, ISBN 1572313498.
2. Don Box, Essential COM, 1998, First Edition, Addison-Wesley Professional, ISBN 0201634465.
3. Randy Abernethy, Randy Morin, Jesus Chahin, Randy Charles Morin, 1999, COM/DCOM Unleashed, SAMS Publishing, ISBN 0672313529.

PTIT8411	**COMPUTER NETWORKS LABORATORY**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

AIM:

To understand the low-level network programming concepts using APIs and Simulation tools.

OBJECTIVES:

- Write a network application program
- Exercise all options of TCP/UDP sockets
- Use tools to visualize packet flow
- To analyze the performance of protocols in different layers using simulation tools
- Configure Router/Switch to set up network (network administration)
- Simple Chat Program using TCP Sockets
- Simulation of HTTP Protocol using TCP Sockets
- Simulation of Sliding Window Protocol using TCP Sockets
- Simulation of DNS using UDP Sockets
- Simulation of Ping using Raw Sockets
- Learn to use commands like TCP Dump, Netstat, TraceRoute
- Develop applications and understand the behaviour of TCP Options.
- Study of TCP/UDP performance using simulation tool
- Performance comparison of MAC protocols using simulation tool
- Performance comparison of Routing protocols using simulation tool
- Study and configure functionalities of a router and switches (or by simulation)

TOTAL: 45 PERIODS

OUTCOMES:

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

- Understand and implement the network application programs
- Understand and Implement the TCP/UDP sockets.
- Understand the configuration of Router/Switches.

PTCS8451 OBJECT ORIENTED ANALYSIS AND DESIGN L T P C
(Common to CSE & IT Programmes) 3 0 0 3

OBJECTIVE

Gives and understanding of OOAD basics, UML diagrams, system modeling, design based on requirements, converting design to code, and design patterns.

UNIT I OOAD BASICS 10

Introduction – Overview of object oriented system development – Object basics-The Unified Process – Modeling concepts – Modeling as a design technique – Analysis and modeling – UML diagrams – Use case Modeling – Class modeling – State modeling – Interaction Modeling

UNIT II REQUIREMENTS & MORE MODELING 7

Object Constraint Language - Inception – Evolutionary Requirements – Domain Models – System Sequence Diagrams – Operation Contracts

UNIT III DESIGN AND PRINCIPLES OF DESIGN 10

Requirements to Design –Design Patterns – Logical Architecture – Package diagram – Design patterns – Model, View, Control pattern – Detailed design – Object design with GRASP pattern – Detailed class diagram with Visibility.

UNIT IV MAPPING TO CODE 8

Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint

UNIT V MORE PATTERNS 10

More Patterns – Analysis update – Objects with responsibilities – Applying design patterns – Architectural Analysis – Logical Architecture Refinement – Package Design –Persistence framework with patterns.

TOTAL : 45 PERIODS

OUTCOMES:

- Analyze and design with object-oriented method in UML
- Describe constraints and introduce OCL.
- Introduce design pattern technology
- Apply object-oriented technology to the practical system analysis and design

TEXT BOOKS:

1. Michael Blaha and James Rumbaugh, “Object-oriented modeling and design with UML”, Prentice-Hall of India, 2005.
2. Craig Larman. “Applying UML and Patterns – An introduction to Object-Oriented Analysis and Design and Iterative Development”, 3rd ed, Pearson Education, 2005.

REFERENCES:

1. Ali Bahrami, “Object Oriented Systems Development”, McGraw-Hill, 1999.
2. Booch, Grady. Object Oriented Analysis and Design. 2nd ed. Pearson Education 2000.
3. Fowler, Martin. UML Distilled. 3rd ed. Pearson Education. 2004.
4. Lunn, Ken. Software development with UML. Palgrave Macmillan. 2003.
5. O’Docherty, Mike. Object-Oriented Analysis & Design. Wiley. 2005.

PTIT8501 **MOBILE COMPUTING** **L T P C**
3 0 0 3

AIM:

- To give a comprehensive exposure to the developments taking place in the areas of wireless networks and mobile computing

OBJECTIVES:

- To understand the challenges of wireless communication and the solutions that are in use
- To study about various types of wireless data networks and wireless voice networks
- To realize the role of wireless protocols in shaping the future Internet
- To design and implement mobile applications
- To give an introduction to the enabling technologies of pervasive computing

UNIT I WIRELESS COMMUNICATION 9

Challenges of Wireless Transmission - Multi-carrier modulation - Spread Spectrum - Satellite Communication - Broadcast systems - Multiplexing - FDMA, TDMA and CDMA - Cellular organization of mobile telephone networks - Operation of cellular networks - Frequency Reuse - Tessellation - Handoff - Capacity Improvement

UNIT II WIRELESS NETWORKS 9

IEEE 802.11 Wireless LAN - Architecture - Modes of Operation - CSMA/CA and its variants - Wireless LAN security - Bluetooth networks - Generation of cellular networks - Overview of GSM - GPRS Network Architecture and Operations - UMTS and IMT 2000 - Packet Switching Domain - Core Network - Radio Access Network - LTE - Control Plane - User Plane

UNIT III L3 AND L4 WIRELESS PROTOCOLS 9

Mobile IP - Mobility features in IPv6 - Proactive and reactive ad hoc routing protocols - DSDV, DSR and AODV - Limitations of Traditional TCP in wireless networks - TCP improvements for Wireless Networks – Indirect TCP, Snoop TCP, Mobile TCP - Security issues in network layer and transport layer

UNIT IV MOBILE COMPUTING PLATFORM 9

PDA - Device characteristics and Software components - Smart Phone - Convergence of Mobile devices - J2ME - Modes, Data store, GUI support - HTTP Connection Interface Push Registry - Application development using Android APIs - Palm OS Architecture and Program Development - Overview of other mobile Operating Systems

UNIT V MOBILE INTERNET 9

WAP - WAP Gateways - WML - VoiceXML - Mobile Messaging - Multimedia Messaging Service - Synchronized Multimedia Integration Language - Application Servers - Internet portals - Device management - Synchronization Models - Communication to Servlets and Web Services - Location aware Mobile computing - IP Multimedia Subsystem

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, students will be able to

- To understand basics of modulation and multiplexing techniques
- To comprehend wireless LAN and cellular systems
- To understand protocols at network and transport layer
- To learn development of applications in mobile computing platform
- To understand internet & pervasive computing over mobile devices

TEXT BOOKS:

1. Asoke Talukder, Hasan Ahmed, Rupa Yavagal, “Mobile Computing: Technology, Applications and Services Creation”, Second Edition, TMH, 2010.
2. William Stallings, “Wireless Communication and Networks”, Pearson, 2009.

REFERENCE BOOKS:

1. Jochen Schiller, “Mobile Communications”, Second Edition, Pearson, 2009.
2. Uwe Hansmann et al, “Principles of Mobile Computing”, Springer, 2003.
3. Ivan Stojmenovic, “Handbook of Wireless Networks and Mobile Computing”, Wiley, 2002.

PTIT8511 MOBILE COMPUTING LABORATORY L T P C
0 0 3 2

OBJECTIVE:

- To understand and use the fundamentals of programming for mobile devices.
- To apply event-driven programming and graphical user interfaces for mobile devices.

1. GSM modem study (Nokia 30) and
2. SMS client-server application
3. Implementation of Mobile Network using Network Simulator (NS2)
4. GUI APIs for high-level and low level programming
5. To store and access information stored in a mobile device (persistence and record management)
6. Usage of HTTP and sockets for communication between mobile devices and remote servers.
7. Mobile Internet and WML
8. J2ME Program for Mobile Node Discovery
9. Mobile protocol study using simulator
10. To design sample programs for Mobile Phones.(Antroid , iPhone etc)
11. Bluetooth Integration

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, students will be able to

- Simulate mobile network using NS-2
- Develop GUI APIs
- Program using J2ME
- Develop application for mobile devices

PTIT8601 DATA ANALYTICS L T P C
3 0 0 3

OBJECTIVES:

- To deal with evolving multidimensional massive data sets and the various analysis which may be performed on it.
- To know the fundamental concepts of big data and analytics.
- To learn various techniques for mining data streams.
- To understand the data mining techniques for frequent itemset and clustering.
- To learn Event Modeling for different applications using the framework of bigdata and visualization data analysis techniques.

UNIT I INTRODUCTION TO BIG DATA 8

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

UNIT II DATA ANALYSIS 12

Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods, Analysis of time series: linear systems analysis, nonlinear dynamics - Rule induction - Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods.

UNIT III MINING DATA STREAMS 8

Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime Analytics Platform(RTAP) applications - case studies - real time sentiment analysis, stock market predictions.

UNIT IV FREQUENT ITEMSETS AND CLUSTERING 9

Mining Frequent itemsets - Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data – CLIQUE and PROCLUS – Frequent pattern based clustering methods – Clustering in non-euclidean space – Clustering for streams and Parallelism.

UNIT V FRAMEWORKS AND VISUALIZATION 8

MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications:

TOTAL: 45 PERIODS

OUTCOMES:

- To apply the various statistical analysis methods on multidimensional massive data sets.
- To design efficient algorithms for mining the data from large volumes.
- to develop data stream model for mining data streams.
- To work with big data platform and its analysis techniques.
- To model a framework for Human Activity Recognition and many applications.

TEXT BOOKS:

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

REFERENCES:

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

PTIT8602 INFORMATION MANAGEMENT L T P C
3 0 0 3

AIM:
To provide an insight in the management of information in the corporate.

OBJECTIVES:
- To aware the significant of information in the business scenario
- To familiarize method of restoring, retrieving and presenting the information.
- To study the basics of business process modeling

UNIT I INTRODUCTION 9
Data, information, knowledge and wisdom; characteristics of information, quality of information, value of information in decision making in various levels of the organization Role of information in Business scenario- functional and process approach in the organization; Source and supply of information and content to employees, shareholders and customers

UNIT II INFORMATION CAPTURING AND MIGRATION MECHANISMS 9
Data management and system integration ;Content management – text, imaging , records, workflow, web content management; Distributed databases, Object oriented databases-object life cycle modeling visual databases and knowledge based databases and business impacts, ETL on data ware house, Meta data and indexing

UNIT III BUSINESS PROCESS MANAGEMENT 9
Practices of BPM, role of Information in BPM, Business Analysis-relationship between information and organization, Critical success factors, Enterprise analysis –framework and tools, Process design and modeling-process improvements, process modeling, business process reengineering, SOA, Six Sigma and continuous improvement, ERP.

UNIT IV INFORMATION PRESENTATION 9
Enterprise wide search-DSS, EIS, ES, Fact and entity extraction -OLAP, Data mining algorithm- classification and clustering of information, information governance, BI

UNIT V INFORMATION IN BUSINESS SCENARIO AND BUSINESS TRENDS 9
Information in management application: Functional areas of management, roles and responsibilities of Information resource manager, E business models, Value of information in E-CRM - Social marketing – social and ethical issues in handling information management.

TOTAL: 45 PERIODS

OUTCOMES:
- Demonstrate the structure and principles of organization
- Develop and analyze the business process modeling
- Use the data mining techniques to classify and cluster the business

REFERENCES:

1. Robert Schultheis and Mary Summer, Management Information Systems – The Managers View, Tata McGraw Hill, 2008.
2. Peter Rob, Carlos Coronel, Database System and Design, Implementation and Management, 7 th edition, Cengage Learning,
3. Jeffrey A Hoffer et al, Modern Database Management, 8th Edition, Pearson Education, 2008,
4. Gordon Davis, Management Information System : Conceptual Foundations, Structure and Development, Tata McGraw Hill, 2000.
5. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
6. Efraim Turban and Jay E. Aronson, Decision Support System and Intelligent Systems, Prentice Hall International, 2002

7. Michel Berry and Gordon Linoff, Data mining techniques for Marketing, Sales and Customer support, John Wiley, 2004.
8. Kimiz Dalkir, Knowledge Management in Theory and Practice, Butterworth –Heinemann 2008.
9. Efraim Turban, Ramesh Sharda, Jay E. Aronson and David King, Business Intelligence, Prentice Hall, 2008.

PTIT8603 PRINCIPLES OF HUMAN COMPUTER INTERACTION L T P C
3 0 0 3

OBJECTIVES:

- To study about the design, implementation and evaluation of effective and usable graphical computer interfaces.
- To describe and apply core theories, models and methodologies from the field of HCI.
- To learn various case studies in HCI

UNIT I FOUNDATIONS FOR INTERACTION DESIGN 9

The psychopathology of Everyday things – Psychology of everyday actions - Human memory – Thinking – Emotion - Psychology and design of interactive system - Text entry devices - display devices - devices for virtual reality and 3D interaction - Models of interaction - Frame work and HCI-Ergonomics - Interaction styles - Elements of WIMP interface – Interactivity - paradigms for interaction - Affective aspects of HCI

UNIT II MODELS AND THEORIES 9

Cognitive models: Linguistic models-Physical and device models - Cognitive architecture, Communication and collaboration models: Face to face communication - conversation - Text based communication - Group working, Models of the system: Standard formalisms - Interaction models - Continuous behavior, Modeling rich interaction: Status event analysis - Rich contexts - Low interaction and sensor based interaction.

UNIT III DESIGN PROCESS 9

Interaction design basics: The process of design - user focus - navigation design - Screen design and layout - iteration and prototyping, HCI in software Process: Usability Engineering - iterative design and prototyping, Design rules: Principles to support usability - Standards - Guidelines - Golden rules and heuristics - HCI patterns, Designing for collaboration and communication.

UNIT IV IMPLEMENTATION AND EVALUATION TECHNIQUES 9

Implementation support: Elements of windowing systems - Programming the application-Using toolkits-User interface management systems, Evaluation techniques: Goals of evaluation-Evaluation through user participation-Choosing and evaluation method, Universal design: Universal design principles-Multi model interaction-Designing for diversity, User support: Requirements of user support-Approaches to user support-Adaptive help systems-Designing user support systems.

UNIT V CASE STUDIES 9

Goals of HCI case studies: Exploration - Explanation - Description - Demonstration, Types of case study: Intrinsic or instrumental - Single case multiple cases - Embedded or holistic, Groupware: Groupware systems - Computer mediated communication - Meeting and decision support system - Shared applications and artifacts - Frameworks for groupware - Implementing synchronous groupware, Ubiquitous computing and augmented realities: Ubiquitous computing applications research - Virtual and augmented reality - Information and data visualization - HCI for smart environment – Virtual reality – HCI for scientific applications, medical applications – HCI for assisitive technology

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student will be able to:

- Appreciate the importance of the user interface in software development.
- Understand key aspects of human psychology which can determine user actions at and satisfaction of the interface.
- Describe the key design principles for user interfaces.
- Set up and carry out a process to gather requirements for, engage in iterative design of, and evaluate the usability of a user interface.
- Describe how user interface development can be integrated into an overall software development process.
- Understand sufficient theory of human computer interaction, experimental methodology and inferential statistics to engage with the contemporary research literature in interface technology and design.
- Identify key design errors in simple interfaces and suggest alternative designs.
- Discuss ethical issues involved in testing user interfaces.

TEXT BOOK:

1. Alan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale, Human – Computer Interaction, Third Edition, Pearson, 2004.

REFERENCES:

1. Helen Sharp, Yvonne Rogers, Interaction Design beyond human - computer interaction, Second Edition, 2009.
2. Jonathan Lazar, Jinjuan Feng and Harry Hochheiser, Research Methods in Human - Computer Interaction, John Wiley & Sons Ltd, 2010.

PTIT8611 HUMAN COMPUTER INTERACTION LABORATORY L T P C
0 0 3 2

OBJECTIVE:

- To design and create effective user interfaces for various applications.
- To create interactive animated displays using various interactive deivces.

1. Design of simple user interfaces using Generalized Interface Toolkit (GITK).
2. Modifying the user interfaces of text processor, Excel, Power point builder.
3. Designing interfaces for health care, telephone directory and collaborative applications using tools like Cog tool, Flash builder.
4. Creating user interfaces for disabled people using speech engines, translators and sign language.
5. Working on Multi touch devices and multi sensor devices
6. Design of interactive devices like cell phones and video controllers, household appliances and smart cars.
7. Drag and Drop an application instance from server to client and then automate the execution of the application on the client side (JAVA / VC++)
8. Simulate the Smart Car display to view the availability of petrol in the tank, distance travelled and a graphic display (continuous monitoring) with different colors about the level of petrol in the tank
9. To drag the magnifying lens on the world map just to zoom the region of interest and to collect the retrieve the relevant information about that region
10. Gaming applications – masking – Hide and Seek the Text and Image.

TOTAL: 45 PERIODS

OUTCOMES:

Upon the completion of lab course, the student will be able to

- Perform design and evaluation of interactive systems with a strong emphasis on user- centred design techniques.
- Understand the human capacities and consequences of using information technology as a tool for solving work related tasks.
- Develop and evaluate the system by putting the user at the centre of the design process.

PTIT8701 INFORMATION SECURITY L T P C
3 0 0 3

AIM:

- To give an overview about the basics of security and cryptography.
- To give an exposure to the security standards and security practices followed in IT industries

OBJECTIVES:

- To introduce the concepts and models of security in computing
- To design and implement symmetric and asymmetric cryptosystems
- To explain the security standards followed at the network level and at the application level
- To estimate the level of security risk faced by an organization and the counter measures to handle the risk
- To learn secured software development

UNIT I SECURITY - AN OVERVIEW 6

Basics of Security - CIA Triad - Threats, Attacks and Controls - Aspects of Security - Legal, Ethical and Professional - Security Models - Depth of Security - Need for Security at Multiple levels - Security Policies - Role of Trust, Bell-LaPadula model - Biba Integrity model - Chinese Wall model - Malicious Logic - Viruses, Worms, Logic Bombs - Notion of Trust

UNIT II CRYPTOGRAPHY 9

Classical Cryptosystems - Substitution and Transposition - Blowfish and AES - Public Key Cryptography - RSA and ElGamal algorithms - Authentication and Key Exchange - Biometric authentication - Diffie Hellman and Needem Schroeder algorithms - Digital Signatures - Message Digest - Certificates - Directories and Revocation of keys and certificates

UNIT III SECURITY STANDARDS 12

Public Key Infrastructure - Kerberos - X.509 - IPSec - Virtual Private Networks - E-Mail Security - PGP and PEM - Web Security - Secured DNS - SSL, TLS and SET - CoBIT Framework - Compliances - Credit Card Applications - GLBA - Standards - ISO 27000

UNIT IV SECURITY PRACTICES 9

Vulnerability Analysis - Flaw Hypothesis Methodology, NRL taxonomy and Aslam's model - Auditing - Anatomy of an Auditing System - Design of Auditing Systems - Posteriori Design - Auditing mechanisms - Risk Analysis and Management - Disaster Recovery Planning/Incident Response Planning - Intrusion Detection System

UNIT V SECURED DEVELOPMENT 9

Secured Coding - OWASP/SANS Top Vulnerabilities - Buffer Overflows - Incomplete mediation - XSS - Anti Cross Site Scripting Libraries - Canonical Data Format - Command Injection - Redirection - Inference – Application Controls - Secured Software Development Life Cycle - Testing, Maintenance and Operation - Evaluation of Security Systems

TOTAL: 45 PERIODS

OUTCOMES:

Upon the completion of this course, students will be able

- To master information security governance, and related legal and regulatory issues.
- To master understanding external and internal threats to an organization.
- To be familiarity with information security awareness and a clear understanding of its importance.
- To be familiar with how threats to an organization are discovered, analyzed, and dealt with.
- To master fundamentals of secret and public cryptography.
- To master protocols for security services.
- To be familiar with network security threats and countermeasures.
- To be familiar with network security designs using available secure solutions (such as PGP, SSL, IPSec, etc).

TEXT BOOKS:

1. Wade Trappe, Lawrence C Washington, “Introduction to Cryptography with Coding and Theory”, Second Edition, Pearson, 2007.
2. Matt Bishop, “Computer Security: Art and Science”, Pearson, 2003.

REFERENCES:

1. Charles Pfleeger, Shari Lawrence Pfleeger, Devin N Paul, “Security in Coding”, Pearson, 2007.
2. Wenbo Mao, “Modern Cryptography Theory and Practice”, Pearson, 2004.

PTCS8021 DIGITAL SIGNAL PROCESSING – ALGORITHMS AND APPLICATIONS **L T P C 3 0 0 3**

OBJECTIVE:

This course provides the idea on design of analog and digital filters, and their classifications. Also, it provides a good knowledge of error correction in signal processing systems, which is then enriched with the applications to the image and speech processing.

UNIT I SIGNALS AND SYSTEMS **9**

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

UNIT II FREQUENCY TRANSFORMATIONS **9**

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

UNIT III IIR FILTER DESIGN **9**

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

UNIT IV FIR FILTER DESIGN **9**

Structures of FIR – Linear phase FIR filter – Fourier Series - Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques – Finite word length effects in digital Filters: Errors, Limit Cycle, Noise Power Spectrum.

UNIT V APPLICATIONS 9

Multirate signal processing: Decimation, Interpolation, Sampling rate conversion by a rational factor – Adaptive Filters: Introduction, Applications of adaptive filtering to equalization, echo cancellation, interference cancellation – Speech Recognition Systems, Speech Synthesis Systems – Image Enhancement.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, students will be able to

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

TEXT BOOKS:

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

REFERENCES:

1. Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", Tata McGraw Hill, Third 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, 2006.

PTCS8071 CYBER FORENSICS L T P C

(Common to CSE & IT Programmes) 3 0 0 3

OBJECTIVE:

To understand Computer Forensics, Computing Investigations, Enforcement Agency Investigations, Corporate Investigations, forensically sound principles and practices related to digital evidence collection, management, and handling.

UNIT I TYPES OF COMPUTER FORENSICS 9

Computer Forensics Fundamentals – Types of Computer Forensics Technology – Types of Vendor and Computer Forensics Services.

UNIT II DATA RECOVERY 9

Data Recovery – Evidence Collection and Data Seizure – Duplication and Preservation of Digital Evidence – Computer Image Verification and Authentication.

UNIT III ELECTRONIC EVIDENCE 9

Discover of Electronic Evidence – Identification of Data – Reconstructing Past Events – Networks.

UNIT IV THREATS 9

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

UNIT V SURVEILLANCE 9

The Future – Arsenal – Surveillance Tools – Victims and Refugees – Advanced Computer Forensics.

TOTAL: 45 PERIODS

OUTCOMES:

- understands the fundamentals and types of computer forensics
- Understands how evidence is identifies, collected and preserved.
- will know the techniques of recovering past evidences
- Understand various threats, tactics used and understanding of surveillance tools in computer forensics.

TEXT BOOK:

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

PTCS8072 GAME PROGRAMMING L T P C
(Common to CSE & IT Programmes) 3 0 0 3

OBJECTIVE

To get subsequent understanding of game design and development, which includes the processes, mechanics, issues in game design, game engine development, modeling, techniques, handling situations, and logic. At the end, the student will be in a position to create interactive games. To learn this course an exposure to 3D graphics principles and animation techniques are the prerequisite.

UNIT I 3D GRAPHICS FOR GAME PROGRAMMING 9

Coordinate Systems, Ray Tracing, Modeling in Game Production, Vertex Processing, Rasterization, Fragment Processing and Output Merging, Illumination and Shaders, Parametric Curves and Surfaces, Shader Models, Image Texturing, Bump Mapping, Advanced Texturing, Character Animation, Physics-based Simulation

UNIT II GAME DESIGN PRINCIPLES 9

Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection, Game Logic, Game AI, Path Finding

UNIT III GAMING ENGINE DESIGN 9

Renderers, Software Rendering, Hardware Rendering, and Controller based animation, Spatial Sorting, Level of detail, collision detection, standard objects, and physics

UNIT IV GAMING PLATFORMS AND FRAMEWORKS 9

Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DXStudio, Unity

UNIT V GAME DEVELOPMENT 9

Developing 2D and 3D interactive games using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

TOTAL : 45 PERIODS

OUTCOMES:

Upon completion of this course students will be able to

- Evaluate various approaches to game design and identify the elements which are likely to make for effective games.
- Be able to develop design game engines
- Be able to integrate development with third party game engines.
- Code and develop prototypes of computer games for a variety of platforms and frameworks

TEXT BOOKS:

1. David H. Eberly, "3D Game Engine Design, Second Edition: A Practical Approach to Real-Time Computer Graphics" Morgan Kaufmann, 2 Edition, 2006.
2. JungHyun Han, "3D Graphics for Game Programming", Chapman and Hall/CRC, 1st edition, 2011.
3. Mike McShaffrfy, "Game Coding Complete", Third Edition, Charles River Media, 2009.
4. Jonathan S. Harbour, "Beginning Game Programming", Course Technology PTR, 3 edition, 2009.

REFERENCES:

1. Ernest Adams and Andrew Rollings, "Fundamentals of Game Design", Prentice Hall 1st edition, 2006.
2. Roger E. Pedersen, "Game Design Foundations", Edition 2, Jones & Bartlett Learning, 2009.
3. Scott Rogers, "Level Up!: The Guide to Great Video Game Design", Wiley, 1st edition, 2010.
4. Jason Gregory, "Game Engine Architecture", A K Peters, 2009.
5. Jeannie Novak, "Game Development Essentials", 3rd Edition, Delmar Cengage Learning, 2011.
6. Andy Harris, "Beginning Flash Game Programming For Dummies", For Dummies; Updated edition, 2005.
7. John Hattan, "Beginning Game Programming: A GameDev.net Collection", Course Technology PTR, 1 edition, 2009.
8. Eric Lengyel, "Mathematics for 3D Game Programming and Computer Graphics", Third Edition, Course Technology PTR, 3rd edition, 2011.
9. Dino Dini, **"**Essential 3D Game Programming", Morgan Kaufmann, 1st edition 2012.
10. Jim Thompson, Barnaby Berbank-Green, and Nic Cusworth, "Game Design: Principles, Practice, and Techniques - The Ultimate Guide for the Aspiring Game Designer", 1st edition, Wiley, 2007.

PTCS8073	SEMANTIC WEB	L	T	P	C
	(Common to CSE & IT Programmes)	**3**	**0**	**0**	**3**

OBJECTIVE:

To build and implement a small ontology that is semantically descriptive of your chosen problem domain, implement applications that can access, use and manipulate the ontology, represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology, depict the semantic relationships among these data elements using Resource Description Framework (RDF), design and implement a web services application that "discovers" the data and/or other web services via the semantic web (which includes the RDF, data elements in properly tagged XML, and the ontology), discover the capabilities and limitations of semantic web technology for different applications

UNIT I INTRODUCTION 9

Introduction to the Syntactic web and Semantic Web – Evolution of the Web – The visual and syntactic web – Levels of Semantics – Metadata for web information - The semantic web architecture and technologies –Contrasting Semantic with Conventional Technologies – Semantic Modeling -Potential of semantic web solutions and challenges of adoption

UNIT II ONTOLOGICAL ENGINEERING 9

Ontologies – Taxonomies –Topic Maps – Classifying Ontologies - Terminological aspects: concepts, terms, relations between them – Complex Objects -Subclasses and Sub-properties definitions –Upper Ontologies – Quality – Uses - Types of terminological resources for ontology building – Methods and methodologies for building ontologies – Multilingual Ontologies -Ontology Development process and Life cycle – Methods for Ontology Learning – Ontology Evolution – Versioning

UNIT III STRUCTURING AND DESCRIBING WEB RESOURCES 9

Structured Web Documents - XML – Structuring – Namespaces – Addressing – Querying – Processing - RDF – RDF Data Model – Serialization Formats- RDF Vocabulary –Inferencing -RDFS – basic Idea – Classes – Properties- Utility Properties – RDFS Modelling for Combinations and Patterns- Transitivity

UNIT IV WEB ONTOLOGY LANGUAGE 9

OWL – Sub-Languages – Basic Notions -Classes- Defining and Using Properties – Domain and Range – Describing Properties - Data Types – Counting and Sets- Negative Property Assertions – Advanced Class Description – Equivalence – Owl Logic.

UNIT V SEMANTIC WEB TOOLS AND APPLICATIONS 9

Development Tools for Semantic Web – Jena Framework – SPARL –Querying semantic web - Semantic Desktop – Semantic Wikis -Semantic Web Services – Application in Science – Business

TOTAL: 45 PERIODS

OUTCOMES:

Students who have successfully completed this course will be able

- To give RDF, RDFS & OWL description to objects
- To use Semantic Web search engines and to use semantic markup of web pages
- To integrate web services using semantic technologies.
- To implement a semantic agent using the features of semantic web.

TEXT BOOKS:

1. Liyang Yu, A Developer's Guide to the Semantic Web, Springer; 1st Edition. Edition, 2011.
2. John Hebeler, Matthew Fisher, Ryan Blace and Andrew Perez-Lopez, Semantic Web Programming, Wiley; 1 edition, 2009.
3. Grigoris Antoniou, Frank van Harmelen, A Semantic Web Primer, Second Edition (Cooperative Information Systems) (Hardcover), MIT Press, 2008
4. Robert M. Colomb, Ontology and the Semantic Web: Volume 156 Frontiers in Artificial Intelligence and Applications (Frontier in Artificial Intelligence and Applications), IOS Press, 2007.
5. Dean Allemang and James Hendler, Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL, Morgan Kaufmann; 2 edition, 2011.

REFERENCES:

1. Michael C. Daconta, Leo J. Obrst and Kevin T. Smith, The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management, Wiley; 1 edition 2003
2. Karin Breitman, Marco Antonio Casanova and Walt Truszkowski, Semantic Web: Concepts, Technologies and Applications (NASA Monographs in Systems and Software Engineering), Springer; Softcover, 2010.
3. Vipul Kashyap, Christoph Bussler and Matthew Moran, The Semantic Web: Semantics for Data and Services on the Web (Data-Centric Systems and Applications), Springer, 2008.

PTCS8075 **UNIX INTERNALS** **L T P C**
(Common to CSE & IT Programmes) **3 0 0 3**

OBJECTIVES:

- Understanding of the fundamentals of operating system design
- To provide knowledge about Unix operating system working principles, its file system and programming for interprocess communication.
- To acquaint student with the description of various system calls.
- To expose the students to the concepts of Memory Management and I/O Subsystem Implementation.

UNIT I OVERVIEW 9

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 9

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 9

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 9

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

OUTCOMES:

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

- Describe the component of operating system
- Explain how they interact with computer hardware
- Apply the concepts of operating systems design to practical problems.
- A deeper understanding of system calls in Unix operating system.

TEXT BOOK:

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.
4. Steve D Pate, “UNIX Filesystems: Evolution, Design and Implementation”, Wiley Publishing Inc., 2003.

PTIT8001 ADVANCED DATABASE TECHNOLOGY L T P C
3 0 0 3

OBJECTIVE:

- To know advanced concepts of database in large scale analytics
- To derive data maintenance, change schema, database update and Benchmark
- To understand Object Databases and to deal with uncertainties in advanced concepts of database, and open issues in database technologies.

UNIT I PARALLEL AND DISTRIBUTED DATABASES 9

Database System Architectures: Centralized and Client-Server Architectures - Server system architectures - Parallel systems - Distributed systems - Parallel databases: I/O Parallelism - Inter and Intra query parallelism - Inter and Intra operation parallelism - Distributed database concepts - Distributed data storage - Distributed transactions - Commit protocols - Concurrency control - Distributed query processing - Three tier client server architecture - Case studies

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES 9

Concepts for Object Databases: Object Identity - Object structure - Type constructors - Encapsulation of operations - Methods – Persistence - Type and class hierarchies - Inheritance - Complex objects - Object database standards, languages and design: Object Data Management Group (ODMG) Model – Object Definition Language – Object Query Language – Object-relational and extended-Relational systems: Object Relational features in SQL/Oracle - Case studies

UNIT III XML DATABASES 9

XML Databases: XML data model - DTD - XML Schema - XML querying - Web databases - JDBC - Information retrieval - Data warehousing - Data mining

UNIT IV MOBILE DATABASES 9

Mobile Databases: Location and Handoff Management - Effect of mobility on data management - Location dependent data distribution - Mobile transaction models - Concurrency control - Transaction commit protocols - Mobile database recovery schemes

UNIT V INTELLIGENT DATABASES 9

Active databases - Deductive databases - Knowledge databases – Multimedia databases - Multidimensional data structures - Image databases - Multimedia database design - Text/Document databases - Audio databases - Video databases

TOTAL: 45 PERIODS

OUTCOMES:

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

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

REFERENCE BOOKS:

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, Sixth Edition, McGraw Hill, 2011.
2. C.J.Date, A.Kannan and S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
3. Subramaniam, “Principles of Multimedia Database Systems”, Morgan Kauffman Publishers, 2008.

TEXT BOOKS:

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2011.
2. Thomas M Connolly and Carolyn E Begg, “Database Systems: A Practical Approach to Design, Implementation and Management”, Fourth Edition, Pearson Education, 2008.

PTIT8002 ADVANCED NETWORKS L T P C
3 0 0 3

OBJECTIVES:
- To explain QoS requirements and compare different approaches to QoS.
- To appreciate need for high speed networks
- To identify reliability issues and provide solutions

UNIT I INTERNETWORKING 9
IPv6 - Design issues - Scalability - Addressing - Headers - Routing - Auto configuration - Transition from IPv4 to IPv6 - Interoperability - QoS in IPv6 - Multicast support - ICMPv6 - Security in IPv6

UNIT II MPLS AND VPN 9
MPLS Architecture and related protocols - Traffic engineering with MPLS - QoS - Network recovery and restoration with MPLS – VPN L2 – VPN L3 & Hybrid

UNIT III QUALITY OF SERVICE 9
Application requirements - VOIP - RT video conferencing - Entertainment video - QoS taxonomy - Resource allocation - Scheduling - Queuing disciplines - Integrated services - Differentiated services - RSVP

UNIT IV OPTICAL NETWORKS 9
Optical network architecture: Next Generation optical networks - Regional optical metro networks – Switching: MPLS controlling optical switches - Optical packet switching - Signaling protocols and network operation

UNIT V WDM NETWORKS 9
WDM: Traffic grooming in WDM - Network survivability - Survivability techniques for optical WDM Networks - Restoration Strategies in optical WDM networks - Network provisioning services

TOTAL: 45 PERIODS

OUTCOMES:
- Understand the QoS requirements and compare different approaches to QoS.
- Understand the appreciate need for high speed networks.
- Understand and identify reliability issues and provide solutions

TEXT BOOKS:

1. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Fifth Edition, Elsevier/Morgan Kaufmann Publishers, 2011.
2. Bruce S. Davie, Adrian Farrel, “MPLS: Next Steps”, Morgan Kaufmann Publishers, 2011.

REFERENCE:

1. Krishna M. Sivalingam, Suresh Subramaniam, “Emerging Optical Network Technologies: Architectures, Protocols and Performance”, Springer publishers, 2011.

PTIT8003 AGENT BASED INTELLIGENT SYSTEMS L T P C
3 0 0 3

OBJECTIVE:
- To know the intelligent agents and the associated searching algorithms
- To understand the various learning approaches and creation of neural network
- To understand the concepts of fuzzy logic

UNIT I AGENTS AND SEARCHING 9

Introduction to AI - Intelligent agents - Uninformed search - Informed search strategies: Greedy best first search - A* search algorithm - Constraint Satisfaction Problems: Backtracking search - Local search - Game Playing: Optimal decisions in games - Alpha-Beta Pruning - Imperfect, real-time decision games

UNIT II RESOLUTION AND REASONING 9

Proportional case - Handling variables and qualifiers - Dealing with intractability - Reasoning with horn clauses - Procedural control of reasoning - Rules in production – Description logic - Vivid knowledge – Beyond vivid

UNIT III NEURAL NETWORKS 9

Machine Learning using Neural Network - Adaptive networks - Feed forward networks - Supervised learning Neural Networks - Radial basis function networks - Reinforcement learning - Unsupervised learning Neural Networks - Adaptive resonance architectures - Advances in Neural Networks

UNIT IV FUZZY LOGIC 9

Fuzzy sets - Operations on Fuzzy sets - Fuzzy relations - Membership functions - Fuzzy rules and Fuzzy reasoning - Fuzzy inference systems - Fuzzy Expert Systems - Fuzzy decision making

UNIT V DEFAULTS, UNCERTAINTY AND EXPRESSIVENESS 9

Introduction to defaults - Closed world reasoning – Circumscription - Default logic limitations - Fuzzy logic - Non-monotonic logic - Theories and world - Semiotics – Autoepistemic logic - Vagueness – Uncertainty and degrees of belief – Non categorical reasoning – Objective and subjective probability

TOTAL: 45 PERIODS

OUTCOMES:

Students who complete the course will be able to:

- Understand the different agent programs
- familiarize with propositional and predicate logic and their roles in logic programming;
- learn the different knowledge representation and reasoning techniques
- appreciate how uncertainty is being tackled in the knowledge representation and reasoning process
- master the skills and techniques in machine learning such as artificial neural networks and fuzzy logic

TEXT BOOKS:

1. Stuart Russell, Peter Norvig, “Artificial Intelligence: A Modern Approach”, Second Edition, Pearson Education, 2004.
2. Elaine Rich, Kevin Knight and B.Nair, “Artificial Intelligence”, Third Edition, Tata McGraw Hill, 2008.

REFERENCES:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, “Neuro-Fuzzy and Soft Computing”, Prentice-Hall of India, 2010.
2. Ronald Brachman, Hector Levesque “Knowledge Representation and Reasoning ”, The Morgan Kaufmann Series in Artificial Intelligence 2004
3. John F. Sowa, “Knowledge Representation: Logical, Philosophical, and Computational Foundations”, 2000
4. Arthur B. Markman, “Knowledge Representation”, Lawrence Erlbaum Associates,1998

PTIT8005 C# AND .NET PROGRAMMING L T P C
3 0 0 3

OBJECTIVE:
Understand the concept of .NET framework, study the different techniques of security, introduce web services with ASP.NET, and explore window based applications.

UNIT I C# LANGUAGE BASICS 9
C# and the .NET framework - C# basics - Objects and types - Inheritance - Arrays - Operators and casts - Indexes

UNIT II C# ADVANCED FEATURES 9
Delegates and events - Strings and regular expressions - Generics - Collections - Memory management and pointers - Errors and exceptions

UNIT III BASE CLASS LIBRARIES AND DATA MANIPULATION 9
Tracing and events - Threading and synchronization - .Net security - Localization - Manipulating XML - Managing the file system - Basic network programming

UNIT IV DATABASE AND WEB SERVICES 9
Window based applications - Data access with .NET - basics of ASP .NET - Introduction to web services

UNIT V .NET FRAMEWORK 9
Architecture - Assemblies - Shared assemblies - CLR hosting - Appdomains – Reflection

TOTAL:45 PERIODS

OUTCOMES:
Upon successful course completion, students will be able to

- Design, document, code and test small C# console and GUI applications.
- Design, document, code and unit test class libraries as part of a larger project.
- Use an object browser and .NET documentation to examine C# and the .NET framework namespace contents.
- Use the Visual Studio IDE to create and debug application and class library solutions and projects.
- Interpret UML class diagrams to create C# classes and applications

TEXT BOOK:
1. Christian Nagel et al. “Professional C# 2005 with .NET 3.0”, Wiley India, 2007.

REFERENCES:

1. Ian Gariffiths, Mathew Adams, Jesse Liberty, “Programming C# 4.0”, O’Reilly,Fourth Edition, 2010.
2. Andrew Troelson, “Pro C# with .NET 3.0”, Apress, 2007.
3. Kevin Hoffman, “Microsoft Visual C# 2005”, Pearson Education, 2006.
4. S.Thamarai Selvi, R. Murugesan, “A Text Book on C#”, Pearson Education, 2003.

PTIT8006	CLOUD COMPUTING	L T P C
		3 0 0 3

OBJECTIVES :

- To understand the concept of cloud and utility computing
- To understand the various issues in cloud computing
- To familiarise themselves with the lead players in cloud
- To appreciate the emergence of cloud as the next generation computing paradigm
- To be able to set up a private cloud
  At the end of this course the student should be able to
- Appreciate the new computing model called cloud computing and why its creating such a hype in the 21st century;
- Use the open source cloud services;
- Understand that one of the major issues in uasge of public cloud is security;
- Is expected to deploy a private cloud and understand the issues currently prevailing.

UNIT I INTRODUCTION 9

Evolution of cloud computing – Need for cloud computing - Benefits - Limitations - Migration into Cloud - Basics of virtualization - Desktop virtualization - Server virtualization - Case study: VMware - Basics of web services - Key concepts

UNIT II CLOUD ARCHITECTURE 9

Three-layer cloud computing architecture - On-demand provisioning - Elasticity in cloud Cloud Computing Services – Infrastructure-as-a-Service – Software-as-a-Service –Platform-as-a-Service - Cloud providers - Cloud deployment models

UNIT III ISSUES IN CLOUD 9

Federation in cloud - Four levels of federation - Privacy in cloud - Security in cloud - Software-as-a-Service security - Case study: Aneka - Service level agreements

UNIT IV CLOUD STORAGE 9

Overview of cloud storage - Cloud storage providers - Case studies: Walrus - Amazon S3 - Cloud file system – Map Reduce - Case study: Hadoop

UNIT V CLOUD DEPLOYMENT TOOLS 9

Study of open source cloud platforms - Eucalyptus - Nimbus - Open Nebula

TOTAL: 45 PERIODS

OUTCOMES:

At the end of course student will be able to

- Understand the systems, protocols and mechanisms to support cloud computing.
- Develop applications for cloud computing.
- Understand the hardware necessary for cloud computing.
- Design and implement a novel cloud computing application

TEXT BOOKS :

1. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing: A Practical Approach”, Tata McGrawHill, 2009.
2. John W.Rittinghous, James F.Ransome, “Cloud Computing: Implementation, Management and Security”, CRC Press, 2010

REFERENCES:

1. Danielle Ruest and Nelson Ruest, 'Virtualization: A Beginner's Guide", McGraw Hill, 2009.
2. Leonard Richardson, Sam Ruby, "RESTful Web Services Web services for the real world", O'REILLY, 2007.
3. Katarina Stanoevska-Slabeva, Thomas Wozniak, Santi Ristol, "Grid and Cloud Computing - A Business Perspective on Technology and Applications", Springer, 2009.
4. Tom White, "Hadoop: The Definitive Guide", O'REILLY Media, 2009.
5. Rajkumar Buyya, James Broberg, Andrzej Goscinski, "Cloud Computing -Principles and Paradigms", John Wiley and Sons, 2011.
6. James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes'', Elsevier/Morgan Kaufmann, 2005.
7. www.open.eucalyptus.com/
8. http://opennebula.org
9. www.nimbusproject.org
10. http://www.nimbusproject.org/files/riteau_CCA11.pdf

PTIT8007	COMPILER DESIGN	L T P C 3 0 0 3

OBJECTIVE:

To design the front end of the compiler, scanner, parser, intermediate code generator, object code generator, and the parallel compilation strategies

UNIT I LEXICAL ANALYSIS 9

Introduction to Compiler: Compilers - Analysis of the Source Program -The phases of compiler - Compiler construction tools - Lexical analyzer - Input buffering - Specification of tokens - Recognition of tokens - A language for specifying lexical analyzer

UNIT II SYNTAX ANALYSIS AND RUN-TIME ENVIRONMENTS 9

Syntax Analysis: The role of the parser - Context-free grammars - Writing a grammar -Top down parsing - Bottom-up parsing - LR parsers - Constructing SLR parsing table - Type checking - Type systems - Specification of a simple type checker – Run-time Environments - Source language issues - Storage organization - Storage-allocation strategies.

UNIT III INTERMEDIATE CODE GENERATION 9

Intermediate languages – Declarations - Assignment statements - Boolean expressions – Flow of Control statements - Back patching - Procedure calls

UNIT IV CODE GENERATION 9

Issues in the design of a code generator - Target machine - Run-time storage management - Basic blocks and flow graphs - Next-use information - Simple code generator - Register allocation and assignment -The DAG representation of basic blocks - Generating code from DAGs

UNIT V CODE OPTIMIZATION 9

Principle sources of optimization - Peephole optimization - Optimization of basic blocks - Loops in flow graphs - Introduction to global data-flow analysis - Code improving transformations

TOTAL: 45 PERIODS

OUTCOME:
Able to design and implement a compiler for a given language

TEXT BOOK:
1. Alfred V. Aho, Ravi Sethi Jeffrey D. Ullman, “Compilers: Principles, Techniques and Tools”, Pearson Education, 2011.

REFERENCES:
1. David Galles, “Modern Compiler Design”, Pearson Education, 2008
2. Steven S. Muchnick, “Advanced Compiler Design & Implementation”, Morgan Kaufmann Publishers, 2000.
3. Charles N. Fischer, Richard. J. LeBlanc, “Crafting a Compiler with C”, Pearson Education, 2008.

PTIT8008 COMPUTATIONAL LINGUISTICS L T P C
3 0 0 3

AIM:
- The aim of this course is to provide an introduction to some basic Language Technologies. The course also provides an overview of Text mining and applications of language processing.

OBJECTIVES:
- To understand the statistical modeling and classification for NLP.
- To understand the basic techniques of Information Retrieval.
- To understand the basic of Text mining and techniques of text mining.
- To know about the generic issues in speech processing and application relevant to Natural Language Generation.

UNIT I NATURAL LANGUAGE PROCESSING 9
Linguistic background - Spoken language input and output technologies - Written language input - Mathematical methods - Statistical modeling and classification - Finite state methods: Grammar for natural language processing - Parsing - Semantic interpretation: Semantics and logical form - Ambiguity resolution – Other strategies for semantic interpretation

UNIT II INFORMATION RETRIEVAL 9
Information Retrieval architecture - Indexing - Storage - Compression techniques -Retrieval approaches - Evaluation - Search engines - commercial search engine features – comparison - performance measures - Document processing - NLP based Information Retrieval - Information extraction

UNIT III TEXT MINING 9
Categorization: Extraction based Categorization - Clustering - Hierarchical clustering - Document classification and routing - Finding and organizing answers from Text search - Categories and clusters for organizing retrieval results - Text Categorization - Efficient summarization using lexical chains - Pattern extraction

UNIT IV GENERIC ISSUES 9
Multilinguality - Multilingual Information Retrieval and Speech processing - Multimodality - Text and Images - Modality integration - Transmission and storage - Speech coding - Evaluation of systems - Human factors and user acceptability

UNIT V APPLICATIONS 9

Machine translation - Transfer metaphor - Interlingua and statistical approaches - Discourse processing - Dialog and conversational agents - Natural language generation - Surface realization and discourse planning

TOTAL: 45 PERIODS

OUTCOME:

Understand the issues present in information as text, apply various information retrieval techniques and text mining techniques to improvise the various operations performed over the information

TEXT BOOKS:

1. Daniel Jurafsky, James H. Martin, "Speech and Language Processing", Pearson Education, 2009.
2. Ronald Cole, J.Mariani, et.al, "Survey of the State of the Art in Human Language Technology", Cambridge University Press, 1997.
3. Michael W. Berry, "Survey of Text Mining: Clustering, Classification and Retrieval", Springer Verlag, 2004.
4. Christopher D.Manning, Hinrich Schutze,"Foundations of Statistical Natural Language Processing ", MIT Press, 1999.

REFERENCES:

1. James Allen, "Natural Language Understanding", Second Edition, Pearson Education, 2008
2. Gerald J.Kowalski, Mark.T. Maybury, "Information Storage and Retrieval systems", Kluwer Academic Publishers, 2000.
3. Tomek Strzalkowski, "Natural Language Information Retrieval", Kluwer Academic Publishers, 1999.

PTIT8012 GRAPH THEORY L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- To acquire knowledge of the basics in graph theory
- To develop the skills in problem solving using graph theory
- To develop the algorithms for solving graph theoretic problems
- To use techniques of permutations and combinations in network security studies
- To use generating functions to simplify recurrence relations

.

UNIT I INTRODUCTION 9

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

UNIT II TREES, CONNECTIVITY & PLANARITY 9

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

UNIT III MATRICES, COLOURING AND DIRECTED GRAPH 8

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

UNIT IV PERMUTATIONS & COMBINATIONS 9

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

UNIT V GENERATING FUNCTIONS 10

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

TOTAL: 45 PERIODS

OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

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

PTIT8014 INTELLECTUAL PROPERTY RIGHTS L T P C
3 0 0 3

OBJECTIVES:

- Get a understanding of the complexities involved in the process of attributing intellectual property rights to people.
- Learn the legalities of intellectual property to avoid plagiarism and other IPR relates crimes like copyright infringements,
- To understand patents, copyrights and IPR related issues.

UNITI INTRODUCTORY ASPECTS 9

Invention and Creativity - Need for protecting Intellectual Property - Concept of Property vis-a- vis Intellectual Property - Forms of Industrial Properties: Patents, Trademarks, Copyrights, Industrial Designs, Plant varieties, Geographical Indicators ..

UNIT II INTERNATIONAL INSTITUTIONS, CONVENTIONS AND TREATIES ON INTELLECTUAL PROPERTY RIGHTS 9

Establishment of WIPO - functions, membership, agreement between WIPO and WTO-dispute settlement - new treaties - Paris convention, Patent Co-operation treaty - Madrid convention - Berne convention - TRIPS Agreement - WTO and Intellectual Property Rights - Commercialization of IPR by licensing.

UNIT III PATENTS 9

Introduction to Patents - History - Patents Act 1970 - Definition of Patents, objects, scope and salient features -- Patentable subject matter, patentability criteria - Procedure for filing Patent Application - Register of Patents and Patent Office - Patent granting procedure - Rights and obligations of patentee, transfer of Patent rights - evocation, Patent infringement and remedies - Case studies.

UNIT IV COPYRIGHTS, TRADEMARKS AND OTHER IPR 10

Copyrights - salient features of Copyright Act - rights conferred by copyright - infringement and remedies - Trademark - rights arising from registration - offences and penalties - Definitions - Industrial designs and Integrated circuits - Protection of Geographical indications - Plant varieties and farmer's rights - Application Procedures, Trade secret - Case studies.

UNITV IPR IN THE CYBER WORLD: 8

Introduction and overview - emergence of cyber crime - software piracy - software copyright and patent - Trademark issues. related to Internet - data protection in cyberspace IPR provisions in Information Technology Act.

TOTAL : 45 PERIODS

OUTCOMES:

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

- Understand the principles, functions and basic legal rules of IP law
- Recognize the relevant criteria for generating and protecting intellectual

TEXT BOOKS:

1. P Narayanan, Intellectual Property Law, Eastern Law House, Fourth Edition.
2. Cornish William, Intellectual Property, Oxford University Press, USA.

REFERENCES:

1. Ganguli -IPR: Unleashed the knowledge economy, Tata McGraw Hill .
2. V.K. Unru, Trademark, Design and Cyber Property Rights, Eastern Law House, 2002.
3. Rodney Ryder, Intellectual Property and the Internet, Lexis Nexis Butterworths Wadhwa, Nagpur.
4. Rahul Matthan, The Law relating to Computers and the Internet, Eastern Book Company.
5. Elizabeth Verkey, Law of Plant Varieties Protection, Eastern Book Company,
6. Pavan Duggal, Cyber Law: The Indian Perspective, Saakshar Law Publications, New Delhi.
7. D.P. Mittal, Law of Information Technology, Taxmann Publications.
8. Prof.A. Chandrasekaran, Intellectual Property Law, C. Sitaraman &Co. Pvt. Ltd, Chennai.

PTIT8015 **KNOWLEDGE ENGINEERING** **L T P C**
3 0 0 3

OBJECTIVES:

- To understand knowledge representation and reasoning techniques
- To understand logics and planning

UNIT I INTRODUCTION 9

Key concepts - Knowledge representation and reasoning - Language of 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 qualifiers - Dealing with intractability - Reasoning with horn clauses - Procedural control of reasoning - Rules in production - Description logic

UNIT III REPRESENTATION 9

Semantic networks - Object Oriented representations - Frame formalism - Structured descriptions - Meaning and Entailment - Taxonomies and Classification - Inheritance - Networks - Strategies for defensible inheritance - Formal account of Inheritance networks - Conceptual dependency - Scripts

UNIT IV DEFAULTS, UNCERTAINTY AND EXPRESSIVENESS 9

Defaults - Introduction - Closed world reasoning - Circumscription - Default logic - Limitations of logic - Fuzzy logic - Nonmontonic 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

Rules - Expert Systems - Explanation and Diagnosis - Natural language processing - Actions - Situational calculus - Frame problem - Complex actions - Planning - Strips - Planning as reasoning - Hierarchical and Conditional Planning

TOTAL: 45 PERIODS

OUTCOMES:

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

- Understand knowledge representation and reasoning techniques.
- Understand logics and planning for complex actions.

TEXT BOOK:

1. Ronald Brachman, Hector Levesque “Knowledge Representation and Reasoning “, The Morgan Kaufmann Series in Artificial Intelligence, 2004.

REFERENCES:

1. Elaine Rich, Kevin Knight, "Artificial Intelligence", McGraw-Hill, Second edition, 2003.
2. John F. Sowa, “Knowledge Representation: Logical, Philosophical and Computational Foundations”, 2000.
3. Arthur B. Markman, “Knowledge Representation”, Lawrence Erlbaum Associates,1998.

PTIT8017 MOBILE APPLICATION DEVELOPMENT L T P C
3 0 0 3

OBJECTIVE

- To know the mobile architecture and its standards
- To develop various applications using mobile devices

UNIT I INTRODUCTION 9

Mobile application fundamentals - Characteristics - Benefits - History of mobiles - Mobile framework - Devices – Platform - Operating systems - Application framework - Overview of types of mobile applications

UNIT II APPLICATION DESIGN 9

Mobile Information Architecture: Click streams - Wireframes - Prototyping – Mobile design - Design elements - Design tools - Design principles - Mobile Web Vs Native applications - Device testing - Desktop testing - Usability testing

UNIT III WEB STANDARDS 9

Overview of Mobile 2.0 - Web Standards - Designing for multiple mobile browsers - Markup languages - Cascading Style Sheets - JavaScript for mobile application development

UNIT IV APPLICATION DEVELOPMENT IN MOBILE DEVICES 9

Native Android and iPhone applications - Android Vs iPhone SDK features - Open handset alliance - Development framework - Android Vs iPhone development tools - Creating applications and activities - Creating user interfaces

UNIT V ADVANCED APPLICATION DEVELOPMENT IN MOBILE DEVICES 9

Internets - Broadcast Receivers - Adapters - Internet - Data Storage - Retrieval and Sharing - Working in the background - Peer to Peer communication - Accessing Android hardware

TOTAL : 45 PERIODS

OUTCOMES:

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

- Understand the mobile architecture and its standards.
- Understand and develop the various applications using mobile devices

TEXT BOOKS:

1. Brian Fling, “Mobile Design and Development”, First Edition, O’Reily Media, 2009.
2. Reto Meier, “Professional Android Application Development”, Wrox Publications, 2010.
3. Lauren Darcey, Shane Conder, “Teach Yourself Android Application Development in 24 Hours”, Second Edition, Sams Publishing, 2010.
4. Jonathan Zdziarski, “iPhone SDK Application Development”, First Edition, O’Reilly, 2009.
5. Neal Goldstein, “iPhone Application Development for Dummies”, Third Edition, Wiley Publishing house, 2010.
6. John Ray, “Teach Yourself iPhone Application Development in 24 days”, Pearson Education, Limited, 2010.

PTIT8019 NETWORK PROGRAMMING AND MANAGEMENT L T P C
3 0 0 3

OBJECTIVE

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

UNIT I SOCKETS AND APPLICATION DEVELOPMENT 9

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

UNIT II SOCKET OPTIONS 9

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

UNIT III ADVANCED SOCKETS 9

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

UNITIV SIMPLE NETWORK MANAGEMENT 9

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

UNIT V SNMP V2, V3 AND RMO 9

Introduction to SNMPv2 - SMI for SNMPV2 - Protocol - SNMPv3 - Architecture and applications - Security and access control model - Overview of RMON

TOTAL: 45 PERIODS

OUTCOMES:

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

Develop programs using TCP Sockets.

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

TEXT BOOKS:

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

REFERENCE BOOK:

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

PTIT8023 SERVICE ORIENTED ARCHITECTURECONCEPTS AND DESIGN **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 SOA FUNDAMENTALS **9**

Principles of Service Orientation - Client-Server Architecture - Distributed Internet Architecture - SOA Characteristics - Anatomy of SOA - Components - Interaction - Technical and Business Benefits - Multi-channel access - Business Process Management

UNIT II SOA AND WEB SERVICES **9**

Web Service Platform - Web Service Description - Service Contracts - Service Level Data Model - Service Discovery - Service Level Security - Service Level Interaction Patterns: SOAP basics - Messaging with SOAP - Message Exchange Patterns - Atomic Services and Composite Services – Service Layer Abstraction - Proxies and Skeletons – SOAP communication based web services

UNIT III SERVICE ORIENTED ANALYSIS AND DESIGN **9**

Design principles - Business Centric SOA - Deriving Business services - Service Modeling - Coordination - Atomic Transaction - Business activities - Web Service Orchestration - Choreography - Entity centric business service design - Application Service design - Task centric business service design

UNIT IV WEB SERVICES DEVELOPMENT AND DEPLOYMENT **9**

XML and Web Services - WSDL basics - SOA support in J2EE - Java API for XML-based Web Services (JAX-WS) - Java Architecture for XML Binding (JAXB) - Java API for XML Registries (JAXR) - Web Services Interoperability Technologies - SOA support in .NET - Common Language Runtime - ASP.NET - Web forms - ASP.NET Web Services - Web Services Enhancements

UNIT V SOA APPLICATIONS AND SECURITY **9**

Business Process Execution Language (BPEL) – Metadata Management – XML Security – XML Signature – XML Encryption – Advanced Messaging – WS Security – Security in Web Service framework

TOTAL: 45 PERIODS

OUTCOMES:

The course aims to give the student an understanding of the strengths and weaknesses of a service-based architecture, informed by an ability to implement and deploy simple web services using a java and .net framework. They will also learn to define and design applications as combinations of services, and be able to discuss the emergent properties of those compositions; and to understand the security and research context and potential future directions for these technologies.

REFERENCES:

1. Eric Newcomer, Greg Lomow, “Understanding SOA with Web Services”, Pearson Education, 2009.
2. Thomas Erl, “Service Oriented Architecture: Concepts, Technology, and Design”, Pearson Education, 2011.
3. Shankar Kambhampaly, “Service Oriented Architecture for Enterprise Applications”, First Edition, Wiley India Pvt Ltd, 2008.

4. Mark O' Neill, et al., "Web Services Security", First Edition, Tata McGraw-Hill Edition, 2003.
5. Frank Cohen, "Fast SOA", First Edition, Elsevier, 2007.
6. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.

PTIT8024 SOCIAL NETWORK ANALYSIS L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

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

UNIT I INTRODUCTION 9

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

UNIT II MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION 9

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

UNIT III EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS 9

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

UNIT IV PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES 9

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

UNIT V VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS 9

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

TOTAL: 45 PERIODS

OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

1. Guandong Xu , Yanchun Zhang and Lin Li, "Web Mining and Social
2. Networking – Techniques and applications", Springer, First edition, 2011.
3. Dion Goh and Schubert Foo, "Social information retrieval systems: emerging technologies and applications for searching the Web effectively", IGI Global snippet, 2008.
4. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, "Collaborative and social information retrieval and access: techniques for improved user modelling", IGI Global snippet, 2009.
5. John G. Breslin, Alexandre Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.

PTIT8025 SOFT COMPUTING L T P C
3 0 0 3

OBJECTIVES:

- To teach basic neural networks, fuzzy system and genetic algorithm concepts and their relations.
- To develop skills in supervised, unsupervised and reinforcement learning networks. comprehend neuro fuzzy modeling.

UNIT I INTRODUCTION TO SOFT COMPUTING 9

Evolution of Computing - Soft Computing Constituents - Conventional Artificial Intelligence to Computational Intelligence - Basics of Machine Learning - Machine Learning approach to Knowledge acquisition

UNIT II GENETIC ALGORITHMS 9

Fundamentals - Genetic Operators - Sample genetic algorithms - Applications of Genetic Algorithms

UNIT III NEURAL NETWORKS 9

Machine Learning using Neural Networks and Adaptive Networks - Feed forward networks - Supervised learning neural networks - Radial basis function networks - Reinforcement learning - Unsupervised learning neural networks - Adaptive resonance architectures – Advancements in neural networks

UNIT IV FUZZY LOGIC 9

Fuzzy sets - Operations on Fuzzy sets - Fuzzy relations - Membership functions - Fuzzy rules and reasoning - Fuzzy Inference systems - Fuzzy Expert systems - Fuzzy decision making

UNIT V NEURO-FUZZY MODELING 9

Adaptive Neuro-Fuzzy Inference Systems - Coactive Neuro-Fuzzy Modeling - Classification and Regression trees - Data Clustering algorithms - Rule based Structure identification - Neuro-Fuzzy control - Case study

TOTAL: 45 PERIODS

OUTCOMES:

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

- Identify and describe soft computing techniques and their roles in building intelligent machines.
- Recognize the feasibility of applying a soft computing methodology for a particular problem.
- Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems
- Apply genetic algorithms to optimization problems
- Apply neural networks to pattern classification and regression problems using soft computing approach

TEXT BOOKS:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, “Neuro-Fuzzy and Soft Computing”, First Edition, Prentice-Hall of India, 2003.
2. S. N. Sivanandam, and S. N. Deepa, “Principles of Soft Computing”, Second Edition, Wiley-India, 2007.

REFERENCES:

1. David Poole, Alan Mackworth and Randy Goebel, “Computational Intelligence: A Logical approach”, First Edition, Oxford University Press, 2009.
2. James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques”, First Edition, Pearson Education, 2003.
3. Mitchell Melanie, “An Introduction to Genetic Algorithm”, First Edition, Prentice Hall, 1998.
4. David E. Goldberg, “Genetic Algorithms in Search, Optimization and Machine Learning”, First Edition, Addison Wesley, 1997.
5. George J. Klir and Bo Yuan, “Fuzzy Sets and Fuzzy Logic-Theory and Applications”, First Edition, Prentice Hall, 1995.

PTIT8028 SOFTWARE PROJECT MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:

- To develop an awareness of the need for project planning and management
- To apply professional attitudes and techniques to managing a project
- Explain the stages in the system development lifecycle and the activities that are carried out to implement an IT application;
- Demonstrate an understanding of steps needed to build and maintain effective development teams;
- Explain the procedures needed to monitor, control and report upon an IT development project;
- Discuss and where appropriate apply the principles of project risk management.
- Explain the ways in which appropriate quality attributes of the products of an IT development project can be assessed and assured.

UNIT I FUNDAMENTALS 9

Conventional software management - Evolution of software economics - Improving software economics - Conventional Vs Modern software project management.

UNITII SOFTWARE MANAGEMENT PROCESS FRAMEWORK 9

Lifecycle phases - Artifacts of the process - Model based software architectures -Workflows of the process - Checkpoints of the process.

UNIT III SOFTWARE MANAGEMENT DISCIPLINES 9

Iterative process planning - Organization and Responsibilities - Process automation - Process control and process instrumentation - Tailoring the process. Project planning - Scheduling - Tracking and Control - Time and Cost overruns - Project organization - Staffing - Group working - Team dynamics.

UNIT IV MANAGED AND OPTIMIZED PROCESSES 9

Quality management and ISO 9000 quality assurance method - Configuration management - Quality reviews - Software standards - Tracking of defects - Process improvements - SCI/CMM models - Other process models - Data gathering and analysis Principles of data gathering - Data gathering process - Software measures - Data analysis - Managing software quality - Defect prevention.

UNIT V CASE STUDIES 9

COCOMO Cost estimation model - Change metrics -Case studies

TOTAL: 45 PERIODS

OUTCOMES:

- Understand the fundamentals of software project process framework
- Understand project planning, scheduling, tracking , organizing and controlling
- Deeper understanding of the Quality management and tools used.
- Will be able to estimate cost and evaluate the project

TEXT BOOKS:

1. Bob Hughes, Mike Cotterell, “Software Project Management”, Fifth edition, Tata McGraw Hill, 2009.
2. Walker Royce “Software Project Management A Unified Framework”, Pearson Education, 2004.

REFERENCES:

1. Ramesh Gopalaswamy, “Managing Global Software Projects”, Tata McGraw Hill, 2001.
2. Humphrey Watts, “Managing the software process”, Addison Wesley, 1989.

PTIT8031 SOFTWARE TESTING L T P C
3 0 0 3

OBJECTIVES

- This objective of the course is to make students aware about the importance of the software testing during software development.
- Understand the theoretical aspects of software testing
- To study traditional static and dynamic analyses, such as data-flow, slicing, and profiling, along with promising techniques such as model checking and abstract interpretation
- To study traditional applications of these analyses, such as validation, program understanding, and debugging as well as new applications, such as security and component-based systems
- To extend understanding of software testing – its application and management – its key disciplines – and to enhance awareness of issues and constraints around testing

UNIT I BASICS OF SOFTWARE TESTING 9

Human errors and testing - Software quality- Requirements - Behavior and Correctness - Correctness Vs Reliability- Testing and Debugging - Test metrics - Software and Hardware testing - Testing and Verification - Defect management - Execution history - Test-generation strategies - Static testing - Model based testing and Model checking - Control flow Graph - Types of testing - Saturation effect - Testing axioms - Origins of defects - Cost of defects - Defect classes - Defect repository and Test design - Defect examples - Developer / Tester support - Defect prevention strategies

UNIT II TEST CASE DESIGN 9

Design strategies - Black box approach - 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 - White box approach - Test adequacy criteria -Static testing Vs Structural testing - Code functional testing - Coverage and control flow graphs - Covering code logic - Paths - Role in White box based test design - Code complexity testing

UNIT III TEST CASE SELECTION AND ADEQUACY TEST EXECUTION 9

Overview - Test specification and cases - Adequacy criteria- Comparing criteria- Overview of test execution - Test case specification to test cases - Scaffolding - Generic Vs specific scaffolding - Test Oracles - Self-checks as Oracles - Capture and replay - Process: Test and analysis activities - Quality process - Planning and Monitoring - Quality goals - Dependability properties - Analysis -Testing - Improving the process - Organizational factors - Integration testing strategies - Testing components and assemblies - System testing - Acceptance testing - Usability - Regression testing - Regression test selection techniques - Test case prioritization and selective execution

UNIT IV TEST MANAGEMENT 9

People and organizational issues in testing - Organization structures for testing teams - Testing services - Test planning - Test plan components - Test plan attachments -Locating test items - Test management - Test process - Reporting test results - Role of three groups in test planning and policy development - Test specialist - Skills - Building a testing group.

UNIT V TEST AUTOMATION 9

Software test automation - Skills - Scope - Design and architecture for automation - Requirements for a test tool - Challenges in automation - Test metrics and measurements - Project progress and productivity metrics

TOTAL : 45 PERIODS

OUTCOMES:

- Understand the basic principles and techniques of software testing.
- Develop the test plan and execute that plan to detect the defects in the software.
- Automate the testing process using appropriate tools.
- Apply the testing metrics to evaluate the test results.
- Implement many real time applications with various software testing tools.

TEXT BOOKS:

1. Srinivasan Desikan and Gopalaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson education, 2007.
2. Ilene Burnstein, “Practical Software Testing”, Springer International Edition, 2003.

REFERENCES:

1. Software Testing and Analysis Process Principles and Techniques – Mauro Pezze, Michal Young, Wiley India, 2008.
2. Ron Patton, " Software Testing", Second Edition, Sams Publishing, Pearson education, 2007
3. Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.
4. Aditya P. Mathur, "Foundations Ff Software Testing – Fundamental algorithms and techniques", Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008

PTIT8033 WIRELESS SENSOR AND MESH NETWORKS L T P C
3 0 0 3

OBJECTIVES:

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

- Explore the state-of-art in sensor and mesh networks
- Understand the specific design challenges for sensors and mesh.
- Identify solution for each applications such as environmental monitoring, home automation
- List protocols suitable for a given task satisfying the performance metric

UNIT I INTRODUCTION AND NETWORKING SENSORS 9

Challenges for WSN - Single node architecture - Energy consumption - Energy scavenging techniques - Operating systems - TinyOS network architecture - Network scenarios - Adaptation of MAC protocols - SMAC - Low duty Cycle Protocols and Wakeup Concepts - SMAC 802.15.4 MAC - Zigbee

UNIT II SYNCHRONIZATION AND LOCALIZATION 9

Time synchronization - calibration - classes - Techniques of Synchronization, Localization Issues - Centralized and Distributive algorithm - Multilateration Positioning tracking Topology Construction - MST- RNG - GG - Delaunay Triangulation Connectivity Metric

UNIT III ROUTING AND QUERYING 9

Routing Protocols - Energy-Efficient Routing - Geographic Routing - Data Centric Routing - In-Network Aggregation - Storage and Retrieval - Range Query - KD Tree -Range Tree - Location Service

UNIT IV MESH NETWORKING 9

Necessity for Mesh Networks - Adaptive Coding and Radio Technologies, MAC enhancements - IEEE 802.11s, IEEE 802.16 MAC in Mesh mode Single Radio and Multi Radio MAC protocol - Mobility and Power Management - Topology Control

UNIT V MESH ROUTING AND CASE STUDY 9

Routing Metrics – Categories - Opportunistic Routing - Self Configuration and Auto Configuration - Cross layer routing - Capacity Models - Heterogeneous Mesh Networks - Vehicular Mesh Networks - Case Study

TOTAL : 45 PERIODS

OUTCOMES:

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

- Understand and explore the state-of-art in sensor and mesh networks
- Understand the specific design challenges for sensors and mesh.
- Understand and identify solution for each application such as environmental monitoring, home automation.

TEXT BOOKS:

1. Holger Karl, Andreas Willig, “Protocols and Architectures for Wireless Sensor Networks”, John Wiley, 2005.
2. Feng Zhao, Leonidas J. Guibas, “Wireless Sensor Networks - An Information Processing Approach", Elsevier, 2007.
3. Thomas Krag, Sebastin Buettrich, “Wireless Mesh Networking”, O’Reilly, 2007.
4. Ian Fuat Akyildiz, Xudong Wang, “Wireless Mesh Networks”, John Wiley, 2009.

REFERENCES:

1. Kazem Sohraby, Daniel Minoli, Taieb Znati, “Wireless Sensor Networks - Technology, Protocols and Applications”, John Wiley, 2007.
2. Robert Faludi, “Building Wireless Sensor Networks”**,** O’Reilly Publishers, 2010.
3. Nobuo Funabiki, “Wireless Mesh Networks”, InTech Publisher, January 2011.
4. Sudip Misra, Subhas Chandra Misra, Isaac Woungang, “Guide to Wireless Mesh Networks”, Springer, 2009.

PTIT8071	DIGITAL IMAGE PROCESSING (Common to CSE & IT Programmes)	L T P C 3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the techniques for processing images including the different File formats used
- Be exposed different image enhancement techniques
- Learn about image segmentation and feature analysis
- Understand the role of multi resolution analysis in image processing
- Study various applications of image processing

UNIT I FUNDAMENTALS OF IMAGE PROCESSING 9

Introduction - Steps in image processing systems - Image acquisition - Sampling and Quantization - Pixel relationships - Color 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 - Color image processing

TOTAL: 45 PERIODS

OUTCOMES:

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

- Explain the various steps in image processing
- Compare and Contrast different image enhancement techniques
- Critically analyze various image segmentation and feature analysis
- Apply Multi resolution analysis to image processing
- Design various applications using image processing

TEXT BOOKS:

1.Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing", Third Edition, Pearson Education, 2009.

2. S.Sridhar, "Digital Image Processing", Oxford University Press, 2011.

REFERENCES:

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Second Edition, Thompson Learning, 2007.
2. Anil K.Jain, "Fundamentals of Digital Image Processing", PHI, 2011.
1. Sanjit K. Mitra, & Giovanni L. Sicuranza, "Non Linear Image Processing", Elsevier, 2007

PTIT8072 FREE AND OPEN SOURCE SOFTWARE L T P C
(Common to CSE & IT Programmes) 3 0 0 3

OBJECTIVES:

The student should be made to:

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

UNIT I PHILOSOPHY 6

Linux,GNU and Freedom, Brief history of GNU, Licensing free software – GPL and copy Left, trends and potential – global and Indian, overview and usage of various Linux Distributions – user friendliness perspective – scientific perspective

UNIT II SYSTEM ADMINISTRATION 10

GNU and linux installation – Boot process, Commands Using bash features, The man pages, files and file systems, File security, Partitions, Processes, Managing processes, I/O redirection, Graphical environment, Installing software, Backup techniques

UNIT III FOSS PROGRAMMING PRACTICES 10

GNU debugging tools, Using source code versioning and managing tools, Review of common programming practices and guidelines for GNU/Linux and FOSS, Documentation

UNIT IV PROGRAMMING TECHNIQUES 10

Application programming – Basics of X Windows server architecture – QT programming – GTK + Programming- Python programming – Open source equivalent of existing Commercial software

UNIT V PROJECTS AND CASE STUDIES 9

Linux for portable Devices, Creation of Bootable CD and USB from command line, Case Studies – Samba, Libreoffice, Assistive technology

OUTCOMES:

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

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

TE XT BOOK:

1. Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, Linux in a nutshell, Sixth edition, OReilly media, September 2009.

REFERENCES:

1. Philosophy of GNU URL: http://www.gnu.org/philosophy/
2. Overview of Linux Distributions URL: http://distrowatch.com/dwres.php?resource=major
3. Introduction to Linux – A Hands on Guide, URL: http://tldp.org/guides.html
4. **Linux:** Rute's User tutorial and exposition , URL: http://rute.2038bug.com/index.html.gz
5. Version control system , URL: http://git-scm.com/
6. SVN version control , URL: http://svnbook.red-bean.com/
7. GTK+/GNOME Application Development, Havoc Pennington. URL: http://developer.gnome.org/doc/GGAD Python Tutorial, Guido van Rossum, Fred L. Drake, Jr., Editor. URL: http://www.python.org/doc/current/tut/tut.html
8. Doug Abbot, Linux for Embedded and Embedded and Real time applications , Newnes
9. Case study SAMBA: URL : http://www.samba.org/
10. Case study., Libre office: http://www.libreoffice.org/
11. Case study, ORCA: http://live.gnome.org/Orca

PTIT8073 TCP/IP DESIGN AND IMPLEMENTATION L T P C
(Common to CSE & IT branches) 3 0 0 3

OBJECTIVES:

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

UNIT I FUNDAMENTALS 9

Internetworking concepts - IP and datagram forwarding - TCP services - Interactive data flow - Timeout and retransmission - Bulk data flow - Persist timer – Keep-alive timer

UNIT II ARP AND IP 9

Structure of TCP/IP in OS - Data structures for ARP - Cache design and management - IP software design and organization - Sending a datagram to IP

UNIT III IP ROUTING IMPLEMENTATION 9

Routing table - Routing algorithms - Fragmentation and reassembly - Error processing (ICMP) - Multicast Processing (IGMP)

UNIT IV TCP I/O PROCESSING AND FSM 9

Data structure and input processing - Transmission control blocks - Segment format - Comparison - Finite state machine implementation - Output processing - Mutual exclusion - Computing TCP data length

UNIT V TCP TIMER AND FLOW CONTROL 9

Timers - Events and messages - Timer process - Deleting and inserting timer event - Flow control and adaptive retransmission - Congestion avoidance and control - Urgent data processing and push function

TOTAL: 45 PERIODS

OUTCOMES:

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

- Understand the internals of the TCP/IP protocols
- Understand how TCP/IP is actually implemented
- Understand the interaction among the protocols in a protocol stack

TEXT BOOKS:

1. Douglas E. Comer, “Internetworking with TCP/IP Principles, Protocols and Architecture”, Vol. 1 Fifth edition, Pearson Education Asia, 2006.
2. Douglas E. Comer, “Internetworking with TCP/IP - Design, Implementation and Internals”, Vol. 2 Third edition, Pearson Education Asia, 1999.

REFERENCE:

1. W. Richard Stevens, “TCP/IP illustrated-The Protocols”, Volume 1, Pearson Education, 2003.

PTMA8001 ALGEBRA AND NUMBER THEORY L T P C
3 0 0 3

OBJECTIVES:

- To introduce the basic notions of groups, rings, fields which will then be used to solve related problems.
- To examine the key questions in the Theory of Numbers.
- To give an integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

UNIT I FIELDS 9

Group Theory - Rings and Polynomials – Fields.

UNIT II FINITE FIELDS AND POLYNOMIALS 9

Finite Fields – Irreducible Polysnomials over Finite fields – Factorization of Polynomials over Finite Fields.

UNIT III DIVISIBILITY THEORY AND CANONICAL DECOMPOSITIONS 9

Division algorithm- Base-b representations – number patterns – Prime and composite numbers –Fibonacci and Lucas numbers – Fermat numbers – GCD – Euclidean Algorithm – Fundamental theorem of Arithmetic – LCM.

UNIT IV DIOPHANTINE EQUATIONS AND CONGRUENCES 9

Linear Diophantine equations – Congruence's – Linear Congruence's - Applications: Divisibility tests – Modular Designs – Chinese remainder theorem – 2x2 linear systems.

UNIT V CLASSICAL THEOREMS AND MULTIPLICATIVE FUNCTIONS 9

Wilson's theorem – Fermat's Little theorem – Euler's theorem – Euler's Phi functions – Tau and Sigma functions – Perfect numbers – Mersenne Primes – Mobius Function.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the student is able to:

- Solve problems related to finite fields and Polynomials
- Understand the applications of division and Euclidean Algorithm
- Understand the classical theorems and multiplicative functions

TEXT BOOKS:

1. Lidl.R., and Pilz. G., "Applied Abstract Algebra", Springer-Verlag, New Delhi, 2nd Edition, 2006.
2. Thomas Koshy, "Elementary Number Theory with Applications", Elsevier Publications, New Delhi, 2002.

REFERENCES:

1. San Ling and Chaoping Xing, "Coding Theory – A first Course", Cambridge Publications, Cambridge, 2004.
2. Niven.I, Zuckerman.H.S., and Montgomery, H.L., "An Introduction to Theory of Numbers" , John Wiley and Sons, Singapore, 2004.

PTMA8251 NUMERICAL METHODS L T P C

(Common to IT, Printing ,Manufacturing, EEE, Industrial, Automobile) 3 0 0 3

OBJECTIVES:

- To provide the mathematical foundations of numerical techniques for solving linear system, Eigenvalue problems, interpolation, numerical differentiation and integration and the errors associated with them;
- To demonstrate the utility of numerical techniques of ordinary and partial differential equations in solving engineering problems where analytical solutions are not readily available.

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton-Raphson method- Solution of linear system of equations - Gauss Elimination method – Pivoting - Gauss-Jordan methods – Iterative methods of Gauss-Jacobi and Gauss-Seidel - Matrix Inversion by Gauss-Jordan method – Eigen values of a matrix by Power method and by Jacobi's method.

UNIT II INTERPOLATION AND APPROXIMATION 9

Interpolation with unequal intervals - Lagrange interpolation – Newton's divided difference interpolation – Cubic Splines - Interpolation with equal intervals - Newton's forward and backward difference formulae – Least square method - Linear curve fitting.

UNIT III NUMERICAL DIFFERENTATION AND INTEGRATION 9

Approximation of derivatives using interpolation polynomials - Numerical integration using Trapezoidal, Simpson's 1/3 and Simpson's 3/8 rules – Romberg's method - Two point and three point Gaussian quadrature formulae – Evaluation of double integrals by Trapezoidal and Simpson's rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9

Single step-methods - Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first and second order equations - Multi-step methods - Milne's and Adams-Bash forth predictor-corrector methods for solving first order equations.

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

Finite difference methods for solving two-point linear boundary value problems. Finite difference techniques for the solution of two dimensional Laplace's and Poisson's equations on rectangular domain – One dimensional heat-flow equation by explicit and implicit (Crank-Nicholson) methods - One dimensional wave equation by explicit method.

TOTAL: 45 PERIODS

OUTCOMES:

- The students will have a clear perception of the power of numerical techniques, ideas and would be able to demonstrate the applications of these techniques to problems drawn from industry, management and other engineering fields.

TEXT BOOKS:

1. Grewal, B.S. and Grewal,J.S., "Numerical methods in Engineering and Science", Khanna Publishers, New Delhi, 9th Edition, 2007.
2. Sankara Rao, K. "Numerical methods for Scientists and Engineers', Prentice Hall of India Private Ltd., New Delhi, 3rd Edition,2007.

REFERENCES:

2. Brian Bradie, "A Friendly Introduction to Numerical Analysis", Pearson Education Asia, New Delhi, 1st Edition, 2007.
3. Gerald, C.F. and Wheatley, P.O., "Applied Numerical Analysis", Pearson Education Asia, New Delhi, 6th Edition, 2006.
4. Laurene V. Fausett, "Applied Numerical Analysis using MATLAB", Pearson Education, New Delhi, 1st print, 2nd Edition, 2009.

PTMG8651 TOTAL QUALITY MANAGEMENT L T P C

(Common to Manufacturing, Mechanical, Production, Printing, Industrial, Auto, Leather, CSE, ECE, IT & EEE) 3 0 0 3

AIM

To provide comprehensive knowledge 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 importance of ISO and Quality systems

UNIT I INTRODUCTION 9

Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of product and service quality - Basic concepts of TQM – TQM Framework - Contributions of Quality Gurus – Barriers to TQM – Cost of Quality.

UNIT II TQM PRINCIPLES 9

Quality statements - Customer focus –Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Continuous process improvement – PDCA 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 – Performance measures - BPR.

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 –Quality Council – Leadership, Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward.

TOTAL : 45 PERIODS

OUTCOMES :

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

TEXT BOOK:

1. Dale H.Besterfiled, 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, Third 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.

PTCS8075 FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT **L T P C 3 0 0 3**

OBJECTIVE:

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

COURSE OBJECTIVES:

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

The student will be able to:

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

UNIT I FUNDAMENTALS OF PRODUCT DEVELOPMENT 9

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

UNIT II REQUIREMENTS AND SYSTEM DESIGN 9

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

UNIT III DESIGN AND TESTING 9

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

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

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

UNIT V BUSINESS DYNAMICS ENGINEERING SERVICES INDUSTRY 9

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

TOTAL: 45 PERIODS

COURSE OUTCOMES:

The students will be able to

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

COURSE MATERIAL AND PEDAGOGY:

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

TEXT BOOKS [INDIAN ECONOMY EDITIONS]:

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

REFERENCES:

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

PTGE8071 DISASTER MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:

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

UNIT I INTRODUCTION TO DISASTERS 9

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

UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9

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

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9

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

UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9

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

UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS 9

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TOTAL: 45 PERIODS

OUTCOMES:

The students will be able to

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

TEXTBOOK:

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

REFERENCES

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

PTGE8072 HUMAN RIGHTS L T P C

3 0 0 3

OBJECTIVES :

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

UNIT I **9**

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

UNIT II **9**

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

UNIT III **9**

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

UNIT IV **9**

Human Rights in India – Constitutional Provisions / Guarantees.

UNIT V **9**

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

TOTAL : 45 PERIODS

OUTCOMES:

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

REFERENCES:

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