KONGU ENGINEERING COLLEGE, PERUNDURAI, ERODE – 638 052
(An Autonomous Institution affiliated to Anna University Coimbatore)

M.Sc. DEGREE IN INFORMATION TECHNOLOGY (2 YEARS)

CURRICULUM
(For the candidates admitted from academic year 2011 – 2012 onwards)

SEMESTER – I

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
11PC101	Theory of Computation	3	0	0	3	50	50	100
11PC102	Data Structures and Algorithms	3	0	0	3	50	50	100
11PC103	Object Oriented Programming	3	0	0	3	50	50	100
11PC104	Operating Systems	3	0	0	3	50	50	100
11PC105	Software Engineering	3	0	0	3	50	50	100
11PI101	Digital Principles	3	0	0	3	50	50	100
	PRACTICAL							
11PC107	Data Structures and Algorithms Laboratory	0	0	3	1	50	50	100
11PC108	Object Oriented Programming Laboratory	0	0	3	1	50	50	100
		0	0	3	--	--	--	--
	Total				**20**			

CA – Continuous Assessment, ESE – End Semester Examination

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SEMESTER – II

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
11PI201	Computational Methods	3	0	0	3	50	50	100
11PC202	Database Management Systems	3	0	0	3	50	50	100
11PI202	Data Communication and Networks	3	0	0	3	50	50	100
11PI203	Internet Programming	3	0	0	3	50	50	100
11PI204	Information Security	3	0	0	3	50	50	100
	Elective – I	3	0	0	3	50	50	100
	PRACTICAL							
11PI205	RDBMS Laboratory	0	0	3	1	50	50	100
11PI206	Internet Programming Laboratory	0	0	3	1	50	50	100
	Communication Skills Laboratory	0	0	3	--	--	--	--
				Total	**20**			

CA – Continuous Assessment, ESE – End Semester Examination

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CURRICULUM
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SEMESTER – III

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
11PC301	.NET Programming	3	0	0	3	50	50	100
11PI301	Mobile Computing	3	0	0	3	50	50	100
11PI302	Grid Computing	3	0	0	3	50	50	100
11PC304	Unix Internals	3	0	0	3	50	50	100
	Elective-II	3	0	0	3	50	50	100
	Elective-III	3	0	0	3	50	50	100
	PRACTICAL							
11PC305	.NET Programming Laboratory	0	0	3	1	50	50	100
11PC306	Unix Internals Laboratory	0	0	3	1	50	50	100
					20			

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CURRICULUM

(For the candidates admitted from academic year 2011 – 2012 onwards)

SEMESTER – IV

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	PRACTICAL							
11PI401	Dissertation and viva voce	0	0	24	12	100	100	200
	Total				12			

CA – Continuous Assessment, ESE – End Semester Examination

LIST OF ELECTIVES					
Course Code	**Course Title**	L	T	P	C
11PI011	Management Information Systems	3	0	0	3
11PC012	Optimization Techniques	3	0	0	3
11PC013	Principles of Management	3	0	0	3
11PC014	E-Commerce	3	0	0	3
11PI012	Human Resource Management	3	0	0	3
11PC017	Computer Graphics and Multimedia Systems	3	0	0	3
11PC019	Advanced Database Technology	3	0	0	3
11PI013	Information Coding Techniques	3	0	0	3
11PI014	System Software	3	0	0	3
11PI015	Web Engineering	3	0	0	3
11PI016	High Performance Networks	3	0	0	3
11PI017	Service Oriented Architecture	3	0	0	3
11PI018	Adhoc Networks	3	0	0	3
11PI019	TCP/IP	3	0	0	3
11PC022	Soft Computing	3	0	0	3

11PC101 THEORY OF COMPUTATION
(Common to M.Sc Computer Technology and Information Technology)

3	0	0	3

Objective :
- To teach the students how to construct correct mathematical arguments.
- To give an awareness of functions which transform a finite set into another finite set which relates to input and output functions.
- To have an understanding of finite state and pushdown automata.

MODULE – I   **15**
Logic: Propositions – Connectives - Truth Table - Statement Formula - Tautologies and Contradictions - Equivalence of Formula - Tautological Implications - Normal Forms -Theory of Inference for Statement Calculus – Predicates - Statement Function-Quantifiers-Free and Bound Variables-Universe of Discourse-Inference Theory and Predicate Calculus.

MODULE - II   **15**
Set Theory & Functions: Basic Concepts of Sets - Operations on Sets - Venn Diagram - Laws of Set Theory – Partition -Principle of Inclusion and Exclusion.Cartesian Product of Two Sets - Relations - Properties of Relations - Equivalence Relations - Relation Matrix and Graph of Relation - Functions - Types of Functions - Injective, Surjective and Bijective Functions – Inverse of Functions - Characteristic Function of a Set.

MODULE- III   **15**
Formal Languages and Automata Theory: Four Classes of Grammars: Phrase Structure, Context Sensitive, Context Free, Regular – Rightmost, Leftmost Derivations – Unambiguity – Construction of Grammars for Languages – Derivation of Languages from Grammars - Definition of Deterministic Finite State Automata (DFA), Non-Deterministic Finite State Automata (NFA) – Equivalence of DFA And NFA – Equivalence of Regular Grammar and Finite Automata – Push Down Automata – Definition – Equivalence of acceptance by Final State and Empty Stack – Equivalence of PDA's and Context Free Languages.

TOTAL : 45

REFERENCE BOOKS
1. Hopcropt John.E., Motwani R, and Ullman Jeffrey D, "Introduction to Automata Theory Languages and Computation", Third Edition, Addison Wesley, 2006.
2. Tremblay J.P. and Manohar R., "Discrete Mathematical Structures with Applications to Computer Science", 33rd Reprint, Tata McGraw-Hill, New Delhi, 2008.
3. Rosen Kenneth. H, "Discrete Mathematics and its Applications", Tata McGraw Hill, New Delhi, 2006.

11PC102   DATA STRUCTURES AND ALGORITHMS
(Common to M.Sc Computer Technology and Information Technology)

3   0   0   3

Objective :
- These courses explore fundamental data structures, algorithms for manipulating them and analyze and use lists, trees, and graphs.
- Apply common algorithm design techniques: divide-and-conquer, the greedy method and back tracking technique.

MODULE – I -   **15**
Linear Data Structures and their Sequential storage representation - Concepts and Terminology – Storage structures for arrays – Structures and arrays of structures – Stacks – Applications of stacks – Queues – Simulation – Priority Queues – **Linear Data Structures and their Linked storage representation -** Pointers and Linked allocation – Linked linear lists – Applications of linked linear lists – **Non Linear Data Structures**: Trees - Definitions and Concepts – Operations – Storage representation & Manipulation – Conversion – Other Representation - Applications.

MODULE - II   **15**
Non Linear Data Structures & Sorting, Searching: Non Linear Data Structures: Graphs and their representation – Matrix representation – List structures – Other Representations - Breadth First Search-Depth First Search-Spanning Tree - Applications Of Graph – **Sorting**: Notations And Concepts - Selection-Bubble - Merge-Tree-Partition-Exchange – Radix - Address Calculation - **Searching** – Sequential – Binary - Search Trees.

MODULE - III   **15**
 Algorithms and Design Techniques: Algorithms - Introduction - Algorithm - Specification - Performance Analysis-**Divide and Conquer**-General Method - Binary Search-Finding the Maximum and Minimum-Merge sort-Quick Sort – **Greedy Method** - The General Method – Knapsack Problem-Tree vertex Splitting – Job Sequence with deadlines-Minimum cost Spanning trees-Optimal storage on tapes-Optimal Merge Patterns – Single source shortest paths - **Backtracking**- The General Method -The 8-Queens Problem - Sum of Subsets - Graph Coloring - Hamiltonian Cycles

TOTAL : 45

REFERENCE BOOKS
1   Tremblay Jean-Paul, and Sorenson Paul G., "An Introduction To Data Structures With Applications", Second Edition, Tata McGraw-Hill Edition, New Delhi, 2007.
2   Horowitz, Ellis., Sahni, Sartaj and Rajasekaran, Sanguthevar., "Computer Algorithms", Second Edition, Galgotia Publications, New Delhi, 2007.

11PC103   OBJECT ORIENTED PROGRAMMING
(Common to M.Sc Computer Technology and Information Technology)

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Objective :
- Gain a strong foundation in Object Oriented Programming Concepts.
- Students are able to implement any Software using OOP concepts.

MODULE – I   **15**

Introduction To C++ & Operator Overloading: Introduction – Structured Programming Vs Object Oriented Programming – Basic Concepts of OOP. C++ Programming Basics – Loops and Decisions – Structures – Functions – Preprocessor. Objects and Classes – Constructors – Arrays and Strings – Operator Overloading – Overloading Unary and Binary Operators for Friend and Member functions – Data Conversion – Operator Overloading and Conversion

MODULE - II   **15**

Inheritance, Pointer & Virtual Function: Inheritance – Types of Inheritance – Access Specifiers - Pointers – Pointer and Address – Pointer and Arrays – Pointer and Functions – Pointer and Strings – Memory Management – Pointer to Objects – Example – Pointer to Pointer – Virtual Functions – Polymorphism – Friend Functions – Static Functions – this Pointer – Dynamic Type Information.

MODULE - III   **15**

Streams, I/O, Templates, Exception & STL: Stream Classes – Stream Error – File I/O with Streams - File Pointer – Error Handling in File I/O – File I/O with Member Functions – Overloading the Extraction and Insertion Operator – Multiple Programs. Template – Function Templates – Class Templates – Exceptions in C++ - Introduction to STL – Algorithms – Sequential Containers – Iterators – Runtime Type ID and the Casting Operator – Name Space and Conversion Functions.

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TOTAL : 45

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REFERENCE BOOKS
1. Lafore Robert, "Object Oriented Programming in C++", Fourth Edition, Galgotia Publications Pvt. Ltd. New Delhi, 2009.
2. Balagurusamy E., "Object Oriented Programming with C++", Second Edition, Tata McGraw Hill Publications, New Delhi, 2005.
3. Schildt Herbert, "C++: The Complete Reference", Fourth Edition, Tata McGraw-Hill Publications, New Delhi, 2007.

(Common to M.Sc Computer Technology and Information Technology)

3   0   0   3

Objective :
To learn the basic concepts, various scheduling algorithms, memory management techniques, disk structure and management.

MODULE – I   15
Introduction & Process Management: Operating-System Services- User Operating-System Interface.- System Calls - Types of System Calls - System Programs - Operating System Design and implementation - Operating - System Structure - Virtual Machines – Process Concept- Process Scheduling - Operations on Processes - Interprocess Communication - Threads – Overview - Multithreading Models - Thread   Libraries   and Threading   Issues - CPU   Scheduling.

MODULE-II   15
Process Synchronization & Storage Management: Process Synchronization – Background - The Critical-Section Problem - Peterson's Solution - Synchronization Hardware - Semaphores - Classic Problems of Synchronization – Monitors - Synchronization Examples - Atomic Transactions Deadlocks - System Model - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Deadlock Avoidance - Deadlock Detection - Recovery from Deadlock - Main Memory – Background – Swapping - Contiguous Memory Allocation- Paging - Structure of the Page Table – Segmentation - Virtual Memory – Background - Demand Paging – Copy–on-Write - Page Replacement - Allocation of Frames – Thrashing - Memory-Mapped Files - Allocating Kernel Memory.

MODULE- III   15
File Management and I/O Systems:. File-System Interface - File Concept - Access Methods - Directory and Disk Structure - File-System Mounting - File-System Implementation **-** File-System Structure - Directory Implementation - Allocation Methods - Free-Space Management **-** Storage Structure - Overview of Mass - Storage Structure - Disk Structure - Disk Attachment - Disk Scheduling - Disk Management - Swap-Space Management - RAID Structure - I/O Systems **–** Overview - I/O Hardware Application - I/O Interface-Kernel I/O Subsystem -Case Study - LINUX System - Windows XP.

TOTAL : 45

REFERENCE BOOKS
1   Silberschatz, Abraham, Baergalvin, Peter And Gagne, Greg., "Operating System Concepts", Eighth edition, John Wiley And Sons, 2010.
2   Deitel, H.M., "Operating Systems", Second Edition, Pearson Education, New Delhi, 2002.
3   Sinha, Pradeep K., "Distributed Operating Systems, Concepts and Design", Prentice Hall of India, New Delhi, 2001.

11PC105   SOFTWARE ENGINEERING
(Common to M.Sc Computer Technology and Information Technology)

3   0   0   3

Objective :
- To understand the concepts of software engineering processes and process management.
- To learn the aspects of Requirements analysis and software planning.
- To develop the students the ability of Designing and coding processes of software development.
- To learn the various testing methods and measuring the implementation.

MODULE – I   15
Introduction & Requirements Analysis & Design: Introduction - A Generic view of Process - Process Models - An Agile View of Process - Software Requirements Analysis and Specification - Design : Function Oriented design - Detailed Design.

MODULE - II   15
Testing and Project Management: Testing Strategies: Basics of testing, Test cases and Test Log - Unit Testing - Integration Testing - Regression Testing -Testing Tactics: Black-Box and White-box Testing - Object-Oriented testing - Project Management - Estimation - Project Scheduling - Risk Management.

MODULE - III   15
Quality Assurance & Reengineering: Quality Management - Change Management - Clean room Software Engineering - Component Based Development - Reengineering - Reverse Engineering - Restructuring - Forward Engineering.

TOTAL : 45

REFERENCE BOOKS
1 Pressman, Roger.S., "Software Engineering", Tata McGraw-Hill, New Delhi, Sixth Edition,2005.
2 Jalote, Pankaj., "An Integrated Approach to Software Engineering", Narosa Publishing House, Delhi, 2000.(MODULE I)

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11PI101 DIGITAL PRINCIPLES

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Objective:
- To introduce the fundamentals of Digital Circuits, combinational and sequential circuit.
- To provide comprehensive, hands-on instruction in the terminology, principles, and applications of the digital logic circuits.

MODULE - I   **15**

Number Systems and Boolean Algebra: Number Systems & Codes: Number System – Base Conversion – Binary Codes – Code Conversion – Complements - Boolean Algebra: Laws & Theorems – Digital Logic Gates – Truth Tables – Universal Gates – SOS, POS methods – Simplification of Boolean Functions – Basic Definitions - Using Theorems - Karnaugh Map - Canonical and Standard forms – Prime Implicants method - Implementation using Universal Gates - Binary Arithmetic : Binary Addition – Subtraction – Various Representations of Binary Numbers.

MODULE - II   **15**

Logic Circuits and Registers: Combinational Logic: Adders – Subtractors - Multiplexers – Demultiplexers – Decoders – Encoders – Code Converters – Parity Generators & Checkers – Programmable Array Logic (PAL) – Programmable Logic Array (PLA) - Sequential Logic: RS, JK, D and T Flip-Flops – Edge-Triggered – Master – Slave Flip-Flops - Registers: Shift Registers – Types of Shift Registers - Register Transfer Logic : Inter-register Transfer – Arithmetic, Logic & Shift Micro Operations – Conditional Control Statements – Instruction Codes.

MODULE - III   **15**

Counters and Memory Logic Counters: Asynchronous Counters : Ripple Counters, Modulus Counters : MOD-3 & MOD-5 - Up-Down Counters – Decoding Gates – Synchronous Counters : Ring Counters, Decade Counters , Presettable Counters, Shift Counters, Control Organization : Hard-wired & Micro-programmed Control - Memory: Basic Terms & Ideas – Magnetic Memories – Memory Addressing – Memory Hierarchy - Types of ROMs : PROM – EPROM – EEPROM – Types of RAMs – DRAM – SRAM - Digital Logic Families: TTL – ECL – CMOS.

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TOTAL : 45

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REFERENCE BOOKS
1. Mano.M.M, "Digital Logic and Computer Design", Prentice Hall India, 2007.
2. Leach.D.P & Malvino.A.P, "Digital Principles and Applications", Sixth Edition, Tata McGraw Hill, 2008.
3. Bartee.T.C, "Digital Computer Fundamentals", 6th Edition ,Tata McGraw Hill, 2007.

11PC107   DATA STRUCTURES AND ALGORITHMS LABORATORY
(Common to M.Sc Computer Technology and Information Technology)

0	**0**	**3**	**1**

Objective :
To learn about the basic data structures and algorithms to implement the various design techniques.

LIST OF EXPERIMENTS
1. Stack operations.
2. Queue operations.
3. Application of stacks and queues.
4. Linked list operations
5. Operations on Binary tree traversals.
6. Breadth first search.
7 Depth First Search.
8. Quick sort using divide and conquer techniques.
9. Merge sort using divide and conquer techniques
10. Finding Maximum and minimum using divide and conquer techniques
11. Knapsack problem using greedy method.
12. Minimum cost spanning tree using greedy method.
13. Shortest path algorithm.
14. Sorting technique.,
15. Searching techniques.

REFERENCES / MANUALS/SOFTWARE:
1 G.A.V. Pai, "Data Structures and Algorithms- Concepts, Techniques and Applications", Tata McGraw Hill Edition, New Delhi 2009
2 www.mhhe.com

11PC108   OBJECT ORIENTED PROGRAMMING LABORATORY
(Common to M.Sc Computer Technology and Information Technology)

0	**0**	**3**	**1**

Objective:
To enable the student to develop software using Object Oriented Concepts using C++

LIST OF EXPERIMENTS
1. Create a class to find the area of square, rectangle and triangle by using the concept of function overloading i.e. the same function name area is used to calculate the areas of shapes according to type and size of parameters you passed.
2. Write a function to read a matrix of size m * n from the user and find sum of the first diagonal of the matrix and display it on the screen.
3. Write a program to find the sum of two complex numbers using the concept of operator overloading
4. Write a program to find the multiplication of two matrices using the concept of operator overloading.
5. Define a class String. Use overloaded = = operator to compare two string
6. Create a class float that contains one float data member. Overload all the four arithmetic operators so that they operate on the object of float
7. Write a program which having 3 classes student, test and result, student class having method to accept enrollment number, test class accept student marks in 3 subjects which is inherited by class student and result class having methods to find sum of marks and displays, which is inherited by class test. Now by using the object of result class call the methods from other classes.
8. Write a program in C++ in which the both base and derived class use the same function name and the object of the base class as well as the derived class will be associated to the function during run time (use the virtual function concept to solve the problem)
9. Create an abstract class, which contains one method, which will be derived by the two classes and the function in the abstract class over rides from these derived classes (use the pure virtual function concept)
10. Create a swap function template the will swap two values of any data type
11. Write a C++ program to create a template function for Quick Sort and demonstrate sorting of integers and doubles
12. With the use of vector class template for performing the scalar product of int type
13. Write a program that copies the contents of a character file to another file invoke the program with two command line arguments .The source file and destination file.
14. Create a student class, which reads and display the roll number, name and marks in 3 subjects of students. Store the details in student data file
15. Modify the above problem to read the data from data file and display the total marks, average and grade (i.e. average<50 fail otherwise pass) on the screen

REFERENCES / MANUALS/SOFTWARE:
1. Robert Lafore, "Object Oriented Programming in C++", Third Edition, Galgotia Publications Pvt. Ltd. 2003
2. *www.cplusplus.com*
3. *www.intap.net/~drw/cpp*
4. www.learncpp.com

11PI201   COMPUTATIONAL METHODS

| | 3 | 0 | 0 | 3 |

Objective :
- To learn about the decision making in the face of uncertainty.
- To understand the meaning of correlation and regression and significance of their study.
- To develop students the ability to design an appropriate numerical method for a particular problem.

MODULE – I   15
Probability & Correlation: Introduction –Basic Terminology - Mathematical Probability - Statistical Probability -Mathematical Tools - Axiomatic Approach to Probability - Some Theorems on Probability-Conditional Probability - Multiplication Theorem of Probability - Independence of Events- Baye's Theorem. Introduction - Meanings of Correlation - Scatter Diagram - Karl Pearson's Coefficient of Correlation - Calculation of Correlation Coefficient for the Bivariate Frequency Distribution-Probable Error - Rank Correlation – Simple Problems

MODULE - II   15
Interpolation, Numerical Differentiation and Integration: Newton – Gregory Forward Interpolation Formula - Newton – Gregory Backward Interpolation Formula for Equally Distributed Data - Newton's Divided Difference Method for Unequally Distributed Data - Numerical Differentiation using Newton's Forward and Backward Difference Formula. Numerical Integration using Simpson's 1/3rd Rule - Simpson's 3/8th Rule - Trapezoidal Rule - Simple Problems

MODULE -III   15
Solution of Non-Linear and Simultaneous Equations and Ordinary Differential Equations: Solution of Non-Linear Equations using Method of Bisection-Method of False Position - Newton Raphson's Method - Simple Problems. Solution of Simultaneous Linear Equations using Gauss Method – Gauss Jordan Method - Gauss Jacobi Method – Gauss Seidel Method–Simple Problems - Taylor's Method, Picard's Method - Euler's Method & Modified Euler's Method-Runge Kutta Method –Fourth Order-Milne and Adams Predictor and Corrector Method - Simple Problems

TOTAL : 45

REFERENCE BOOKS
1. Gupta S.C. and Kapoor V.K., "Fundamentals of Mathematical Statistics", Eleventh revised Edition, Sultan Chand & Sons, New Delhi, 2007 (MODULE I)
2. Kandasamy P., Thilagavathy K. and Gunavathy K., "Numerical Methods", S.Chand & Company Ltd., New Delhi, 2010 Reprint. (MODULE II & III).

11PC202   DATABASE MANAGEMENT SYSTEMS
(Common to M.Sc Computer Technology and Information Technology)

3   0   0   3

Objective :
- To understand the basic principles of database management systems
- To gain knowledge about various database models, Query Languages, and concurrency control techniques.

MODULE – I   **15**

Introduction: Database System Applications- purpose - View of Data - Data Models- Database - Transaction   Management - Database architecture- Relational Model: Structure of Relational Databases-Relational Algebra operations- SQL – Data definition – Basic Queries – Complex Queries.

MODULE - II   **15**

Relational-Database Design: Advanced SQL - Embedded SQL-Dynamic SQL - Domain Constraints - Referential Integrity – Assertions – Triggers - Security and Authorization –Database Design: ER model – Relational Database Design: Features of good Relational designs - 1NF-Functional Dependencies-Decomposition using Functional Dependencies Boyce-codd Normal Form-3NF-4NF-More Normal Forms- Database Design Process.

MODULE -III   **15**

Transaction and Concurrency Control: Storage and File structures - RAID-Tertiary Storage-Storage Access-File Organization-Organization of Records -Data Dictionary Storage -Indexing and Hashing: Ordered Indices-Static Hashing-Dynamic Hashing-Comparison of Ordered Indexing and Hashing- Transaction management: Transaction concept, States - Concurrent Executions - Serializability – Recoverability - Testing for Serializability - Concurrency Control: Lock-Based Protocols - Timestamp - Based Protocols - Validation Based Protocols -Multiple Granularity-Multiversion Schemes - Deadlock Handling – Recovery System: Log based Recovery – recovery with concurrent Transactions – Buffer Management.

TOTAL : 45

REFERENCE BOOKS
1 Silberschatz, Abraham, Korth, Henry F., S.Sudarshan, "Database System Concepts", Fifth Edition, Mc Graw Hill, 2006.
2 Ramez Elmasri, Shamkanth B.Navathe, "Fundamentals of Database Systems," Fifth Edition, Pearson Education, 2008

11PI202   DATA COMMUNICATION AND NETWORKS

3   0   0   3

Objective:
- To understand the basic concepts of data communications.
- To learn the functionalities of data link and network layer protocols
- To make the students to understand transport and application layer functionalities.

MODULE – I   15
Basics of Data communication: Introduction - Network Models - Physical Layer and Media – Data and Signals - Analog and Digital – Periodic analog signals-Digital signals-Transmission Impairments-- Data Rate Limits and Performance Multiplexing and spreading -Transmission Media - Switching – Circuit Switched Networks - Datagram Networks.

MODULE - II   15
Error Control, Flow Control and Routing: Data link layer – Error detection and correction-Data link control –Framing-Flow control and Error control –Protocols for noiseless and noisy channels – Multiple Access –Wired LANs: Ethernet – Fast Ethernet – Gigabit Ethernet – Wireless LAN (802.11)- Network Layer – Logical Addressing – Internet Protocol –Address Mapping - Error reporting and Multicasting Delivery - Forwarding and Routing Protocols – Delivery - Forwarding - Unicast Routing Protocols

MODULE - III   15
Transport and Application Layer: Process to Process Delivery – UDP (User Datagram Protocol) – TCP (Transmission Control Protocol) - Congestion Control and QOS – Data Traffic - Congestion Control – Examples – QOS - Techniques to improve QOS - Application Layer **-** Domain Name System – Remote Logging – Email – FTP – WWW and HTTP – Network Management : SNMP

TOTAL : 45

REFERENCE BOOKS
1. Forouzan Behrouz A., "Data Communication and Networking", Fourth Edition, Tata McGraw-Hill, New Delhi, 2006.
2. Peterson Larry L. and Davie Bruce S., "Computer Networks: A Systems Approach", Third Edition, Harcourt Asia / Morgan Kaufmann publishers, Singapore, 2003.
3. Tanenbaum Andrew S., "Computer Networks", Fourth Edition, Prentice Hall of India, New Delhi, 2003.

                                                                          3   0   0   3
Objective:
  - Students can know about the basic web and network concepts.
  - Students can learn the fundamentals of Java Programming.
  - Acquire Knowledge about Network Programming.
  - Enable the students to design web pages using JSP

MODULE - I   **15**
JAva Fundamentals: Defining a class – Constructors – Methods – overloading – static Members – Nesting of Methods – Overriding methods – Final Classes – Abstract Class – Visibility control – Arrays – Strings – String Arrays – String Methods – String Buffer Class – Defining a subclass – Subclass constructor – Inheritance – Interfaces – Java API Packages: Creation, accessing – Extending the Thread class – Runnable Interface – Exceptions – Throwing own Exceptions.

MODULE - II   **15**
Streams, Basic Network Concepts and Socket Programming: Concepts of streams – Byte Stream Classes – Character stream Classes **-** Networking Protocols and OSI reference Model – Internetworking Concepts, Devices, Basics, History and Architecture. Basic Network concepts – Basic web concepts – Looking up Internet Addressing – Retrieving data with URL's – Sockets for Clients – Sockets for Servers – UDP datagram and Sockets – Multicast Socket – The URL Connection class.

MODULE- III   **15**
JSP and JDBC: JSP Overview – Syntax and Semantics: The JSP Development model, Components of JSP Page, Example – Expressions, Scripts and Declarations – Request Dispatching: Anatomy of request dispatching, Including other resources, The <JSP:include> – Applications Event Listener – Filters – Custom tags – JSP standard Tab Library – Database Access with JDBC.
                                                                          TOTAL : 45
REFERENCE BOOKS
  1. Naughton Patrick and Schildt Herbert, "Java 2: The Complete Reference", Third Edition, Tata McGraw-Hill Publication, 2006. (MODULE I)
  2. Godbole Achyat S and Kahate Atul, "Web Technologies", Tata McGraw-Hill Publishers, New Delhi, 2003 (MODULE II).
  3. Harold, Elliotte Rusty, "Java Network Programming", Second Edition, Shroff publishers and Distributors Pvt Ltd, 2004.(MODULE II)
  4. Hanna, Phil, "JSP2.0: Complete Reference", Tata McGraw-Hill, New Delhi, 2005. (MODULE III)

11PI204   INFORMATION SECURITY

3   0   0   3

Objective:
- To present the different kinds of applications, its weakness and controls.
- To understand the application area, general programs, operating system, database   management system, remote access computing, multi computer networks.

MODULE – I   15
Cryptography and Algorithms: Characteristics of Computer Intrusion – Kinds of Security Breaches – Security Goals and Vulnerabilities – The People Involved - Methods of Defense – Plan of Attacks - Program Security - Virus and Other Malicious Code – Targeted Malicious Code – Controls against Program Threats. Symmetric Key Encryption: DES - AES. Public Key Encryption: RSA Algorithm - Digital Signature Algorithm – Hash Algorithms. Quantum Cryptography: Quantum Physics - Photon Reception - Cryptography with Photons.

MODULE - II   15
Operating System Security and Database Security: Protection in General-Purpose Operating Systems: Protected Objects and Methods of Protection –Protecting Memory and Addressing – Protecting Access to General Objects – File Protection Mechanisms - User Authentication. Designing Trusted Operating System: Security Policies – Models of Security - Designing Trusted Operating Systems - Assurance in Trusted Operating System. Database Security: Introduction to Databases – Security Requirements – Reliability and Integrity – Sensitive data – Inference Problem - Multilevel Databases – Proposal for Multilevel security.

MODULE-III   15
Network Security and Administering Security: Security in Networks and Distributed Systems: Network Concepts - Threats in Networks – Network Security Controls – Privacy Enhanced E-Mail - Firewalls – Encrypting Gateways – Multilevel Security on Networks. Administering Security: Risk Analysis – Security Planning - Organizational Security Policies - Disaster Recovery.

TOTAL : 45

REFERENCE BOOKS
1. Pfleeger, Charles P., "Security in Computing", Prentice Hall India, New Delhi, 2005.
2. Stallings, William., "Cryptography and Network Security: Principles and Practice", Third Edition, Prentice Hall of India, New Delhi, 2002.
3. Bishop, Matt., "Computer Security: Art and Science", Pearson Education, New Delhi, 2003.

11PI205   RDBMS LABORATORY

                                                        0   0   3   1
Objective :
- To understand the various SQL statements and the concepts in PL/SQL.
- To make the student develop the application using Front End as Visual Basic and connecting to the back end.

LIST OF EXPERIMENTS / **EXERCISES**
1. Implementation of Data Definition statements and Keys.
2. Data Manipulation and Queries..
3. Data Control Statements and complex quries.
4. Implementation of triggers in PL/SQL.
5. Implementation of cursors in PL/SQL.
6. Stored Procedures.
7. Exception Handling
8. Working with Forms and Menus.
9. Working with Reports.
10. Library information processing
11. Student mark sheet processing
12.Stock Maintenance
13.Telephone directory maintenance
14.Bank transactions
15.Electricity bill processing

REFERENCES / MANUALS/SOFTWARE:
1 Kelvin Loney " Oracle Database 11g: The Complete Reference", McGraw-Hill, Oracle Press, 2008.
2 Noel Jerke " Visual Basic 6 : The Complete Reference", McGraw-Hill, 2007.

11PI206   INTERNET PROGRAMMING LABORATORY

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OBJECTIVE:
- To make the student to familiarize in Internet Protocols, network programming and web development concepts using JSP.

LIST OF EXPERIMENTS
1. Programs on class and object, String and StringBuffer class methods.
2. Programs on Interfaces.
3. Programs on Package.
4. Programs on Thread.
5. Programs on Streams for Byte oriented manipulations.
6. Programs on Streams for Character oriented manipulations
7. Programs on serialization and StreamTokenizer.
8. Write programs in Java to do the following features:
   Set   the URL of another server. Download the homepage of the server. Display the contents of home page with date, content type and expiry date. Last modified and length of home page.
9. Write programs in Java using sockets to implement the following :
   HTTP request , FTP, SMTP, POP3
10. Write a program in Java for creating simple chat application with datagram sockets and datagram packets.
11. Program to connect Ms Access with java using JDBC.
12. Write programs in Java using Servlets:
    To invoke servlets from HTML forms. To invoke servlets from Applets
13. Write programs in Java to create three tier applications using servlets:
    For conducting on-line examination. For displaying student mark list.Assume that student information is available in a database which has been stored in a database server.
14. Program for invoking JSP page
15. Develop a code for JDBC with JSP

REFERENCES / MANUALS/SOFTWARE:
1. Harold Elliotte Rusty, "Java Network Programming", Second Edition, Shroff publishers and Distributors Pvt Ltd, 2004.
2. Hunter Jason, and Crawford William, "Java Servlet Programming", Second Edition, Shroff publishers and Distributors Pvt Ltd, Mumbai, 2004.
3. www.java.sun.com
4. www.javapassion.com

11PC301 .NET PROGRAMMING
(Common to M.Sc Computer Technology and Information Technology)

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Objective:
- Students can get the strong foundation in .NET framework.
- Understanding C#
- Students can learn how to design a dynamic web page using ASP.NET.
- Acquire advanced web page designing techniques that are used in professional applications.

MODULE – I   **15**
.NET Overview And Introduction to C#: The origin of .Net – The .Net framework overview - .Net framework base classes, user and program interfaces, XML as the .Net meta-language. Introduction to CLR – the anatomy of .Net Applications, Common type system, metadata managed data, IL Disassembler. An introduction to C# - C# and MS .Net, data types in C#, control flow, C# classes, advanced C# features

MODULE - II   **15**
. NET Class Framework and Introduction to ASP.NET: Inside the .Net class framework, ASP.NET, new version of ASP, difference of ASP and ASP.net, Features of ASP. Net – ASP.Net pages, Programming with code-behind, ASP.Net web services, ASP.Net web services, ASP.Net configuration, ASP.Net Application and session state, ADO.Net, Caching, Error handling and debugging Techniques, security, creating own custom controls.

MODULE - III   **15**
Building .NET Components and ADO.NET: Web Services – Started with web services, developing a weather information web service, designing web services, Windows forms Assemblies – writing business objects – cross-language inheritance, working with unmanaged code. ADO.NET object model, ADO.Net capabilities, ASP.Net Case study.

TOTAL : 45

REFERENCE BOOKS
1   James Konard, Patrick Dengler, Brain Francis "Introducing .NET", Shroff publishers & Distributors Pvt. Ltd., Mumbai 2008.
2   Duthie G Andrew, "Microsoft ASP.NET Programming With Microsoft Visual C#.Net", Prentice Hall of India Pvt Ltd , New Delhi 2004

11PI301   MOBILE COMPUTING

3   0   0   3

Objective :
- To gain in depth knowledge of Wireless devices and Wireless transmissions
- To learn about GSM and Satellite Systems
- To learn about routing and Tunneling process in Wireless networks, Wireless Protocols and Markup Language

MODULE – I   15
Introduction and GSM Mobiles: Applications – Wireless Transmission – Multiplexing – Modulation - Spread Spectrum and Cellular Systems – Medium Access Control – Motivation – SDMA – FDMA – TDMA – CDMA – Comparisons - Telecommunication Systems – GSM – Mobile services – System Architecture - Protocols – Localization and Calling – Hand Over and Security New Data Services.

MODULE - II   15
Satellite Systems, Wireless LAN and Network Layer: DECT-System Architecture-Protocol Architecture –TETRA-UMTS and IMT-2000 – Satellite Systems - IEEE 802.11 – HIPER LAN – HIPERLAN 1- WATM-BRAN-HIPERLAN2-Bluetooth – User Scenarios – Architecture – Radio layer and Baseband Layer - Link Manager Protocol – L2CAP – Security – SDP – Profiles – IEEE 802.15 - Mobile IP – Dynamic host Configuration Protocol – Mobile ad-hoc Networks – Mobile transport layer.

MODULE-III   15
TCP and Wireless Application Protocol: Traditional TCP – Classical TCP improvements – TCP over 2.5/3G Wireless Networks – Performance enhancing proxies - World Wide Web – HTTP – HTML – Approaches – System Architecture - Wireless Application Protocol (WAP) –Architecture - Wireless datagram protocol-Wireless Transport Layer Security-Wireless Transaction Protocol-Wireless Session Protocol-Wireless Application Environment-WML – WML Script – Applications.

TOTAL : 45

REFERENCE BOOKS
1. Schiller, Jochen H., "Mobile Communications", Second Edition, Pearson Education, New Delhi, 2009.
2. Schwarth, Mischa, "Mobile Wireless Communications", Cambridge University Press, London, 2009.

11PI302   GRID COMPUTING

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Objective :
- To understand the geneses of grid computing and its architecture
- To learn the technology and tool kits to do the projects

MODULE – I   15
Fundamentals Of Grid Computing: Introduction – history – High-Performance Computing – Cluster Computing –Peer To Peer Computing – Internet Computing – Grid Computing – grid computing model – Grid Protocols- Globus Tool Kit – Open Grid Services Architecture – global grid forum-Types Of Grid– Grid Networks – Grid Applications And Characteristics –Application integration – grid computing and public key – Desktop Grids – Cluster Grids – HPC -Grids- Data Grids.

MODULE-II   15
Open Grid Services Architecture: Introduction- Analogy OGSA – Evolution –Convergence – OGSA overview – OGSA Platform – Implementing OGSA Grids – Creating And Managing Grid Services – Desktop Supercomputing : Native Programming For Grids –Parallel Computing– Parallel Programming Paradigms- Desktop Super Computing – programming paradigm – parallel computing in Cxc – Parallelizing Existing Application

MODULE- III   15
Applications: Grid Enabling Software Applications – Introduction – Needs – Deployment - Methods Grid Enable Software – Requirements – Tools And Expertise – Grid Enabling Software Applications – Grid Enabling A Mainstream – Application Integration – Grid - Enabling Network Services- Managing Grid Environments – Grid In Life Sciences - Grids In Telecommunication Sector – Introduction –Telecos As User – Telecos As Providers .

TOTAL : 45

REFERENCE BOOKS
1   Abbas, Ahmar., "Grid Computing: A Practical Guide to Technology to Technology and Applications", Firewall Media, New Delhi, 2005.
2   Joseph, Joshy and Fellenstein, Craig, "Grid Computing", Pearson Education, New Delhi, 2003
3   Foster, I, and Kesselam, C, "The GRID: Blueprint for a New Computing Infrastructure", Morgan Kaufmann Publisher, San Francisco, 2004

11PC304   UNIX INTERNALS
(Common to M.Sc Computer Technology and Information Technology)

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Objective :
- To understand the internal representation of Unix System
- To understand the process communication
- To understand sockets

MODULE – I   **15**
Overview of The System and Internal Representation of Files: System Structure – User Perspective – Operating System Services – Assumption About Hardware. Introduction to the Kernel: Architecture of the Unix Operating System – Kernel Data Structures – System Administration. The Buffer Cache: Buffer Headers – Structure of the Buffer Pool – Scenarios for Retrieval of A Buffer – Reading and Writing DiskBlocks – Advantage and Disadvantage of the Buffer Cache. 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.

MODULE– II   **15**
System Calls and The Process: System Calls For The File System - The Structure Of Process: – 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 – The User ID of the Process – The Shell – System Boot and Init Process

MODULE– III   **15**
Memory Management and Interprocess Communication: Swapping – Demand Paging – A Hybrid System With Swapping and Demand Paging. The I/O Subsystems: Driver Interfaces – Disk Drivers – Terminal Drivers – Streams. Process Tracing – System V IPC – Network Communications – Sockets. Multiprocessor Systems: Problem – Solution With Master And Slave Processors – Solution with Semaphores. Distributed Unix Systems: Satellite Processors – The New Castle Connection – Transparent Distributed File Systems – A Transparent Distributed Model Without Stub Processes

TOTAL : 45
REFERENCE BOOKS
1. Bach Maurice J., "The Design of the Unix Operating System", Prentice Hall of India, New Delhi, 2010.
2. Vahalia, Uresh, "Unix Internals: New Frontiers", Pearson Education, New Delhi, 2006.

(Common to M.Sc Computer Technology and Information Technology)

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Objective:

- Students can get the strong foundation in .NET framework.
- Students can learn how to design a dynamic web page using ASP.NET.
- Acquire advanced web page designing techniques that are used in professional applications.

LAB EXPERIMENTS

1. Program using control structures
2. Functions and subroutines
3. Program using ASP.Net classes
4. ASP. Net program for creating simple page applet
5. Program using HTML control classes
6. ASP.Net program for illustrating web controls classes and web control events
7. Creating web forms using visual studio.Net
8. Designing web form using rich controls and writing code for validating the form
9. Program for exceptions
10. Create a simple application for connecting database using ADO.Net

REFERENCE BOOKS

1   MacDonald, Matthew, "ASP.NET: Complete Reference", Tata McGraw-Hill, New Delhi, 2005.
2   Homer, Alex ,ASP .Net 1.1: Insider Solutions New Delhi: Pearson Education Inc, 2004.

11PC306   UNIX INTERNALS LABORATORY
(Common to M.Sc Computer Technology and Information Technology)

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Objective:
- To familiarize with Unix Commands
- To Understand the implementation of CPU scheduling
- To Understand and write shell scripts in UNIX

LIST OF EXPERIMENTS /EXERCISES
1. Basic UNIX Commands
2. Shell program using redirecting standard I/O
3. Shell programming – Device Driver
4. Program for parallel execution
5. Program using control structure
6. Program using passing parameters
7. Program for pattern matching
8. Implementation of CPU Scheduling – FCFS
9. Implementation of CPU Scheduling – SJF
10. .Implementation of CPU Scheduling – RR
11. Implement Best fit, First Fit & Worst-fit Algorithm for Memory Management
12. Implement Inter Process Communication Problem (Producer-Consumer / Reader- Writer Problem) Using Semaphores
13. Producer Consumer Problem using Shared Buffer
14. Implement FIFO page Replacement Algorithm
15. Implement LRU page Replacement Algorithm

REFERENCES / MANUALS/SOFTWARE:
1. Strphen G. Kochen, Patrich Wood, "Unix Shell programming " Third Edition Sams Publishing 2003
2. www.dreamsoft.com

11PI011   MANAGEMENT INFORMATION SYSTEMS

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Objective:
- This course presents the information systems, data resource management, electronic business systems, DSS and security.

MODULE I   **15**

Information Systems - Information system in business - The real world of IS - Fundaments Roles of Information systems in Business - Types of IS-Managerial challenges of Information Technology – system concepts - Components of Information Systems - IS resources-IS Activities - Competing with IT- Strategic advantages- Strategic uses of IT -Data resource management- Managing data resources- Types of databases-Data ware housing and data mining- Traditional file processing- the database management approach- Database management-database structures- hierarchical – network- relational structures-multidimensional structure-object oriented structure- evaluation of database structure- database development.

MODULE II   **15**

Electronic Business System - Enterprise business system- cross functional enterprise applications- Architecture – Integration- Transaction processing system- Enterprise collaborating systems- Information Technology in business- marketing systems- sales force automation- manufacturing- human resource-accounting-financial management systems – CRM- phases- benefits and challenges- trends- ERP- SCM- DSS and AI: Information, decision and management- decision structure- Decision support trends-Decision support system components-Management Information system-online analytical processing –using DSS-Executive IS-Business and AI-Expert system-developing expert systems- Neural Networks, Fuzzy Logic Systems, Genetic Algorithms – virtual reality-Intelligent agent.

MODULE III   **15**

DSS & Security And Global Management: DSS and AI: Information, decision and management- decision structure- Decision support trends-Decision support system components-Management Information system-online analytical processing –using DSS-Executive IS-Business and AI-Expert system-developing expert systems- Neural Networks, Fuzzy Logic Systems, Genetic Algorithms – virtual reality-Intelligent agent.. Security and Ethical Challenges: Ethical responsibility of business professionals-computer crimes-privacy issues-other challenges- security management of IT-tools of security management- Internetworks security defenses- other security measures-system controls and audits. Global management of information technology

TOTAL : 45

REFERENCE BOOKS
1   O'Brien, James A, and Marakas, George M., "Management Information Systems", Seventh Edition, Tata McGraw-Hill, New York, 2007.
2   Oz, Effy, "Management Information Systems", Third Edition, Vikas Publishing House, Bombay, 2002.

11PC012   OPTIMIZATION TECHNIQUES
(Common to M.Sc Computer Technology and Information Technology)

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Objective :
- To develop problem modeling and solving stills and to make intelligent decisions from the point of view of optimization.

MODULE – I   15
Linear Programming and Transportation Problem: Mathematical Formulation of Linear Programming Problem – Graphical Solution – Simplex Method – Artificial Variable Technique – Big M Method – Two Phase Method – Simple Problems. Transportation Model – Initial Basic Feasible Solution – North West Corner Rule – Least Cost Method – Vogel's Approximation Method – MODI Method- Variants of Transportation Problem – Simple Problems.

MODULE - II   15
Assignment Problem and Network Models: Assignment Model – Hungarian Algorithm – Unbalanced Assignment Problem- Maximization Assignment Problem- Impossible Assignment - Simple Problems. Shortest Route Problem –Dijkstra's Algorithm – Floyd's Algorithm-Network Construction - Critical Path Computation- Total , Free and Independent Floats- Thee Time Estimates- Programme Evaluation and Review Technique- Simple Problems.

MODULE - III   15
Inventory Models and Queuing Models: Deterministic Inventory Models – Static and Dynamic EOQ Models – with or without Shortage – Probabilistic Inventory Model – Discrete and Continuous Type - Simple Problems. Characterization of Queuing Models- Poisson Queues- (M/M/1): (FIFO/∝/∝), (M/M/1): (FIFO/N/∝), (M/M/C): (FIFO/∝/∝), and (M/M/C): (FIFO/N/∝) Models. Simple Problems.

TOTAL: 45

REFERENCE BOOKS
1. Natarajan, A. M., Balasubramani P. and Tamilarasi A., "Operations Research", Pearson Education, New Delhi, 2003.
2. Taha, H.A., "Operations Research: An Introduction", Eighth Edition, Pearson Education, New Delhi, 2009.

11PC013   PRINCIPLES OF MANAGEMENT
(Common to M.Sc Computer Technology and Information Technology)

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Objective :
- This course presents the management concepts planning organizing, staffing and controlling.
- To learn the basic functions, principles of management.

MODULE – I   15
Nature and functions of management: Management – Definition - Nature and Scope – Importance – History of Management – Contribution by Henry Fayol – Taylor – Scientific Management – Functions of the Manager. Planning: Meaning – Objectives - Importance – Steps in Planning – Types of plan – Objectives, Policies, Procedures and Methods.

MODULE - II   15
Decision Making and Organizing: Decision Making – Process of Decision Making – Types of Decisions – Factors involved in decision making. Organization – Meaning - Types – Structure – Line and Staff Organization - Functional Organization – Committee Organization –Matrix Organization- Centralization and Decentralization – Departmentation. Delegation of authority.

MODULE- III   15
Staffing and Controlling: Staffing - Recruitment –Source- Internal –External-Selection Process-Importance – Training-Needs of training-Methods of training. Directing: Meaning- Elements- Span of Control- Types – Communication- Meaning-nature-Elements-Types- Importance -Barriers – Controlling – Meaning – Control process – Budgetary and Non-budgetary control-Coordination— Need for Coordination-Mechanism.

TOTAL : 45

REFERENCE BOOKS
1. Dinkar Pagare, "Business Management", Fifth Edition, Sulthon Chand & Sons , 2010.
2. Harold Koontz , Weihrigh Kaniz and Ramachandra Aryasri, " Principles of Management", Tata Mcgraw Hill 2004.

11PC014   E-COMMERCE
(Common to M.Sc Computer Technology and Information Technology)

3   0   0   3

Objective:
- To enable the students to learn the basic functions, principles and concepts of E-commerce.
- To develop an understanding of the current practice and opportunities in E-Commerce.

MODULE – I   15
Introduction to E-Commerce and Framework: E-Commerce Framework – E-commerce of Media Convergence – Anatomy of E-Commerce Applications – E-Commerce Consumer Applications – Components of I-way - Network Access Equipment. Global Information Distribution Networks – Internet Terminology-NSFNET: Architectural and Components-National Research and Education Network-World wide web: Background-Hypertext publishing-Technology behind the web-Security in web-Consumer Oriented applications – Mercantile models for consumer perspective, Mercantile models for merchant's perspective.

MODULE - II   15
Payment Systems and Data Interchange: Types of electronic payment system – Pre-paid and Post-paid electronic payment system – Digital token based electronic payment systems-Smart cards and Electronic payment systems-Credit card-based Electronic payment systems-Risk and Electronic payment system – Designing electronic payment systems – Electronic Data Interchange – EDI Applications in Business – EDI: legal, Security and Privacy issues – EDI and E-Commerce-Standardization and EDI-EDI software Implementation.

MODULE-III   15
E-Commerce Implementation and Applications: Internal Information System – Macro forces and Internal Commerce – Work flow automation and coordination – Customization and internal Commerce - Supply chain Management – Making a Business case for a document library – Types of digital documents – Issues behind Document Infrastructure –The new age of information based marketing – Advertising on the internet – Charting, the on-line market process – Search and Resource discovery Paradigm – Information search and retrieval – E-Commerce catalogs and Directories – Information Filtering – Consumer-data interfacing tools.

TOTAL : 45

REFERENCE BOOKS
1. Kalakota, Ravi and Whinston Andreq B. "Frontiers of E-Commerce", Pearson Education, Asia, 2004.
2. Rayport Jeffery F. and Jaworski Bernard J., "E-Commerce", Tata McGraw-Hill, New Delhi, 2008.

11PI012   HUMAN RESOURCE MANAGEMENT

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Objective :
- This course presents the human resource management concepts planning, development and Compensation.
- To learn the Industrial relations and worker's participation.

MODULE – I   **15**

Nature, Functions of HRM and Procurement: Nature and scope of Human Resource Management (HRM): HRM- Meaning – Nature – Scope – Objectives – Personnel Management Vs. HRM – Importance of HRM – Functions of HRM - Human Resource Planning – Meaning – Need and Importance – Objectives – Process - Recruitment - Meaning – Sources of Recruitment – Recruitment Practice in India. Selection – Selection process

MODULE - II   **15**

Development and Compensation: Development of Human Resources: Training – Meaning – Need and importance – Types – Steps in Training Programme – Transfer- Meaning- Objectives - Promotion – Meaning – Methods ,Demotion and Separation- Compensation: Objectives of Compensation - Principles – Factors Influencing Wage and Salary Administration –Incentives – Meaning – Types - Employee Benefits and Services- Fringe Benefits.

MODULE- III   **15**

Industrial Relations and Maintenance: Industrial Relations –Meaning- Parties involved in IR- Importance- Discipline – Meaning – Positive and Negative Aspects of Discipline – Causes of Indiscipline – Disciplinary Procedure – Maintaining Discipline Grievance handling – Meaning – Procedures - Collective Bargaining- Strategies - Worker's Participation in Management – Meaning – Methods.

<div align="right">**TOTAL : 45**</div>

REFERENCE BOOKS
1. Khanka S.S, "Human Resource Management", Sulthon Chand & Sons , 2009.
2. Memoria C.B and Gankar S.N. "Personnel Management", Himalaya Publications 2003.

11PC017   COMPUTER GRAPHICS AND MULTIMEDIA SYSTEMS
(Common to M.Sc Computer Technology and Information Technology)

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Objective :
- It provides the knowledge about 2D and 3D Graphics.
- It provides the knowledge about digital representation of audio, video and Compression techniques

MODULE – I   **15**

Overview and 2D Transformations: Overview of Computer Graphics System - Output Primitives and Attributes – DDA Line drawing algorithm – Bresenham's Line drawing algorithm, properties of circle – Circle and ellipse drawing algorithms - Two-dimensional Geometric Transformations – Windowing and Clipping – Clipping of lines - Cohen – Sutherland algorithm Sutherland polygon Clipping algorithm.

MODULE - II   **15**

3D Transformations and Color Models: Three-dimensional Transformations - Geometric and Modeling transformations – Viewing - Parallel and perspective projections. - Visible Surface Detection Methods - Object-space Methods - Image-space Methods - Depth Sorting – Depth Buffer - Scan line - Octree Algorithms - Color models and Animation.

MODULE - III   **15**

Multimedia Systems: Multimedia and Personalized computing – emerging applications - Perspective and challenges – Architecture and issues for distributed multimedia systems – synchronization and QOS – Standards and framework. Digital Video and image compression – Video compression techniques – JPEG – H.261 – MPEG – DVI Technology - Multimedia Devices, Presentations services and the user interface – multimedia services and window system, client, device control – Tool kits – Multimedia file systems and information models – File system support – data models – multimedia presentation and authoring – current state of the industry – Design paradigms and user interfaces.

TOTAL :45

REFERENCE BOOKS
1. Hearn, D. and Baker, M Pauline, "Computer Graphics (C-Version)", Second Edition, Pearson Education, New Delhi, 2008.
2. Koegel Buferd , "Multimedia Systems", Pearson Education, New Delhi, 2004.

11PC019   ADVANCED DATABASE TECHNOLOGY
(Common to M.Sc Computer Technology and Information Technology)

3   0   0   3

Objective :
- To understand the Transaction management Concepts, concurrency control techniques, distributed and parallel databases.
- To understand the basic concepts of Data Mining & Data Warehousing

MODULE – I   **15**
Query Optimization and Transaction concepts: Query Processing - Query Optimization- cost based optimizations & Heuristics. Transactions: Transaction concept - Concurrent Executions – Serializability – Recoverability - Concurrency Control protocols – Deadlock Handling - Recovery System – Log based Recovery –Shadow Paging – Advanced Recovery Techniques.

MODULE - II   **15**
DBMS Architecture and Distributed Databases: -Database System Architecture: Centralized and Client-Server Architectures-Server System Architectures - Parallel Systems - Distributed Systems - Network Types-Parallel Databases: Introduction - I/O Parallelism - Interquery Parallelism - Intraquery Parallelism - Intraoperation Parallelism- Interoperation Parallelism. Distributed databases – data storage – Distributed Transactions– Commit Protocols – concurrency control in Distributed databases.

MODULE- III   **15**
Data Mining and Information Retrieval : Decision-Support Systems - Data Analysis and OLAP- Data Mining - Data Warehousing –Data Mining & Decision Tree Classifiers - Advanced Data types and New Applications: Motivation - Time in Databases - Spatial and Geographic Data - Multimedia Databases - Mobility and Personal Databases.

TOTAL : 45

REFERENCE BOOKS
1. Silberschatz, Abraham and Korth Henry F., "Database System Concepts", Bell Laboratories, Fifth Edition, McGraw Hill, New York, 2005.
2. Elamasri. Navathe., "Fundamentals of Database System", Fifth Edition, McGraw-Hill, New York, 2005.

11PI013 INFORMATION CODING TECHNIQUES

3   0   0   3

Objective:
- To have a complete understanding of error–control coding.
- To understand encoding and decoding of digital data streams
- To introduce methods for the generation of these codes and their decoding techniques
- To have a detailed knowledge of compression and decompression techniques

MODULE – I   **15**

Information Theory and Source Coding: Information Theory : Introduction – Uncertainty and Information – Average Mutual Information & Entropy – Information Measures – Source Coding Theorem – Huffman Coding – Lempel-Ziv Algorithm – Run length Encoding & PCX format – Rate Distortion function – Optimum Quantizer Design - Image Compression – JPEG Standard for Lossless Compression & Lossy Compression – Channel Models – Channel Capacity – Channel Coding – Information Capacity Theorem – Shannon Limit .

MODULE – II   **15**

Linear Block Codes and Cyclic Codes: Definitions – Matrix Description – Equivalent Codes- Parity Check Matrix – Decoding – Syndrome Decoding – Error Probability – Perfect Codes – Hamming Codes – Optimal Linear Codes – Maximum Distance Separable Codes (MDS) – Cyclic Codes : Polynomials – Division Algorithm – Generating Cyclic Codes – Matrix description – Burst Error Correction – Fire Codes – Golay Codes – CRC Codes.

MODULE – III   **15**

Convolutional and Trellis Codes Convolutional Codes – Tree Codes & Trellis Codes – Analytical Representation – Distance Notions – Generating Function – Matrix Description – Viterbi Decoding – Distance Bounds – Performance Bounds – Turbo Codes – Turbo Decoding – Trellis Coded Modulation (TCM) – Basic Concept – Mapping by Set Partitioning – Ungerboeck's TCM Design Rules – TCM Decoder – AWGN Channel : Performance – Computation of d_{free} – TCM for Fading Channels.

TOTAL   45

REFERENCE BOOKS
1. Bose R., "Information Theory, Coding and Cryptography", Tata McGraw Hill, 2007
2. Halsall Fred., "Multimedia Communications, Applications Networks Protocols and Standards", Pearson Education Asia, 2009.

11PI014   SYSTEM SOFTWARE

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Objective:
- To learn about various system software techniques
- To understand the concept of assemblers and loaders
- To analyze the various phases of compiler

MODULE -I   **15**
Introduction to Assembler: Evolution of Programming System – General Machine Structure – Machine Language – Assembly Language – Assembler: General Design Procedure – Design of an Assembler- Data Structures – Format of Databases – Table Processing.

MODULE - II   **15**
Macro Processor and Loader :Macro instructions – Features of Macro Facilities - Implementation – Single Pass Algorithm – Two Pass Algorithm - Loader Schemes – Compile and go Loaders - General Loader Scheme – Absolute Loader – Relocating Loaders - Direct Linking Loaders – Other Loading Schemes: Linking Loader- Overlays- Dynamic .

MODULE - III   **15**
Compilers : Phases of the Compiler – Lexical Phase – Syntax Phase – Interpretation Phase – Optimization – Storage Assignment – Code Generation – Assembly Phases – Passes of a Compiler – Implementation of Storage Classes – Debugger - Text Editors.

TOTAL: 45

REFERENCE BOOKS
1. Donovan John J., "Systems Programming", McGraw Hill, New York, 2009.
2. Dhamdhere, D.M ,"Systems Programming", Tata McGraw Hill, New Delhi, 2003.
3. Aho A.V., Monica S, R.Sethi and Ullman J.D. "Compilers: Principles, Techniques and Tools", Addison Wesley, 2006.
4. Dhamdhere D.M., "Compiler Construction Principles and Practice", Macmillan, 2005.

11PI015   WEB ENGINEERING

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Objective :
- This subject provides in depth knowledge about developing a web based software including analysis, design and testing of WebApps.
- Be familiar with Web application development software tools and environments currently available on the market.

MODULE – I   15
Introduction to Web Engineering: Web Engineering : Web Engineering – Components. Web Engineering process : Framework – Process Flow – Generic Actions and Tasks – Umbrella Activities. Communication : Activity – Formulation – Elicitation. Planning – Modeling Activity : Concept – The models – Modeling Frameworks – Modeling Languages – Modeling Applications.

MODULE - II   15
Design for WebApps : Analysis Modeling for WebApps : Understanding Analysis – Analysis modeling – Content Model – Interaction Model – Functional Model – Configuration Model. WebApp Design: Design for WebApps – Goals – Quality – Design Process – Architecture. Interaction Design – Information Design – Functional Design.

MODULE - III   15
Tools and Testing: Construction and Deployment – Design patterns : Patterns – WebApp Patterns – Pattern Repositories. Technologies and Tools : General Issues – Implementation Tools and Technologies – Development Tools and Technologies, Testing WebApps – Change and Content Management : Change – Change Management for Web Engineering – Content Management – Criteria for Implementing a CMS.

TOTAL : 45

REFERENCE BOOKS
1 Pressman Roger S., "Web Engineering A Practitioner's Approach", McGraw Hill, New York, 2009.
2 Rossi, Gustavo., "Web Engineering: Modeling and Implementing Web Applications", Springer, Berlin, 2008.

11PI016   HIGH PERFORMANCE NETWORKS

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Objective:
- To highlight the features of different technologies involved in High Speed Networking and their performance.
- To get an introduction about ATM and Frame relay.
- To know the techniques involved to support real-time traffic and congestion control.
- To understand different levels of Quality of Service to different applications

MODULE - I   **15**
High Speed Networks and Congestion Control: Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM Logical Connections, ATM Cells – ATM Service Categories – AAL – High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fibre Channel – Wireless LANs – Queuing Analysis- Queuing Models – Single Server Queues– Effects of Congestion - Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control-SDH/SONET and WDM

MODULE - II   **15**
TCP and ATM Congestion Control: TCP Flow control – TCP Congestion Control – Retransmission Timer Management – Exponential RTO Backoff – Karn's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work – Traffic Control – ABR traffic Management – ABR Rate Control, RM Cell Formats, ABR Capacity Allocation – GFR Traffic Management.

MODULE - III   **15**
Quality of Service in IP Networks: Integrated Services Architecture – Approach, Components, Services- Queuing Discipline- FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services. Protocols for QoS Support: RSVP – Goals and Characteristics, Data Flows, RSVP Operation, Protocol Mechanisms – Multiprotocol Label Switching – Operation, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.

TOTAL : 45

REFERENCE BOOKS
1. Stallings,William., "High Speed Networks and Internets: Performance and QoS", Second Edition, Pearson Education, 2002.
2. Warland, Jean andVaraiya, Pravin., "High Performance Communication Networks", Second Edition, Harcourt Asia Pvt. Ltd., 2000.
3. IrvanPepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN Architecture", Volume 1 and 2, Cisco Press, 2003.
4. KaseraSumit and SethiPankaj, "ATM Networks", Tata McGraw Hill, New Delhi, 2000.

11PI017   SERVICE ORIENTED ARCHITECTURE

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Objective:
- To learn about the Web Application Environment
- To understand Services, WSDL, SOAP
- To know the Basic Concept of WS, SOA Platform

MODULE – I   15
Introduction to SOA and Evolution: Fundamentals of SOA - Characteristics of Common Misperceptions - Tangible Benefits - Pitfalls of Adopting - The Evolution of SOA – Web Services – Timeline – Continuing – Roots - Web Services and Primitive - The Web Service Framework – Services – Roles – Models - Service Descriptions-Abstract- Concrete - Metadata and Service Contracts – Semantic – Discovery – Messaging – Messages – Nodes - Message Paths.

MODULE - II   15
Service-Oriented Design: Introduction – WSDL - Related XML Schema Language Basics – Schema – Element - Complex Type and Simple Type - Import and Include elements - WSDL Language Basics - SOAP Language Basics -Service Interface Design Tools - Service Design Overview - Entity Service Design - Application Service Design- Task Service Design – Guidelines - WS-BPEL Language Basics – WS – Coordination - Service-Oriented Business Process Design.

MODULE-III   15
Fundamental WS and SOA Platform WS-Addressing Language - The Endpoint Reference - Message Information – WS - Addressing Reusability - Reliable Messaging Language - Policy Language - Metadata Exchange -Security – SOA Platform: Basics - Support in J2EE-Platform Overview - Service-Orientation Principles - Support in .NET- Primitive – Principles - Contemporary SOA Support - Integration Considerations.

                                                               TOTAL : 45
REFERENCE BOOKS
1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Prentice Hall India, 2009.
2. James, Sameer, Michael E, Sunil, "Java Web Services Architecture", Elsevier, London, 2008.
3. Eric Newcomer, and Greg Lomow., "Understanding SOA with web Services", Pearson Education, 2005.

11PI018   ADHOC NETWORKS

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Objective :
- To learn about Fundamentals of Wireless Communication Technology, Ad Hoc Wireless Networks & Protocols
- To learn about QoS framework and Energy Management.

MODULE - I   15
Introduction and   Wireless LAN: Introduction-Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum - Radio Propagation Mechanisms - Characteristics of the Wireless Channel – Modulation and Multiple Access Techniques – Wireless LAN - IEEE 802.11 Standard – HIPERLAN – Bluetooth – Wireless Internet – Mobile IP – TCP in Wireless domain

MODULE - II   15
AD HOC Wireless Networks and Protocols
Introduction - Issues in Ad Hoc Wireless Networks - Ad Hoc Wireless Internet – MAC Protocols for Ad Hoc Wireless Networks - Classification – Contention based protocols – Contention based protocols with Reservation and Scheduling mechanisms -   Other MAC Protocols – Routing Protocols for Ad Hoc Wireless Networks – issues – Classification – Table Driven, On Demand and Hybrid Protocols- Hierarchical and Power Aware Routing protocols

MODULE - III   15
QoS and Energy Management : Introduction - Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks - Classifications of QoS Solutions - MAC Layer Solutions - Network Layer Solutions - QoS Frameworks for Ad Hoc Wireless Networks - Energy Management in Ad Hoc Wireless Networks –Introduction - Need for Energy Management in Ad Hoc Wireless Networks - Classification of Energy Management Schemes - Battery Management Schemes - Transmission Power Management Schemes - System Power Management Schemes

<div align="right">**Total : 45**</div>

REFERENCE BOOKS

1   C. Siva Ram Murthy and B.S. Manoj "Ad Hoc Wireless Networks: Architectures and Protocols", Prentice Hall PTR,2004
2   C.K. Toh, Ad Hoc Mobile Wireless Networks: Protocols and Systems, Prentice Hall PTR , 2001
3   Charles E. Perkins, Ad Hoc Networking, Addison Wesley, 2000

<center>**11PI019   TCP/IP**</center>

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Objective:
- Helps to learn the basic internetworking concepts
- Understands to learn the implementation of IP
- Understands to learn the implementation of TCP

MODULE – I   15

Introduction: Internetworking Concepts and Architectural Model– Classful Internet Addresses – Mapping Internet Address To Physical Addresses (ARP) –Internet Protocol: Connectionless Datagram Delivery (Ipv4) - Internet Protocol: Forwarding IP Datagrams - Internet Protocol: Error and Control Messages (ICMP) - Classless and subnet address Extensions (CIDR)–Protocol Layering - Reliable Stream Transport Service (TCP) – The future of TCP/IP (Ipv6).

MODULE - II   15

IP Implementation: Introduction and Overview - Structure of TCP/IP software - Network Interface layer - IP global software organization – IP Routing table and Routing algorithm–IP Fragmentation and reassembly–IP Error processing (ICMP) –IP Multicast Processing (IGMP)-UDP User Datagrams.

MODULE-III   15

TCP Implementation: TCP: Data structure and input processing – TCP: finite state machine implementation– TCP: Output processing– TCP: Timers management- TCP: flow control and adaptive retransmission– TCP: urgent data processing and the push function.

<div align="right">**TOTAL : 45**</div>

REFERENCE BOOKS
1. Comer, Douglas E., "Internetworking with TCP/IP: Principles, Protocols and Architectures", Volume I, Fifth Edition, Prentice hall of India Pvt. Ltd., New Delhi, 2008.
2. Comer, Douglas E., Stevens, David L., "Internetworking with TCP/IP: Design, Implementation and Internals", Volume II, Third Edition, Prentice hall of India Pvt. Ltd., New Delhi, 2008.

11PC022   SOFT COMPUTING
(Common to M.Sc Computer Technology and Information Technology)

3   0   0   3

Objective :
- To learn about artificial intelligence, search and fuzzy systems.
- To learn about genetic algorithms and swarm intelligence

MODULE – I   15
Artificial Intelligence and Search: Artificial Intelligence: History and applications – Introduction – Intelligence – Artificial Intelligence – Progress of Artificial Intelligence – Modeling, Simulation and AI – Intelligent systems – Knowledge Representation: Introduction – Propositional calculus – Predicate Calculus – Rule-based Knowledge Representation – Symbolic Reasoning under Uncertainity – Basic Knowledge Representation Issues – Knowledge Acquisition- Heuristic Search : Search as a Problem Solving Technique – Heuristic Search – Techniques for Heuristic Search – Heuristic Classification – Intelligent Agents – State Space Search: Introduction – State Space Search – Strategies for State Space Search

MODULE - II   15
Fuzzy Systems and Genetic Algorithms : Implementation of Graph Search – Search Based on Recursion – Pattern-directed Search – Learning- Fuzzy Systems : Foundation of Fuzzy Systems – Fuzzy Relations – Arithmetic Operations of Fuzzy Numbers – Linguistic Descriptions and their Analytical Forms – Defuzzication Methods – Fuzzy Logic in Control and Decision- Making Applications – Hardware Realization of the Analog Fuzzy Controller- Introduction – Genetic Algorithms - Procedures of Genetic Algorithms – The Working of Genetic Algorithms – The Logic Behind Genetic Algorithms.

MODULE - III   15
Swarm Intelligence : Evolutionary Programming – The Working of Evolutionary Programming – Genetic Algorithm-based Machine Learning Classifier System- Introduction – Background of Ant Intelligent Systems – Importance of the Ant Colony Paradigm – Ant Colony Systems – Development of the Ant Colony System – Applications of Ant Colony Intelligence – The working of Ant Colony Systems – Particle Swarm Intelligent Systems – Engineering Applications of PSIS and Future Research.

TOTAL : 45

REFERENCE BOOKS
1. Padhy N.P., "Artificial Intelligence and Intelligent Systems", Oxford Higher Education, 2007
2. Russel Stuart and Norvig Peter, "Artificial Intelligence – A Modern Approach", 2nd Edition, Prentice Hall of India, New Delhi, 2004.