Department of ....Computre science & Engg.....MTECH.....

Courses Offered

Subject Code	Name of the course	Credits
TMSE-101	Advanced Computational Mathematics	5(3-2-0)
TMSE-102	Advanced Data Structure and Algorithm	6(3-2-1)
TMSE-103	Advance Computer Architecture	5(3-2-0)
TMSE-104	Object Oriented Technology	6(3-2-1)
TMSE-105	Advanced Computer Networking	5(3-2-0)
TMSE-201	Web Technology & Commerce	5(3-2-0)
TMSE-202	Information Theory, Coding & Cryptography	5(3-2-0)
TMSE-203	Advanced Concept in Databases	6(3-2-1)
TMSE-204	System Programming	6(3-2-1)
TMSE-205	Soft Computing	5(3-2-0)
TMSE-301	Elective I (A) Data Warehousing & Mining (B) Ad-hoc Networks (C) Software Testing & Quality Assurance	5(3-2-0)
TMSE-302	Elective II(A) Network Security (B) Simulation and Modelling (C) Grid Computing	5(3-2-0)
TMSE-303	Seminar	(0-0-4)
TMSE-304	Dissertation Part- I(Literature Review/Problem Formulation/ Synopsis)	(0-0-8)

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			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-101	ADVANCED COMPUTATIONAL MATHEMATICS	5(3+2+0)	50	20	30	-	-	100	3 hr	-

Course Objectives:

- Apply critical thinking and communication skills to solve applied problems.
- Use knowledge and skills necessary for immediate employment or acceptance into a graduate program.
- Maintain a core of mathematical and technical knowledge that is adaptable to changing technologies and provides a solid foundation for future learning.

Syllabus

Theory:

UNIT-I
Linear Algebra: Linear transformation, vector spaces, hash function, Hermite polynomial, Heavisite's unit function and error function. Elementary concepts of Modular mathematics

UNIT-II
Solution of Partial Differential Equation (PDE) by separation of variable method, numerical solution of PDE (Laplace, Poisson's, Parabolic) using finite difference methods, Elementary properties of FT, DFT, WFT, Wavelet transform, Haar transform.

UNIT-III
Probability, compound probability and discrete random variable. Binomial, Normal and Poisson's distributions, Sampling distribution, elementary concept of estimation and theory of hypothesis, recurred relations.

UNIT-IV
Stochastic process, Markov process transition probability transition probability matrix, just and higher order Markov process, Application of Eigen value problems in Markov Process, Markov chain. Queuing system, transient and steady state, traffic intensity, distribution queuing system, concepts of queuing models (M/M/1: Infinity/ Infinity/ FC FS), (M/M/1: N/ Infinity/ FC FS), (M/M/S: Infinity/ Infinity/ FC FS)

UNIT- V

Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relation equations, fuzzy logics. MATLAB introduction, programming in MATLAB scripts, functions and their application.

Course Outcomes:

1. Apply mathematical concepts and principles to perform computations
2. Apply mathematics to solve problems
3. Create, use and analyze graphical representations of mathematical relationships
4. Communicate mathematical knowledge and understanding
5. Apply technology tools to solve problems
6. Perform abstract mathematical reasoning
7. Learn independently

Reference Books:

1. Higher Engineering Mathematics by B.V. Ramana, Tata Me Hill.
2. Advance Engineering Mathematics by Ervin Kreszig, Wiley Easten Edd.
3. Applied Numerical Methods with MATLAB by Steven C Chapra, TMH.
4. Advance Engg Mathematics, O' Neil, Cengage (Thomson)
5. Introductory Methods of Numerical Analysis by S.S. Shastry,
6. Introduction of Numerical Analysis by Forberg
7. Numerical Solution of Differential Equation by M. K. Jain
8. Numerical Mathematical Analysis By James B. Scarborogh
9. Fourier Transforms by J. N. Sheddon
10. Fuzzy Logic in Engineering by T. J. Ross
11. Fuzzy Sets Theory & its Applications by H. J. Zimmersoms

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			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-102	ADVANCED DATA STRUCTURES AND ALGORITHM	6(3+2+1)	50	20	30	75	75	250	3 hr	2 hr

Course Objectives:

The fundamental design, analysis, and implementation of basic data structures. Basic concepts in the specification and analysis of programs. Principles for good program design, especially the uses of data abstraction. Significance of algorithms in the computer field Various aspects of algorithm development Qualities of a good solution

Syllabus

Theory:

UNIT-I

INTRODUCTION:
Basic concepts of OOPs - Templates - Algorithm Analysis - ADT -List (Singly, Doubly and Circular) Implementation - Array, Pointer, Cursor Implementation

UNIT-II

BASIC DATA STRUCTURES:
Stacks and Queues - ADT, Implementation and Applications - Trees- General, Binary, Binary Search, Expression Search, AVL, Splay, B-Trees- Implementations - Tree Traversals.

UNIT-III

ADVANCED DATA STRUCTURES:
Set - Implementation - Basic operations on set -Priority Queue - Implementation - Graphs - Directed Graphs - Shortest Path Problem - Undirected Graph - Spanning Trees- Graph Traversals

UNIT-IV

MEMORY MANAGEMENT:
Issues - Managing Equal Sized Blocks- Garbage Collection Algorithms for Equal Sized Blocks - Storage Allocation for Objects with Mixed Sizes - Buddy Systems - Storage Compaction

UNIT- V

SEARCHING, SORTING AND DESIGN TECHNIQUES:
Searching Techniques, Sorting - Internal Sorting - Bubble Sort, Insertion Sort, Quick Sort, Heap Sort, Bin Sort, Radix Sort - External Sorting - Merge Sort, Multi-way Merge Sort, Polyphase Sorting - Design Techniques- Divide and Conquer - Dynamic Programming - Greedy Algorithm - Backtracking - Local Search Algorithms

Course Outcomes:

1. Students develop knowledge of basic data structures for storage and retrieval of ordered or unordered data. Data structures include: arrays, linked lists, binary trees, heaps, and hash tables.
2. Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
3. Students learn to analyze and compare algorithms for efficiency using Big-O notation. Students implement projects requiring the implementation of the above data structures.

List Of Experiments:

1. Write C++ program to implement the following using an array

   a) Stack ADT b) Queue ADT

2. Write C++ programs to implement the following using a singly linked list

   a) Stack ADT b) Queue ADT

3. Write C++ program to implement the dequeue (double ended queue) ADT using a doubly linked list

4. Write a C++ program to perform the following operations:

   a) Insert element into a binary search tree.

   b) Delete an element from a binary search tree

   c) Search for a key element in a binary search tree

5. Write a C++ program to implement circular queue ADT using an array

6. Write a C++ programs that use non-recursive functions to traverse the given binary tree in

   a) Preorder b) in order c) post order

7. Write a C++ programs for the implementation of bfs and dfs for a given graph

8. Write C++ programs for implementing that following sorting methods:

a) Quick sort b) Merge sort c) Heap sort

9. Write a C++ program to perform the following operations

   a) Insertion into a B-tree b) Deletion from B-tree

10. Write a C++ program to perform the following operations

    a) Insertion into an AVL tree b) Deletion from an AVL tree

11. Write a C++ program to implement kruskal's algorithm to generate a minimum spanning Tree.

12. Write a C++ program for implement prim's algorithm to generate a minimum spanning Tree.

13. Write a C++ program to implement all the functions of a dictionary (ADT) using hashing

REFERENCE BOOKS :

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson P
2. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Pearson Education P
3. Drozdek, Data Structures and algorithm in Jawa, Cengage (Thomson)
4. Gilberg, Data structures Using C++, Cengage
5. Horowitz, Sahni, Rajasekaran, "Computer Algorithms", Galgotia,
6. Tanenbaum A.S., Langram Y, Augestien M.J., "Data Structures using C & C++",Prentice Hall of India,2002

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			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-103	ADVANCED COMPUTOR ARCHITECTURE	5(3+2+0)	50	20	30	-	-	100	3 hr	-

Course Objectives:

- Give students a broad and deep knowledge of contemporary computer architecture issues and techniques.
- Give students knowledge of advanced hardware-based techniques for exploiting instruction level parallelism.
- Give students knowledge of various architectures and techniques used for building high performance scalable multithreaded and multiprocessor systems.
- Give students ability to apply the learned knowledge to conduct computer architecture research using performance simulators.

Syllabus

Theory:

UNIT-I

Flynn'sand Handler's Classification of parallel computing structures. Pipelined and Vector Processors.

UNIT-II

Data and control hazards and method to resolve them. SIMD multiprocessor structures. I

UNIT-III

Interconnection Networks. Parallel Algorithms for array processors, Search algorithms, MIMD multiprocessor systems,

UNIT-IV

Scheduling and load balancing in multiprocessor systems, Multiprocessing control and algorithms.

Course Outcomes:

- Identify the factors affecting performance in superscalar processors and the key components, options and tradeoffs that a designer has to consider when designing such processors.
- Identify various simulation techniques used to study superscalar processor

performance. Compare a trace cache to conventional instruction cache and explain advantages and disadvantages of each approach.

- Explain advanced branch prediction techniques such as 2-level branch prediction, perception-based branch prediction, combined predictors, indirect branch prediction and branch confidence estimation.
- Describe the hardware needed to properly order loads and stores execution in a superscalar processor, and methods to optimize, predict, and perform load store ordering in large instruction window processors.
- Explain how data speculation and dynamic instruction reuse work, why they work, and compare the two techniques.
- Explain different dynamic optimization techniques and the hardware support needed to perform these optimizations in a superscalar processor.
- Compare checkpoint architectures to conventional speculative execution methods, such as reorder buffer.

REFERENCE BOOKS:

1. Advance Computer Architecture, parthsarthy, Cengage (Thomson)
2. Computer Architecture and Organisation- John Hays, McGraw-Hill.
3. Computer Architecture and Parallel Processing- Hwang And Briggs, TMH.

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TMSE-104	OBJECT ORIENTED TECHNOLOGY	6(3+2+1)	50	20	30	75	75	250	3 hr	2 hr

Course Objective:

- Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm

Syllabus

Theory:

UNIT-I

OVERVIEW OF OBJECT ORIENTED CONCEPTS:
Need for object oriented programming, characterization of object oriented languages.

UNIT-II

OBJECT ORIENTED DESIGN:
Object structure concepts, methodology for object oriented design (Booch, and chen and chen), Design modelling , system design life cycle.

UNIT-III

OBJECT ORIENTED PROGRAMMING:
An overview of C++ programming, loops and decisions, structures and functions, objects and classes, Array and pointers, Inheritance, virtual function, files and stream.

UNIT-IV

OBJECT ORIENTED DATABASES:
Relational v/s object oriented databases, the architecture of 00 databases, Query languages for 00 databases, Gemstone/02/Orion.

UNIT- V

DISTRIBUTED OBJECT ORIENTED SYSTEMS:
Object management group, CORBA.

Course outcomes:

Understand the features of C++ supporting object oriented programming Understand the relative merits of C++ as an object oriented programming language Understand how to produce object-oriented software using C++ Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism Understand advanced features of C++ specifically stream I/O, templates and operator overloading

PRACTICAL:

1. Write a C++ program that overloads the + operator and relational operators (suitable) to perform Concatenation of two strings.
2. Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.
3. Write a C++ program that illustrates the role of virtual base class in building class.
4. Write a C++ program that uses a function to delete all duplicate characters in the given.
5. Write C++ programs that illustrate how the following forms of inheritance are supported (a) Single inheritance (b) Multiple inheritance (c) Multi level inheritance (d) Hierarchical inheritance.
6. Consider a payroll system; construct its Class diagram, use-case diagram, sequence diagram and activity diagram.
7. Consider a calculator, Draw Class, State, sequence and DFD for this system.
8. Consider a railway reservation system, Draw Class, State, sequence and DFD for this.
9. Consider a Telephone system, Draw Class, State, sequence and DFD for this system.
10. Draw class, state, sequence diagram and DFD for online sales system.
11. Programs Using Functions (a) Functions with default arguments (b) Implementation of Call by Value, Call by Address and Call by Reference.
12. Compile time Polymorphism (a) Operator Overloading including Unary and Binary Operators (b) Function Overloading.
13. Runtime Polymorphism (a) Inheritance (b) Virtual functions (c) Virtual Base Classes (d) Templates.
14. File Handling Sequential access and Random access.

REFERENCE BOOKS:

1. Object Oriented Analysis and Design, Satzinger, Cengage (Thomson).
2. Object Oriented S/W Development by Me. Gregor & Sykes DA, Van Nostrand.
3. OOP in C++ by Lafore, Galgotia Pub.
4. The C++ Programming Language by Stroustrup B, Addison Wesely.
5. Introduction to OOP by Witt KV, Galgotia Pub.
6. Object Data Management by Cartel R., Addison Wesely.
7. Modern Data Base System by Kim W, ACM Press, Addison Wesely.
8. OOP by Blaschek G, Springer Verlag.An Introduction to Java Programming and OOAD,Johnson,Cengage

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			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-105	ADVANCED COMPUTER NETWORKING	5(3+2+0)	50	20	30	-	-	100	3 hr	-

Course Objectives:
At the end of the course, the students will be able to:

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Syllabus

Theory:

UNIT-I
Review of Networking and OS. fundamentals, ISO-OSI Model, different layers and their functions, LAN, MAN, WAN, Communication media & principles IEEE standards etc.

UNIT-II
Internetworking with TCP/IP, Basic concepts, Principles, Protocols and Architecture, Address handling Internet protocols and protocol layering. DNS, Applications: TELNET, RLOGN , FTP, TFTP, NFS, SMTP, POPL, IMAP, MIME, HTTP,STTP,DHCP, VOIP, SNMP.

UNIT-III
Introduction to Router, Configuring a Router, Interior & Exterior Routing, RIP, Distance Vector Routing, OSPF, BGP, Uni-cast, Multicast and Broadcast. Multicast routing protocols: DVMRP, MOSPF, CBT, PIM, MBONE, EIGRP, CIDR, Multicast Trees, Comparative study of IPv6 and IPv4.

UNIT-IV
VPN addressing and routing, VPN Host management, ATM Concepts, Services Architecture, Equipments and Implementation

UNIT- V

Introduction to wireless transmission and medium access control, wireless LAN: IEEE 802.11, Hipher LAN, Bluetooth Mobile Network and Transport layer, WAP GSM and CDMA: Network architecture and management

Course Outcomes:

After completing this course the student must demonstrate the knowledge and ability to:

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer. 5. Identify the different types of network devices and their functions within a network
- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

REFERENCE BOOKS:

1. Computer Networks: Tanenbaum.
2. Internetworking with TCP/IP: Comer.
3. Data Communications, Computer Networks and Open Systems: Hallsall.
4. Data Communications, Stalling.
5. Mobile Communication: Schiller, Pearson Education
6. Computer Communications and network Technology, Gallo, Cengage (Thomson)
7. Wireless and Mobile Network Architecture: Yi Bing Lin, Wiley
8. ATM Network: Kasara, TMH
9. TCP/IP protocol Suite, Forouzan ,TMH

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			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-201	WEB TECHNOLOGY AND COMMERCE	5(3+2+0)	50	20	30	-	-	100	3 hr	-

Course Objectives:

The objective of this subject is to develop an ability to design and implement static and dynamic website

Syllabus

Theory:

UNIT-I
Introduction to building blocks of electronic commerce: Internet and networking. Technologies, IP addressing, ARP, RARP, BOOTP, DHCP, ICMP, DNS, TFTP, TELNET.

UNIT-II
Static and dynamic web pages, tiers, plug-ins, frames and forms. Exposure to Markup languages, HTML, DHTML, VRML, SGML, XML etc. CGI, Applets & Serve-lets, JSP & JAVA Beans, active X control, ASP cookies creating and reading cookies, semantic web, semantic web service ontology Comparative case study of Microsoft and JAVA technologies, web server scalability, Distributed objects, object request brokers, component technology, Web services, Web application architectures, Browsers, Search engines.

UNIT-III
Electronic Commerce and physical Commerce, Different type of e-commerce, e-commerce scenarios, advantages of e-commerce. Business models: Feature of B2B e-commerce, Business models, Integration. E-Services: category of e-services, Web- enabled services, Matchmaking services, and information-selling on the web.

UNIT-IV
Internet payment system: Characteristics of payment system, 4C payments methods, SET Protocol for credit card payment, E-cash, E-check, Micro payment system, Overview of smart card, overview of Mondex. E-Governance: E-Governance architecture, Public private partnership, Readiness, Security, Cyber Crime and Law, IT Act

UNIT-V

Advanced technologies for e-commerce: Introduction to mobile agents. WAP: the enabling technology: The WAP model, WAP Architecture, Benefit of WAP to e-commerce. Web Security, Encryption Schemes, Secure Web documents, Digital signatures and firewalls.

Course Outcomes:

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

- Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
- Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
- Get introduced in the area of Online Game programming.

REFERENCES:

1. Web Technology, Achyut Godbole, Atul Kahate, TMH
2. Henry Chan, Raymond Lee, Tharam Dillon, E-Commerce Fundamental and Applications, Willey Publication.
3. Minoli & Minoli, Web Commerce Technology Hand Book, TMH
4. Satyanarayana, E-Government, PHI
5. Uttam K: Web Technologies, Oxford University Press.
6. G. Winfield Treese, Lawrence C. Stewart, Designing Systems for Internet Commerce, Longman Pub.
7. Charles Trepper. E Commerce Strategies, Microsoft Press

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			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-202	INFORMATION THEORY, CODING AND CRYPTOGRAPHY	5(3+2+0)	50	20	30	-	-	100	3 hr	-

Course Objective:

This course aims to address the efficient error free and secure delivery of information using binary data streams. For efficiency, the information source is coded to reduce redundancy. To minimise the effects of errors, channel coding is employed and, finally, cryptographic techniques are required to make the data secure. The aim is to present the basic theory and objectives of each of these steps, together with the basics of information theory.

Syllabus

Theory:

UNIT-I

INFORMATION THEORY, PROBABILITY AND CHANNEL:
Introduction, Information Measures, Review probability theory, Random variables, Processes, Mutual Information, Entropy, Uncertainty, Shannon's theorem, redundancy, Huffman Coding, Discrete random Variable. Gaussian random variables, Bounds on tail probabilities.

UNIT-II

STOCHASTIC PROCESSES:
Statistical independence, Bernoulli Process, Poisson Process, Renewal Process, Random Incidence, Markov Modulated Bernoulli Process, Irreducible Finite Chains with Aperiodic States, Discrete-Time Birth-Death Processes, Markov property, Finite Markov Chains, Continuous time Markov chain, Hidden Markov Model.

UNIT-III

ERROR CONTROL CODING: CHANNEL CODING: LINEAR BLOCK CODES:
Introduction, Matrix description, Decoding, Equivalent codes, Parity check matrix, Syndrome decoding, Perfect codes Hamming Codes .Optimal linear codes. Maximum distance separable (MDS) codes. Cyclic Codes: Introduction, generation, Polynomials, division algorithm, Matrix description of cyclic codes, burst error correction, Fire Codes, Golay Codes, and CRC Codes. BCH Codes: Introduction, Primitive elements, Minimal polynomials, Generator Polynomials in terms of Minimal Polynomials, Decoding of BCH codes.

UNIT-IV

CODING FOR SECURE COMMUNICATIONS:
Review of Cryptography, Introduction, Encryption techniques and algorithms, DES, IDEA , RC Ciphers ,RSA Algorithm ,Diffi-Hellman, PGP, Chaos Functions, Cryptanalysis, Perfect security, Unicity distance, Diffusion and confusion, McEliece Cryptosystem

UNIT- V

ADVANCE CODING TECHNIQUES:
Reed-Solomon codes, space time codes, concatenated codes, turbo coding and LDPC codes (In details), Nested Codes, block (in Details), Convolution channel coding: Introduction, Linear convolution codes, Transfer function representation & distance properties, Decoding convolution codes(Soft-decision MLSE, Hard-decision MLSE),The Viterbi algorithm for MLSE, Performance of convolution code decoders, Soft & Hard decision decoding performance, Viterbi algorithm implementation issues: RSSE, trellis truncation, cost normalization, Sequential decoding: Stack, Fano, feedback decision decoding, Techniques for constructing more complex convolution codes with both soft and hard decoding.

Course outcomes:
After successful completion of the course students will be able to:
1. apply the basics of information theory to calculate channel capacity and other measures
2. design specific data compression techniques and calculate the compression achieved
3. apply and control specific coding methods and be able to calculate the rate and error probabilities achieved
4. understand the basic concepts and complexity of cryptographic security methods and their practical applications.

REFERENCES BOOK:

1. Rajan Bose "Information Theory, Coding and Cryptography", TMH,2002.
2. Kishor S. Trivedi "Probability and Statistics with Reliability, Queuing and Computer Science.
   Applications", Wiley India, Second Edition.
3. J.C.Moreira, P.G. Farrell "Essentials of Error-Control Coding", Willey Student Edition.
4. San Ling and Chaoping "Coding Theory: A first Course", Cambridge University Press,2004.
5. G A Jones J M Jones, "Information and Coding Theory", Springer Verlag,2004.
6. Cole, "Network Security", Bible, Wiley INDIA, Second Addition.
7. Proakis and Masoud, "Digital Communication" .McGraw-Hill ,2008.

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			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-203	ADVANCED CONCEPT IN DATA BASES	6(3+2+1)	50	20	30	25	25	150	3 hr	2 hr

Course Objectives:

Learning state-of-art techniques in database systems and information management that students can apply to your future research and/or your practical work.

Learning how the prepare and present technical papers which is an essential skill for students and researchers.

Learning how to review papers. Reviewing technical and scientific papers is a skill that you need to develop.

Syllabus

Theory:

UNIT-I
DBMS Concept Introduction, Data Model, Entity & Attributes, Relationship, E-R Model, Relational Data Model, Domain Tuples, Attributes, Key, Schema, Integrity Constraints, Relational Algebra & Relational Calculus, Normalization & Normal Form.

UNIT-II
Query Processing and Optimization Introduction, Query Processing, Syntax Analyzer, Query Decomposition: - Query Analysis, Query Normalization, Semantic Analyzer, Query Simplifier, Query Restructuring. Query Optimization, Cost Estimation in Query Optimization, Structure of Query Evaluation Plans, Pipelining and Materialization.

UNIT-III
Distributed Databases Introduction, Architecture of Distributed Databases , Distributed Database System Design, Distributed Query Processing, Concurrency Control in Distributed Databases, Recovery Control in Distributed Databases. Web Databases, Multimedia Databases, Spatial Databases, Clustering-based Disaster-proof Databases, Mobile Databases.

UNIT-IV
Object-Oriented Databases Introduction, Concept of Object Oriented Database, Object Oriented Data Model(OODM), Object-Oriented DBMS(OODBMS), Object Data Management Group and Object-Oriented Languages. Object-Relational DBMS, ORDBMS Design, ORDBMS Query Language.

UNIT-V

Design of Data Warehouse, Dimension and Measures, Data Marts and Distributed Data Marts, Conceptual Modeling of Data Warehouses:-Star Schema, Snowflake Schema, Fact Constellations. Multidimensional Data Model & Aggregates.

Data Mining: Data, Information and Knowledge Discovery, Data Mining Functionalities, Data Mining System categorization and its Issues. Data Processing, Data Reduction, Data Mining Statistics. Data Mining Techniques.

Course Outcomes:

By the end of this module, students should be able to:

1. explain and evaluate the fundamental theories and requirements that influence the design of modern database systems
2. assess and apply database functions and packages suitable for enterprise database development and database management
3. critically evaluate alternative designs and architectures for databases and data warehouses
4. discuss and evaluate methods of storing, managing and interrogating complex data
5. explain and critically evaluate database solutions for data exchange
6. analyse the background processes involved in queries and transactions, and explain how these impact on database operation and design

Practical List

1. To perform basic PL/SQL blocks

I. Display square of given no from 1 to 10 using loop, for and while.
II. Write a PL-SQL block for checking weather a given year is a Leap year or not.
III. Write a PL-SQL block to fine total no of odd and even (from 1 to 20)
IV. Write a PL-SQL block for reverse the string

2. To perform the concept of cursor

I. Display all the information of employee using %ROWTYPE
II. Get Employee Number as input and check whether the employee exists. If it exists display name and department no otherwise print "Employee Not Found"
III. Create a copy of Emp table. Write a PL/SQL block that will transfer all the records from Emp table to newly created table. If there is any existing record then the new value should be updated in the existing record.
IV. Write a PL/SQL block that will assign 2 hrs of workload to employee with lowest workload from the employee with highest workload
V. Display employee-name, dept-name, basic salary, total experience of all the employees whose area of interest is 'C Programming' using record type.

3. To perform the concept of loop

I. Display Employee Names, Joining Date (Monday 24th of May, 2004 format) of all the employees using a) Loop – End Loop b) While Loop and c) For Loop
II. The manager has decided to raise the salary for all the employees in the department number 10 by 0.7. Whenever any such raise is given to employees, a record for the same is maintained in the empraise table. Write a PL/SQL block to update the salary of each employee and insert a record in the empraise table. Use for loop.

4. To perform the concept of locking

I. Write a PL/SQL block that will accept the employee code, department no, amount and operation. Based on specified operation amount is added or deducted from salary of said employee. Use locking concept at appropriate place.

5. To perform the concept of exception handler

I. Write a PL/SQL block that will increase the salary of the employee by 0.7 who is working as 'manager'. Handle the exception using oracle named exception handler

II. Write a PL/SQL block that will accept the employee code, amount and operation. Based on specified operation amount is added or deducted from salary of said employee. Use user defined exception handler for handling the exception.

6. To perform the concept of function

I. Write a PL/SQL block to update the salary of employee specified by emp_code. If record exist then update the salary otherwise display appropriate message. Write a function for updating salary.

II. List the department names, and, for each department, list the names of the employees in that department.

7. To perform the concept of package

I. Write a PL/SQL block to update the current stock of the item specified by item_id. If specified record not found then insert the new record into table item_record. Use package for function and procedure used

II. Write a PL/SQL block that will accept the employee code, amount and operation. Based on specified operation amount is added or deducted from salary of said employee. Use package for used procedures.

REFERENCES:

1. C. J. Date: An Introduction to Database Systems , Addison-Wesley
2. Avi Silberschatz, Henry F. Korth ,S. Sudarshan .Data Base System Concepts, TMH
3. Patrick O'Neil & Elizabeth O'Neil, Database Principles, Programming and Performance,
4. Morgan Kaufmann Hardcourt India
5. Gillenson, Fundamental of Data Base Management Sytem, Willey India
6. Ceri & Pelagatti, Distributed Databases Principles & Systems.TMH
7. Paulraj Ponniah, Dataware Housing Fundamental, Willey India.
8. Jiawei Han, Data Mining Concept & Techniques, Elsevier Pub.

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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Computer Science & Engg.

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-204	SYSTEM PROGRAMMING	6(3+2+1)	50	20	30	25	25	150	3 hr	2 hr

Course objectives:

- Consolidate the programming skills from the previous core courses.
- The System Programming course concentrates on how programs run in user space and how the interact with the OS.
- It does not cover OS internals. That will be covered in the Operating Systems Course.

Syllabus

Theory:

UNIT-I

Overview of language processors, Elements of assembly level programming, Design of assembler, Macro definition, Design of Macro preprocessor, Relocating and linking concepts , Design of linker , Programming Environments.

UNIT-II

Aspects of Compilation, overview of the various phases of compiler, Scanning, Syntax error handling , Symbol table conceptual design , Intermediate Code conceptual Design , Intermediate code interfaces , Dynamic storage allocation techniques , Dynamic Programming code generation algorithm .Principal sources of optimization , Approaches to compiler development. Register allocation techniques. Concurrentisation and vectorisation of programs.

UNIT-III

Motivation and overview, Structure of a Parallelizing compiler. Parallelism detection: data dependence, direction vectors, loop carried and loop independent dependences. Compilation for Distributed Machines Data partitioning, instruction scheduling, register allocation, machine optimization. Dynamic compilation.

Introduction to code optimisation. Classical theory of data flow analysis. Bi-directional data flows. Unified algorithms for data flow analysis. Program representation for optimization - SSA form, etc. Efficient code generation for expressions. Code generator generators (CGGs). Code generation for pipelined machines.

UNIT-IV

Design Issues in distributed operating system, Networking Issues, Communication Protocols, Message Passing, RPC in heterogeneous environment, Resource allocation .Algorithms for Distributed control. Distributed Deadlock detection .Mechanism for building Distributed File System, Distributed shared memory, and distributed scheduling.

UNIT-V

RESOURCE SECURITY AND PROTECTION:
The Access Matrix model, Advanced models of protection,. Cryptography, Authentication, Multiprocessor System Architecture , Structure of multiprocessor operating systems , Process synchronization, scheduling , Memory management, Fault tolerance. Case studies :Unix Operating system, Amoeba, Andrew.

Course Outcomes:
Upon successful completion of the course, the student will be able to:

1. Enumerate and explain the function of the common operating system kernel routines that are provided by an operating system and accessible from a systems programming language
2. Design, write,and test moderately complicated low-level programs using a systems programming language.
3. Proficiently use a preprocessor to implement code that is portable between different computing platforms.
4. Implement routines that read and write structured binary fies such as word processing documents, index systems, or serialized hierarchical data
5. Use operating system kernel calls from within a programming language to allocate/free virtual memory, initiate and synchronize multiple threads/processes, interact with the file system, set and respond to timers/interrupts.
6. Implement routines that implement complex data structures which superimpose arrays, records, and references on unstructured blocks of memory
7. Implement that exploit the use of pointers to improve efficiency.

Practical:

List of Experiment

1. How can you design a assembler.
2. How can you handle syntax error?
3. Write various steps for compilation of distributed machines.
4. Describe the mechanism for building distributed file system.
5. Describe multiprocessor system architecture in detail.
6. Write a program to implement the lexical analyzer.
7. Write a program to remove the left recursion from a given grammar.
8. Write a c program to parse a given string using predictive parsing for given grammar.

REFERENCES:

1. Dhamdhere, Systems Programming and Operating systems, TMH
2. Keith Cooper, Engineering a Compiler, Elsevier Pub
3. Mak , Writing compilers and Interpreters , Wiley India
4. Singhal & Shivaratri, Advanced concepts in Operating Systems, TMH
5. Sinha , Distributed operating system , PHI

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Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-205	SOFT COMPUTING	5(3+2+0)	50	20	30			100	3 hr	

Course Objectives:

- To familiarize with soft computing concepts.
- To introduce the ideas of Neural networks, fuzzy logic and use of heuristics based on human experience.
- To introduce the concepts of Genetic algorithm and its applications to soft computing using some applications.

Syllabus

Theory:

UNIT - I

INTRODUCTION OF SOFT COMPUTING:
Soft computing vs hard computing. Soft computing techniques. Computational Intelligence and applications, problem space and searching: Graph searching, different searching algorithms like breadth first search, depth first search techniques, heuristic searching Techniques like Best first Search, A* algorithm, AO* Algorithms.

GAME PLAYING:
Minimax search procedure, adding alpha-beta cutoffs, additional refinements, Iterative deepening, Statistical Reasoning: Probability and Bayes theorem, Certainty factors and Rules based systems, Bayesian Networks, Dempster Shafer theorem

UNIT -II

NEURAL NETWORK:
Introduction, Biological neural network: Structure of a brain, Learning methodologies. Artificial Neural Network(ANN): Evolution of, Basic neuron modeling , Difference between ANN and human brain, characteristics, McCulloch-Pitts neuron models, Learning (Supervised & Unsupervised) and activation function, Architecture, Models, Hebbian learning , Single layer Perceptron, Perceptron learning, Windrow-Hoff/ Delta learning rule, winner take all , linear Separability, Multilayer Perceptron, Adaline, Madaline, different activation functions Back propagation network, derivation of EBPA, momentum, limitation, Applications of Neural network.

UNIT III

UNSUPERVISED LEARNING IN NEURAL NETWORK:
Counter propagation network, architecture, functioning & characteristics of counter Propagation network, Associative memory, hope field network and Bidirectional associative memory. Adaptive Resonance Theory: Architecture, classifications, Implementation and training. Introduction to Support Vector machine, architecture and algorithms, Introduction to Kohanan's Self organization map, architecture and algorithms

UNIT - IV

FUZZY SYSTEMS:
Introduction, Need, classical sets (crisp sets) and operations on classical sets Interval Arithmetic's ,Fuzzy set theory and operations, Fuzzy set versus crisp set, Crisp relation & fuzzy relations, Membership functions, Fuzzy rule base system : fuzzy propositions, formation, decomposition & aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic, fuzzification and defuzzification. Fuzzy associative memory. Fuzzy Logic Theory, Modeling & Control Systems

UNIT- V

GENETIC ALGORITHM :
Introduction, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, including JSPP (Job shop scheduling problem), TSP (Travelling salesman problem), Applications of GA, Differences & similarities between GA & other traditional methods.

EVOLUTIONARY COMPUTING:
Concepts & Applications. Swarm Intelligence.

Course Outcomes:
At the end of the course, students will be able to:

- Understand importance of soft computing.
- Understand different soft computing techniques like Genetic Algorithms, Fuzzy Logic , Neural Networks and their combination.
- Implementing algorithms based on soft computing.
- Apply soft computing techniques to solve engineering or real life problems.

REFERENCES :

1. S.N. Shivnandam, "Principle of soft computing", Wiley India.
2. David Poole, Alan Mackworth "Computational Intelligence: A logical Approach" Oxford.
3. Russell & Yuhui, "Computational Intelligence: Concepts to Implementations", Elsevier.
4. Eiben and Smith "Introduction to Evolutionary Computing" Springer

5. Janga Reddy Manne; "Swarm Intelligence and Evolutionary Computing"; Lap LambertAcademicPublishing
6. E. Sanchez, T. Shibata, and L. A. Zadeh, Eds., "Genetic Algorithms and Fuzzy Logic Systems:Soft Computing Perspectives, Advances in Fuzzy Systems - Applications andTheory",Vol.7,Rivere, World Scientific,I997.
7. Ajith Abraham etal, "Soft computing as transdisciplinary science and technology: proceedingsof4th IEEE International Workshop WSTST' 05" Springer.
8. D.E. Goldberg "Genetic algorithms, optimization and machine learning" Addison Wesley
9. De Jong, Kenneth "A Evolutionary Computation : A Unified Approach" Prentice-HallOfIndiaPrivateLimited
10. Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.

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TMSE-301(A)	DATA WAREHOUSING & MINING	5(3+2+0)	50	20	30	-	-	100	3 hr	-

Course Objectives

1) Identify the scope and necessity of Data Mining & Warehousing for the society.

2) Describe the designing of Data Warehousing so that it can be able to solve the root problems.

3) To understand various tools of Data Mining and their techniques to solve the real time problems.

4) To develop ability to design various algorithms based on data mining tools.

5) To develop further interest in research and design of new Data Mining techniques.

Syllabus

Theory:

UNIT -I
Data Mining: Definitions, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

UNIT-II
Association Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K-Medioid, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

UNIT-III
Other DM techniques & Web Mining: Application of Neural Network, Al, Fuzzy logic and

Genetic algorithm, Decision tree in DM. Web Mining, Web content mining, Web structure Mining, Web Usage Mining.

UNIT-IV

Temporal and spatial DM: Temporal association rules, Sequence Mining, GSP, SPADE, SPIRIT, and WUM algorithms, Episode Discovery, Event prediction, Time series analysis. Spatial Mining, Spatial Mining tasks, Spatial clustering, Spatial Trends.

UNIT-V

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

Course Outcomes:

The candidate will get knowledge of:

- Data pre processing and data quality.
- Modelling and design of data warehouses.
- Algorithms for data mining.

REFERENCE BOOKS:

1. Data Mining Techniques; Arun K.Pujari ; University Press.
2. Data Mining; Adriaans & Zantinge; Pearson education.
3. Mastering Data Mining; Berry Linoff; Wiley.
4. Data Mining; Dunham; Pearson education.
5. Text Mining Applications, Konchandy, Cengage.

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Scheme of Examination

Department: Computer Science & Engg.

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-301(B)	Ad-Hoc Networks	5(3+2+0)	50	20	30	-	-	100	3 hr	-

Course Objectives:

- Explains the constraints of physical layer that affect the design and performance of ad hoc network.
- The Concept of protocols required for wired network may not work for wired network at MAC, Network and Transport Layer.
- Explains the operations and performance of various MAC layer protocols, unicast routing protocols and transport layer protocols proposed for ad hoc networks.

Syllabus

Theory:

UNIT-I

Ad Hoc Networking : An introduction, Model of operation, symmetric Links, Layer-2 Ad Hoc solutions, Proactive versus reactive protocols, multicast, commercial replications of Ad Hoc networking, conferencing, Home Networking, Emergency services, personal Area Networks and Bluetooth, Embedded Computing Applications, Sensor Dust, Automotive/PC Interaction. Factors Affecting Ad Hoc Networks, Scalability, Wireless Data Rates, DARPA packet Radio network, Survivable Radio Networks.

UNIT-II

Ad Hoc Wireless Media Access Protocols: Issues in Designing a MAC protocol for Ad Hoc Wireless networks. Design Goals of a MAC Protocol for Ad Hoc Wireless Networks. Classifications of MAC Protocols. Contention-Based Protocols, Contention-Based Protocols with reservation Mechanisms. Contention –Based MAC Protocols with Scheduling Mechanisms. MAC protocols that use Directional Antennas. Other MAC Protocols.

UNIT-III

Overview of Ad Hoc Routing Protocols: Table-Driven Approaches, Destination Sequenced Distance Vector (DSDV), Wireless Routing Protocol (WRP), Cluster Switch Gateway Routing (CSGR) , Source-Initiated On –Demand Approaches . Ad Hoc On-Demand Distance Vector Routing (AODV) , Dynamic Source Routing (DSR), Temporally Ordered Routing Algorithm (TORA), Signal Stability Routing (SSR) , Location-Aided Routing (LAR) , Power –Aware Routing (PAR), Zone Routing Protocol (ZRP), Source Tree Adaptive Routing (STAR) , Relative Distance Microdiversity Routing (RDMAR) , Multicast Routing in Mobile Ad Hoc Networks, Existing Ad Hoc Multicast Routing Protocols, ABAM : Associativity-Based Ad Hoc Multicast.

UNIT-IV

Transport Layer for Ad Hoc Wireless Network : Introduction , Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocols for Ad Hoc Wireless Networks.

UNIT-V

Sensor Network: Sensor Network Architecture, Network Protocols, Data Storage and Manipulation, Localization and Management, Data Dissemination, Data Gathering, MAC protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards.

Security issues in Ad Hoc Network: Security in Ad Hoc Wireless Network, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, and Secure Routing in Ad HocWireless Networks.

Course Outcomes:

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

- Understand the challenges in design of wireless ad hoc networks.
- Understand and analyze proposed protocols at MAC and routing layers of ad hoc networks.
- Understand and analyze attacks pertaining to network layer.

REFERENCE BOOKS:

1. Ad Hoc Mobile Wireless Networks : Protocols and Systems, C. K. Toh, Springer.
2. Ad Hoc Network, C E Perkins, Pearson Education.
3. Ad Hoc Wireless Networks : Architectures and protocols, C, Siva Ram Murthy and B.S. Manoj, Pearson Education.

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AISECT UNIVERSITY, Bhopal, (M.P.)
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Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
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TMSE-301(C)	Software Testing & Quality Assurance	5(3+2+0)	50	20	30	-	-	100	3 hr	-

Course Objectives:

1. To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2. To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
3. To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
4. To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
5. To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.
6. To understand software test automation problems and solutions.
7. To learn how to write software testing documents, and communicate with engineers in various forms.
8. To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

Syllabus

Theory:

UNIT-I

Introduction to software testing, concepts, issues and techniques, test activities, management and automation, Coverage and usage testing based on checklist, input domain portioning and boundary testing.

UNIT-II

Object oriented testing: testing OOA and OOD models, object oriented testing strategies, test case design for OO software, testing methods applicable at the class level, interclass test case design, Web application testing, debugging, security & reliability.

UNIT-III

Programming style and program quality: simple style rules, comment statements, program quality, quantifying program quality.

UNIT-IV

Software quality and quality Assurance: Principle of Software Quality Assurance (SQA), Applying SQA to software project, proven factors for SQA success, SQA during software requirements, SQA during software design phase, SQA during software code and test, Advance quality engineering topics.

UNIT-V

Human factors in software engineering: Human factors history, HCL requirements and design process, HCL testing.

Course Outcomes:

At the end of this course attendees will be able to:

- Understand quality management processes
- Distinguish between the various activities of quality assurance, quality planning and quality control.
- Understand the importance of standards in the quality management process and their impact on the final product.

REFERENCE BOOKS:

1. Ali Behforooz and Frederick J. Hudson, Software Engineering Fundamentals, Oxford University Press
2. JeffTain, Software Quality Engineering: Testing, Quality Assurance and Quantifiable improvement, Willy Pub.
3. Aditya Mathur, Foundation of Software Testing 1/e, Pearson Education
4. Paul C. Jorgensen, Software Testing, A Craftsman's Approach, Second Edition, CRC Press

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Department: Computer Science & Engg.

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-302(A)	NETWORK SECURITY	5(3+2+0)	50	20	30	-	-	100	3 hr	-

Course Objectives:
Students are expected to demonstrate the ability to:

1. Identify computer and network security threats, classify the threats and develop a security model to prevent, detect and recover from the attacks.
2. Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.
3. Analyze existing authentication and key agreement protocols, identify the weaknesses of these protocols.
4. Download and install an e-mail and file security software, PGP, and efficiently use the code to encrypt and sign messages.
5. Develop SSL or Firewall based solutions against security threats, employ access control techniques to the existing computer platforms such as Unix and Windows NT.
6. Write an extensive analysis report on any existing security product or code, investigate the strong and weak points of the product or code.

Syllabus

Theory:

UNIT -I
Convention Encryption : Conventional Encryption Model , Steganography , Classical Encryption Techniques, Simplified DES , Block Cipher Principles , The Data Encryption Standard, The Strength of DES , Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of operation, Conventional Encryption algorithms.

UNIT -II
Public Key Encryption And Hash Functions : Public Key Cryptography , Principles of Public Key Cryptosystems , The RSA Algorithm , Key Management , Diffie Hellman Key Exchange , Elliptic Curve Cryptography

UNIT-III
Message Authentication and Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes , Hash Functions , Security of Hash Functions

UNIT-IV

Hash And Mac Algorithms ;MD5 Message Digest Algorithm , Secure Hash Algorithm (SHA-I) , RIPEMD , HMAC Digital Signatures and Authentication Protocols Digital Signatures.

UNIT-V

Authentication Protocols -Digital Signature Standard Authentication Applications , IP Security , Web Security Intruders, Viruses and Worms Intruders , Viruses and Related Threats Firewall Design Principles , Trusted Systems

Course outcomes:

- Describe and analyze the hardware, software, components of a network and the interrelations.
- Explain networking protocols and their hierarchical relationship hardware and software. Compare protocol models and select appropriate protocols for a particular design.
- Manage multiple operating systems, systems software, network services and security. Evaluate and compare systems software and emerging technologies.
- Develop solutions for networking and security problems, balancing business concerns, technical issues and security.

REFERENCE BOOKS:

1. William Stallings, " Cryptography and Network Security", Second edition, Prentice Hall,I999.
2. Atul Kahate, " Cryptography and Network Security," TMH
3. William Stallings,"Cryptography and Network Security",Third Edition, Pearson Ed
4. Introduction to network security, Krawetz, Cengage

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			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-302(B)	Simulation and Modeling	5(3+2+0)	50	20	30	-	-	100	3 hr	-

Course objectives:

This subject provides students with

1. The basic system concept and definitions of system;
2. Techniques to model and to simulate various systems;
3. The ability to analyze a system and to make use of the information to improve the performance.

Syllabus

Theory:

UNIT-I

INTRODUCTION TO MODELING AND SIMULATION:
Modeling and simulation methodology, system modeling, concept of simulation, continuous and discrete time simulation.

UNIT-II
BASIC CONCEPT OF PROBABILITY AND RANDOM VARIABLES continuous and discrete random variables, distribution of random variables: discrete and continuous, Compartmental models: linear, nonlinear and stochastic models.

UNIT-III
Introduction to Queuing Theory: Characteristics of queuing system, Poisson's formula, birth-death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc.

UNIT-IV
System Dynamics modeling: Identification of problem situation , preparation of causal loop diagrams and flow diagrams, equation writing, level and rate relationship. Simulation of system dynamics models.

UNIT-V

Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw-SIMULA, DYNAMO, STELLA, POWERSIM.

Course Outcomes:

Upon completion of the subject, students will be able to

a. understand the system concept and apply functional modeling method to model the activities of a static system;

b. understand the behavior of a dynamic system and create an analogous model for a dynamic system;

c. simulate the operation of a dynamic system and make improvement according to the simulation results.

REFERENCE BOOKS :

1. Gorden G., System simulation, Printice Hall.
2. Payer T., Introduction to system simulation, McGraw Hill.
3. Seila, Applied Simulation Modeling, Cengage
4. Spriet, Computer Aided Modeling and Simulation, W.I.A.
5. Sushil, System Dynamics, Wiley Eastern Ltd.22I.

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			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TMSE-302(C)	Grid Computing	5(3+2+0)	50	20	30	-	-	100	3 hr	-

Course Objective: The course will provide an insight for achieving cost efficient high performance system. The course will deal with design and architecture of grid and cluster computing.

Syllabus

Theory:

UNIT-I
The Grid - The Evolution of the Grid - Grids and Grid Technologies, Overview of Grid systems, Grid activities, Grid Business Areas, Applications, Programming models -A Look at a Grid Enabled Server and Parallelization Techniques – Grid applications.

UNIT-II
The concept of virtual organizations – Grid architecture – Grid architecture and relationship to other Distributed Technologies – computational and data Grids, semantic grids.

UNIT-III
Grid Management systems, Grid security, Grid-Enabling software and Grid enabling network services, Data Grid - Virtualization Services for Data Grids, Peer-to-Peer Grids - Peer-to-Peer Grid Databases for Web Service Discovery, Merging the Grid service Architecture with Web service Architecture, Relationship between Web services & Grid services.

UNIT-IV
Open Grid Services Infrastructure (OGSI):Introduction-Grid services- High-level introduction to OGSI- Technical details- Introduction to service data components- Grid service: Naming & change management recommendations, Open Grid Service Architecture (OGSA):OGSA Basic Services: Common Management model (CMM)-service domains-policy architecture- security architecture- Mastering & Accounting- common distributed Logging.

UNIT-V
Grid Middleware, Resource management and scheduling, setting up Grid, deployment of

Grid software and tools, and application execution, Compilers, Languages and Libraries for the Grid, Grid Application Description Languages, Application Partitioning, Grid Portals.

Course Outcome: AT the end of the course student will have knowledge of Grid Computing, Web Services, and Service-oriented architecture, Architecture for grid computing, Cluster Computing, process scheduling and load balancing

REFERENCE BOOKS :

1. Joshy Joseph, Craig Fallenstein, "Grid Computing", Pearson Education, New Delhi, 2004.
2. Fran Bermn, Geoffrey Fox, Anthony Hey J.G., "Grid Computing: Making the Global Infrastructure a Reality", Wiley, USA, 2003.
3. Ian Foster, Carl Kesselman, "The Grid2: Blueprint for a New Computing Infrastructure", Morgan Kaufman, New Delhi, 2004
4. Ahmar Abbas, "Grid Computing: Practical Guide to Technology and Applications", Delmar Thomson Learning, USA, 2004.

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