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Supporting Document for 1.1.3

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Courses having focus on

Employability/ Entrepreneurship/ skill Development

Program: M.Tech.- Computer Science

Regulations : SVEC-16

The Courses (with course outcomes) under SVEC-16 Regulations which focus on *employability/ entrepreneurship/ skill development* are highlighted with the following colours.

Skill

Employability

Entrepreneurship

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. (CS) – I Semester
(16MT10501) ADVANCED COMPUTER NETWORKS
(Common to CS & CNIS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	*60*	*100*	*4*	*--*	*--*	*4*

PRE-REQUISITES: A Course on "Computer Networks"

COURSE DESCRIPTION:
Computer Networks and Protocols, Data Link Layer, LAN and Network Routing; Transport Layer and Internet Protocols; Wireless and Optical Networks; MANETs and Wireless Sensor Networks

COURSE OUTCOMES:
After successful completion of this course, students will be able to:

CO1. Gain knowledge on principles of computers, network topologies, routing mechanisms.

CO2. Analyze the computer network with suitable network protocols and routing algorithms.

CO3. Formulate solutions for engineering problems pertaining to the advanced networking technologies.

CO4. Develop techniques for subnet masks and addresses to fulfill networking requirements.

CO5. Conduct Research to solve the problems related to Routing Algorithms in Networks.

DETAILED SYLLABUS:

UNIT I – REVIEW OF COMPUTER NETWORKS AND FOUNDATION OF NETWORKING PROTOCOLS   **(11 periods)**
Review of Computer Networks and the Internet-The Network edge, The Network core, Access Networks and Physical Media, ISPs and Internet Backbones, Delay and Loss in Packet, Packet-Switched Networks.
Foundations of Networking Protocols-5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM.

UNIT II – DATA LINKS, TRANSMISSION AND ROUTING
                                              (11 periods)
The Link Layer and Local Area Networks-Link Layer Introduction and Services, Error-Detection and Error-Correction Techniques, Multiple Access Protocols, Link Layer Addressing.
Routing and Internet Working-Network Layer Routing, Least-Cost-Path Algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols

UNIT III – TRANSPORT LAYER PROTOCOLS AND NETWORK APPLICATIONS

(11 p*eriods*)

Transport and End-to-End Protocols-Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), TCP Congestion Control.

Application Layer-Principles of Network Applications, the Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS).

UNIT IV – WIRELESS NETWORKS AND OPTICAL NETWORKS

(11 periods)

Wireless Networks and Mobile IP-Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standards, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs).

Optical Networks and WDM Systems-Overview of Optical Networks, Basic Optical Networking Devices, Large-Scale Optical Switches, Optical Routers

UNIT V – MANETS AND WIRELESS SENSOR NETWORKS

(11 p*eriods*)

Mobile Ad-Hoc Networks-Overview of Wireless Ad–Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks-DSDV, DSR, CGSR and AODV.

Wireless Sensor Networks-Sensor Networks and Protocol Structures, Communication Energy Model, Clustering Protocols, Routing Protocols

Total Periods: 55

TEXT BOOKS:

1. Nader F. Mir, "*Computer and Communication Networks*," Pearson Education, 2007.
2. F. Kurose, Keith W. Ross, *"Computer Networking: A Top-Down Approach Featuring the*
   Internet," 3ed,Pearson Education, 2007.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, *"Data Communications and Networking,"* 4 ed ,Tata McGraw Hill,2007
2. Andrew S. Tanenbaum, *"Computer Networks,"* 4 ed, Pearson Education, New Delhi, 1997

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. I Semester
(16MT10502) Advanced Database Management Systems

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: A Course on "Database Management System".

COURSE DESCRIPTION:
Concepts of Database System and Architectures, Data modeling using ER-Model; SQL, Objects Relational Database and XML; Database Design and File Organizations; Query Processing, Concurrency and Recovery; Distributed DBMS Architecture and Design.

COURSE OUTCOMES:
After successful completion of this course the students will be able to:

CO1:   Gain Advanced knowledge in
- Database System Concepts , Languages , Interfaces and Architectures
- Query Languages , Relational Databases and XML
- Database Design and File Organization.
- Query Processing and Recovery
- Distributed Database Architecture and Design

CO2: Analyze database management architecture and categorize languages and database objects.

CO3: Design a wide range of potential solutions for the database problems using ER-diagrams SQL, Normalization and XML.

CO4: Initiate Research to develop new Architectural models and Query processing using SQL in database Systems.

CO5: Apply appropriate modern techniques, resources and tools for the real world problems in databases.

DETAILED SYLLABUS:

UNIT I–Database System Concepts and Architectures, Data modeling using ER-Model   (11 periods)

Database System Concepts and Architectures:
Architecture And Data Independence, Database Languages and Interfaces, Database System Environment, Centralized and Client/server Architectures for DBMS.

Data modeling using ER-Model:
Using High-Level Conceptual data Model for Database Design, A Sample Database Application, Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, Refining the ER Design for the COMPANY Database, ER Diagrams, Naming Conventions, and Design Issues, Relationship Types of Degree Higher than Two, Relational Database Design using ER-to-Relational Model.

UNIT II: SQL, Objects Relational Database and XML (12 Periods)
SQL: Schema Definition, Constraints, Queries, Joins, Assertions, Triggers and Views
Object Relational Databases: Concepts for Object Databases, Standards, Languages and Design.
XML: Hierarchical data model, Documents, DTD, XML Schema, Documents and Databases, Querying.

UNIT III: Database Design and File Organizations   (11 Periods)
Database Design: Functional Dependencies, Types of Normal Forms, properties of relational decompositions, Algorithms for Relational Database Design.
File Organizations: Introduction, Secondary Storage Devices, Buffering of Blocks, Placing File Records on Disk, Operations on Files, Files of Unordered Records, Files of Ordered Records, Hashing Techniques, Other Primary File Organizations, Parallelizing Disk Access Using RAID Technology, New Storage Systems.

UNIT IV: Query Processing, Concurrency and Recovery
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(12 Periods)
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Query Processing: Problem, Objectives, Characterization, Layers and Query Optimization and Query Optimization Algorithms: INGRES, System R, Distributed INGRES, R*, SDD-1 Algorithms
Concurrency Control: Transaction management types and properties, Algorithms, Deadlock Management.
Recovery: Concepts, Techniques Based on Deferred Update and Immediate Update, Shadow paging and ARIES Algorithm.

UNIT V: Distributed DBMS Architecture and Design (09 Periods)
Distributed DBMS Architecture: Architectural Models and Architectures
Distributed Database Design: Alternative Design Strategies, Distribution Design Issues, Fragmentation and Allocation
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Total Periods: 55
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TEXT BOOKS:
1. Ramez Elmasri & Shamkant B. Navathe, "*Database Systems: Models, Languages, Design and Application Programming,*" 6 ed., Pearson Education, New Delhi , 2013.
2. M. Tamer Ozsu, Patrick Valduriez, "*Principles of Distributed Database System,*" 2 ed., Pearson Education, New Delhi ,2006.

REFERENCE BOOKS:
1. Abraham Silberchatz, Henry F. Korth, S. Sudarsan, "Database System Concepts," 5 ed., McGraw-Hill, New York, 2006.
2. Thomas M. Connolly, Carolyn E. Begg, "Database Systems – A Practical Approach to Design, Implementation and Management," 3 ed., Pearson Education, New Delhi, 2003.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – I Semester
(16MT10503) Advanced Operating Systems

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	*60*	*100*	*4*	*--*	*--*	*4*

PRE-REQUISITES:
 A Course on "Operating Systems"
COURSE DESCRIPTION
Process management and process scheduling; Concurrency, synchronization and deadlocks; Memory management, file system and secondary storage; I/O systems, protection and security; Introduction to Distributed Systems, Synchronization in Distributed Systems
COURSE OUTCOMES:
After Successful completion of the course, students will be able to:
CO-1: Gain advanced knowledge in
- Process management concepts.
- Synchronization and Deadlocks
- Inter Process Communication.
- Group Communication.
- Remote Procedure Call.

CO-2: Analyze how operating system manages resources among the users.

CO-3: Formulate solutions for engineering problems pertaining to the advanced Operating Systems

CO-4: Design real time solutions for the problems related to CPU Scheduling, concurrency and Synchronization

CO-5: Apply the concepts of semaphores, monitors, message-passing and other forms of synchronization to maintain Concurrency.

DETAILED SYLLABUS:
UNIT I – INTRODUCTION TO OPERATING SYSTEMS, PROCESS MANAGEMENT AND PROCESS SCHEDULING
                                    (12 periods)
Introduction: Operating system operations, Protection and Security, Distributed Systems, Special Purpose Systems, Open-Source Operating Systems, Operating System Services, System Calls.
Process Management: Process Concepts, Process State, Process Control Block, Operations on Processes, Inter Process Communication, Multithreaded programming.
Process Scheduling: Scheduling Criteria,   Scheduling Algorithms, Multiple-Processor scheduling, thread scheduling
UNIT II – CONCURRENCY AND SYNCHRONIZATION, DEAD LOCKS   **(12 periods)**
Concurrency and Synchronization: Process Synchronization, Critical-Section Problem, Peterson's Solution, Synchronization Hardware,

Semaphores, Classic Problems of synchronization, Readers and Writers Problem, Dining Philosophers Problem, Monitors.

Deadlocks: System Model, Deadlock Characterization, Deadlock Prevention, Deadlock Detection and Avoidance, Recovery from Deadlock- Bankers Algorithm.

UNIT III – MEMORY MANAGEMENT, FILE SYSTEM IMPLEMENTATION AND SECONDARY STORAGE STRUCTURE
(12 p*eriods*)

Memory Management: Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.

File System Interface &Implementation: Concept of a File, Access Methods, Directory Structure, File Sharing, Protection.

Secondary Storage Structure: Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk scheduling algorithms

UNIT IV – I/O SYSTEMS, PROTECTION AND SECURITY
(11 periods)

I/O Systems: I/O systems, Hardware, Application I/O Interface, and Transforming I/O requests Hardware Operation.

Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, and Access control, Revocation of Access Rights.

Security: The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication.

UNIT V–DISTRIBUTED SYSTEMS, SYNCHRONIZATION IN DISTRIBUTED SYSTEMS
(08 p*eriods*)

Introduction to Distributed systems: Goals of distributed system- hardware and software concepts- design issues, the client server model- Remote Procedure Call and Group Communication.

Synchronization in distributed systems: Clock Synchronization- Election Algorithms- Bully Algorithm, Ring Algorithm

Total Periods: 55

TEXT BOOKS:
1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne," *Operating System Concepts*," 7 ed., John Wiley and Sons**,** 2009
2. Andrew. S. Tanenbaum, "*Distributed Operating System*," Prentice Hall, New Delhi 2010

REFERENCE BOOKS:
1. William Stallings, "*Operating Systems – Internals and Design Principles*," 5 ed., Pearson Education, New Delhi, 2008
2. Andrew S Tanenbaum, "*Modern Operating Systems*,", 3 ed., Pearson Education, New Delhi, 2008
3. Charles Crowley "*Operating Systems - A Design Approach,*" 1 ed., TMH, New Delhi, 2009.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) I Semester
(16MT10504) Data Warehousing and Data mining
(Common to CS & CNIS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	*60*	*100*	*4*	*0*	*--*	*4*

PRE-REQUISITES: A Course on "Database Management System".

COURSE DESCRIPTION: Concepts of Data Warehousing and Data mining; Pre-processing techniques in Data Warehouses; Data cube computation and OLAP query processing; Data Mining process and System architecture; relationship with data warehouse and OLAP Systems; Data mining Techniques and Applications.

COURSE OUTCOMES:
After successful completion of this course, the student will be able to:
CO1:   Gain knowledge in -
- Multidimensional data model and Data warehouse Architecture.
- Data mining algorithms.
- Association Rules, Classification and Prediction and Cluster Analysis.

CO2: Analyse data mining algorithms for complex industrial problems.

CO3: Solve engineering problems to get wide variety of solutions by applying data mining algorithms.

CO4: Ability to carry out research in Spatial Mining, Spatio Temporal Mining, Text Mining Multimedia Mining and web Mining

CO5: Create and apply appropriate techniques & tools of data mining to solve real world problems.

DETAILED SYLLABUS:
UNIT I – INTRODUCTION TO DATA WAREHOUSE AND DATA MINING   (10 periods)
Data Warehouse- A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehouse to Data Mining.
Data Mining – Kinds of Data, Data Mining Functionalities, Primitives, Major Issues in Data Mining

UNIT II – DATA PREPROCESSING, MINING FREQUENT PATTERNS AND ASSOCIATIONS (10 periods)
Data Preprocessing- Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction.
Mining Frequent Patterns and Associations- Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules, Constraint based association mining.

UNIT III – CLASSIFICATION AND PREDICTION (8 p*eriods*)
Issues regarding classification and prediction, classification by decision tree induction, Bayesian classification, Rule based classification, classification by Back propagation, Prediction, Accuracy and Error Measures.

UNIT IV – CLUSTER ANALYSIS (11 periods)
Cluster Analysis: Basic Concepts and Algorithms : Introduction to Cluster Analysis, different Types of Clustering, Different Types of Clusters, K-means, The Basic K-means Algorithm, K-means: Additional Issues, Bisecting Kmeans, K-means and Different Types of Clusters, Strengths and Weaknesses, K-means as an Optimization Problem, Agglomerative Hierarchical Clustering, Basic Agglomerative Hierarchical Clustering Algorithm, Specific Techniques, DBSCAN, Traditional Density: Center-Based Approach, The DBSCAN Algorithm, Strengths and Weaknesses.

UNIT V – MINING STREAM, TIME SERIES, SPATIAL DATA, MULTIMEDIA, TEXT AND WORLD WIDE WEB
(9 p*eriods*)
Mining Data Streams, Mining Time Series Data, Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

Total Periods: *48*

TEXT BOOKS:
1. Jiawei Han and MichelineKamber, "*Data Mining: Concepts and Techniques*," 2 ed. , Elsevier, 2009
2. Pang-Ning Tan, Michael Steinbach, Vipin Kumar,"Introduction to Data Mining", Pearson Education, 2009.

REFERENCE BOOKS:
1. Margaret H Dunham, *Data Mining Introductory and Advanced Topics*," 2 ed., Pearson Education, 2006
2. Amitesh Sinha, "*Data Warehousing*," PHI Learning, 2007.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) I-Semester
(16MT12502) DATA STRUCTURES AND ALGORITHMS
(Common to SE and CS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A course on "Computer Programming".
COURSE DESCRIPTION:
Introduction to Data Structures and Algorithms; Searching and Sorting; Trees and Graphs; Divide and Conquer; Greedy method; Dynamic Programming, Back Tracking; Branch and Bound.
COURSE OUTCOMES:
After successful completion of this course, students will be able to:
1. Gain knowledge on:
   - Linear data structures including Stack, Queue and Linked Lists and Non-linear data structures like Trees and Graphs.
   - Divide and Conquer Method, Greedy Method, Dynamic Programming, Backtracking and Branch & Bound algorithms.
2. Analyze the efficiency of algorithms using space and time complexities.
3. Solve real world problems using algorithm design techniques.
4. Apply Dynamic programming techniques to provide software solutions.

DETAILED SYLLABUS:
UNIT-I: INTRODUCTION TO DATA STRUCTURES AND ALGORITHMS

(10 Periods)

Data Structures: Review of Data Structures - Stack, Queue, Circular Queue, Linked Lists, Applications, **Algorithm Analysis:** Efficiency of algorithms, Apriori Analysis, Asymptotic Notations, Polynomial vs Exponential Algorithms, Average, Best and Worst Case Complexities, Analyzing Recursive Algorithms.
UNIT-II: SEARCHING, SORTING AND TREES & GRAPHS

(10 Periods)

Searching and Sorting: Linear Search, Fibonacci Search, Counting Sort, Bucket Sort, Radix Sort, **Trees and Graphs:** Introduction to trees, representation of trees, binary trees, binary tree traversal techniques, Introduction to graphs, representation of graphs, graph traversal techniques.

UNIT-III: BINARY SEARCH TREES, AVL TREES, B- TREES AND HASH TABLES **(10 Periods)**

Binary Search Trees: Definition, Operations, Applications, AVL Trees: Definition, Operations, Applications, **Heaps:** Definition, Heap Implementation, Applications, **Hash Tables:** Definition, Hash Functions, Applications.

UNITI-IV: DIVIDE AND CONQUER & GREEDY METHODS

(10 Periods)

Divide and Conquer: General Method, Binary Search, Finding Maximum and Minimum, Quick Sort, Merge sort, Strassen's Matrix Multiplication.

Greedy Method: General Method, Job sequencing with deadlines, Minimum Cost Spanning Tree and Single Source Shortest Path.

UNIT-V: DYNAMIC PROGRAMMING, BACK TRACKING & BRANCH AND BOUND **(11 Periods)**

Dynamic Programming: General Method, All Pairs Shortest Path, 0/1 Knapsack problem, Traveling Salesperson Problem, **Back Tracking:** General Method, 8 – Queen's Problem, Graph Coloring, **Branch and Bound:** General Method, LC Search, LIFO and FIFO branch and bound solutions of 0/1 Knapsack Problem.

[Total Periods: 50]

TEXT BOOKS:
1. G. A. V. Pai, *"Data Structures and Algorithms: Concepts, Techniques and Applications,"* 1st Edition, Tata McGraw Hill, 2008.
2. Ellis Horowitz, Sartaj Sahni, and Sanguthevar Rajasekaran*, "Fundamentals of Computer Algorithms,"* 2nd Edition, Universities Press (India) Pvt. Ltd, 2008.

REFERENCE BOOKS:
1. Richard Gileberg, Behrouz A. Forouzan*, "Data Structures: A Pseudocode Approach with C,"* Second Edition, 2007.
2. Mark Allen Weiss, *"Data Structures and Algorithm Analysis in C++,"*
   3rd Edition, Pearson Education, 2007.
3. Sartaj Sahni, *"Data structures, Algorithms and Applications in C++,"* 2nd Edition, Universities press (India) Pvt. Ltd., 2005.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – I Semester
(16MT10505) COMPUTER VISION
(Professional Elective-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	*60*	*100*	*4*	*-*	*-*	*4*

PRE-REQUISITES:
A Course on "Computer Graphics"

COURSE DESCRIPTION:
Concepts of Cameras, Measuring Light , Sources, Shadows and Shading; Linear filters, Edge detection; Segmentation by clustering, Segmentation by fitting a model; Finding templates using classifiers , Recognition by relations between Templates; Geometric camera models, Camera calibration.

COURSE OUTCOMES:
After successful completion of this course the students will be able to:
CO -1: Gain knowledge in image processing techniques.
CO -2: Analyze the applicability of various techniques such as Fourier Transforms, Normalized Correlation, Estimating Derivatives in filtering and edge detection to generate quality images.
CO -3: Solve complex image segmentation problems using clustering and fitting models.
CO -4: Conduct Research on geometric methods and tools for camera calibration.
CO -5: Apply building classifiers, voting and search techniques and Image Processing tools for finding templates for real world images.

 DETAILED SYLLABUS:
UNIT-I: CAMERAS, SOURCES, SHADOWS AND SHADING
                                             (10 Periods)
Cameras: Pinhole Cameras, Camera with Lenses, the Human Eye and Sensing. **Radiometry-Measuring Light:** Light in Space, Light at Surfaces and Important Special Cases.
Sources, Shadows and Shading: Qualitative Radiometry, Sources and their effects, Local Shading Models, Application: Photometric Stereo, Inter reflections: Global Shading Models.
UNIT-II: LINEAR FILTERS AND EDGE DETECTION (11 Periods)
Linear Filters: Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing ,Filters as Templates, Techniques- Normalized Correlation and Finding Patterns, Scale and Image Pyramids.
Edge Detection: Noise, Estimating Derivatives, Detecting Edges, Texture: Representing Texture, Analysis using Oriented Pyramids.
Application: Synthesizing Textures for Rendering Shape for Texture for Planes.

UNIT-III: SEGMENTATION BY CLUSTERING AND FITTING A MODEL (11 Periods)

Segmentation by Clustering: Introduction to Segmentation, Human Vision: Grouping and Gestalt, Applications: Shot Boundary Detection and Background Subtraction, Image Segmentation by Clustering Pixels, Segmentation by Graph-Theoretic Clustering.

Segmentation by Fitting a Model: The Hough Transform, Fitting Lines, Fitting Curves, Fitting as Probabilistic Inference Problem, Robustness, Example: Using RANSAC to Fit Fundamental Matrices, Missing Data Problems, the EM Algorithm.

UNIT-IV:FINDING TEMPLATES USING CLASSIFIERS AND RECOGNITION BY RELATIONS BETWEEN TEMPLATES 13 Periods)

Finding Templates using Classifiers: Method for Building Classifiers, Building Classifiers from Class Histograms, Feature Selection, Neural Networks, the Support Vector Machine**.**

Recognition by relations between Templates: Finding Objects by Voting on Relations between Templates, Relational Reasoning Using Probabilistic Models and Search, Using Classifiers to Prune Search, Hidden Markov Models, Application: HMM and Sign Language Understanding, Finding People with HMM.

UNIT-V: GEOMETRIC CAMERA MODELS AND GEOMETRIC CAMERA CALIBRATION   (10 Periods)

Geometric Camera Models: Elements of Analytical Euclidean Geometry, Camera Parameters and the Perspective Projection, Affine Cameras and Affine Projection Equations, **Geometric Camera Calibration:** Least-Squares Parameter Estimation, A Linear Approach to Camera Calibration, Taking Radial Distortion into Account, Analytical Photogrammetry, An Application: Mobile Robot Localization, **Introduction to image processing tools**: Adobe Photoshop, Macromedia Fireworks.

                                        Total Periods: *55*

TEXT BOOK:
1. David A. Forsyth and Jean Ponce:"*Computer Vision – A Modern Approach*,"
   PHI Learning, 2009.

REFERENCE BOOKS:
1. G Sommer, "*Geometric Computing with Clifford Algebra*, "1 ed., Springer ,Newyork,2001
2. Milan Sonka, Vaclav Hlavac, Roger Boyle "*Digital Image Processing and Computer Vision*," 1 ed., Ceneage Learning India Pvt. Ltd, New Delhi , 2008.
3. Jack," *Computer Vision and Applications*," Concise Edition, Academy Press, 2000.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – I Semester
(16MT10506) INFORMATION RETRIEVAL SYSTEMS
(Professional Elective - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITE:
 *A Course on "*Database Management Systems"
COURSE DESCRIPTION:
Concepts of Information retrieval Systems; Indexing and data structures; indexing, Document and term clustering; user search techniques; Text search algorithms, information system Evaluation;
COURSE OUTCOMES:
After successful completion of this course, students will be able to:
CO-1 : Acquire knowledge in fundamental concepts of
  - Information Retrieval System capabilities
  - Data Structures
  - Indexing and Search Algorithms

CO -2:   Analyze concepts of Database, Data Warehouses of real time applications related to Document Store, Document data warehouses like space research , judicial, biomedical, scientific documents.

CO -3 : Solve complex search problems like ranking , weighted ,software text searches by implementing A* Search, Zipf and Information retrieval frame work

CO -4: Initiate research to identify and develop algorithms for indexing , clustering and searching.

CO -5:   Create and apply online Information Retrieval Systems like search engines.

DETAILED SYLLABUS:
UNIT I: INTRODUCTIONTO INFORMATION RETRIEVAL SYSTEM
                                              (11 Periods)
Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.
Information Retrieval System Capabilities: Search, Browse.
UNIT II: INDEXING AND DATA STRUCTURES   (11 Periods)
Objectives of Indexing, Indexing Process, Automatic Indexing.
Data Structures: Introduction to Data Structures, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Hypertext data structure.
UNIT III: AUTOMATIC INDEXING AND CLUSTERING (10 Periods)
Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing. **Document and Term Clustering:** Introduction to Clustering, Thesaurus generation, Manual clustering, Automatic Term Clustering, Hierarchy of clusters.

UNIT IV: USER SEARCH TECHNIQUES   (12 Periods)
Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems.

UNIT V: TEXT SEARCH ALGORITHMS   (11 Periods)
Introduction to Text Search Techniques, Software text search algorithms, Hardware text search systems.

Information System Evaluation: Introduction to Information System Evaluation, Measures used in system evaluation.

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Total No. of periods: 55

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TEXT BOOK:
1. Kowalski, Gerald, Mark T Maybury Kluwer, *"Information Storage and Retrieval Systems: Theory and Implementation"*, Springer, Seventh Indian reprint 2 ed., 2013..

REFERENCE BOOKS:
1. Ricardo Baeza-Yates ,*"Modern Information Retrieval"* , Pearson Education, 2007
2. David A Grossman and Ophir Frieder, *"Information Retrieval: Algorithms and Heuristics"* , Springer International Edition ,2 ed., 2012.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – I Semester
(16MT10507)INTERNET OF THINGS
(Common to CS and CNIS)
(Professional Elective – 1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	*60*	*100*	*4*	*-*	*--*	*4*

PRE-REQUISITES:
Courses on "Computer Networks" and "Java"
COURSE DESCRIPTION:
Domain Specific IoT's; M2M& System Management with Netconf-Yang; Developing Internet of Things Using Python; IoT Physical Devices & Case Studies Illustrating IoT Design
COURSE OUTCOMES:
 After successful completion of this course, students will be able to:
CO1: Gain knowledge on
- o Building blocks of Internet of Things and characteristics.
- o Application areas of IoT
- o Concept of M2M (machine to machine) with necessary protocols

CO2: Analyze Domain specific IoT's, revolution of Internet in Mobile Devices.
CO3: Design and Develop Techniques for solutions to solve the problems in IoT using Python Scripting Language.
CO4: Conduct research on domain specific IoT's and IoT enabling Technologies.
CO5: Acquire knowledge to recognize the opportunities and contribute to collaborative-multidisciplinary Scientific Research.

DETAILED SYLLABUS:
UNIT I– INTRODUCTION & CONCEPTS   (08 periods)
Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, Logical Design of IOT, IOT Enabling Technologies, IoT Levels and Templates
UNIT II – DOMAIN SPECIFIC IOTS   (09 periods)
Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Life Style
UNIT III – M2M & SYSTEM MANAGEMENT WITH NETCONF-YANG
(11 p*eriods*)
IoT and M2M – M2M, Difference between IOT and M2M, difference between SDN and NFV for IoT, Software defined networks, network function virtualization, Need for IOT Systems Management, Simple Network Management Protocol, Limitations of SNMP, Network Operator Requirements.
Basics of IoT System Management with NETCOZF, YANG, YANG-NETCONF

UNIT IV – DEVELOPING INTERNET OF THINGSUSING PYTHON
(15 periods)

Introduction, IOT Design Methodology, Installing Python, Language features of Python, Python Data Types & Data Structures, Control Flow, Functions, Modules, File Handling, Date/ Time Operations, Classes, Exception handling, Python Packages of Interest for IoT.

UNIT V – IOT PHYSICAL DEVICES & ENDPOINTS (12 p*eriods*)

What is an IOT Device, Exemplary Device, Board, Linux on Raspberry Pi, Interfaces, Programming and IOT Devices, Case Studies Illustrating IoT Design: Home Automation, Cities and Agriculture.

Total Periods: *55*

TEXT BOOK:

1. Vijay Madisetti and Arshdeep Bahga," *Internet of Things A Hands On Approach*", Universities Press, 2015.

REFERENCE BOOKS:

1. Adrian McEwen, "*Designing the Internet of Things*", Wiely Piblishers, 2014.
2**.** Daniel Kellmereit, "*The Silent Intelligence: The Internet of Things*". 2013, DND Ventures LLc, 2013

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) – I Semester
(16MT22504) SOFTWARE TESTING TECHNIQUES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A course on "Software Development Methodologies".

COURSE DESCRIPTION: Basic concepts of Software Testing; Testing Techniques – Levels of Testing; Testing Process – Test Planning; Test Metrics and Reports; Software Test Automation.

COURSE OUTCOMES:
On successful completion of this course, the students will be able to:

1. Gain knowledge on the Software Testing types and Process for different programming environments.
2. Analyze and apply the appropriate testing techniques suitable for testing the software.
3. Perform testing by applying appropriate strategies for selecting test cases to meet requirements of the product.
4. Apply efficient modern software testing tools for automation.
5. Write test cases and perform defect reporting.

DETAILED SYLLABUS
UNIT-I: BASIC CONCEPTS OF SOFTWARE TESTING (12 Periods)
Fundamentals of software testing - software verification and validation – V test model: V model for software, testing during proposal stage, testing during requirements stage, testing during test-planning phase, test during design phase, VV model, critical roles and responsibilities.

UNIT-II: TESTING TECHNIQUES   (12 Periods)
Levels of testing, Acceptance testing, Feature based testing, and Application based testing.

UNIT-III: TESTING PROCESS   (11 Periods)
Test planning –test policy, contents, strategy, test plan, Quality plan, test plan template, guidelines, test administration and estimation, standards, building test data, test cases, scenarios, templates for test cases, test scripts, effective test cases, building test data, generation of test data, roles and responsibilities in testing life cycle, test process monitoring.

UNIT-IV: TEST METRICS AND REPORTS   (10 Periods)
Testing related data, defect data, efficiency data, categories of test metrics, estimated, budgeted, approved and actual, resources, effectiveness in testing, defect density, defect leakage ratio, residual defect density, test team efficiency, test case efficiency, rework, MTBF/MTTR, test reports, status reports, integration test reports, system test reports, final test reporting, test status report, Bench marking.

UNIT-V: SOFTWARE TEST AUTOMATION   **(10 Periods)**
Test Automation: Scope of Automation, Design and Architecture of automation, Process Model for Automation, challenges in automation; Load Runner, Selenium, QTP, RFT and RQM.

[Total Periods: 54]

TEXT BOOKS:
1. M. G. Limaye, *"Software Testing: Principles and Techniques and Tools,"* Tata McGraw Hill Education, 1st Edition, 2012.
2. Srinivasan Desikan and Gopalaswamy Ramesh, "*Software Testing: Principles and Practices*", Pearson education, 2012

REFERENCE BOOKS:
1. Dr. K. V. K. K. Prasad*, "Software Testing Tools,"* Dreamtech, 1st Edition, 2004.
2. Aditya P. Mathur, "*Foundations of Software Testing*", Pearson, 2008

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) I Semester
(16MT10531) DATABASE MANAGEMENT SYSTEMS & DATA WAREHOUSING AND DATA MINING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	*50*	*100*	-	-	*4*	*2*

PRE-REQUISITES:
Courses on "Database Management Systems" and "Data Warehousing and Data Mining"

Course Description:
Hands on practice and implementation of data mining algorithms - Apriori, Fp-tree; Bayesian classification; Back propagation; k-means clustering; Bisecting k-means clustering in C++.

Designing and implement basic SQL Queries, PL/SQL and advanced concepts in PL/SQL such as Object creation structures; Triggers; Embedded SQL using Oracle Database Management System Package.

COURSE OUTCOMES:
After successful completion of this course, the student will be able to:
CO-1: Acquire Practical Knowledge on

- SQL Queries
- Triggers
- Data Mining Algorithms
- Classification , Prediction and Cluster Analysis

CO-2: Analyze Integrity Constraints on databases for validation and Data Mining algorithms for solving real time applications

CO-3:Develop and Design solutions to complex problems related to frequent item sets, classification and clustering.

CO-4: Apply advanced knowledge to identify research challenges, and issues related to databases and data mining.

CO-5: Use modern software tools and technologies for designing simple to complex applications in databases and Data warehousing and data mining.

CO-6: Attitude for independent and continuous learning for improved knowledge with newer versions of DBMS packages and data mining.

'ADBMS' LABORATORY EXERCISES:
  1. Consider the following tables:
      Employee(employee_name, street,city)
      Works(employee_name, company_name,salary)
      Company(company_name,city)
      Manages(employee_name,manager-name)

Write the SQL Queries for the following:

   a. Find the names and cities of residence of all employees who work for First Bank Corporation.
   b. Find the names, street address ad cities of residence of all employees .
   c. Find all employees in the database who do not work for First Bank Corporation
   d. Find all employees in the database who earn more than each employee of small bank corporation.
   e. Assume that the companies may be located in several cities. Find all companies located in every city in which small bank corporation is located.
   f. Find the company that has the most employees find those companies whose employees earn a higher salary, on average, than the average salary at First Bank Corporation.

2. Write a PL/SQL block to do the following:
   a. Read a Number and reverse the given number.
   b. Factorial of a given number using while, for and until loops
   c. Check whether the given number is prime or not.
   d. To calculate the sum of individual numbers.

3.   a. Write a PL/SQL block that inserts a row and updates salary of an employee in employee table by using update_sal function which takes employee number as argument, calculates increment and returns increment based on the following criteria.

If salary <= 3000 increment = 30% of salary
      If salary > 3000 and <= 6000 increment = 20% of salary
            Else increment = 10% of salary.

   b. Write a stored procedure, raise salary which accepts an employee number. It uses update_salfunction of previous program to get the salary increase amount and uses employee number to select the current salary from employee table. If employee number is not found or if the current salary is null, it should raise an exception. Otherwise, updates the salary.

4. Design and develop a suitable Student Database application by considering appropriate attributes. Couple of attributes to be maintained is the Attendance of a student in each subject for which he/she has enrolled and Internal Assessment Using TRIGGERS for the following:

   a) Whenever the attendance is updated, check if the attendance is less than 85%; if so, notify the Head of the Department concerned.
   b) Whenever, the marks in an Internal Assessment Test are entered, check if the marks are less than 40%; if so, and notify the Head of the Department concerned.

5. Implement Database Objects and creation of object structures for complex relations.
6. Implement C program segment with embedded SQL.

'DATA WAREHOUSING AND DATA MINING' EXERCISES:

1. Implementation of multi dimensional data model using oracle warehouse builder/SQL Server.

'Weka' laboratory Exercises:

2. Demonstration of preprocessing on dataset student.arff
3. Demonstration of preprocessing on dataset labor.arff
4. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm
5. Demonstration of Association rule process on dataset test.arff using apriori algorithm
6. Demonstration of classification rule process on dataset student.arff using j48 algorithm
7. Demonstration of classification rule process on dataset employee.arff using j48 algorithm

Implementation of data mining algorithms in C++:

8. Write a C++ program to implement Apriori algorithm and find the frequent item sets.
9. Write a C++ program to implement FP tree algorithm.
10. Write a C++ program to Implement Naïve Bayesian classification algorithm to classify the data.
11. Write a C++ program to Implement of Back propagation algorithm to classify the data.
12. Write a C++ program to Implement K-means clustering algorithm to cluster the data.

REFERENCE BOOKS:

1. Margaret H Dunham, *Data Mining Introductory and Advanced Topics*," 2 ed., Pearson Education, 2006.
2. Amitesh Sinha, "*Data Warehousing*," PHI Learning, 2007.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. (CS) – I Semester
(16MT10532) DATA STRUCTURES AND COMPUTER NETWORKS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	*50*	*100*	*--*	*--*	*4*	*2*

PRE-REQUISITES:
Courses on "Advanced Computer Networks" and "Data Structures"

COURSE DESCRIPTION:
Hands on practical experience on implementing data link layer farming methods and routing algorithms;
Practical implementation of linked lists, stacks, queues, binary tree, binary search tree, AVL tree, B -tree, graphs, N-Queen's problem using C++.

COURSE OUTCOMES:
After successful completion of this course the students will be able to:
 CO-1. Gain basic programming skills to implement
    a. Framing mechanisms for data link layer,
    b. Shortest path using Dijkstra's routing mechanism
    c. Distance vector routing mechanism
d. Linear and non-linear data structures, backtracking problems.
CO-2. Analyze data structures for various problem solving techniques and typical performance measures of network models.
CO-3 Design, conceptualize and solve real world problems by providing the best solutions for data structures and networking models.
CO-4:. Use modern software tools and technologies for designing simple to complex applications in real world.
CO-5: Apply advanced knowledge to identify research challenges, and contribute individually or in teams to the development of network projects for real world problems.
CO-6: Develop effective professional and business communication in data structures and networks.
CO-7: Attitude for independent and continuous learning for improved knowledge with newer versions of object oriented software and new simulation models of protocols.

DETAILED SYLLABUS:
**LIST OF EXERCISES IN COMPUTER NETWORKS**
1. Implement the following data link layer farming methods
    a. Character Count
    b. Character Stuffing
    c. Bit Stuffing
2. Design a program to compute checksum for the given frame 1101011011 using CRC-

12, CRC-16, CRC-CCIP. Display the actual bit string transmitted. Suppose any bit from is inverted during transmission. Show that this error is detected at the   receivers end.

3. Implement Dijkstra's algorithm to compute the Shortest path through a graph.
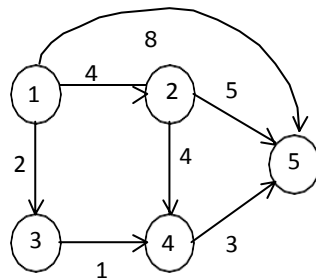
4. Design a program to obtain routing table for each node using distance vector routing algorithm by considering the given subnet with weights indicating delay between   nodes.
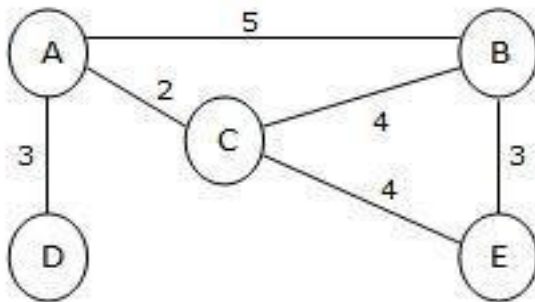
5. Write a program to simulates flow based routing
6. Simulate the Random Early Detection congestion control algorithm

LIST OF EXERCISES IN DATA STRUCTURES

1.   Implementation of Stacks and Queue operations using linked list.
2.   Perform the following operations on binary search tree:
     a) Insertion   b) Deletion c) Searching
3. Perform the following operations on AVL-tree:
     a) Insertion b) Deletion
4. Implementing the following operations on B-Tree:
     a) Insertion b) Searching c) Deletion
5. Implement the following using recursive and non-recursive traversals for binary tree:
     a) Pre-order b) In-order c) Post-order
6. Implement the following functions of a dictionary using hashing:
     a) Insertion b) Searching c) Deletion

7. Implement single source shortest path in a graph by using Bellman and Ford algorithm.

8. Implement N-queen's problem using Backtracking. The N Queen is the problem of

placing N chess queens on an N×N chessboard so that no two queens attack each other.The expected output is a binary matrix which has 1s for the blocks where queens are placed. For example following is the output matrix for above 4 queen problem's solution.

    {0, 1, 0, 0}
    {0, 0, 0, 1}
    {1, 0, 0, 0}
    {0, 0, 1, 0}

REFERENCE BOOKS:

1. G. A. V. Pai, "Data Structures and Algorithms: Concepts, Techniques and Applications," Mc Graw Hill, First Edition, 2008
2. Nader F. Mir, "Computer and Communication Networks," Pearson Education, 2007.
3. Behrouz A. Forouzan, "Data Communications and Networking," Tata McGraw Hill,
   Fourth Edition, 2007.
4. D. Samanta, "Classic Data Structures," PHI learning, 2005.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech.   I Semester
(16MT13808) RESEARCH METHODOLOGY
(Common to all M. Tech. Programs)
(Audit Course)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	2	-	-

PREREQUISITES: --

COURSE DESCRIPTION:
Overview of Research, research problem and design, various research designs, data collection methods, statistical methods for research, importance of research reports and its types.

COURSE OUTCOMES: After completion of the course, students should be able to:

1. Acquire in-depth knowledge on
   a. Research design and conducting research
   b. Various data collection methods
   c. Statistical methods in research
   d. Report writing techniques.
2. Analyze various research design issues for conducting research in core or allied areas
3. Formulate solutions for engineering problems by conducting research effectively in the core or allied areas
4. Carryout literature survey and apply research methodologies for the development of scientific/technological knowledge in one or more domains of engineering.
5. Select and Apply appropriate techniques and tools to complex engineering activities in their respective fields
6. Write effective research reports.
7. Develop attitude for lifelong learning to do research.
8. Develop professional code of conduct and ethics of research.

DETAILED SYLLABUS:

Unit-I: Introduction to Research Methodology   (5 Periods)
Objectives and Motivation of Research, Types of Research, Research Approaches, Research Process, Criteria of good Research, Defining and Formulating the Research Problem, Problem Selection, Necessity of Defining the Problem, Techniques involved in Defining a Problem.

Unit-II: Research Problem Design and Data Collection Methods
(7 Periods)
Features of Good Design, Research Design Concepts, Different Research Designs, Different Methods of Data Collection, Data preparation: Processing Operations, Types of Analysis.

Unit-III: Statistics in Research   **(6 Periods)**
Review of Statistical Techniques - Mean, Median, Mode, Geometric and Harmonic Mean, Standard Deviation, Measure of Asymmetry, ANOVA, Regression analysis.

Unit-IV: Hypothesis Testing   **(7 Periods)**
Normal Distribution, Properties of Normal Distribution, Basic Concepts of Testing of Hypothesis, Hypothesis Testing Procedure, Hypothesis Testing: t-Distribution, Chi-Square Test as a Test of Goodness of Fit.

Unit-V: Interpretation and Report Writing   **(3 Periods)**
Interpretation – Techniques and Precautions, Report Writing – Significance, Stages, Layout, Types of reports, Precautions in Writing Reports.

                                        [Total Periods: 28]

Text Book:
1) C.R. Kothari, "*Research Methodology: Methods and Techniques*," New Age International Publishers, New Delhi, 2nd Revised Edition, 2004.

Reference Books:
1) Ranjit Kumar, "*Research Methodology: A step-by-step guide for beginners*," Sage South Asia, 3rd ed., 2011.
2) R. Panneerselvam, "Research Methodology," PHI learning Pvt. Ltd., 2009

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) II-Semester
(16MT20501) ADVANCED COMPUTER ARCHITECTURE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITES: *A course on "Computer Organization".*

COURSE DESCRIPTION

Quantitative design and analysis, memory hierarchy design; parallel computer models and network properties; pipelining, superscalar techniques, multiprocessors and multi computers; Multi-Vector, SIMD and Multi-Core computers

COURSE OUTCOMES:

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

CO1.   Acquire knowledge of:
- Models and Computer Architectures.
- Concepts of parallel computer models.
- Scalable Architectures.
- Pipelining, Superscalar processors, multiprocessors, SIMD and Multi core Computers.

CO2.   Analyze architectures of parallel computers, sub systems and their interconnection   structures.

CO3.   Apply concepts and techniques of advanced computer architectures to solve engineering problems

CO4.   Conduct research in the area of parallel computer architecture development and warehouse scale computing.

DETAILED SYLLABUS:

UNIT-I: FUNDAMENTALS OF QUANTITATIVE DESIGN AND ANALYSIS, MEMORY HIERARCHY DESIGN   (10 Periods)

Fundamentals of Quantitative Design and Analysis: Introduction, Classes of computers, Defining Computer Architecture, Trends in technology, Trends in power and energy in ICs, Trends in cost, Dependability, Quantitative Principles of Computer Design.

Memory Hierarchy Design: Introduction, Advanced optimizations of cache performance, Memory technology and optimizations

UNIT-II: PARALLEL COMPUTER MODELS AND NETWORKS PROPERTIES   (10 Periods)

Parallel Computer Models: The state of computing, Multiprocessors and multi-computers, Multi vector and SIMD computers.

P**rogram and Networks Properties:** Conditions of Parallelism, Program partitioning and scheduling, Program flow mechanisms, System interconnect architectures.

Examples: Detection of Parallelism in a program using Bernstein's conditions.

UNIT-III: PRINCIPLES OF SCALABLE PERFORMANCE AND MEMORY   **(12 Periods)**
Principles of Scalable Performance: Performance metrics and measures, Parallel Processing applications, Speedup performance laws.
Bus, Cache and Shared memory: Bus systems, Cache memory organizations, Shared memory organizations.
UNIT-IV: PIPELINING, MULTIPROCESSORS AND MULTI COMPUTERS   **(12 Periods)**
Pipelining: Linear pipeline processors, nonlinear pipeline processors, Instruction pipeline design, Arithmetic pipeline design.
Multiprocessors and Multi-computers: Multiprocessor system interconnects; Cache Coherence and synchronization mechanisms.
UNIT-V: MULTIVECTOR AND SIMD COMPUTERS, MULTICORE COMPUTERS   **(10 Periods)**
Multi-Vector and SIMD computers: Vector processing principles, Multi-vector multiprocessors, SIMD computer organizations, The Evolution of Dataflow computers Computer Architecture of Warehouse–Scale Computers
Multi-Core computers: Multi-core organization.
Example Architectures: Intel x86 Multi core Organization

[Total Periods: 54]

TEXT BOOKS:
1. Kai Hwang and Naresh Jotwani, "*Advanced Computer Architecture,*" 2 ed., McGraw Hill, New Delhi ,2011.
2. John L. Hennessy and David A. Patterson, *"Computer Architecture- A Quantitative Approach,"* 5 ed., Elsevier, U.S.A, 2012

REFERENCE BOOKS:
1. William Stallings, *"Computer Organization and Architecture- Designing for performance,"*
    9 ed., Pearson Education, New Delhi, 2014.
2. Kai Hwang "*Advanced Computer Architecture,*" 1 ed., Tata McGraw Hill, New Delhi, 2001.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – II Semester
(16MT20502) BIG DATA ANALYTICS
(Common to CS & CNIS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	*60*	*100*	*4*	*--*	*--*	*4*

PRE-REQUISITES:
Courses on "Data Base Management Systems" & "Data Warehousing and Data Mining".

COURSE DESCRIPTION:
Concepts of Big Data, Types of Data Elements; Introduction to Hadoop, Hadoop Ecosystem;
Map Reduce; Building Blocks of Hadoop; Big data analytics applications; Predictive and
Descriptive Analytics.

COURSE OUTCOMES:
After successful completion of this course, the student will be able to:
CO-1:   Gain knowledge in:
   • Big data Characteristics
   • Hadoop Framework
   • Map Reduce.
   • Hadoop Release

CO-2:   Analyze and develop solutions for database systems for storing and analyzing the large data.
CO-3:   Apply Big Data Analytics for estimating the data sets to solve the real world problems.
CO-4:   Design and model for an effective database by using big data tools.
CO-5:   Carry out research on Predictive Analysis and Sentiment Analysis
CO-6:   Learning advance analytics techniques for effective Database monitoring.

DETAILED SYLLABUS:
UNIT I: INTRODUCTION TO BIG DATA: **(10 periods)**
Big Data Characteristics: Volume-Variety-Velocity-Veracity, Analytics, Basic Nomenclature, Analytics Process Model, Analytical Model Requirements, Types of Data Sources, Sampling, Types of Data Elements, Missing Values, Standardizing Data, Outlier Detection and Treatment, Categorization.

UNIT II: INTRODUCTION TO HADOOP: **(10 periods)**
Data, data types, Storage and Analysis, Relational Database Management Systems, Grid Computing, Volunteer Computing, A Brief History of Hadoop, Apache Hadoop and the Hadoop Ecosystem.

UNIT III – MAPREDUCE: **(11 periods)**
A weather Dataset: Data format, Analyzing the data with unix tools, Analyzing the data with Hadoop: MapReduce, Java MapReduce, Scaling Out: Data Flow, Combiner Functions, Running a Distributed MapReduce Job, Hadoop Streaming: Ruby, Python, Hadoop Pipes, Compiling and Running.

UNIT IV – HADOOP RELEASES   **(11 Periods)**
The Building Blocks of Hadoop: Name Node-Data Node-Secondary Name Node-Job Tracker-Task Tracker. BIG DATA ANALYTICS APPLICATIONS: Back Testing Analytical Model, Credit Risk Modeling, Fraud Detection, Net Lift Response, Web Analytics, Social Media Analytics, and Business Process Analytics.

UNIT V–PREDICTIVE ANALYTICS AND DESCRIPTIVE ANALYTICS
                                       (11 Periods)
Predictive Analytics: Target Definition, Linear Regression, Logistic Regression, Decision Trees, Support Vector Machines, Ensemble Methods, Multiclass Classification Techniques, Evaluating Predictive Models.
Descriptive Analytics: Association Rules, Sequence Rules.

                                           Total No. of Periods: 53

TEXT BOOKS:
1. Bart Baesens, "*Analytics in a Big Data World: The Essential Guide to Data Science and its Applications,*" Wiley Publications, 2014.
2. Tom White, "*Hadoop: The Definitive Guide,*" 3 ed., O'REILLY Publications, 2012.

REFERENCE BOOKS:
1. Paul Zikopoulos, IBM, Chris Eaton, Paul Zikopoulos *"Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data,"* The McGraw-Hill Companies, 2012.
2. Chuck Lam "*Hadoop in Action,*" Manning Publications, 2011.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) II-Semester
(16MT20503) OBJECT ORIENTED ANALYSIS AND DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	*60*	*100*	*4*	*--*	*--*	*4*

PRE-REQUISITES:
A Course on "Object Oriented Programming"
COURSE DESCRIPTION:
Concepts of Unified Modeling language; Sequence and collaboration diagrams; Behavioral Modeling; Unified Process and phases of unified process
COURSE OUTCOMES:
After successful completion of the course, the students will be able to:
CO-1: Gain advanced knowledge in
  * Object Oriented Methodologies
  * UML Diagrams
  * Unified Process
CO-2: Analyze Various UML Models which are required for solving Real World problems.
CO-3: Formulate solutions for engineering problems pertaining to the Object Oriented Analysis and Design
CO-4: Design UML Diagrams Using Visual Modelling Tools
CO-5: Apply unified process models for building of Applications, which is required for effective project management.
DETAILED SYLLABUS:
UNIT – I: INTRODUCTION TO UML   (11 Periods)
Introduction To UML: Importance Of Modeling- Principles Of Modeling Object Oriented Modeling- Conceptual Model Of The UML- Architecture.
Basic Structural Modeling: Classes- Relationships- Common Mechanisms - and Diagrams.
Class Diagram: Terms - Concepts- Modeling Techniques for Class Diagram.
UNIT – II: INTERACTION DIAGRAMS AND COLLABORATION DIAGRAMS   (11 Periods)
Interaction Diagrams: Sequence Diagrams: Terms - Concepts and Common Modeling Techniques
Collaboration Diagrams: Terms- Concepts and Common Modeling Techniques.
Basic Behavioral Modeling: Use Cases- Use Case Diagrams- Activity Diagrams.

UNIT -III: ADVANCED BEHAVIORAL MODELING   (11 Periods)
Advanced Behavioral Modeling: Events And Signals- State Machines - State Chart Diagrams.
Architectural Modeling: Component – Deployment - Component Diagrams and Deployment Diagrams.
Case Studies: Online Bookshop, Point of sales System.
UNIT – IV: THE UNIFIED PROCESS   (11 Periods)
The Unified Process: Use Case Driven- Architecture Centric- Iterative and Incremental.
The Four Ps: People- Project- Product- And Process.
Use Case Driven Process: Why Use Case - Capturing Use Cases- Analysis- Design - And Implementation To Realize The Use Cases - Testing The Use Cases.
Architecture-Centric Process: Architecture In Brief- Why We Need Architecture - Use Cases and Architecture- An Architecture Description.
Iterative Incremental Process: Iterative Incremental In Brief- Why Iterative Incremental Development? The Iterative Approach Is Risk Driven- The Generic Iteration.
UNIT – V: PHASES OF UNIFIED PROCESS   (11 Periods)
Inception Phase: Early In The Inception Phase- The Archetypal Inception Iteration Workflow- Execute The Core Workflows- Requirements To Test.
Elaboration Phase: Elaboration Phase In Brief- Early In The Elaboration Phase- The Architectural Elaboration Iteration Workflow- Execute The Core Workflows-Requirements to Test.
Construction Phase: Early In The Construction Phase- The Archetypal Construction Iteration Workflow- Execute The Core Workflow.
Transition Phase: Early In the Transition Phase- Activities in Transition Phase.

Total Periods: 55

TEXT BOOKS:
1. Grady Booch, James Rumbaugh, Ivar Jacobson, *"The Unified Modeling Language User Guide, "Pearson* Education, 2 ed., 2006
2. Ivar Jacobson, Grady Booch, James Rumbaugh, *"The Unified Software Development Process",* Pearson Education, 1 ed., 2009
REFERENCE BOOKS:
   1. Mark Priestley, *"Practical Object-Oriented Design with UML,"* Second Edition, Tata
      McGraw Hill, 2011.
   2. Mike O' Docherty, *"Object-Oriented Analysis and Design with UML Version 2.0,"* Wiley India Pvt. Ltd, 2012.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) II Semester
(16MT12501) CLOUD COMPUTING
(Common to SE, CS & CNIS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: *Courses on* "Operating Systems" and "Computer Networks"

COURSE DESCRIPTION:
Virtualization, Case studies – XEN, VMware, Microsoft Hyper-V; Cloud architecture; Services and Applications; Cloud Programming; Industry practices and Case studies –Amazon Web Services, Google App Engine, and Microsoft Azure.

COURSE OUTCOMES:
After successful completion of this course, students will be able to:

CO1: Demonstrate knowledge on Virtualization models, Cloud Architecture, Services and Programming concepts.

CO2: Analyze the problems in existing cloud architectures.

CO3: Apply concurrent programming, throughput computing and Data intensive computing in Cloud programming.

CO4: Conduct research on emerging technologies in cloud and energy management in cloud

CO5: Apply virtualization techniques to optimize resource sharing.

DETAILED SYLLABUS:

Unit I: Introduction to Virtualization   (9 Periods)
Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples – XEN, VMware, Microsoft Hyper-V.

UNIT II: Cloud Architecture   (11 Periods)
Introduction to Cloud: Defining Cloud Computing, Cloud Types - The NIST model, The Cloud Cube Model, Deployment models, Service models, Examining the Characteristics of Cloud Computing, Paradigm shift, Benefits of cloud computing, Disadvantages of cloud computing, Assessing the Role of Open Standards.
Cloud Architecture: Exploring the Cloud Computing Stack, Composability, Infrastructure, Platforms, Virtual Appliances, Communication Protocols, and Applications.

UNIT III: Defining Cloud Services   (10 Periods)
Defining Infrastructure as a Service (IaaS) – IaaS workloads, Pods, aggregation, and silos, **Defining Platform as a Service (PaaS), Defining Software as a Service (SaaS)** – SaaS characteristics, Open SaaS and SOA, Salesforce.com and CRM SaaS, **Defining Identity as a Service (IDaaS)** – Introduction to identity, Networked identity service classes, Identity system codes of conduct, IDaaS interoperability, **Defining Compliance as a Service (CaaS)**.

UNIT IV: Cloud Programming Concepts   (12 Periods)
Concurrent Programming – Introduction to Parallelism for Single Machine Computation, Programming Applications with Threads, **High Throughput Computing** – Task Programming, Task based Application Models, **Data Intensive Computing** – Introduction to Data Intensive Computing and Technologies for Data Intensive Computing.

UNIT V: Industrial Platforms and Trending Developments
                                                      (13 Periods)
Case Studies on Cloud Platforms – Amazon Web Services, Google App Engine, and Microsoft Azure, Case Studies on Cloud Applications – Scientific Applications, Business and Consumer Applications.

Enhancements in Cloud – Energy Efficiency in Clouds, Market based Management of Clouds, Federated Clouds / InterCloud, Third Party Cloud Services.

                                                      Total Periods: 55

TEXT BOOKS:
   1. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, "*Mastering Cloud Computing: Foundations and Applications Programming,*" 1st Edition, McGraw Hill,New Delhi, 2013.
   2. Barrie Sosinsky, "*Cloud Computing Bible,*" 1st Edition, Wiley India Pvt Ltd, New Delhi,2011.

REFERENCE BOOKS:
   1. Anthony T. Velte, Toby J. Velte Robert Elsenpeter, "*Cloud Computing: A Practical Approach,*" 1st Edition, Tata McGraw Hill, 2010.
   2. George Reese, "*Cloud Application Architectures,*" 1st Edition, O'Reilly Publishers, 2010.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS)   II Semester
(16MT22505) WEB TECHNOLOGIES
(Common to SE and CS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION: Web Technologies: HTML5, CSS, JavaScript, JQuery; Open source server-side scripting language- PHP; MySQL database concepts; and AJAX.

COURSE OUTCOMES:

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

CO1:   Gain knowledge on web technologies.

CO2:   Analyze the functionality of client as well as server side web technologies for validating web pages.

CO3:   Gain programming skills to design and develop novel web applications

CO4:   Apply web technologies to make web pages more interactive, scalable and user friendly web applications.

DETAILED SYLLABUS

UNIT–I: HTML5 AND CSS3   (14 Periods)

HTML5: Overview of HTML and XHTML, HTML5 - Introduction, HTML5 Document Structure, Creating Editable Content, Checking Spelling Mistakes, Exploring Custom Data Attributes, Microdata, Client-Side Storage, Drag and Drop Feature, ARIA Accessibility, Offline Web Applications, Web Communications, Cross-Document Messaging and Desktop Notifications, 2D and 3D Graphics; **CSS3**: Introduction, Features of CSS3, Syntax of CSS, Exploring CSS selectors, Inserting CSS in HTML Document, State of CSS3.

UNIT–II: JAVASCRIPT AND JQUERY   (10Periods)

JavaScript: Overview of JavaScript**,** JavaScript Functions, Events, Image Maps and Animations, JavaScript Objects; **JQuery**: Fundamentals of JQuery, JQuery Selectors, JQuery Methods to Access HTML Attributes and Traversing, JQuery Manipulators, Events and Effects.

UNIT–III: INTRODUCTION TO PHP   **(10 Periods)**
Introduction, Data Types, Variables, Constants, Expressions, String Interpolation, Control Structures, Functions, Arrays, Embedding PHP Code in Web Pages, Object Oriented PHP.

UNIT–IV: PHP AND MYSQL   **(10Periods)**
PHP and Web Forms, Sending Form Data to a Server, Authenticating Users with PHP, Session Handlers, PHP with MySQL, Interacting with the Database, Database Transactions.

UNIT–V: AJAX   **(08Periods)**
Exploring Different Web Technologies, Exploring AJAX, Creating a Sample AJAX Application, Displaying Date and Time using AJAX, Creating the XML HttpRequest Object, Reading a File Synchronously and Asynchronously, Reading Response Headers, Loading List Boxes Dynamically using XML HttpRequest Object, JQuery with AJAX, Validating a Field using AJAX and PHP.

                                    [Total Periods: 52]

TEXT BOOKS:
1. Kogent Learning Solutions Inc, *"HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery,"* 1st Edition, Dreamtech Press, 2011.
2. W. Jason Gilmore, *"Beginning PHP and MySQL,"* 4th Edition, APress, 2011.

REFERENCE BOOKS:
1. Andrea Tarr, *"PHP and MySQL,"* 1st Edition, Willy India, 2012.
2. Thomas A. Powell, *"The Complete Reference: HTML and CSS,"* 5th Edition, Tata McGraw Hill, 2010.
3. Steve Suehring, Tim Converse and Joyce Park, "*PHP6 and MySQL,"* 1st Edition, Willy India, 2009.
4. P. J. Deitel and H. M. Deitel, "*Internet & World Wide Web How to Program*," 4th Edition, Pearson, 2009.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) II-Semester
(16MT20504) EMBEDDED SYSTEMS
(PROFESSIONAL ELECTIVE–II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	*60*	*100*	*4*	*--*	*--*	*4*

PRE-REQUISITES:
Courses on Computer Organization & Operating Systems
COURSE DESCRIPTION:
Concepts of Embedded System components, Micro controller program-ming; Programming in Embedded Systems, design using hardware and software components; Real-Time Operating systems, Embedded Product Development Life Cycle .
COURSE OUTCOMES:
After successful completion of this course the students will be able to:
CO-1: Gain advanced knowledge in
- Embedded system components.
- Micro controller programming.

CO-2: Analyze critical problems related to programming for hardware and software components by conducting detailed research.
CO-3: Apply and solve issues in computer based systems using a range of solutions provided by Embedded Systems..
CO-5: Use appropriate techniques, tools, resources and usage of modern Embedded Product Development Life Cycle (EDLC) tools for the design and development of Embedded Systems.

DETAILED SYLLABUS
UNIT I - INTRODUCTION TO EMBEDDED SYSTEMS (11 Periods)
Embedded Systems, History, classification, application areas, purpose. Core of Embedded systems, memory, sensors and actuators, communication Interface, firmware, other system components, PCD and Passive components. Embedded systems Applications and domain specific.
UNIT II -MICRO CONTROLLER   (11 Periods)
8051 Architecture, Real World Interfacing, Introduction to Advanced Architectures, Processor and Memory Organization, Instruction -level parallelism, memory-types, memory-maps and addresses, processor selection, memory selection.

UNIT III-EMBEDDED SYSTEM DESIGN AND DEVELOPMENT
(11 Periods)
Hardware Design: Analog and Digital components, VLSI circuit Design, EDA tools, PCB Layout design and Fabrication.
Firmware Design and Development: Firmware design approaches, development languages, Programming
UNIT IV-PROCESSES AND REAL - TIME OPERATING SYSTEM
(11 Periods)
OS-basics-types-tasks, process and threads-Multi-processing and Multi-tasking-Task Scheduling-Task communication-Task Synchronization-Device Drivers-Case study: VxWorks and MicroC/OS-II.
UNIT V-EMBEDDED SYSTEM DEVELOPMENT (11 Periods)
Integrated Development Environment, Cross-compilation, De-compiler, simulators, Emulators, Debuggers. **Embedded Product Development Life cycle**: EDLC-the EDLC Objectives -Phases-Modeling.
TOTAL PERIODS: 55
TEXT BOOKS:
  1. SHIBU KV, "Introduction to Embedded Systems", Fifth Edition, McGraw Hill ,2012.
  2. Manish K Patel, "Microcontroller based Embedded Systems", McGraw Hill ,2014.
REFERENCE BOOKS:
1. Wayne Wolf, "Computers as Components -Principles of Embedded Computing System Design", Morgan Kaufman Publishers, First Indian Reprint, 2001.
2. Steve Heath, "Embedded Systems Design", Second Edition, Newnes Publications, 2003.
3. David E. Simon, "An Embedded Software Primer", Pearson Education, First Indian Reprint, 2000.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) II-Semester
(16MT20505)INFORMATION SECURITY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	*60*	*100*	*4*	*--*	*--*	*4*

PRE-REQUISITES:
*A Course on "*Computer Networks*"*
COURSE DESCRIPTION
Concepts of cryptographic algorithms, public key and private key encryption; security models, Hash Algorithms; Intrusion Detection, IP Security; analysis of security principles in internet and system security
COURSE OUTCOMES:
After successful completion of this course, students will be able to:
*CO1.*Gain advanced knowledge in
- Symmetric and Asymmetric Encryption Algorithms
- Key distribution and message Authentication
- Hash algorithms and digital signature techniques
- IP security and Wireless network security
- Intrusion Detection and Firewall configurations

CO2. Analyze the symmetric algorithms, Public-Key Encryption and Hash Algorithms.
CO3. Develop solutions to solve the problems related to Public-Key Encryption, Digital signatures, Secure Hash Functions
*CO4.*Conduct research to identify efficient ciphers and cryptographic algorithms to provide novel solutions for Real- Time applications
*CO5.*Apply the appropriate Cryptographic Techniques and security Algorithms in the area of Information Security

DETAILED SYLLABUS
UNIT-I: INTRODUCTION (**10Periods**)
Security Attacks, Security Services, Security Mechanisms, Model for Network Security, Mono alphabetic cipher and Poly alphabetic cipher
Symmetric Block Encryption- Symmetric Block Encryption Algorithms-DES, Triple-DES, AES, Cipher Block Modes of Operation
UNIT-II: PUBLIC-KEY ENCRYPTION **(10 Periods)**
Message Authentication-Approaches to Message Authentication, Simple hash function, Secure Hash Functions –SHA-1, SHA-512, Message Authentication Codes and HMAC
Public-Key Cryptography-Public-Key Cryptography Algorithms-RSA, Diffie-Hellman Key Exchange, Digital signature standard
UNIT-III: NETWORK SECURITY APPLICATIONS **(12 Periods)**
Key Distribution and User Authentication-Kerberos, Key Distribution Using Asymmetric Encryption, X.509 Certificates, Public Key Infrastructure
Electronic Mail Security-Pretty Good Privacy, Key Rings, Multipurpose Internet Mail Extensions, S/MIME - Functionality, Messages and certificate processing.

UNIT-IV: INTERNET SECURITY   **(11 Periods)**
Transport Level Security- Secure Socket Layer and Transport Layer Security.
IP Security-Overview, policy, Encapsulating Security Payload and IKE.
Wireless Network security- IEEE 802.11 Wireless LAN Overview, IEEE 802.11i Wireless LAN Security
UNIT-V: SYSTEM SECURITY   **(10 Periods)**
Intruders-Intrusion Detection, Password Management, Malicious Software - Types, Viruses, Virus Countermeasures, Worms.
Firewalls- Firewall Characteristics, Firewall Basing, Types of Firewalls, Firewall Location and Configurations.

                                         Total number of Periods: 53

TEXTBOOKS:
      a. William Stallings, "*Network Security Essentials: Applications and Standards," 4ed,* Pearson Education, New Delhi,2011
      b. Douglas R.Stinson, "*Cryptography – Theory and Practice,"* 3ed, CRC Press, 2005

REFERENCE BOOKS:
1. William Stallings, "*Cryptography and Network Security,*" 5ed., Pearson education, New Delhi,2011.
2. Eric Maiwald, "*Fundamentals of Network Security*", 1ed., McGraw-Hill, 2003

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) – II Semester
(16MT20506) MOBILE COMPUTING
(Professional Elective-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	*60*	*100*	*4*	*--*	*--*	*4*

PRE-REQUISITES:
A Course on "Computer Networks"

COURSE DESCRIPTION:
GSM architecture, Wireless MAC and CDMA Systems; Mobile IP network layer, Mobile Transport Layer; Databases, Data Dissemination and Broadcasting Systems; Synchronization in Mobile Devices and Mobile Computing Systems; Mobile Application Languages and Mobile Operating Systems.

COURSE OUTCOMES:
After successful completion of this course, students will be able to:
CO1. Gain advanced knowledge in
   - GSM and CDMA Systems.
   - Mobile IP, and Mobile TCP
   - Databases and Data Dissemination
   - Mobile Data Synchronization

CO2. Analyze various methods in data dissemination and broadcasting models

CO3. Evaluate and implement novel applications to realize power computing and context-aware computing. .

CO4. Contribute positively to multidisciplinary scientific research on mobile application languages and mobile operating systems.

CO5. Apply Database Hoarding Techniques, Selective Indexing and Tuning Techniques to solve problems in Mobile Computing

DETAILED SYLLABUS:
UNIT I – GSM AND WIRELESS MEDIUM ACCESS CONTROL
(11 periods)
GSM and Similar Architectures: GSM, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services.
Wireless MAC and CDMA – Based Communication: Medium Access control, Introduction to CDMA-based Systems, Spread Spectrum in CDMA Systems, Coding Methods in CDMA.

UNIT II – MOBILE IP NETWORK LAYER AND MOBILE TRANSPORT LAYER **(11 periods)**
Mobile IP Network Layer: IP and Mobile IP Network Layer, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, Dynamic Host Configuration Protocol.
Mobile Transport Layer: Conventional Transport Layer Protocols, Indirect TCP, Snooping TCP and Mobile TCP.

UNIT III – DATABASES AND DATA DISSEMINATION
(11 p*eriods*)

Databases: Database Hoarding Techniques, Data Caching, Client-Server Computing and Adaptation.

Data Dissemination and Broadcasting Systems: Communication Asymmetry, Classification of Data-Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Techniques.

UNIT IV – DATA SYNCHRONIZATION IN MOBILE COMPUTING SYSTEMS AND MOBILE DEVICES (11 periods)

Data Synchronization in Mobile Computing Systems: Synchronization, Synchronization Software for Mobile Devices, Synchronization Protocols, SynML- Synchronization Language for Mobile Computing, Sync4J (Funambol).

Mobile Devices: Server and Management –Mobile Agent, Application Server, Gateways, Portals, Service Discovery, Device Management, Mobile File Systems, Security.

UNIT V – MOBILE APPLICATION LANGUAGES AND MOBILE OPERATING SYSTEMS (10 p*eriods*)

Mobile Application Languages: Introduction, XML, JAVA, Java 2 Micro Edition (J2ME), JavaCard.

Mobile Operating Systems: Operating System, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices.

[Total Periods: 54]

TEXT BOOK:

1. Raj Kamal, "Mobile Computing," 2 ed., OXFORD University Press, 2007.

REFERENCE BOOKS:

1. Jochen H. Schiller, "Mobile Communications," 2 ed. , Pearson Education, 2004
2. Ashok K Talukder, Roopa R Yavagal, "Mobile Computing," 2 ed., Tata McGraw Hill, 2010

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – II Semester
(16MT20507) SOFTWARE PROJECT MANAGEMENT
(Professional Elective-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	*60*	*100*	*4*			*4*

PRE-REQUISITES:
A course on "Software Engineering"

COURSE DESCRIPTION:
Concepts of Software Project Management; Software efforts estimation techniques; Software economics; life cycle phases; model based software architectures; project organizations & responsibilities.

COURSE OUTCOMES:
After successful completion of this course the students will be able to:

CO-1: Gain knowledge on project planning and management, client management and project Scheduling and monitoring.

CO-2: Analyze the major and minor milestones, artifacts and metrics from management and technical perspective.

CO-3: Design software products using conventional and modern principles of software project management.

CO-4: Apply Software Metrics for a given Project to calculate Cost estimation models.

CO-5: Adopt team effectiveness through Work Breakdown Structures by optimal cost and schedule estimates

CO-6: Demonstrate skills of project management and process measurement in software projects.

DETAILED SYLLABUS:
UNIT-I: SOFTWARE EFFORTS ESTIMATION TECHNIQUES
(10 Periods)

Introduction to software project management, An overview of project planning, The Waterfall model, Conventional Software Management Performance, Evolution of Software Economics, Software Economics

UNIT-II: IMPROVING SOFTWARE ECONOMICS
(11 Periods)

Reducing Software product size, improving software processes, improving team effectiveness, improving automation, achieving required quality, peer inspections, the old way and the new, the principles of conventional software Engineering, and principles of modern software management.

UNIT-III: LIFE CYCLE PHASES **(10 Periods)**
Engineering and production stages, inception, Elaboration, construction phase, transition phases, ISO 12207 approach to software lifecycle processes, Artifacts of the process, the artifact sets, Management artifacts, engineering artifacts.

UNIT-IV: MODEL BASED SOFTWARE ARCHITECTURES
(10 Periods)

A Management perspective and Technical perspective, Workflows of the process, Software process workflows, Iteration workflows. Checkpoints of the Process- Major mile stones, Minor Milestones, Periodic status assessments, Iterative Process Planning, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT-V: PROJECT ORGANIZATIONS AND RESPONSIBILITIES
(14 Periods)

Line-of-Business organization, Project organizations- case study, evolution of organizations, Automation building blocks, The project environment, the seven core metrics, Management indicators, quality indicators, life cycle expectations, Software Metrics automation, Tailoring the process discriminates, COCOMO cost estimation model- case study.

[Total Periods: 55]

TEXT BOOKS:
1. Walker Royce, "*Software Project Management*," Pearson Education, 2005.
2. Bob Hughes and Mike Cotterell, "*Software Project Management*," 4 ed., Tata McGraw-Hill Edition, 2006.

REFERENCE BOOKS:
1. Joel Henry, "*Software Project Management*," 1 ed., Pearson Education,2003.
2. Pankaj Jalote, "*Software Project Management in Practice,*" 7 ed., Pearson Education,2008.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. II-Semester
(16MT20531) CLOUD COMPUTING & BIG DATA ANALYTICS LAB
(Common to CS and CNIS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	--	--	4	2

PRE-REQUISITES:
Course on "Cloud Computing" and "Operating Systems"
COURSE DESCRIPTION:
Hands-on experience on creating Virtual machines on Windows and Linux platforms, Development of Service based web applications & their deployment and Mobile app development, Designing and implementing Hadoop cluster.
COURSE OUTCOMES:
After successful completion of this course , students will be able to:
CO-1:   Demonstrate hands-on experience on Virtualization models, Cloud Environment and Hadoop cluster setup.
CO-2:   Analyze the given experiment and measure the performance of services and datasets.
CO-3:   Apply API development skills in web applications for Cloud deployment and develop solutions for real time applications using Hadoop.
CO-4:   Devise virtual environments based on virtualization techniques and processing huge amount of data using Big data tools
CO-5:   Develop written and oral communications in preparing and presenting reports.
LIST OF PRACTICAL EXERCISES:
1 : Create Virtual machines with given set of configuration on Hyper-V, " Ubuntu 14 LTS OS, with 2 GB RAM and 200 GB HDD". (IaaS)
2: Create Virtual machines with given set of configuration on Ubuntu OS: "Windows 7 OS with 4 GB RAM and 500 GB HDD". (IaaS)
3: Develop a Design document for a web application, to perform operations based on service   calls and to be deployed on cloud environment. (Design Doc)
4: Develop a web application for performing Calculator operations be selecting relevant services. Deploy it on cloud platform. (SaaS)
5: Develop a HTTPS web application with social media interfaces (Facebook / Twitter / Instagram / Google+ APIs). (SaaS)
6: Develop a mobile app on Google App Engine for uploading a resume into a website, collaborated with Drop box. The resume should be encrypted. (PaaS)
7: Develop a service call to run on Drop box resumes for picking the resumes of given skill set. (PaaS)
       i.   6+ years of Exp in Java Development.
      ii.   10 years of experience in Automation Testing.

       iii. 15+ years of Managerial experience with technical background.

       iv. 5-7 years of on-site experience in .NET support and programming.

8: Install and run Hadoop using Single node Cluster.

9: Install and run Hadoop using Multi node cluster

10: Write a program to count words in a program using map and reduce functions and Hadoop.

11: Illustrate installation and configuring of Hive

REFERENCE BOOKS:

1: Ivanka Menken and Ivanka Menken, "*Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book,*" 1 st Edition, Emereo Pty. Ltd., 2009.

2: Barrie Sosinsky, "*Cloud Computing Bible,*" 1st Edition, Wiley India Pvt Ltd, 2011.

3: Tom White, "*Hadoop: The Definitive Guide*," 3rd Edition, O'REILLY Publications, 2012.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech – II Semester
(16MT20532) OBJECT ORIENTED ANALYSIS & DESIGN LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	--	--	4	2

PRE-REQUISITES:
A Course on "Object Oriented Programming"

COURSE DESCRIPTION:
Concepts of Unified Modeling language; Sequence and collaboration diagrams; Behavioral Modeling; Unified Process and phases of unified process.

COURSE OUTCOMES:
After successful completion of this course the students will be able to:

CO-1: Demonstrate knowledge on Object Oriented concepts, project planning and modeling concepts.

CO-2: Analyze and understand requirements of given real life problems.

CO-3: Design Structural and Behavioral Diagrams to solve real world problems.

CO-5: Apply UML to develop blueprints of a given problem.

CO-6: Develop written and oral communications in preparing and presenting reports.

CO-7: Update knowledge in object oriented analysis and design continuously

LIST OF EXERCISES:
Case Study No: 1
Problem Title: Automated Teller Machine (ATM)
Problem Statement:
          Software is designed for supporting a computerized ATM banking network. All the process involved in the bank is computerized these days. All the accounts maintained in the bank and also the transactions effected, including ATM transactions are to be processed by the computers in the bank. An ATM accepts a relevant cash card, interacts with user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system to be designed and implemented must include appropriate record keeping and security provisions. The system must handle concurrent access to the same account.

Case Study No: 2
Problem Title: Online Ticket Reservation for Railways
Problem Statement:
          Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, data of journey, destination, class of train etc. The

reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes ie Sleeper class, First class and the AC compartment. Design the application for the above problem description.

Case Study No: 3
Problem Title: A Point-of-Sale (POS) System
Problem Statement:

A POS system is a computerized application used to record sales and handle payments, it is typically used in a retail store, it includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant, that is, even if remote services are temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client-side terminals and interfaces such as browser, PDA's, touch-screens.

Case Study No: 4
Problem Title: University Course Information System
Problem Statement:

Each student has access to his or her course and grade information only and must be authenticated prior to viewing or updating the information. A course instructor will use the system to view the list of courses he or she is assigned for a given semester or has taught previously, view the list of students registered for the course(s) he or she is teaching, and record final grades for each student in the course(s). TA assignments will also be viewable through this system. Instructors must also be authenticated prior to viewing or updating any information.

Case Study No: 5
Problem Title: Hospital Management System
Problem Statement:

Hospital Management System (HMS) is state-of-the-art software that offers comprehensive solutions to various segments of Healthcare Industry such as Super Specialty, Multispecialty and General Hospitals of varied capacities, small Nursing Homes, HMOs, Polyclinics and General Practitioners. This HMS solution addresses the issues from multi-discipline angels namely Patients, Doctors, Pharmacy, Hospital Management and Services.

The Software provides both clinical as well as patient care aspects to hospital management. The software is divided into different

modules, each addressing a specific activity of the hospital and there by facilitating better patient care. Each module can be used as a standalone solution or can be integrated in a phased manner. Modules are designed so that they meet the present and future requirements of the hospital.HMS offers various sub-systems and a seamless integration. By being modular, each module can be used as a standalone solution or can be integrated in a phased manner. Modules are also so designed to meet the present as well as future requirements of the organization and process a unique ability with the business growth.HMS consists of the Base modules, Add-on modules and Specialty modules. Additional modules both add-on and specialty modules can be seamlessly integrated to the HMS at any time. The Integration Manager takes care of all the data consistency issues.

Case Study No: 6
Problem Title: Unified Library Application
Problem Statement:

A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned by the library that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the systems.

Case Study No: 7
Problem Title: Online Shopping
Problem Statement:

A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client – side terminals and interfaces such as browser, PDA s, touch – screens.

Case Study No: 8
Problem Title: Passport Automation System
Problem Statement:

Passport Automation System (PAS) is used in the effective dispatch of passport to all of the applicants. This system adopts a comprehensive approach to minimize the manual work and schedule resources, time in a cogent manner. The core of the system is to get the online registration form (with details such as name, address etc.,) filled by the applicant whose testament is verified for its genuineness by the Passport Automation System with respect to the already existing information in the database.

This forms the first and foremost step in the processing of passport application. After the first round of verification done by the system, the information is in turn forwarded to the regional administrator's (Ministry of External Affairs) office. The application is then processed manually based on the report given by the system, and any forfeiting identified can make the applicant liable to penalty as per the law. The system forwards the necessary details to the police for its separate verification whose report is then presented to the administrator. After all the necessary criteria have been met, the original information is added to the database and the passport is sent to the applicant.

Case Study No: 9
Problem Title: Recruitment Procedure for Software Industry
Problem Statement:

In the software industry the recruitment procedure is the basic thing that goes in the hand with the requirement as specified by the technical management team. HR first gives an advertisement in leading Newspapers, Journals, Weeklies and Websites. The job seekers can apply for it through by Post or by e-mail to the company.

The technical skill and the experience of the candidates are reviewed and the sort listed candidates are called for the interview. There may be different rounds for interview like the written test technical interview, HR interview. After the successful completion of all rounds of interview, the selected candidate's names are displayed. Mean while HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

REFERENCE BOOKS:

R1. Mark Priestley, "Practical Object-Oriented Design with UML," Second Edition, Tata McGraw Hill, 2011.
R2. Mike O' Docherty, "Object-Oriented Analysis and Design with UML Version 2.0," Wiley
    India Pvt. Ltd, 2012.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. (CS)-II Semester
(16MT20533) SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
--	100	100	--	--	--	2

PRE-REQUISITES:--

COURSE DESCRIPTION:

Identification of seminar topic; literature survey; preparation of technical report and presentation

COURSE OUTCOMES:

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

CO1. Demonstrate capacity to identify an advanced topic for seminar in core and allied areas.

CO2. Extract information pertinent to the topic through literature survey.

CO3. Comprehend extracted information through analysis and synthesis critically on the topic.

CO4. Plan, organize, prepare and present effective written and oral technical report on the topic.

CO5. Adapt to independent and reflective learning for sustainable professional growth in Computer Science and software systems

CO6. Contribute to multidisciplinary scientific working the field of Computer Science and software systems

CO7. Understand ethical responsibility towards environment and society in the field of Computer Science and software systems

CO8. Engage in lifelong learning for development of technical competence in the field of Computer Science and software systems

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. – II Semester
(16MT23810) INTELLECTUAL PROPERTY RIGHTS
(Common to all M. Tech. Programs)
(Audit Course)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	2	-	-

PRE-REQUISITES: --

COURSE DESCRIPTION:
Introduction to Intellectual Property; Trade Marks; Law of Copy Rights; Law of Patents; Trade Secrets; Unfair Competition; New Development of Intellectual Property.

COURSE OUTCOMES: After successful completion of the course, students will be able to:
1. Demonstrate in-depth knowledge on
   a. Intellectual Property
   b. Trade Marks & Secrets
   c. Law of Copy Rights, Patents
   d. New development of Intellectual Property
2. Analyze the different forms of infringement of intellectual property rights.
3. Solve problems pertaining to Intellectual Property Rights.
4. Stimulate research zeal for patenting of an idea or product.
5. Write effective reports required for filing patents.
6. Develop life-long learning capabilities.
7. Develop awareness of the relevance and impact of IP Law on their academic and professional lives.
8. Develop attitude for reflective learning.

DETAILED SYLLABUS:

UNIT - I: Introduction to Intellectual property   (5 Periods)
Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT - II: Trade Marks: (5 Periods)
Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT - III: Law of copy rights: (6 Periods)
Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT - IV: Trade Secrets: **(6 Periods)**
Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition: Misappropriation right of publicity, False advertising.

UNIT - V: New development of intellectual property:
                                   (6 Periods)
New developments in trade mark law; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international - trade mark law, copy right law, international patent law, international development in trade secrets law.

[Total Periods: 28]

REFERENCE BOOKS:
1. Deborah, E. Bouchoux, *Intellectual property rights*, Cengage learning.
2. Prabuddha Ganguli, *Intellectual property right - Unleashing the knowledge economy*, Tata Mc Graw Hill Publishing Company Ltd.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. (CS) III & IV Semesters

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
200	200	400	--	--	--	28

PRE-REQUISITES: --
COURSE DESCRIPTION:
Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Writing of thesis and presentation.

COURSE OUTCOMES:
On successful completion of this course, the students will be able to
CO1.   Demonstrate capacity to identify an advanced topic for project work in core and allied areas.
CO2.   Extract information pertinent to the topic through literature survey.
CO3.   Comprehend extracted information through analysis and synthesis critically on the topic.
CO4.   Solve engineering problems in the chosen topic with higher order skill to obtain solutions.
CO5.   Use the techniques, skills and modern engineering tools necessary for project work.
CO6.   Perform time and cost analysis on the project.
CO7.   Plan, prepare and present effective written and oral technical report on the topic.
CO8.   Adapt to independent and reflective learning for sustainable professional growth. CO9. Contribute to multidisciplinary scientific working the field of Computer Science and Software Systems
CO10.   Understand ethical responsibility towards environment and society in the field of   Computer Science and Software Systems
CO11.   Engage lifelong learning for development of technical competence in the field of Computer Science and Software Systems.