GODAVARI INSTITUTE OF ENGINEERING & TECHNOLOGY(A)

Department of Computer Science & Engineering

COURSE STRUCTURE

B. Tech. Computer Science & Engineering

IV Year **I Semester**

S. No.	Subject Title	Periods per week			C	Scheme of Examination Maximum Marks		
		T	P	D		Int.	Ext.	Total
14150701	Cryptography and Network Security	4	-	-	3	30	70	100
14150702	UML & Design Patterns	4	-	-	3	30	70	100
14150703	Mobile Computing	4	-	-	3	30	70	100
14150704	Software Project Management	4	-	-	3	30	70	100
14150761a-e	Elective – I	4	-	-	3	30	70	100
14150762a-e	Elective – II	4	-	-	3	30	70	100
14150711	UML & Design Patterns Lab	-	3	-	2	50	50	100
14150712	Network Security Lab	-	3	-	2	50	50	100
141507<u>95</u>	IPR & Patents	4	-	-	-	-	-	-
14150731	Summer Internship / Training	-	-	-	2	100	-	100
Total		**28**	**6**	**0**	**24**	**380**	**520**	**900**

IV Year **II Semester**

S. No.	Subject Title	Periods per week			C	Scheme of Examination Maximum Marks		
		T	P	D		Int.	Ext.	Total
14150804	Distributed Systems	4	-	-	3	30	70	100
14159801	Management Science	4	-	-	3	30	70	100
14150862 a-e	Elective – III	4	-	-	3	30	70	100
14150863 a-e	Elective – IV	4	-	-	3	30	70	100
14150841	Project	-	-	-	9	60	140	200
Total		**16**	**0**	**0**	**21**	**180**	**420**	**600**

LIST OF ELECTIVES

Elective-I

14150761-a) Software Testing Methodologies

14150761-b) Simulation Modeling.

14150761-c) Information Retrieval Systems

14150761-d) Artificial Intelligence.

14150761-e) High Performance Computing

Elective-II

14150762-a) Digital Forensics

14150762-b) Hadoop and Big Data

14150762-c).Net programming

14150762-d) Machine Learning

14150762-e) Advanced Databases

Elective-III

14150862-a) Human Computer Interaction

14150862-b)Advanced Operating Systems

14150862-c) Mobile Adhoc & Sensor Networks

14150862-d)Pattern Recognition

14150862-e)Digital Image Processing

Elective-IV

14150863-a)Embedded and Real Time Systems

14150863-b)Neural Networks & Soft Computing

14150863-c)Social Networks and the Semantic Web

14150863-d)Parallel Computing

14150863-e)E-Commerce

MOOCS

a) Data Warehousing and Mining
b) Design and Analysis of Algorithms
c) Web Technologies

IV Year B.Tech. (CSE). – I Semester

Cryptography and Network Security

Course objectives:

The main objective of this course is to teach students to understand and how to address various software security problems in a secure and controlled environment. During this course the students will gain knowledge (both theoretical and practical) in various kinds of software security problems, and techniques that could be used to protect the software from security threats. The students will also learn to understand the "modus operandi" of adversaries; which could be used for increasing software dependability.

Course Outcomes

1. *be able to individually reason about software security problems and protection techniques on both an abstract and a more technically advanced level.*
2. *be able to individually explain how software exploitation techniques, used by adversaries, function and how to protect against them.*

Unit- I

Introduction: The OSI Security Architecture, Security attacks, services & mechanisms, Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Cyber threats and their defense (Phishing Defensive measures, Web based attacks, SQL injection & Defense techniques), Buffer overflow & format string vulnerabilities.

Unit-II

Block Ciphers & Symmetric Key Cryptography: Traditional Block Cipher Structure, DES, Block Cipher Design Principles, AES-Structure, Transformation functions, Key Expansion, Block Cipher Modes of Operations

Unit-III

Number Theory: Divisibility and the division Algorithm, Euclidean Algorithm, Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder theorem, Discrete logarithms.

Unit-IV

Public Key Cryptography: Principles of public key cryptography algorithms, RSA Algorithms, Diffie Hellman Key Exchange, Elgamal cryptosystem, Elliptic Curve Cryptography.

Cryptographic Hash Functions: Application of Cryptographic hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication Functions, Requirements & Security, HMAC & CMAC.

Unit-V

Digital Signatures: Digital Signatures, NIST Digital Signature Algorithm. X.509 Certificate, Key management & distribution.

User Authentication- Remote user authentication principles, Kerberos

Unit-VI

Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME.

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

Text Books:

1. Cryptography & Network Security: Principles and Practices, William Stallings, PEA, Sixth edition.
2. Introduction to Computer Networks & Cyber Security, Chwan Hwa Wu, J.David Irwin, CRC press
3. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech.

Reference Books:

1. Everyday Cryptography, Fundamental Principles & Applications, Keith Martin, Oxford
2. Network Security & Cryptography, Bernard Menezes, Cengage,2010

IVYear B.Tech. (CSE). – I Semester

UML & Design Patterns

Course Objectives:

- *The focus of this course is on design rather than implementation.*
- *Introducing the Unified Process and showing how UML can be used within the process.*
- *Presenting a comparison of the major UML tools for industrial-strength development.*
- *Introduction to design patterns, practical experience with a selection of central patterns.*

Course Outcomes:

Students successfully completing this course will be able to:

1. *identify the purpose and methods of use of common object-oriented design patterns*
2. *select and apply these patterns in their own designs for simple programs*
3. *represent the data dependencies of a simple program using UML*
4. *represent user and programmatic interactions using UML*
5. *create design documentation outlining the testable and complete design of a simple program*
6. *produce and present documents for the purpose of capturing software requirements and specification*
7. *produce plans to limit risks specific to software designed for use in a particular social context*

Unit-I

Introduction : Introduction to OOAD; typical activities / workflows / disciplines in OOAD, Introduction to iterative development and the Unified Process, Introduction to UML; mapping disciplines to UML artifacts, Introduction to Design Patterns - goals of a good design, Introducing a case study & MVC architecture

Unit-II

Basic Structural Modeling: Classes, Relationships, Common Mechanisms, and diagrams, class diagrams
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Object Diagrams

Unit-III

Inception: Artifacts in inception, Understanding requirements - the FURPS model, Understanding Use case model - introduction, use case types and formats, Writing use cases - goals and scope of a use case, elements / sections of a use case, Use case diagrams, Use cases in the UP context and UP artifacts, Identifying additional requirements, Writing requirements for the case study in the use case model

Unit-IV

Elaboration: System sequence diagrams for use case model, Domain model: identifying concepts, adding associations, adding attributes, Interaction Diagrams
Design Model: Design Class diagrams in each MVC layer, Mapping Design to Code, Design class diagrams for case study and skeleton code.

Unit-V

More UML Diagrams: State-Chart diagrams, Activity diagrams, Component Diagrams, Deployment diagrams, Object diagrams

Unit-VI

Advanced concepts in OOAD: Use case relationships, Generalizations Domain Model refinements, Architecture, Packaging model elements

Text Books:

1. Applying UML and patterns' by Craig Larman, Pearson.
2. Object-Oriented Analysis & Design with the Unified Process by Satzinger, Jackson & Burd Cengage Learning.
3. 'UML distilled' by Martin Fowler, Addison Wesley, 2003.

Reference Books:

1. O'reilly ' s 'Head-First Design Patterns' by Eric Freeman et al, Oreilll
2. UML 2 Toolkit, by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: WILE\'-Dreamtech lndia Pvt. Lid.

IV Year B.Tech. (CSE). – I Semester

Mobile Computing

Course Objective:

1. *To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.*
2. *To understand the typical mobile networking infrastructure through a popular GSM protocol*
3. *To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer*
4. *To understand the database issues in mobile environments & data delivery models.*
5. *To understand the ad hoc networks and related concepts.*
6. *To understand the platforms and protocols used in mobile environment.*

Course outcomes:

1. *Able to think and develop new mobile application.*
2. *Able to take any new technical issue related to this new paradigm and come up with a solution(s).*
3. *Able to develop new ad hoc network applications and/or algorithms/protocols.*
4. *Able to understand & develop any existing or new protocol related to mobile environment*

Unit-I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

Unit –II

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

Unit –III

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

Unit –IV

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

Unit-V

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.

Unit-VI

Mobile Adhoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.

Text Books:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772
3. Fundamentals of Mobile Computing, Prasant Kumar Pattnaik and Rajib Mall, PHI Learning

Reference Book:

1. Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, "Mobile Computing, Technology Applications and Service Creation" Second Edition, Mc Graw Hill.
2. UWE Hansmann, Lother Merk, Martin S. Nocklous, Thomas Stober, "Principles of Mobile Computing," Second Edition, Springer.

IV Year B.Tech. (CSE). – I Semester

Software Project Management

Course Objectives:

1. *To study how to plan and manage projects at each stage of the software development life cycle (SDLC)*
2. *To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.*
3. *To understand successful software projects that support organization's strategic goals*

Course Outcomes:

1. *To match organizational needs to the most effective software development model*
2. *To understand the basic concepts and issues of software project management*
3. *To effectively Planning the software projects*
4. *To implement the project plans through managing people, communications and change*
5. *To select and employ mechanisms for tracking the software projects*
6. *To conduct activities necessary to successfully complete and close the Software projects*
7. *To develop the skills for tracking and controlling software deliverables*
8. *To create project plans that address real-world management challenges*

Unit– I

Introduction: Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals

Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure

Unit– II

Project Approach: Lifecycle models, Choosing Technology, Protoyping Iterative & incremental Process Framework: Lifecycle phases, Process Artifacts, Process workflows

Unit–III

Effort estimation & activity Planning: Estimation techniques, Function Point analysis, SLOC, COCOMO, Usecase-based estimation, Activity Identification Approaches.

Unit–IV

Risk Management: Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

Unit–V

Project Monitoring & Control, Resource Allocation: Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

Unit–VI

Software Quality: Planning Quality, Defining Quality - ISO 9016, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality
Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality

Text Books:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA Mcgraw-Hill
2. Software Project Management, Walker Royce: Pearson Education, 2005.
3. Software Project Management in practice, Pankaj Jalote, Pearson.

Reference Books:

1. Software Project Management, Joel Henry, Pearson Education.

IV Year B.Tech. (CSE). – I Semester

UML & Design Patterns Lab

(Textbook no.2 i.e. Object-Oriented Analysis & Design with the Unified Process by Satzinger, Jackson & Burd Cengage Learning will be the primary source for finding templates for developing different artifacts / diagrams)

Take Three Case Studies:

- Customer Support System (in the Object-Oriented Analysis & Design with the Unified Process by Satzinger, Jackson & Burd Cengage Learning).
- Point-Of-Sale Terminal (in Larman textbook)
- Library Management System **(in the reference book no. 2 i.e. UML toolkit)**

1. **Familiarization with Rational Rose or Umbrello**

2. **For each case study:**

a) Identify and analyze events
b) Identify Use cases
c) Develop event table
d) Identify & analyze domain classes
e) Represent use cases and a domain class diagram using Rational Rose

3. **For each case study:**

a) Develop Use case diagrams
b) Develop elaborate Use case descriptions & scenarios
c) Develop prototypes (without functionality)
d) Develop system sequence diagrams

4. **For each case study:**

a) Develop high-level sequence diagrams for each use case
b) Identify MVC classes / objects for each use case
c) Develop Detailed Sequence Diagrams / Communication diagrams for each use case showing interactions among all the three-layer objects

5. **For each case study:**

a) Develop Use case Packages
b) Develop component diagrams
c) Identify relationships between use cases and represent them
d) Refine domain class model by showing all the associations among classes

6. **For each case study:**

a) Develop sample diagrams for other UML diagrams - state chart diagrams, activity diagrams and deployment diagrams

IV Year B.Tech. (CSE). – I Semester

Network Security Lab

List of Experiments

The following programs should be implemented using 'C' language

1. To encoding the data using playfair cipher model
2. To encoding the data using railfence algorithm
3. To study block cipher principles.
   a) ECB b) CBC c) OFB d) CFB
4. Implement the encryption and decryption of 8-bit data using 'Simplified DES Algorithm
5. Implement RSA algorithm for encryption and decryption in 'C'.
6. To study MD-5 algorithm
7. To implement Diffie Hellman Key Exchange.
8. To study Intrusion Detection System(Snort IDS)

IV Year B.Tech. (CSE). – I Semester

Intellectual Property Rights and Patents

Unit-I

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics - Types of Intellectual Property - Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement - Regulatory – Over use or Misuse of Intellectual Property Rights - Compliance and Liability Issues.

Unit-II

Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works – Rights of Distribution – Rights of performers **–** Copyright Formalities and Registration – Limitations – Infringement of Copyright – International Copyright Law- Semiconductor Chip Protection Act.

Unit-III

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation - International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty- New developments in Patent Law- Invention Developers and Promoters.

Unit-IV

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Inter parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law

Unit-V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law.

Unit-VI

Introduction to Cyber Law – Information Technology Act - Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy - International aspects of Computer and Online Crime.

Reference Books:

1. Deborah E.Bouchoux: “Intellectual Property”. Cengage learning , New Delhi
2. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western’s Special Topics Collections
4. Prabhuddha Ganguli: ‘ Intellectual Property Rights” Tata Mc-Graw –Hill, New Delhi
5. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
6. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights",Excel Books. New Delhi.
7. M.Ashok Kumar and Mohd.Iqbal Ali: “Intellectual Property Right” Serials Pub.

IV Year B.Tech. (CSE). – II Semester

Distributed Systems

Course Objectives:

1. *Provides an introduction to the fundamentals of distributed computer systems, assuming the availability of facilities for data transmission, IPC mechanisms in distributed systems, Remote procedure calls*
2. *Expose students to current technology used to build architectures to enhance distributed computing infrastructures with various computing principles*

Course Outcomes:

1. *Develop a familiarity with distributed file systems.*
2. *Describe important characteristics of distributed systems and the salient architectural features of such systems.*
3. *Describe the features and applications of important standard protocols which are used in distributed systems.*
4. *Gaining practical experience of inter-process communication in a distributed environment*

Unit-I

Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges.

System Models: Introduction, Architectural Models- Software Layers, System Architecture, Variations, Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models- Interaction Model, Failure Model, Security Model.

Unit-II

Interprocess Communication: Introduction, The API for the Internet Protocols- The Characteristics of Interprocess communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling; Client Server Communication; Group Communication- IP Multicast- an implementation of group communication, Reliability and Ordering of Multicast.

Unit-III

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects- Object Model, Distributed Object Modal, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI

Unit-IV

Operating System Support: Introduction, The Operating System Layer, Protection, Processes and Threads –Address Space, Creation of a New Process, Threads.

Unit-V

Distributed File Systems: Introduction, File Service Architecture; Peer-to-Peer Systems: Introduction, Napster and its Legacy, Peer-to-Peer Middleware, Routing Overlays.

Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication.

Unit-VI

Transactions & Replications: Introduction, System Model and Group Communication, Concurrency Control in Distributed Transactions, Distributed Dead Locks, Transaction Recovery; Replication- Introduction, Passive (Primary) Replication, Active Replication.

Text Books:

1. Ajay D Kshemkalyani, Mukesh Sighal, "Distributed Computing, Principles, Algorithms and Systems", Cambridge
2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems- Concepts and Design", Fourth Edition, Pearson Publication

IV Year B.Tech. (CSE). – II Semester

Management Science

Unit-I

Introduction to Management: Concept –nature and importance of Management – Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process- Designing organization structure- Principles of organization - Types of organization structure

Unit-II

Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and Cchart) Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis)

Unit-III

Functional Management: Concept of HRM, HRD and PMIR- Functions of HR Manager- Wage payment plans(Simple Problems) – Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions.

Unit-IV

Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems)

Unit-V

Strategic Management: Vision, Mission, Goals, Strategy –Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis-Steps in Strategy Formulation and Implementation, Generic Strategy alternatives

Unit-VI

Contemporary Management Practice: Basic concepts of MIS, MRP, Justin-Time(JIT) system, Total Quality Management(TQM), Six sigma and Capability Maturity Model(CMM) Levies, Supply Chain Management, Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.

Text Books

1. Dr. P. Vijaya Kumar & Dr. N. Appa Rao, '*Management Science'* Cengage, Delhi, 2012.
2. Dr. A. R. Aryasri, *Management Science'* TMH 2011.

Reference Books

1. Koontz & Weihrich: 'Essentials *of management'* TMH 2011
2. Seth & Rastogi: Global Management Systems, Cengage learning , Delhi, 2011
3. Robbins: Organizational Behaviour, Pearson publications, 2011
4. Kanishka Bedi: Production & Operations Management, Oxford

IV Year B.Tech. (CSE). – I Semester

(Elective – I)

Software Testing Methodologies

Course Objectives:

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

Course Outcomes:

By the end of the course, the student should:

- *Have an ability to apply software testing knowledge and engineering methods.*
- *Have an ability to design and conduct a software test process for a software testing project.*
- *Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.*
- *Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.*
- *Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.*
- *Have basic understanding and knowledge of contemporary issues in software testing, such as component-based software testing problems*

Unit – I

Software Testing: Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing.

Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life Cycle, relating test life cycle to development life cycle Software Testing Methodology.

Unit- II

Verification and Validation: Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation

Dynamic Testing I: Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing

Unit- III

Dynamic Testing II: White-Box Testing: need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing

Static Testing: inspections, Structured Walkthroughs, Technical reviews

Unit- IV

Validation activities: Unit testing, Integration Testing, Function testing, system testing, acceptance testing.

Regression testing: Progressives Vs regressive testing, Regression testability, Objectives of regression testing, When regression testing done?, Regression testing types, Regression testing techniques.

Unit- V

Efficient Test Suite Management: Test case deisgnWhy does a test suite grow, Minimizing the test suite and its benefits, test suite prioritization, Types of test case prioritization, prioritization techniques, measuring the effectiveness of a prioritized test suite

Software Quality Management: Software Quality metrics, SQA models

Debugging: process, techniques, correcting bugs, Basics of testing management tools, test link and Jira

Unit -VI

Automation and Testing Tools: need for automation, categorization of testing tools, selection of testing tools, Cost incurred, Guidelines for automated testing, overview of some commercial testing tools.

Testing Object Oriented Software: basics, Object oriented testing

Testing Web based Systems: Challenges in testing for web based software, quality aspects, web engineering, testing of web based systems, Testing mobile systems

Text Books:

1. Software Testing, Principles and Practices, Naresh Chauhan, Oxford
2. Foundations of Software testing, Aditya P Mathur, 2ed, Pearson
3. Software Testing- Yogesh Singh, CAMBRIDGE

References:

1. Software testing techniques - Baris Beizer, International Thomson computer press, second edition.
2. Software Testing, Principles, techniques and Tools, M G Limaye, TMH
3. Effective Methods for Software testing, Willian E Perry, 3ed, Wiley

IV Year B.Tech. (CSE). – I Semester

(Elective – I)

Simulation and Modeling

Course Objectives:

- *Introduce computer simulation technologies and techniques, provides the foundations for the student to understand computer simulation needs, and to implement and test a variety of simulation and data analysis libraries and programs. This course focusses what is needed to build simulation software environments, and not just building simulations using preexisting packages.*
- *Introduce concepts of modeling layers of society's critical infrastructure networks.*
- *Build tools to view and control simulations and their results.*

Course Outcomes:

- *provide a strong foundation on concept of simulation, and modeling.*
- *understand the techniques of random number generations.*
- *understand the techniques of testing randomness.*
- *design simulation models for various case studies like inventory, traffic flow networks, etc.*
- *practice on simulation tools and impart knowledge on building simulation systems.*

Unit – I

System models: Concepts, continuous and discrete systems, System modeling, types of models, subsystems, system study.

Unit- II

System Simulation: Techniques, comparison of simulation and analytical methods, types of simulation, Distributed log models, cobweb models.

Unit-III

Continuous system Simulation: Numerical solution of differential equations, Analog Computers, Hybrid Computers, continuous system simulation languages CSMP, system dynamic growth models, logistic curves.

Unit- IV

Probability concepts in simulation: Monte Carlo techniques, stochastic variables, probability functions, Random Number generation algorithms

Unit- V

Queuing Theory: Arrival pattern distributions, servicing times, queuing disciplines, measure of queues, mathematical solutions to queuing problems. Discrete System Simulation: Events, generation of arrival patterns, simulation programming tasks, analysis of simulation output.

Unit- VI

GPSS & SIMSCRIPT: general description of GPSS and SIMSCRIPT, programming in GPSS & SIMSCRIPT, Data structures, Implementation of activities, events and queues, Event scanning, simulation algorithms in GPSS and SIMSCRIPT.

Text Books:

4. Geoffrey Gordon, "System Simulation", 2nd Edition, Prentice Hall, India, 2002.
5. Narsingh Deo, "System Simulation with Digital Computer, "Prentice Hall, India, 2001.

References:

1. Jerry Banks and John S.Carson, Barry L. Nelson, David M.Nicol, "Discrete Event System Simulation", 3rd Edition, Prentice Hall, India, 2002.
2. Shannon. R.E. Systems simulation, The art and science, prentice Hall, 1975.
3. Thomas J. Schriber; Simulation using GPSS, John Wiley, 1991.

IV Year B.Tech. (CSE). – I Semester

(Elective – I)

Information Retrieval Systems

Course Objectives:

- *To provide the foundation knowledge in information retrieval.*
- *To equip students with sound skills to solve computational search problems.*
- *To appreciate how to evaluate search engines.*
- *To appreciate the different applications of information retrieval techniques in the Internet or Web environment.*
- *To provide hands-on experience in building search engines and/or hands-on experience in evaluating search engines.*

Course Outcomes:

- *Identify basic theories in information retrieval systems*
- *Identify the analysis tools as they apply to information retrieval systems Understands the problems solved in current IR systems*
- *Describes the advantages of current IR systems*
- *Understand the difficulty of representing and retrieving documents.*
- *Understand the latest technologies for linking, describing and searching the web.*

Unit - I

Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation.
Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms

Unit- II

Inverted Files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.

Unit -III

Signature Files: Introduction, Concepts of Signature Files, Compression,Vertical Partitioning, Horizontal Partitioning.

Unit -IV

New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.

Unit -V

Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files

Unit -VI

Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts, Merging existing Thesauri

Text Books:

6. Frakes,W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
7. Modern Information Retrival By Yates Pearson Education.
8. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.

Reference Books:

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
2. Information retrieval Algorithms and Heuristics, 2ed, Springer

IV Year B.Tech. (CSE). – I Semester

(Elective – I)

Artificial Intelligence

Course Objectives:

- *To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.*
- *To have an understanding of the basic issues of knowledge representation and blind and heuristic*

search, as well as an understanding of other topics such as minimax, resolution, etc. that play an important role in AI programs.

- *To have a basic understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and robotics, expert systems, and planning*

Course Outcomes:

After completing this course, students should be able to:

1. *Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.*
2. *Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).*
3. *Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).*
4. *Design and carry out an empirical evaluation of different algorithms on a problem formalization, and state the conclusions that the evaluation supports.*

Unit-I

Introduction to artificial intelligence: Introduction ,history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, development of AI languages, current trends in AI

Unit-II

Problem Solving: State-Space Search And Control Strategies: Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative-deepening a*, constraint satisfaction

Problem Reduction And Game Playing: Introduction, problem reduction, game playing, alpha-beta pruning, two-player perfect information games

Unit-III

Logic Concepts: Introduction, propositional calculus, proportional logic, natural deduction system, axiomatic system, semantic tableau system in proportional logic, resolution refutation in proportional logic, predicate logic

Unit-IV

Knowledge Representation: Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames

Unit-V

Expert System and Applications: Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools

Unit-VI

Uncertainty Measure: Probability Theory: Introduction, probability theory, Bayesian belief networks, certainty factor theory, dempster-shafer theory

Fuzzy Sets and Fuzzy Logic: Introduction, fuzzy sets, fuzzy set operations, types of membership functions, multi valued logic, fuzzy logic.

Text Books:

4. Artificial Intelligence- Saroj Kaushik, CENGAGE Learning,
5. Artificial intelligence, A modern Approach , 2nd ed, Stuart Russel, Peter Norvig, PEA
6. Artificial Intelligence- Rich, Kevin Knight, Shiv Shankar B Nair, 3rd ed, TMH
7. Introduction to Artificial Intelligence, Patterson, PHI

Reference Books:

1. Atificial intelligence, structures and Strategies for Complex problem solving, -George F Lugar, 5th ed, PEA
2. Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer
3. Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier

IV Year B.Tech. (CSE). – I Semester

(Elective – I)

High Performance Computing

Course Objectives:

This course covers the design of advanced modern computing systems. In particular, the design of modern microprocessors, characteristics of the memory hierarchy, and issues involved in multi-threading and multi-processing are discussed. The main objective of this course is to provide students with an understanding and appreciation of the fundamental issues and tradeoffs involved in the design and evaluation of modern computers

Course Outcomes:

- *Understand the concepts and terminology of high performance computing.*
- *Can write and analyze the behavior of high performance parallel programs for distributed memory architectures (using MPI).*
- *Can write and analyze the behavior of high performance parallel programs for shared memory architectures (using Pthreads and OpenMP).*
- *Can write simple programs for the GPU.*
- *Can independently study, learn about, and present some aspect of high performance computing.*

Unit-I

Introduction to Parallel hardware and software, need for high performance systems and Parallel Programming, SISD, SIMD, MISD, MIMD models, Performance issues.

Unit-II

Processors, PThreads, Thread Creation, Passing arguments to Thread function, Simple matrix multiplication using Pthreads, critical sections, mutexes, semaphores, barriers and conditional variables, locks, thread safety, simple programming assignments.

Unit-III

OpenMP Programming: introduction, reduction clause, parallel for-loop scheduling, atomic directive, critical sections and locks, private directive, Programming assignments, n body solvers using openMP.

Unit -IV

Introduction to MPI programming: MPI primitives such as MPI_Send, MPI-Recv, MPI_Init, MPI-Finalize, etc. Application of MPI to Trepizoidal rule, Collective Communication primitives in MPI, MPI derived datatypes, Performance evaluation of MPI programs, Parallel sorting algorithms, Tree search solved using MPI, Programming Assignments.

Unit -V

Introduction to GPU computing, Graphics pipelines, GPGPU, Data Parallelism and CUDA C Programming, CUDA Threads Organization, Simple Matrix multiplication using CUDA, CUDA memories.

Unit- VI
Bench Marking and Tools for High Performance Computing Environments, Numerical Linear Algebra Routines BLAS for Parallel Systems evaluation.

Text Books:
8. An Introduction to Parallel Programming, Peter S Pacheco, Elsevier, 2011
9. Programming Massively Parallel Processors, Kirk & Hwu, Elsevier, 2012

Reference Books:
1. CUDA by example: An introduction to General Purpose GPU Programming, Jason, Sanders, Edward Kandrit, Perason, 2011
2. CUDA Programming, Shame Cook, Elsevier
3. High Performance Heterogeneous Computing, Jack Dongarra, Alexey & Lastovetsky, Wiley
4. Parallel computing theory and practice, Michel J.Quinn, TMH

IV Year B.Tech. (CSE). – I Semester

(Elective – II)

Digital Forensics

Course Objectives: *This course is intended to provide students with greater depth of study in a number of key topics in the area of computer security in society: cybercrime, computer and forensics, analysis*

Course Outcomes:
- *Understand financial and accounting forensics, and explain their role in preventing various forms of fraud.*
- *Distinguish various types of computer crime, and use computer forensic techniques to identify the digital fingerprints associated with criminal activities*

Unit-I
Computer Forensics and Investigations: Understanding Computer Forensics, Preparing for Computer Investigations, Taking A Systematic Approach, Procedure for Corporate High-Tech Investigations, Understanding Data Recovery Workstations and Software
Investor's Office and Laboratory: Understanding Forensics Lab Certification Requirements, Determining the Physical Requirements for a Computer Forensics Lab, Selecting a Basic Forensic Workstation.

Unit-II
Data Acquisition: Understanding Storage Formats for Digital Evidence, Determining the Best Acquisition Method, Contingency Planning for Image Acquisitions, Using Acquisition Tools, Validating Data Acquisition, Performing RAID Data Acquisition, Using Remote Network Acquisition Tools, Using Other Forensics Acquisition Tools.

Unit-III
Processing Crime and Incident Scenes: Identifying Digital Evidence, Collecting the Evidence in Private-Sector Incident Scenes, Processing law Enforcement Crime Scenes, Preparing for a Search, Securing a Computer Incident or Crime Scene, Sizing Digital evidence at the Scene, Storing Digital evidence, obtaining a Digital Hash.

Unit-IV
Current Computer Forensics **Tools:** Evaluating Computer Forensics Toll Needs, Computer Forensics Software Tools, Computer Forensics Hardware Tools, Validating and Testing Forensics Software

Computer Forensics Analysis and Validation: Determining What Data to Collect and Analyze, Validating Forensic Data, Addressing Data-Hiding Techniques, Performing Remote Acquisition

Unit-V

Recovering Graphics and Network Forensics: Recognizing a Graphics File, Understanding Data Compression, Locating and Recovering Graphics Files, Understanding Copyright Issues with Graphics, Network Forensic, Developing Standard Procedure for Network Forensics, Using Network Tools, Examining Hiney Project

Unit-VI

E-mail Investigations Cell Phone and Mobile Device Forensics: Exploring the Role of E-mail in Investigations, Exploring the Role of Client and Server in E-mail, Investigating E-mail Crimes and Violations, Understanding E-mail Servers, Using Specialized E-mail Forensics Tools, Understanding Mobile Device Forensics, Understanding Acquisition Procedure for Cell Phones and Mobile Devoices

Text Book:

1. Nelson, Phillips Enfinger, Steuart, " Computer Forensics and Investigations, Cengage Learning

IV Year B.Tech. (CSE). – II Semester

(Elective-II)

Hadoop and Big Data

Course Objectives:

1. *Optimize business decisions and create competitive advantage with Big Data analytics*
2. *Introducing Java concepts required for developing map reduce programs*
3. *Derive business benefit from unstructured data*
4. *Imparting the architectural concepts of Hadoop and introducing map reduce paradigm*
5. *To introduce programming tools PIG & HIVE in Hadoop echo system.*

Course Outcomes:

- *Preparing for data summarization, query, and analysis.*
- *Applying data modelling techniques to large data sets*
- *Creating applications for Big Data analytics*
- *Building a complete business data analytic solution*

Unit -I

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization.

Unit-II

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

Unit -III

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner.

Unit -IV

Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, Bytes Writable, Null Writable, Object Writable and Generic Writable, Writable collections, Implementing a Custom Writable: Implementing a Raw Comparator for speed, Custom comparators.

Unit -V

Pig: Hadoop Programming Made Easier.

Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin.

Unit-VI

Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data

Text Books:

1. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC
2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
3. Hadoop in Action by Chuck Lam, MANNING Publ.
4. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk, Bruce Brown, Rafael Coss

References:

1. Hadoop in Practice by Alex Holmes, MANNING Publ.
2. Hadoop MapReduce Cookbook,Srinath Perera, Thilina Gunarathne

Software Links:

1. Hadoop: http://hadoop.apache.org/
2. Hive: https://cwiki.apache.org/confluence/display/Hive/Home
3. Piglatin: http://pig.apache.org/docs/r0.7.0/tutorial.html

IV Year B.Tech. (CSE). – I Semester

(Elective – II)

.Net Programming

Unit -I

Introduction: MS .Net Platform: Microsoft .NET Architecture Hierarchy Features of the .NET Platform: Multilanguage Development, Platform and Processor Independence, Automatic Memory Management, Easy Deployment, Distributed Architecture, Interoperability with Unmanaged Code, Security, Performance and Scalability Components of the .NET Architecture: MS .NET Runtime, Managed/Unmanaged Code, Intermediate Language, Common Type System, MS .NET Base Class Library (BCL), Assemblies, Metadata, Assemblies and Modules, Assembly Cache, Reflection, Just In Time Compilation, Garbage Collection

Unit -II

C # .Net: Introduction to visual studio, Project basics, types of project in .Net IDE of C# .NETMenu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser. The Environment Editor tab, format tab, general tab, docking tab. visual development & event drive Programming -Methods and events.

Unit- III

Basics Content C # . Net: Basic Variables – Declaring variables, Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Subroutines, Functions, Passing variable Number of Argument Optional Argument, Returning value from function. Control flow statements conditional statement, loop statement. Msgbox & Inputbox.

Unit -IV

Working with GUI: Working with Forms Loading, showing and hiding forms, controlling One form within another. GUI Programming with Windows Form Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, RadioButton, Panel, scroll-bar, Timer, ListView, TreeView, toolbar, StatusBar.There Properties, Methods and events OpenFileDilog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog. Link Label. Designing menu's ContextMenu, access & shorcut keys.

Unit- V

OOP: Object oriented Programming Classes & objects, fields Properties, Methods & Events, constructor, inheritance. Access Specifiers Public Private, Projected Overloading.

UNIT -VI

Database Programming with ADO.NET: ADO.NET Architecture Understanding the Connection Object Building the Connection String Understanding the Command Object Understanding Data Readers Understanding Data Sets and Data Adapters Data Table Data Column

Text Books:

1. C#.NET Programming Black Book by steven holzner –dreamtech publications
2. Introduction to .NET framework-Wrox publication
3. Microsoft ADO. Net, by Rebecca M. Riordan, Microsoft Press.

References:

1. .Net 4.0 Programming 6-in-1 Black Book

IV Year B.Tech. (CSE). – I Semester

(Elective – II)

Machine Learning

Course objectives:

1. *The main objective of this course is for the students to achieve basic knowledge of artificial intelligence, a deepened technical understanding of machine learning research and theories, as well as practical experience of the use and design of machine learning and data mining algorithms for applications and experiments. The course has a strong focus towards applied IT.*
2. *The student not only learns how to critically review and compare different algorithms and methods, but how to plan, design, and implement learning components and applications and how to conduct machine learning experiments.*

Course Outcomes:

- *The student will be able evaluate and compare the performance or, other qualities, of algorithms for typical learning problems.*
- *The student will be able to design a supervised or unsupervised learning system.*

Unit -I

Introduction: Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning. Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias.

Unit -II

Linear Regression & Logistic Regression:

Predicting Numeric Values: regression - Finding the best fit lines with linear regression, Locally weighted linear regression, Shrinking Coefficients, The bias / Variance tradeoff.

Logistic Regression: Classification with logistic regression and the sigmoid function, Using optimization to find the best regression coefficients.

Unit -III

Artificial Neural Networks: Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition, Advanced topics in artificial neural networks

Unit- IV

Evaluation Hypotheses: Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms.

Unit- V

Support vector machines & Dimensionality Reduction techniques: Separating data with the maximum margin, finding the maximum margin, efficient optimization with SMO algorithm, speeding up optimization with full platt SMO, Using Kernels for more Complex data.

Dimensionality Reduction techniques: Principal Component analysis, Example.

Unit -VI

Instance-Based Learning: Introduction, k -Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.

Genetic Algorithms: Representing Hypotheses, Genetic Operators, Fitness Function and Selection, Illustrative Example.

Text Books:

1. Machine Learning ,Tom M. Mitchell, MGH
2. Machine Learning in Action, Peter Harington, 2012, Cengage.`

Reference Books:

1. Introduction to Machine Learning, Ethem Alpaydin, PHI, 2004

IV Year B.Tech. (CSE). – I Semester

(Elective – II)

Advanced Databases

Course Objectives:

1. *Be able to design high-quality relational databases and database applications.*
2. *Have developed skills in advanced visual& conceptual modeling and database design.*
3. *Be able to translate complex conceptual data models into logical and physical database designs.*
4. *Have developed an appreciation of emerging database trends as they apply to semi-structured data, the internet and object-oriented databases*

Course Outcomes:

1. *Identify, describe, and categorize database objects*
2. *Design and implement advanced queries using Structured Query Language*
3. *Design, construct and maintain a database and various database objects using procedural language constructs, forms and reports to solve problems*
4. *Administer a database by recommending and implementing procedures including database tuning, backup and recovery*
5. *Propose, implement and maintain database security mechanisms*
6. *Explore non-relational database systems and structures*

Unit-I

Algorithms for Query Processing and Optimization: Translating SQL queries into relational algebra-algorithms for external sorting-algorithms for select and join operations-algorithms for project and set operations-implementing aggregate operations and outer joins-combining operations using pipelining-using heuristics in query optimization.

Unit-II

Data Base Systems Architecture And The System Catalog: System architectures for DBMSs, Catalogs for Relational DBMSs, System catalog information in oracle.

Practical database design and tuning: Physical Database Design in Relational Databases-an overview of Database Tuning in Relational systems.

Unit-III

Distributed DBMS Concepts and Design: Introduction-function and architecture of a Distributed DBMS-Distributed Relational Database Design-transparencies in a Distributed DBMS-Date's Twelve Rules for Distributed DBMS.

Distributed DBMS-Advanced Concepts: Distributed Transaction Management-Distributed Concurrency Control-Distributed Deadlock Management-Distributed Database Recovery-The X/Open Distributed Transaction processing model-Replication Servers.

Unit- IV

Introduction to Object DBMSs: Advanced Database Applications-Weaknesses of RDBMSs-Object oriented Concepts-Storing objects in a Relational Database-Next generation Database systems.

Object-Oriented DBMSs-Concepts and Design : Introduction to Object-Oriented Data Models and DBMSs-OODBMS perspectives-Persistence-Issues in OODBMSs-The object Oriented Database System Manifesto-Advantages and Disadvantages of OODBMSs-Object oriented Database Design.

Unit -V

Object-Oriented DBMSs-Standards and Systems: Object management group-Object Database Standard ODMG3.0, 1999-Object store.

Object relational DBMSs: Introduction to Object-relational Database systems- third generation Database manifesto-Postgres-an early ORDBMS-SQL3.

Unit - VI

Emerging Database Technologies And Applications: Hadoop, Big Data characteristics, NO SQL databases, BASE, Brewer's theorem, Relationship between CAP, ACID and No SQL databases, comparison with Relational databases, No SQL databases types, Comparative study of NO SQL products, Case studies using MangoDB and Cassandra

Text Books:

1. "Fundamentals of Database Systems", ElmasriNavate, 5/e, Pearson Education.
2. Principles of distributed databases S Ceri and Palgettgi TMH
3. Getting started with No SQL Databases , Gaurav Vaish

References Books:

1. "Principles of Distributed Database Systems", Ozsu, 2/e, PHI.

IV Year B.Tech (CSE) – II Semester

(Elective-III)

Human Computer Interaction

Course Objectives: *The main objective is to get student to think constructively and analytically about how to design and evaluate interactive technologies.*

Course Outcomes:

1. *Explain the capabilities of both humans and computers from the viewpoint of human information processing.*
2. *Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.*
3. *Apply an interactive design process and universal design principles to designing HCI systems.*
4. *Describe and use HCI design principles, standards and guidelines.*
5. *Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.*
6. *Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design*

Unit-I

Objective: Explain the capabilities of both humans and computers from the viewpoint of human information processing.

Introduction: Usability of Interactive Systems- introduction, usability goals and measures, usability motivations, universal usability, goals for our profession

Managing Design Processes: Introduction, Organizational design to support usability, Four pillars of design, development methodologies, Ethnographic observation, Participatory design, Scenario Development, Social impact statement for early design review, legal issues, Usability Testing and Laboratories

Unit-II

Objective: Discuss task and dialogs of relevant HCI systems based on task analysis and dialog design.

Menu Selection, Form Fill-In and Dialog Boxes: Introduction, Task- Related Menu Organization, Single menus, Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, Data entry with Menus: Form Fill-in, dialog Boxes, and alternatives, Audio Menus and menus for Small Displays

Unit-III

Objective: Apply an interactive design process and universal design principles to designing HCI systems.

Command and Natural Languages: Introduction, Command organization Functionality, Strategies and Structure, Naming and Abbreviations, Natural Language in Computing

Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays- Small and large

Unit- IV

Objective: Describe typical human computer interaction (HCI) models, styles, and various historic HCI paradigms.

Quality of Service: Introduction, Models of Response-Time impacts, Expectations and attitudes, User Productivity, Variability in Response Time, Frustrating Experiences

Balancing Function and Fashion: Introduction, Error Messages, Nonanthropomorphic Design, Display Design, Web Page Design, Window Design, Color

Unit -V

Objective: Describe and use HCI design principles, standards and guidelines.

User Documentation and Online Help: Introduction, Online Vs Paper Documentation, Reading from paper Vs from Displays, Shaping the content of the Documentation, Accessing the Documentation, Online tutorials and animated documentation, Online communities for User Assistance, The Development Process

Unit -VI

Objective: Analyze and identify user models, user support, socio-organizational issues, and stakeholders requirements of HCI systems.

Information Search: Introduction, Searching in Textual Documents and Database Querying, Multimedia Document Searches, Advanced Filtering and Searching Interfaces

Information Visualization: Introduction, Data Type by Task Taxonomy, Challenges for Information Visualization

Text Books:

1. Designing the User Interface, Strategies for Effective Human Computer Interaction, 5ed, Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven M Jacobs, Pearson
2. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech.

Reference Books:

1. Human Computer, Interaction Dan R.Olsan, Cengage, 2010.
2. Designing the user interface. 4/e, Ben Shneidermann, PEA.
3. User Interface Design, Soren Lauesen , PEA.
4. Interaction Design PRECE, ROGERS, SHARPS, Wiley.

IV Year B.Tech. (CSE). – II Semester

(Elective – III)

Advanced Operating Systems

Course Objectives: *The aim of this module is to study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems); Hardware and software features that support these systems.*

Course outcomes:

1. *Outline the potential benefits of distributed systems*
2. *Summarize the major security issues associated with distributed systems along with the range of techniques available for increasing system security*

Unit–I

Introduction to Distributed systems: Goals of distributed system, hardware and software concepts, design issues.

Communication in Distributed systems: Layered protocols, ATM networks, the Client - Server model, remote procedure call and group communication.

Unit–II

Synchronization in Distributed systems: Clock synchronization, Mutual exclusion, E-tech algorithms, the Bully algorithm, a ring algorithm, atomic transactions,

Unit-III

Deadlocks: Deadlock in distributed systems, Distributed deadlock prevention, and distributed dead lock detection.

Unit–IV

Processes: Processes and Processors in distributed systems: Threads, system models, Processor allocation, Scheduling in distributed system, Fault tolerance and real time distributed systems.

Unit-V

Distributed File Systems: Distributed file systems design, distributed file system implementation, trends in distributed file systems**.**

Distributed Shared Memory: What is shared memory, consistency models, page based distributed shared memory, shared variable distributed shared memory, object based DSM.

Unit-VI

Case study MACH: Introduction to MACH, process management in MACH, memory management in MACH, communication in MACH, UNIX emulation in MACH. Case study **DCE:** Introduction to DCE threads, RPC's, Time service, Directory service, security service, Distributed file system.

Text Books:

1. Distributed Operating System - Andrew. S. Tanenbaum, PHI
2. Operating Systems – Internal and Design Principles Stallings, Fifth Edition–2005, Pearson education/PHI

Reference Books:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI

IV Year B.Tech. (CSE). – II Semester

(Elective – III)

Mobile Adhoc & Sensor Networks

Course Objectives:

1. *To make the student understand the concepts of MOBILE AD HOC NETWORKS (Manets) as well as Wireless Sensor Networks (WSN), their characteristics, novel applications, and technical challenges.*
2. *To understand the issues and solutions of various layers of Manets, namely MAC layer, Network Layer & Transport Layer in Manets and WSN.*
3. *To understand the platforms and protocols used in Manets and WSN.*
4. *To make the student take up further research as part of his higher studies*

Course Outcomes:

1. *Able to think and develop new applications in Manets and WSN.*
2. *Able to take any new technical issue related to these new thrust areas and come up with a solution(s).*
3. *Able to develop algorithms/protocols for Manets and WSN.*

Unit-I

Introduction to Ad Hoc Networks: Characteristics of MANETs, applications of MANETs, and challenges of MANETs.

Routing in MANETs: Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Position based routing algorithms.

Unit-II
Data Transmission: Broadcast storm problem, Broadcasting, Multicasting and Geocasting

Unit-III
TCP over Ad Hoc*:* TCP protocol overview, TCP and MANETs, and Solutions for TCP over Ad hoc

Unit-IV
Basics of Wireless Sensors and Applications: Applications, Classification of sensor networks, Architecture of sensor networks, Physical layer, MAC layer, Link layer

Unit-V
Data Retrieval in Sensor Networks: Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, and Sensor Networks and mobile robots.

Unit-VI
Security: Security in ad hoc networks, Key management, Secure routing, Cooperation in MANETs, and Intrusion detection systems.
Sensor Network Platforms and Tools: Sensor Network Hardware, Berkeley motes, Sensor Network Programming Challenges, Node-Level Software Platforms, TinyOS, NS-2 and TOSSIM.

Text Books:

1. Ad hoc and Sensor Networks - Theory and Applications, by Carlos Cordeiro and Dharma P. Agrawal, World Scientific Publications, Marc2006, ISBN 981-256-681-3.

2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science ISBN: 978-1-55860-914-3, (Morgan Kauffman)

IV Year B.Tech (CSE) – II Semester

(Elective-III)

Pattern Recognition

Course Objectives: *The course is designed to introduce students to theoretical concepts and practical issues associated with pattern recognition*

Course Outcomes:

1. *Design systems and algorithms for pattern recognition (signal classification), with focus on sequences of patterns that are analyzed using, e.g., hidden Markov models (HMM),*
2. *Analyse classification problems probabilistically and estimate classifier performance,*
3. *Understand and analyse methods for automatic training of classification systems,*
4. *Apply Maximum-likelihood parameter estimation in relatively complex probabilistic models, such as mixture density models and hidden Markov models,*
5. *Understand the principles of Bayesian parameter estimation and apply them in relatively simple probabilistic models*

Unit-I
Objectives: Design systems and algorithms for pattern recognition (signal classification), with focus on sequences of patterns that are analyzed using, e.g., hidden Markov models (HMM).
Introduction: Machine perception, pattern recognition example, pattern recognition systems, the Design cycle, learning and adaptation.
Bayesian Decision Theory: Introduction, continuous features – two categories classifications, minimum error-rate classification-zero–one loss function, classifiers, discriminant functions, and decision surfaces.

Unit-II

Objectives: Analyze classification problems probabilistically and estimate classifier performance.

Normal density: Univariate and multivariate density, discriminant functions for the normal Density different cases, Bayes decision theory – discrete features, compound Bayesian decision theory and context.

Unit-III

Objectives: Understand and analyze methods for automatic training of classification systems.

Maximum likelihood and Bayesian parameter estimation: Introduction, maximum likelihood Estimation, Bayesian estimation, Bayesian parameter estimation–Gaussian case.

Unit-IV

Objectives: Apply Maximum-likelihood parameter estimation in relatively complex probabilistic models, such as mixture density models and hidden Markov models**.**

Un-supervised learning and clustering: Introduction, mixture densities and identifiability, maximum likelihood estimates, application to normal mixtures, K-means clustering. Date description and clustering – similarity measures, criteria function for clustering.

Unit-V

Objectives: Understand the principles of Bayesian parameter estimation and apply them in relatively simple probabilistic models.

Pattern recognition using discrete hidden Markov models: Discrete-time Markov process, Extensions to hidden Markov models, three basic problems of HMMs, types of HMMs.

Unit-VI

Objectives: Using markov model we analyses different densities and speech applications.

Continuous hidden Markov models:

Continuous observation densities, multiple mixtures per state, speech recognition applications.

Text Books:

1. Pattern classifications, Richard O. Duda, Peter E. Hart, David G. Stroke. Wiley student edition, Second Edition.
2. Pattern Recognition, An Introduction, V Susheela Devi, M Narsimha Murthy, Universiy Press

Reference Books:

1. R.C Gonzalez and R.E. Woods, "Digital Image Processing", Addison Wesley, 1992.
2. Pattern Recognition and Image Analysis – Earl Gose, Richard John baugh, Steve Jost PHI 2004
3. Fundamentals of speech Recognition, Lawerence Rabiner, Biing – Hwang Juang Pearson education.
4. Pattern Recognition, Sergios Theodoridis, Konstantinos Koutroumbas, Academic Press, Elsevier, 4ed.

IV Year B.Tech. (CSE). – II Semester

(Elective – III)

Digital Image Processing

Course Objectives:

1. *The fundamentals of Computer Graphics and Image Processing*
2. *The concepts related edge detection, segmentation, morphology and image compression methods.*

Course Outcomes:

- *Understanding of digital image processing fundamentals: hardware and software, digitization, enhancement and restoration, encoding, segmentation, feature detection*
- *Ability to apply image processing techniques in both the spatial and frequency (Fourier) domains*

- *Ability To understand (i.e., be able to describe, analyse and reason about) how digital images are represented, manipulated, encoded and processed, with emphasis on algorithm design, implementation and performance evaluation*

Unit-I

Introduction: Applications of Computer Graphics and Image Processing, Fundamentals on Pixel concepts, effect of Aliasing and Jaggles, Advantages of high resolution systems

DDA line algorithms: Bresenhams line and circle derivations and algorithms

Unit-II

2-D Transformations: Translations, Scaling, rotation, reflection and shear transformations, Homogeneous coordinates, Composite Transformations- Reflection about an arbitrary line; Windowing and clipping, viewing transformations, Cohen- Sutherland clipping algorithm

Unit-III

Digital Image Properties: Metric and topological properties of Digital Images, Histogram, entropy, Visual Perception, Image Quality, Color perceived by humans, Color Spaces, Palette Images, color Constancy

Color Images: Pixel brightness transformations, Local Preprocessing, image smoothing, Edge detectors, Robert Operators, Laplace, Prewitt, Sobel, Fri-chen, Canny Edge detection

Unit-IV

Mathematical Morphology: Basic Mathematical Concepts, Binary dilation and Erosion, Opening and closing, Gray Scale dilation and erosion, Skeleton, Thinning , Thickening Ultimate erosion, Geodesic transformations, Morphology and reconstruction, Morphological Segmentation

Unit-V

Segmentation: Threshold detection methods, Optimal Thresholding, Edge based Segmentation-Edge image thresholding, Edge relaxation, Border tracing, Hough Transforms, Region based segmentation: Region Mergingm Region Splitting, Splitting and Merging, Watershed Segmentation.

Unit-VI

Image Data Compression: Image data Properties, Discrete Image Transformations in data compression, Discrete Cosine and Wavelet Transforms, Types of DWT and merits; Predicative Compression methods, Hierarchical and Progressive Compression methods, Comparison of Compression methods, JPEG- MPEG Image Compression methods.

Text Books:

1. Computer Graphics C Version, Donald Hearn, M Paulli Baker , Pearson
2. Image Processing, Analysis and Machine Vision, Millan Sonka, Vaclov Halvoc, Roger Boyle, Cengage Learning, 3ed.

References:

1. Computer & Machine Vision, Theory, Algorithms, Practicles, E.R.Davies, Elsevier, 4ed
2. Digital Image Processing with MATLAB and LABVIEW, Vipul Singh, Elsevier
3. Digital Image Processing, R.C Gonzalez &R E woods, Addison Pearson, 3ed.

IV Year B.Tech. (CSE). – II Semester

(Elective – IV)

Embedded and Real Time Systems

Course Objectives:

1. *Develop an understanding of the technologies behind the embedded computing systems*
2. *Technology capabilities and limitations of the hardware, software components*
3. *Methods to evaluate design tradeoffs between different technology choices.*
4. *Design methodologies*

Course Outcomes:

1. *Understand the basics of an embedded system*
2. *Program an embedded system*
3. *Design, implement and test an embedded system. Identify the unique characteristics of real-time systems*
4. *Explain the general structure of a real-time system*
5. *Define the unique design problems and challenges of real-time systems*

Unit-I

Introduction to Embedded systems: What is an embedded system Vs. General computing system, history, classification, major application areas, and purpose of embedded systems. Core of embedded system, memory, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components.

Unit-II

8-Bit Microcontrollers Architecture: Characteristics, quality attributes application specific, domain specific, embedded systems. Factors to be considered in selecting a controller, 8051 architecture, memory organization, registers, oscillator unit, ports, source current, sinking current, design examples.

Unit-III

RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

Unit-IV

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher's problem.

Unit-V

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

Unit-VI

Simulators, emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

Text Books:

1. Introduction to embedded systems Shibu. K.V, TMH, 2009.

Reference Books:

1. Ayala & Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2. Embedded Systems, Rajkamal, TMH, 2009.
3. Embedded Software Primer, David Simon, Pearson.
4. The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi, Pearson,.

IV Year B.Tech. (CSE). – II Semester

(Elective – IV)

Neural Networks and Soft Computing

Course Objectives:

1. *To have a detailed study of neural networks, Fuzzy Logic and uses of Heuristics based on human experience.*
2. *To Familiarize with Soft computing concepts.*
3. *To introduce the concepts of genetic algorithm and its applications to soft computing using some applications*

Course Outcomes:

1. *Identify and describe soft computing techniques and their roles in building intelligent machines.*
2. *Recognize the feasibility of applying a soft computing methodology for a particular problem.*
3. *Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.*

Unit -I

Introduction: What is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural

Unit-II

Learning Process: Error Correction learning, Memory based learning, Hebbian learning, Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process.

Unit-III

Classical & Fuzzy Sets: Introduction to classical sets – properties, operations and relations; Fuzzy sets – memberships, uncertainty, operations, properties, fuzzy relations, cardinalities, membership functions.

Unit- IV

Fuzzy Logic System Components: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods

Unit -V

Concept Learning: Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm

Decision Tree Learning: Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning

Unit-VI

Genetic Algorithms: Motivation, Genetic Algorithms, an Illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms

Text Books:

1. Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2nd edition, 2004.
2. Neural Networks, Fuzzy Logic, Genetic Algorithms: Synthesis and Applications by Rajasekharan and Pai, PHI Publications
3. Machine Learning, Tom M. Mitchell, MGH

IV Year B.Tech (CSE) – II Semester

(Elective-IV)

Social Networks and the Semantic Web

Course Objectives: *This course addresses the issues needed to realize the vision of the Semantic Web through the use of Intelligent Agents. The objectives are:*

1. *to understand semantic web*
2. *to understand the role of ontology and inference engines in semantic web*

Course Outcomes:

1. *Demonstrate knowledge and be able to explain the three different "named" generations of the web.*
2. *Demonstrate the ability to anticipate materially in projects that develop programs relating to Web applications and the analysis of Web data.*
3. *Be able to understand and analyze key Web applications including search engines and social networking sites.*
4. *Be able to understand and explain the key aspects of Web architecture and why these are important to the continued functioning of the World Wide Web.*
5. *Be able to analyze and explain how technical changes affect the social aspects of Web-based computing.*
6. *Be able to develop "linked data" applications using Semantic Web technologies.*

Unit-I

Objectives: Demonstrate knowledge and be able to explain the three different "named" generations of the web.

The Semantic Web: Limitations of the current Web, The semantic solution, Development of the Semantic Web, The emergence of the social web.

Unit-II

Objectives: Demonstrate the ability articipate materially in projects that develop programs relating to Web applications and the analysis of Web data.

Social Network Analysis: What is network analysis?, Development of Social Network analysis, Key concepts and measures in network analysis.

Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities, Web-based networks.

Unit-III

Objectives: Be able to understand and analyze key Web applications including search engines and social networking sites.

Knowledge Representation on the Semantic Web: Anthologies and their role in the Semantic Web, Ontology languages for the semantic Web.

Unit-IV

Objectives: Be able to understand and explain the key aspects of Web architecture and why these are important to the continued functioning of the World Wide Web.

Modeling and Aggregating Social Network Data: State of the art in network data representation, Ontologicl representation of Social individuals, Ontological representation of social relationships, Aggregating and reasoning with social network data.

Unit-V

Objectives: Be able to analyze and explain how technical changes affect the social aspects of Web-based computing.

Developing social semantic applications: Building Semantic Web applications with social network features, Flink- the social networks of the Semantic Web community, Open academia: distributed, semantic-based publication management.

Unit-VI

Objectives: Be able to develop "linked data" applications using Semantic Web technologies.

Evaluation of Web-Based Social Network Extraction: Differences between survey methods and electronic data extraction, context of the empirical study, Data collection, Preparing the data, Optimizing goodness of fit, Comparison across methods and networks, Predicting the goodness of fit, Evaluation through analysis.

Text Books:

1. Peter Semantic Web Social Networks and the Mika, Springer, 2007.
2. Technologies Semantic Web Ontology Based Systems, J. Davies, Rudi Studer, Paul Trends and Research in Warren, JohnWiley&Sons.

Reference Books:

1. Semantic and Semantic Web Services –Liyang Lu Chapman and Hall/CRC Publishers,(Taylor Web & Francis Group)
2. Information Sharing on Springer – Heiner Stuckenschmidt; Frank Van Harmelen, semantic Web the Publications .

IV Year B.Tech. (CSE). – II Semester

***(*Elective-IV)**

Parallel Computing

Course Objectives:

1. *Become acquainted with commonly used discretization techniques, and their role in the analysis of continuum mechanics problems*
2. *Be exposed to currently available high performance computing platforms*
3. *Learn to improve the efficiency of their analysis codes by using programming techniques that take into account the memory hierarchy of the processing unit*
4. *Begin to apply parallelization techniques in order to dramatically reduce time required to complete the numerical simulation*
5. *Explore the internal workings of a parallel finite element implementation for fluid flow analysis*

Unit-I

Introduction: Computational demand in various application areas, advent of parallel processing, terminology-pipelining, Data parallelism and control parallelism-Amdahl's law. Basic parallel random access Machine Algorithms-definitions of P, NP and NP-Hard, NP-complete classes of sequential algorithms; NC–class for parallel algorithms.

Unit-II

Scheduling: Organizational features of Processor Arrays, Multi processors and multi-computers. Mapping and scheduling aspects of algorithms. Coffman-graham scheduling algorithm for parallel processors.

Unit-III
Algorithms-1: Elementary Parallel algorithms on SIMD and MIMD machines, Analysis of these algorithms. Matrix Multiplication algorithms on SIMD and MIMD models.

Unit-IV
Algorithms: Fast Fourier Transform algorithms. Implementation on Hyper cube architectures. Solving linear file -system of equations, parallelizing aspects of sequential methods back substitution and Tri diagonal.

Unit-V
Array processors: Array processors, 2D-Mesh processor and Hypercube Processor Array.

Unit-VI
Sorting: Parallel sorting methods, Odd-even transposition Sorting on processor arrays, Parallel Quick-sort on Multi processors.
Searching: Parallel search operations. Ellis algorithm and Manber and ladner's Algorithms for dictionary operations.

Text Books:
1. Parallel computing theory and practice, Michel J.Quinn
2. Programming Parallel Algorithms, Guy E. Blelloch, Communications of the ACM

IV Year B.Tech. (CSE). – II Semester

(Elective-IV)

E-Commerce

Course Objectives : T*o introduce the concept of electronic commerce, and to understand how electronic commerce is affecting business enterprises, governments, consumers and people in general.*

Unit–I
Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

Unit – II
Consumer Oriented Electronic commerce - Mercantile Process models.

Unit–III
Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

Unit-IV
Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

Unit–V
Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

Unit–VI

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.

Text Books:

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.
2. E-Commerce , strategy, Technology, and Implementation,

References Books:

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.