



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

**Course Structure for Computer Science and Engineering
B. Tech Course
(2013-14)**

IV - I Semester

S.No	Course code	Subject	Theory	T	P	Credits
1.	13A05701	Software Architecture & Design Patterns	3	1	-	3
2.	13A05702	Cryptography & Network Security	3	1	-	3
3.	13A05703	Mobile Application Development	3	1	-	3
4.	13A52702	Management Science	3	1	-	3
5.	Choice Based Credit Courses (Department specific)				-	
	13A05704	1. Human Computer Interaction	3	1		3
	13A05705	2. Computer Graphics & Multimedia				
	13A05706	3. Soft Computing				
6.	Choice Based Credit Courses (Department specific)				-	
	13A05707	1. Artificial Intelligence	3	1		3
	13A05708	2. Information Retrieval Systems				
	13A05709	3. Advanced Computer Architecture				
7.	13A05710	Computer Networks and Network Security Laboratory	-		4	2
8.	13A05711	Mobile Application Development Laboratory	-		4	2
Total			18	06	08	22

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B.Tech. IV - I sem (C.S.E.)

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(13A05701) SOFTWARE ARCHITECTURE & DESIGN PATTERNS

Course Objective:

- To understand interrelationships, principles and guidelines governing architecture and evolution over time.
- To understand various architectural styles of software systems.
- To understand design patterns and their underlying object oriented concepts.
- To understand implementation of design patterns and providing solutions to real world software design problems.
- To understand patterns with each other and understanding the consequences of combining patterns on the overall quality of a system

Learning Outcome:

- Know concepts, principles, techniques, and methods for design, analysis, and maintenance of software architectures
- Know the underlying object oriented principles of design patterns.
- Understand the context in which the pattern can be applied
- Understand how the application of a pattern affects the system quality and its tradeoffs

UNIT I

Introduction: What is Software Architecture? An Engineering Discipline for Software, The Status of Software Architecture.

Architectural Styles: Architectural Styles, Pipes and Filters, Data Abstraction and Object-Oriented Organization, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters, Process Control, Other Familiar Architectures, Heterogeneous Architectures.

Shared Information Systems: Shared Information Systems, Database Integration, Integration in Software Development Environments, Architectural Structures for Shared Information Systems.

UNIT II

Introduction: What Is a Design Pattern? Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT III

Structural Pattern Part-I: Adapter, Bridge, Composite.

Structural Pattern Part-II: Decorator, Facade, Flyweight, Proxy.

UNIT IV

Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer.

UNIT V

Behavioral Patterns Part-II: State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

A Case Study (Designing a Document Editor): Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation.

Text Books :

1. *Design Patterns* By Erich Gamma, Pearson Education
2. *Software Architecture: Perspective on an Emerging Discipline* By Mary Shaw, David Garlan, PHI.

Reference Books :

1. *Software Architecture in Practice* by Len Bass, Paul Clements, Rick Kazman, Third Edition, Pearson Education.
2. *Head First Design Patterns* By Eric Freeman-Oreilly-spd.
3. *Design Patterns Explained* By Alan Shalloway, Pearson Education.
4. *Pattern Oriented Software Architecture*, F.Buschmann&others, John Wiley & Sons
5. *Pattern's in JAVA Vol-I* By Mark Grand, Wiley DreamTech.
6. *Pattern's in JAVA Vol-II* By Mark Grand, Wiley DreamTech.
7. *JAVA Enterprise Design Patterns Vol-III* By Mark Grand, Wiley DreamTech

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(13A05702) CRYPTOGRAPHY & NETWORK SECURITY

Course Objective:

- Extensive, thorough and significant understanding of the concepts, issues, principles and theories of computer network security
- Identifying the suitable points for applying security features for network traffic
- Understanding the various cryptographic algorithms and implementation of the same.
- Understanding the various attacks, security mechanisms and services

Learning Outcome:

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

- Protect the network from both internal and external attacks
- Understand and implement various public and private key cryptographic algorithms
- Design of new security approaches

UNIT I

Computer Security concepts, The OSI Security Architecture, Security attacks, Security services and Security mechanisms, A model for Network Security, Classical encryption techniques- symmetric cipher model, substitution ciphers, transposition ciphers, Steganography, Modern Block ciphers, Modern Stream ciphers.

Modern Block Ciphers: Block ciphers principles, Data encryption standard (DES), Strength of DES, linear and differential cryptanalysis, block cipher modes of operations, AES, RC4

UNIT II

Introduction to Number theory : Integer Arithmetic, Modular Arithmetic, Matrices, Linear Congruence, Algebraic Structures, $GF(2^n)$ Fields, Primes, Primarily Testing, Factorization, Chinese remainder Theorem, Quadratic Congruence, Exponentiation and Logarithm.

Public-key cryptography :Principles of public-key cryptography, RSA Algorithm, Diffie-Hellman Key Exchange, ElGamal cryptographic system, Elliptic Curve Arithmetic, Elliptic curve cryptography

UNIT III

Cryptographic Hash functions: Applications of Cryptographic Hash functions, Requirements and security, Hash functions based on Cipher Block Chaining, Secure Hash Algorithm (SHA)

Message Authentication Codes: Message authentication Requirements, Message authentication functions, Requirements for Message authentication codes, security of MACs, HMAC, MACs based on Block Ciphers, Authenticated Encryption

Digital Signatures : RSA with SHA & DSS

UNIT IV

Key Management and distribution: Symmetric key distribution using Symmetric Encryption, Symmetric key distribution using Asymmetric, Distribution of Public keys, X.509 Certificates, Public key Infrastructure.

User Authentication: Remote user Authentication Principles, Remote user Authentication using Symmetric Encryption, Kerberos, Remote user Authentication using Asymmetric Encryption, Federated Identity Management

Electronic mail security: Pretty Good Privacy (PGP), S/MIME

UNIT V

Security at the Transport Layer(SSL and TLS) : SSL Architecture, Four Protocols, SSL Message Formats, Transport Layer Security, HTTPS, SSH

Security at the Network layer (IPSec): Two modes, Two Security Protocols, Security Association, Security Policy, Internet Key Exchange.

System Security: Description of the system, users, Trust and Trusted Systems, Buffer Overflow and Malicious Software, Malicious Programs, worms, viruses, Intrusion Detection System(IDS), Firewalls

Text Books :

1. *Cryptography and Network Security: Principals and Practice*, William Stallings, Fifth Edition, Pearson Education.
2. *Cryptography and Network Security*, Behrouz A. Frouzan and Debdeep Mukhopadhyay, 2nd edition, Mc Graw Hill Education

Reference Books :

1. *Network Security and Cryptography*, Bernard Menezes , Cengage Learning.
2. *Cryptography and Security*, C.K. Shymala, N. Harini and Dr. T.R. Padmanabhan, Wiley-India.
3. *Applied Cryptography*, Bruce Schneier, 2nd edition, John Wiley & Sons.
4. *Cryptography and Network Security*, Atul Kahate, TMH.
5. *Introduction to Cryptography*, Buchmann, Springer.
6. *Number Theory in the Spirit of Ramanujan*, Bruce C.Berndt, University Press
7. *Introduction to Analytic Number Theory*, Tom M.Apostol, University Press

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(13A05703) MOBILE APPLICATION DEVELOPMENT

Course Objective:

- *To introduce the Android technology and its application.*
- *Design & program real working education based mobile application projects.*
- *Become familiar with common mobile application technologies and platforms; open files, save files, create and program original material, integrate separate files into a mobile application project, create and edit audio sound effects & music.*

Learning Outcome:

At the end of the course students will be assessed to determine whether they are able to

- *Describe the limitations and challenges of working in a mobile and wireless environment as well as the commercial and research opportunities presented by these technologies*
- *Describe and apply the different types of application models/architectures used to develop mobile software applications*
- *Describe the components and structure of a mobile development frameworks (Android SDK and Eclipse Android Development Tools (ADT)) and learn how and when to apply the different components to develop a working system*
- *Describe and apply software patterns for the development of the application models described above*
- *Describe and work within the capabilities and limitations of a range of mobile computing devices*
- *Design, implement and deploy mobile applications using an appropriate software development environment*

UNIT I

J2ME Overview: Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices. Small computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants.

J2ME Architecture and Development Environment: J2ME Architecture, Small Computing Device Requirements, Run – Time Environment, MIDlet programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME wireless Toolkit.

UNIT II

J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices, **Commands, Items, and Event Processing:** J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling.

High – Level Display: Screens, Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class.

UNIT III

Low Level Display: The Canvas, User Interactions, Graphics, Clipping Regions, Animation. **Record Management System:** Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener.

UNIT IV

JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages. Overview of the JDBC process, Database Connection, Statement Objects, Result Set, Transaction Processing, Metadata, Data Types, Exceptions.

JDBC and Embedded SQL: Model programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Updating Tables, Deleting Data from a table.

Introduction Android Programming: What is Android, Activities, Linking Activities Using Intents, Fragments, Calling Built – in Applications using Intents, Displaying Notifications

UNIT V

Android User Interface: Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilizing the Action Bar, Listening for UI Notifications.

Designing User Interface with Views: Basic Views, Picker Views, Using List Views to Display Long Lists.

Text Books :

1. *J2ME: The Complete Reference*, James Keogh, TMH.
2. *Beginning Android 4 Application Development*, Wei-Meng Lee, Wiley India

Reference Books :

1. *Enterprise J2ME: Developing Mobile Java Applications*, Michael Juntao Yuan, Pearson Education, 2004.
2. *Android Application Development for Java programming* by James C. Sheusi, Cengage Learning
3. *Android A Programmers Guide* by Jerome DiMargio, TMH.

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(13A52702) MANAGEMENT SCIENCE

Course Objective:

The objectives of this course are to equip the student the fundamental knowledge of Management Science and its application to effective management of human resources, materials and operations of an organization. It also aims to expose the students about the latest and contemporary developments in the field of management.

Learning outcome:

This course enables the student to know the principles and applications of management knowledge and exposure to the latest developments in the field. This helps to take effective and efficient managerial decisions on physical and human resources of an organization. Besides, the knowledge of Management Science facilitates for his/her personal and professional development.

UNIT I

INTRODUCTION TO MANAGEMENT

Definition of Management- Function of Management- Management as a Science and Art-Management as a Profession- Universality of Management- Henri Faylo's Administrative Theory –Elton Mayo's Human Relations Movement- Systems theory – Contingency theory- Monetary and non-monetary incentives to motivate work teams- Leadership –Definition- Qualities of successful leaders- Different leadership styles.

UNIT II

ORGANIZATION DESIGN AND STRUCTURE

Organization design and structure- Principles—Types of organization structure-Mechanic and Organic Structures- Line organization- Line & Staff organization- Functional Organization – Matrix organization structures- merits and demerits- Departmentation and Decentralization-Power and Authority- Delegation of authority-Principles for effective delegation of authority.

UNIT III

HUMAN RESOURCE AND MATERIALS MANAGEMENT

Concept of HRM-functions – Human Resource Planning-Job Analysis-Recruitment and Selection- Training and Development- Performance appraisal –methods- Wage and Salary Administration- Grievances handling Procedure-Material Management- Need for Inventory control- Economic order quantity- ABC analysis- Management of purchase, stores and stores records.-Marketing Management – Concept- Channels of distribution- Marketing mix and product mix.

UNIT IV

MANAGEMENT OF OPERATIONS & PROJECT MANAGEMENT

Nature of organizational control- Marketing control- HR control- effective control systems- Operations Management- Essentials of operations management- Trends in operational management- Designing operation system for effective management of an organization-Project Management –Network Analysis- PERT and CPM-Project crashing (Simple problems)

UNIT V

CONTEMPORARY MANAGEMENT ISSUES

Strategic Management-Concept- Mission-Vision-Core values-Setting objectives-Corporate planning – Environmental scanning-SWOT analysis- Steps in strategy formulation & implementation- Management

Information System (MIS)- Enterprise Resource Planning (ERP)-Just-in-Time (JIT)- Total Quality Management (TQM) – Supply Chain Management-Six Sigma-Business Process Outsourcing (BPO).

Text Books:

1. *Stoner, Freeman, Gilbert, Management, Pearson, Six Edition 2008*
2. *Aryasri: Management Science, Fourth Edition TMH, 2012.*

Reference Books:

1. *Vijay Kumar & Apparo, Introduction to Management Science, Cengage, 2011.*
2. *Kotler Philip & Keller Kevin Lane: Marketing Management, 14th Edition, Pearson, 2012.*
3. *Aswathappa, Human Resource Management, Himalaya, 2012.*
4. *Kanishka Bedi, Production and Operations Management, Oxford University Press, 2011.*
5. *Schermerhorn, Capling, Poole & Wiesner: Management, Wiley, 2012.*
6. *Joseph M Putti, Management Principles, Mc Millan Publishers, 2012.*

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**(13A05704) HUMAN COMPUTER INTERACTION
CBCC-II**

Course Objective:

- Gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design.
- Become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans
- Be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation
- Be familiar with a variety of both conventional and non-traditional user interface paradigms

Learning Outcome:

At the end of the course students will be assessed to determine whether they are able to

- Find innovative ways of interacting with computers
- Help the disabled by designing non-traditional ways of interacting
- Use cognitive psychology in the design of devices for interaction

UNIT I

Introduction: Importance of user Interface: Definition, Importance of Good Design, Benefits of Good Design, A Brief History of Screen Design.

The Graphical User Interface : Popularity of Graphics, the Concept of Direct Manipulation, Graphical System, Characteristics,

Web User – Interface Popularity, Characteristics- Principles of User Interface.

UNIT II

Design process – Understanding how people interact with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business functions.

Screen Designing: Design goals – Screen meaning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design

UNIT III

System menus: Structures of Menus, Functions of Menus, Content of Menus, Kinds of Graphical menus

Windows: Window characteristics, Components of a window, Window presentation styles, Types of windows, Window management

UNIT IV

Controls: Characteristics of device based controls, Selecting the proper device based controls, Operable controls, Text Entry/Read-only controls, Selection controls, Combination Entry/selection controls, Selecting the proper controls

UNIT V

Graphics: Icons, Multimedia, Colour-what is it, Colour uses, Colour and Human vision, Choosing colours

Testing: The purpose and importance of usability testing, Scope of testing, Prototypes, Kinds of Tests, Developing and conducting the test

Text Books :

1. *The essential guide to user interface design, Wilbert O Galitz, 2nd edition, 2013, Wiley.*

Reference Books :

1. *Designing the user interface, 3rd Edition Ben Shneidermann, Pearson Education Asia.*
2. *Human –Computer Interaction, D.R.Olsen, Cengage Learning.*
3. *Human – Computer Interaction, I.Scott Mackenzie, Elsevier Publishers.*
4. *Interaction Design, Prece, Rogers, Sharps, Wiley Dreamtech.*
5. *User Interface Design, Soren Lauesen, Pearson Education.*
6. *Human –Computer Interaction, Smith - Atakan, Cengage Learning*

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**(13A05705) COMPUTER GRAPHICS AND MULTIMEDIA
(CBCC-II)**

Course Objective:

- To know about different graphics hardware
- To study different techniques and algorithms related to Computer Graphics.
- To make the students understand the creation, storage, and manipulation of models and images of objects.
- Understand the basic concepts of multimedia and gain the skills required to work with them

Learning Outcome:

- Ability to develop programs to control the content, structure and appearance of objects.
- Ability to design, organize and produce multimedia projects of all kinds

UNIT I

Introduction: Computer-Aided design, Presentation graphics, Computer Art, Entertainment, Education and Training, Visualization, Image processing, Graphics user interfaces.

Graphics Systems: Video display devices, Raster scan systems, Random scan systems, Graphics monitors and workstations, Input devices, Hard-copy devices, Graphics software

UNIT II

Basic Graphic algorithms: Overview, Scan converting lines, Scan converting Circles, Scan converting Ellipse, Filling rectangles, Filling polygons, Filling ellipse Arcs, Pattern filling, Clipping lines, Clipping circles and ellipse, Clipping polygons, Generating characters.

Geometrical Transformations: 2D Transformation, Homogeneous co-ordinates and matrix representation of 2D transformations, Composition of 2D transformations, The window-to-view port transformation, Efficiency.

3D Transformations: Matrix representation of 3D transformations, Composition of 3D transformations, Transformations as a change in coordinate system.

UNIT III

Viewing in 3D: Projections, Specifying an arbitrary 3D view, Examples of 3D viewing.

Curves and surfaces: Polygon meshes, Parametric cubic curves: Hermite curves, Bezier curves, Uniform non rational B-splines, Non uniform Non rational B-splines

Parametric Bicubic surfaces: Hermite surfaces, Bezier surfaces, B-spline surfaces

Visual realism: Why realism, Fundamental difficulties, Rendering techniques for line drawings, Rendering techniques for shaded images, Dynamics.

UNIT IV

Visible surface determination: Functions of two variables, Techniques for efficient visible surface algorithms, Algorithms for visible-line determination, The z-buffer algorithm, List priority algorithms, Scan line algorithms.

Illumination and Shading: Illumination models, Shading models for polygons, Surface detail, Shadows, Transparency.

UNIT V

Multimedia: Where to use multimedia, Text: The power of meaning, About fonts and faces, Images: Before you start to create, Making still images, color, Sound: The power of sound, Digital audio, MIDI Audio, MIDI Vs Digital audio, Multimedia system sounds, Audio File formats, Animation, Video: Using video, How video works and is displayed, Digital video containers

Text Books :

1. *Computer Graphics C version, Donald Hearn and M. Pauline Baker, 2nd edition, 2011, Pearson.*
2. *Computer Graphics Principles and Practice in C, Foley, Dam, Feiner, John, 2nd Edition, 2013, Pearson.*
3. *Multimedia: Making It Work, Tay Vaughan, 8th Edition, 2011, Tata McGrawHill Edition*

Reference Books :

1. *Computer Graphics with Virtual Reality System, Rajesh K.Mourya, Wiley India.*
2. *Principles of Computer Graphics, Theory and Practice, Shalini, Govil Pai, Springer.*
3. *Multimedia Applications, Relp Stteinmetz, Kolara Nahrstedt, Springer International Edition.*
4. *Principles of Multimedia, Ranjan Parckh, Second Edition, Mc Graw Hill.*

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(13A05706) SOFT COMPUTING

(CBCC-II)

Course Objectives:

To give students knowledge of soft computing theories, i.e. Fundamentals of artificial and neural networks, fuzzy sets and fuzzy logic and genetic algorithms

Course Outcomes:

Learn the unified and exact mathematical basis as well as the general principles of various soft computing techniques

Unit-1

Fundamentals of Artificial Neural Network: Introduction, Model of Biological Neuron, Mathematical Model of Neuron, ANN Architecture, Learning Rules, Learning Paradigms, Perceptron Network, Adaline and madaline network, Applications of Neural network.

Feed forward Neural Network: Introduction, Back Propagation Network, parameter Selection in BPN, Local Minima and Global minima, Merits and demerits of Back Propagation, variants of Back Propagation, Applications of BPN, Radial Basis Function, Applications of RBF

Unit-2

Associate Models: Hopfield Network, Blotzmann Network, Simulated Annealing, Applications of Network.

Classical Sets and Fuzzy Sets: Crisp Sets, Fuzzy Sets: History and Origin, Basic concepts, Paradigm Shift, Representation of Fuzzy Sets, Alpha cuts, Basic Operations on Fuzzy sets, Fuzzy complements, Intersections and Unions, Extension Principles for Fuzzy sets, Intuitionistic fuzzy sets, Operations on Intuitionistic fuzzy sets, Alpha-beta cuts

Unit-3

Crisp Relations and Fuzzy Relations: Crisp Relations, Fuzzy Relations, Binary Fuzzy Relations, Intuitionistic Fuzzy Relations

Classical Logic and Fuzzy Logic: Logic, Interval Analysis, Fuzzy Numbers, Fuzzy logic.

Unit-4

Fuzzy Associative Memories: FAM – an Introduction, Single Association FAM, Fuzzy Hebb FAMs, FAM Involving a Rule base, FAM Rules with Multiple Antecedents/Consequents, Applications.

Fuzzy Logic Controlled Genetic Algorithms: Soft computing tools, Problem description of Optimum design, Fuzzy constraints, Illustrations, GA in Fuzzy logic controller design, Fuzzy logic controller, FLC-GA Based Structural Optimization.

Fuzzy Rule Based System: Linguistic variables and Hedges, Rule_based System, Conventional Programs vs Rule based systems, Fuzzy Propositions, Fuzzification and Defuzzification, Approximate Reasoning.

Unit-5

Genetic Algorithms: History of Evolutionary Computing, Crossover and Mutation properties, Genetic Algorithm Cycle, Fitness Function, Applications of Genetic Algorithm.

Rough Sets, Rule Induction, and Discernibility Matrix: Knowledge Representation, Knowledge Representation System, Decision tables, Rule Induction, Discernibility Matrix.

Text Books:

1. Soft Computing advantages and applications by B.K Tripathy, J. Anuradha, Cengage Learning.
2. Neural Networks, Fuzzy logic, and Genetic Algorithms by S. Rajasekaran, G.A. Vijaya Lakshmi Pai, PHI.

Reference Books:

1. Bart Kosko, "Neural Networks and Fuzzy Systems," Prentice Hall of India, 2005.
George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic: Theory and Application," Prentice Hall of India, 2001.
 1. Vojislav Kecman, "Learning and Soft Computing," Pearson Education (Asia) Pte. Ltd. 2004.
 2. S. Haykin, "Neural Networks: A Comprehensive Foundation," Pearson Education (Asia) Pte. Ltd./Prentice Hall of India, 2003.
- M.T. Hagan, H.B. Demuth and M. Beale, "Neural Network Design," Thomson Learning, 2002.

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(13A05707) ARTIFICIAL INTELLIGENCE (CBCC-III)

Course Objective:

- *To learn the difference between optimal reasoning Vs human like reasoning*
- *To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities*
- *To learn different knowledge representation techniques*
- *To understand the applications of AI namely, Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing*

Learning Outcome:

- *Possess the ability to formulate an efficient problem space for a problem expressed in English*
- *Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.*
- *Possess the skill for representing knowledge using the appropriate technique*
- *Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing*

UNIT I

Introduction: History, Intelligent Systems, Foundations of AI, sub areas of AI, applications. 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 and Planning. Game Playing, Bounded Look-ahead strategy and use of Evaluation functions, Alpha-Beta Pruning

UNIT II

Logic concepts and Logic programming: - Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming. Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames, advanced knowledge representation Techniques.

UNIT III

Expert System and Applications: Introduction, Phases in Building Expert systems, expert system architecture, expert systems Vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of shells and tools. Uncertainty Measure – Probability Theory: - Introduction, Probability Theory, Bayesian Belief Networks, Certainty factor theory, Dempster-Shafer Theory

UNIT IV

Machine-Learning Paradigms: - Introduction, Machine Learning systems. Supervised and unsupervised learning. Inductive learning, learning decision Tree (Text Book 2), Deductive Learning. Clustering, Support Vector Machines. Artificial Neural Networks: - Introduction, artificial neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Network, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks

UNIT V

Fuzzy Logic : - Fuzzy sets, Evolutionary Programming, Genetic Programming Concepts, swarm Intelligence Ant colony Paradigm, Natural Language Processing

Text Books :

1. *Artificial Intelligence, Saroj Kaushik, Cengage Learning 2011*
2. *Artificial intelligence, A Modern Approach, Russell, Norvig, Pearson Education, Second Edition. 2004*

Reference Books :

1. *Artificial intelligence, Rich, Knight, Nair, Tata McGraw Hill, Third Edition 2009*

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**(13A05708) INFORMATION RETRIEVAL SYSTEMS
(CBCC-III)**

Course Objective:

- To learn the different models for information storage and retrieval
- To learn about the various retrieval utilities
- To understand indexing and querying in information retrieval systems
- To expose the students to the notions of structured and semi structured data
- To learn about web search

Learning Outcome:

At the end of the course students will be assessed to determine whether they are able to

- store and retrieve textual documents using appropriate models
- use the various retrieval utilities for improving search
- do indexing and compressing documents to improve space and time efficiency
- formulate SQL like queries for unstructured data

UNIT I

Introduction to Information Retrieval

Retrieval Strategies: Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model, Language Models

UNIT II

Retrieval Utilities: Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

UNIT III

Retrieval Utilities: Semantic networks, Parsing.

Cross-Language Information Retrieval: Introduction, Crossing the language barrier.

UNIT IV

Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection

UNIT V

Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema.

Distributed Information Retrieval: A Theoretical model of distributed retrieval, Web search.

Text Books :

1. *Information Retrieval – Algorithms and Heuristics*, David A. Grossman, Ophir Frieder, 2nd Edition, 2012, Springer, (Distributed by Universities Press)

Reference Books :

1. *Modern Information Retrieval Systems*, Yates, Pearson Education
2. *Information Storage and Retrieval Systems*, Gerald J Kowalski, Mark T Maybury, Springer, 2000
3. *Mining the Web : Discovering Knowledge from Hypertext Data*, Soumen Chakrabarti Morgan-Kaufmann Publishers, 2002
4. *An Introduction to Information Retrieval*, Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, , Cambridge University Press, Cambridge, England, 2009

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(13A05709) ADVANCED COMPUTER ARCHITECTURE (CBCC-III)

Course Objective:

- *Discuss the concept of parallel processing and the relationship between parallelism and performance*
- *Understand the organization of computer structures that can be electronically configured and reconfigured*
- *Discuss the performance advantages that multithreading can offer along with the factors that make it difficult to derive maximum benefits from this approach*

Learning Outcome:

- *Realize Parallelism and Parallel architectures*
- *Ability to use Instruction Level Parallelism*
- *Ability to use Thread level parallelism*

UNIT I

Evolution of Computer Architecture, System Attributes to performance; Shared Memory Multiprocessors, Distributed Memory Multiprocessors, A Taxonomy of MIMD Computers; architecture of Vector Super computers, operational model of SIMD computer, PRAM models and PRAM variants.

Conditions of Parallelism- data and resource dependencies, hardware and software parallelism, Program partitioning and Scheduling- grain sizes and latency, grain packing and scheduling, static multi processor scheduling, Program flow mechanisms- control flow vs data flow, demand driven mechanisms, comparison of flow mechanisms, System interconnect architectures- network properties and routing, static and dynamic connection networks

UNIT II

Principles of scalable performances- performance metrics and measures- parallelism profile in programs, mean performance, efficiency, utilization and quality, benchmarks and performance measures, characteristics of parallel processing applications, Speed up performance laws- Amdahl's law, Gustafson's law, memory bounded speed up model, Scalability metrics and goals,

Bus systems- back plane bus specification, Addressing and Timing protocols, Arbitration, transaction and interrupt, IEEE future bus standard requirement set, Shared memory organizations- Interleaved memory organization, band width and fault tolerance, memory allocation schemes, Atomicity and event ordering

UNIT III

Linear Pipeline Processors- asynchronous and synchronous models, clocking and timing control, speedup, efficiency, and throughput, Non linear pipeline processors- reservation and latency analysis, collision free scheduling, pipeline schedule optimization, Instruction pipe line design- instruction execution phases, mechanisms for instruction pipelining, dynamic instruction scheduling, branch handling techniques, static arithmetic pipelines.

Hierarchical bus system, cross bar switch and multiport memory, multistage and combining networks, multistage and combining networks, The cache coherence problem, message passing mechanism- message routing schemes, deadlock virtual channels, flow control strategies, multicast routing algorithms

UNIT IV

Vector processing principles- vector instruction types, vector access memory schemes, early super computers, Multi vector multiprocessors- performance directed design rules, architecture of Cray and MPP, Compound vector operations, vector loops and chaining, SIMD computer organizations

UNIT V

Latency-hiding techniques- shared virtual memory, prefetching techniques, distributed coherent caches, scalable coherence interface, relaxed memory consistency, principles of multithreading and context switching policies,
MPD architecture, The Tera multiprocessor system, Data flow computer architecture

Text Books :

1. Kai Hwang & Naresh Jotwani, "Advanced Computer Architecture- Parallelism, Scalability, Programmability" Second Edition, Mc Graw Hill Publishing

Reference Books :

1. Hennessy Patterson, "Computer Architecture- A Quantitative Approach" Fifth Edition, Elsevier
2. Kai Hwang, "Advanced Computer Architecture- Parallelism, Scalability, Programmability", TMH.
3. Computer Architecture, Concepts and Evolutions, Garrit A Blaauw, PEA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B.Tech. IV - I sem (C.S.E.)

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**(13A05710) COMPUTER NETWORKS AND NETWORK SECURITY
LABORATORY**

PART-A (Computer Networks)

1. submit a report on the computer network facility available in the college including the devices used, topology used, specification of all the equipment used
2. submit a report on the Internet facility available in the college including the specification of the devices used and logical configuration
3. Implement the algorithm for parity method for error control
4. Implement the algorithm on hamming method for error correction (both single and block errors)
5. Implement the algorithm for check sum computation
6. Implement the distance vector routing algorithm
7. Implement the link state routing algorithm
8. Study any simulator available in the market and submit a report containing executive summary of it and detail description of the features

PART-B (Network Security)

1. Working with Sniffers for monitoring network communication (Ethereal)
2. Understanding of cryptographic algorithms and implementation of the same in C or C++
3. Using openssl for web server - browser communication
4. Using GNU PGP
5. Performance evaluation of various cryptographic algorithms
6. Using IPTABLES on Linux and setting the filtering rules
7. Configuring S/MIME for e-mail communication
8. Understanding the buffer overflow and format string attacks
9. Using NMAP for ports monitoring
10. Implementation of proxy based security protocols in C or C++ with features like confidentiality, integrity and authentication

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B.Tech. IV - I sem (C.S.E.)

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(13A05711) MOBILE APPLICATION DEVELOPMENT LABORATORY

Common to CSE & IT

OBJECTIVES:

The student should be made to:

- Know the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
- Understand how to work with various mobile application development frameworks.
- Learn the basic and important design concepts and issues of development of mobile applications.
- Understand the capabilities and limitations of mobile devices.

OUTCOMES:

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

- Design and implement various mobile applications using emulators.
- Deploy applications to hand-held devices

LIST OF EXPERIMENTS:

1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi threading
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Write a mobile application that creates alarm clock