

**ACADEMIC REGULATIONS  
COURSE STRUCTURE  
AND  
DETAILED SYLLABUS**

**COMPUTER SCIENCE ENGINEERING**

**FOR**

**B.TECH. FOUR YEAR DEGREE COURSE**

***(Applicable for batches admitted from 2010-2011)***



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
KAKINADA - 533 003, Andhra Pradesh, India



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
**KAKINADA - 533 003, Andhra Pradesh, India**

**COMPUTER SCIENCE ENGINEERING**

**COURSE STRUCTURE**

IV YEAR		II SEMESTER		
S. No.	Subject	T	P	Credits
1	<b>Elective –II</b> i) Human Computer Interaction ii) Advanced Operating Systems iii) Mobile Adhoc & Sensor Networks iv) Pattern Recognition v) Digital Image Processing	4	-	4
2	<b>Elective –III</b> i) Embedded and Real Time Systems ii) Simulation Modeling iii) Information Retrieval Systems iv) Artificial Intelligence v) Multimedia & Application Development	4	-	4
3	<b>Elective –IV</b> i) Software Testing Methodologies ii) Neural Networks & Soft Computing iii) Social Networks and the Semantic Web iv) Parallel Computing v) E- Commerce	4	-	4
4	Distributed Systems	4	-	4
5	Project			12
	<b>Total</b>			<b>28</b>

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

#### HUMAN COMPUTER INTERACTION

##### UNIT-I:

**Introduction:** Importance of user Interface, definition, importance of good design. Benefits of good design. A brief history of Screen design

##### UNIT-II:

**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-III:

**Design process:** Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

##### UNIT-IV:

**Screen Designing :** Design goals, Screen planning 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-V:

**Windows:** Windows new and Navigation schemes selection of window, selection of devices based and screen based controls.

##### UNIT-VI:

**Components:** Components text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors.

##### UNIT-VII:

**Software tools:** Specification methods, interface, Building Tools.

##### UNIT-VIII:

**Interaction Devices:** Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

**TEXT BOOKS:**

1. Human Computer Interaction. 3/e, Alan Dix, Janet Finlay, Goryd, Abowd, Russell Beal, PEA,2004.
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.

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

#### ADVANCED OPERATING SYSTEMS

##### UNIT-I:

**Computer System and Operating System Overview:** Overview of Computer System hardware – Instruction execution – I/O function – Interrupts – Memory hierarchy – I.O Communication techniques. Operating System Objectives and functions – Evaluation of operating System – Example Systems.

##### UNIT-II:

**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-III:

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

##### UNIT-IV:

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

##### UNIT-V:

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

##### UNIT-VI:

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

##### UNIT-VII:

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

##### UNIT-VIII:

**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  
7<sup>th</sup> Edition, John Wiley.
2. Modern Operating Systems, Andrew S Tanenbaum 2<sup>nd</sup> edition Pearson/PHI

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B.Tech. Computer Science Engineering. II-Sem.

### MOBILE ADHOC & SENSOR NETWORKS

#### UNIT-I:

##### **Introduction to Ad Hoc Wireless Networks**

Cellular and Ad Hoc Wireless Networks, Characteristics of MANETs, Applications of MANETs, Issues and Challenges of MANETs.

#### UNIT-II:

##### **Routing in MANETs**

Classification of Routing Protocols, Topology-based versus Position-based Approaches, Topology based Routing Protocols; Position based Routing, Other Routing Protocols.

#### UNIT-III:

##### **Data Transmission in MANETs**

The Broadcast Storm, Multicasting, Geocasting, TCP over Ad Hoc Networks-TCP Protocol overview, TCP and MANETs, Solutions for TCP over Ad Hoc

#### UNIT-IV:

##### **Security in MANETs**

Security in Ad Hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

#### UNIT-V:

##### **Basics of Wireless Sensors and Applications**

The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

#### UNIT-VI:

##### **Data Retrieval in Sensor Networks**

Classification of WSNs, MAC Layer, Routing Layer, High-Level Application Layer Support, Adapting to the Inherent Dynamic Nature of WSNs.

#### UNIT-VII:

##### **Sensor Network Platforms and Tools**

Sensor Node Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms, Node-Level Simulators,

**UNIT-VIII:**

**Security in WSNs**

Security in Wireless Sensor Networks, Key Management in Wireless Sensor Networks, Secure Data Aggregation in Wireless Sensor Networks, Introduction to Vehicular Ad Hoc Networks, Introduction to Wireless Mesh Networks

**TEXT BOOKS:**

1. Ad Hoc and Sensor Networks: Theory and Applications, Carlos de Morais Cordeiro and Dharma Prakash Agrawal, World Scientific Publications / Cambridge University Press, 2006.
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science Imprint, Morgan Kauffman Publishers, 2005.

**REFERENCE BOOKS:**

1. Ad Hoc Wireless Networks: Architectures and Protocols, C. Siva Ram Murthy and B. S. Manoj, Pearson Education, 2004.
2. Guide to Wireless Ad Hoc Networks, Sudip Misra, Isaac Woungang, and Subhas Chandra Misra, Springer International Edition, 2011.
3. Guide to Wireless Sensor Networks, Sudip Misra, Isaac Woungang, and Subhas Chandra Misra, Springer International Edition, 2012.
4. Wireless Mesh Networking, Thomas Krag and Sebastin Buettrich, O'Reilly Publishers, 2007.
5. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010.
6. Wireless Ad hoc Mobile Wireless Networks-Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
7. Wireless Ad hoc Networking, Shih-Lin Wu, Yu-Chee Tseng, Auerbach Publications, Taylor & Francis Group, 2007
8. Wireless Ad hoc and Sensor Networks – Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
9. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications / Cambridge University Press, 2010

\*\*\*





## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

### PATTERN RECOGNITION

#### UNIT-I:

**Introduction:** Is Pattern Recognition Important; features, feature vectors, and classifiers; supervised, unsupervised and semi supervised learning; Matlab programs.

#### UNIT-II:

**Classifiers based on Bayes Decision Theory:** Introduction, Bayes Decision Theory; discriminant functions and decision surfaces; Bayesian classification for normal distributions- the Gaussian probability density function, the Bayesian classifier for normally distributed classes;

#### UNIT-III:

**Linear & Non linear Classifiers:** Introduction; linear discriminant functions and decision hyper planes, the perceptron algorithm, Nonlinear Classifiers: introduction, the xor problem, the two-layer perceptron-classification capabilities of the two-layer perceptron; three-layer perception.

#### UNIT-IV:

**Feature Selection:** Introduction, Preprocessing- outlier removal, data normalization, missing data; the peaking phenomenon; class separability measures- divergence, chernoff bound and Bhattacharya distance, scatter matrices.

#### UNIT-V:

**Supervised Learning:** introduction, error-counting approach, exploiting the finite size of the data set; a case study from medical imaging; semi supervised learning- generative models, graph-based methods, transductive support vector machines.

#### Unit-VI:

**Skin based Pattern Extraction And Recognition** -Introduction, Neural color Constancy based skin detection, Image segmentation, Local region graph Pattern, Skin region Synthesis pattern, Matching multiple regions with Local Global Graph Method.

#### UNIT-VII:

**Spatio Temporal Patterns** - Measuring similarity patterns-Introduction-Spatio-temporal data collection, representation,. data summarization, Querying Indexing and Clustering of moving object Patterns and trajectories, group patterns mining, mobile patterns, Predicting, similarity measures, I data generation, Trajectory representation, Defining a new similarity measure, Clustering trajectories with K-means algorithm, Incremental approach for clustering.

**UNIT-VIII:**

Graph-based methods Introduction, Hyper graph matching and Algorithms, Parquet graphs-similarity function, Local Feature Detectors.

**TEXT BOOKS:**

1. Sergios Theodoridis, Konstantinos Koutroumbas, "Pattern Recognition" Fourth Edition, (Unit I –V) Elsevier
2. Horst Bunke, Abrahamkadel, MarksLast, "Applied Pattern Recognition" 2008 Springer –Verlag Berlin Heidelberg.(Unit VI-VIII)

**REFERENCE BOOKS:**

1. "Pattern Recognition", Devi & Murthy, Universities Press
2. "Pattern Recognition and Image Analysis", Gose, Johnsonbaugh, Jost, PHI
3. Rajjan Shinghal, "Pattern Recognition Techniques and Applications" Oxford University Press.
4. Pattern Classification, 2<sup>nd</sup> ed, Richard O Duda
5. Applied Pattern recognition, Horst Bunku, Abraham Kandel

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

#### DIGITAL IMAGE PROCESSING

##### UNIT-I:

**DIGITAL IMAGE FUNDAMENTALS:** Image Sensing and Acquisition, Image Sampling & quantization, some basic Relationships between pixels. Mathematical tools used in digital image processing – array Vs matrix operations, linear Vs non linear operations, arithmetic operations, set and logical operations, spatial operations, vector and matrix operations, Probabilistic methods.

##### UNIT-II:

**IMAGE TRANSFORMS:** 2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete cosine Transform, Haar-Transform, Slant Transform, KL transform, comparison of different image transforms.

##### UNIT-III:

**IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN:** Basic Intensity transformations functions, histogram Processing, fundamentals of Spatial Filtering, Smoothing Spatial filters, Sharpening spatial filters, Combining spatial enhancement methods.

##### UNIT-IV:

**IMAGE ENHANCEMENT IN FREQUENCY DOMAIN:** Basics of filtering in frequency domain, additional characteristics of the frequency domain, correspondence between filtering in the spatial and frequency domains. Image smoothing using frequency domain filters, image sharpening using frequency domain filters – Gaussian High pass filters, Laplacian in the frequency domain, Homomorphic filtering.

##### UNIT-V:

##### IMAGE DEGRADATION / RESTORATION:

Noise models, Restoration in the presence of Noise only-spatial filtering, - mean, order- statistic and adaptive filters, Estimating the Degradation function, Inverse filtering, Weiner filtering, Constrained Least squares filtering.

##### UNIT-VI:

##### IMAGE SEGMENTATION:

Point, line and edge Detection, Thresholding, Region based segmentation, the use of motion in segmentation.

##### UNIT-VII:

**IMAGE COMPRESSION:** Need for Image compression, Classification of Redundancy in Images, Image compression models, Classification of image compression schemes, Run length coding,

arithmetic coding, Block truncation coding, Dictionary based compression, transform based compression, Image compression standards, Scalar quantization, vector quantization.

**UNIT-VIII:**

**COLOR IMAGE PROCESSING:** Color models, pseudo color image processing, color transformations, Smoothing and sharpening, image segmentation based on color.

**TEXT BOOKS:**

1. Digital Image processing– S jayaraman, S Esakkirajan, T Veerakumar, Tata McGraw Hill.
2. Digital Image Processing-R. C .Gonzalez & R.E. Woods, Addison Wesley/Pearson education, 3<sup>rd</sup> Edition, 2010.
3. Digital Image Processing and Computer Vision, Sonka, CENGAGE

**REFERENCE BOOKS:**

1. Digital Image processing using MATLAB-Rafael C. Gonzalez, Richard E woods and Steven L.Eddins, Tata McGraw Hill, 2010.
2. Fundamentals of Digital Image processing-A .K. Jain, PHI.

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

#### EMBEDDED AND 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:

Interrupt, timers and serial ports of 8051: 8051 interrupts, interfacing ADC 0801, Timers, serial port, reset circuit, power saving modes.

##### UNIT-IV:

**Programming the 8051 Micro controller:** Addressing modes, Instruction set, data transfer instructions, Arithmetic Instructions, Logical Instructions, Arithmetic Instructions, logical instructions, Boolean, Program control transfer instructions.

##### UNIT-V:

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

##### UNIT-VI:

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-VII:

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-VIII:**

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

**TEXT BOOK:**

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,.

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

#### SIMULATION MODELLING

##### UNIT-I:

System models: Concepts, continuous and discrete systems, System modeling, types of models, subsystems, corporate model, and 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.

##### UNIT-VI:

Discrete System Simulation: Events, generation of arrival patterns, simulation programming tasks, analysis of simulation output.

##### UNIT-VII:

GPSS & SIMSCRIPT: general description of GPSS and SIMSCRIPT, programming in GPSS.

##### UNIT-VIII:

Simulation Programming Techniques: Data structures, Implementation of activities, events and queues, Event scanning, simulation algorithms in GPSS and SIMSCRIPT.

##### TEXT BOOK:

Geoffrey Gordon: System Simulation, PHI.

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

#### INFORMATION RETRIEVAL SYSTEMS

##### UNIT-I:

**Introduction:** Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

##### UNIT-II:

**Information Retrieval System Capabilities:** Search, Browse, Miscellaneous

**Cataloging and Indexing:** Objectives, Indexing Process, Automatic Indexing, Information Extraction.

##### UNIT-III:

**Data Structures:** Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

##### UNIT-IV:

**Automatic Indexing:** Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

##### UNIT-V:

**Document and Term Clustering:** Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

##### UNIT-VI:

**User Search Techniques:** Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext.

##### UNIT-VII:

**Information Visualization:** Introduction, Cognition and perception, Information visualization technologies.

##### UNIT-VIII:

**Text Search Algorithms:** Introduction, Software text search algorithms, Hardware text search systems.

**Information System Evaluation:** Introduction, Measures used in system evaluation, Measurement example – TREC results.



**TEXT BOOKS:**

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.

**REFERENCE BOOKS:**

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Modern Information Retrieval By Yates Pearson Education.
3. Information Storage & Retrieval By Robert Korfhage – John Wiley & Sons.

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

#### ARTIFICIAL INTELLIGENCE

##### UNIT-I:

**Introduction to artificial intelligence:** Introduction, history, intelligent systems, foundations of AI, applications, tic-tac-toe 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, propositional logic, natural deduction system, axiomatic system, semantic tableau system in propositional logic, resolution refutation in propositional 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 **advanced knowledge representation techniques:** Introduction, conceptual dependency theory, script structure, cyc theory, case grammars, semantic web

##### 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, linguistic variables and hedges, fuzzy propositions, inference rules for fuzzy propositions, fuzzy systems.

**UNIT-VII:**

**Machine learning paradigms:** Introduction, machine learning systems, supervised and unsupervised learnings, inductive learning, deductive learning, clustering, support vector machines, case based reasoning and learning

**UNIT VIII: Artificial neural networks:** Introduction, artificial networks, single layer feed forward networks, multi layered forward networks, design issues of artificial neural networks

**TEXT BOOKS:**

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

**REFERNCE BOOKS:**

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

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

#### MULTIMEDIA AND APPLICATION DEVELOPMENT

##### UNIT-I:

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

##### UNIT-II:

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

##### UNIT-III:

**Action Script I:** ActionScript Features, Object-Oriented ActionScript, Datatypes and Type Checking, Classes, Authoring an ActionScript Class.

##### UNIT-IV:

**Action Script II:** Inheritance, Authoring an ActionScript 2.0 Subclass, Interfaces, Packages, Exceptions.

##### UNIT-V:

**Application Development:** An OOP Application Frame work, Using Components with ActionScript MovieClip Subclasses.

##### UNIT-VI:

**Multimedia data compression:** Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

##### UNIT-VII:

**Basic Video Compression Techniques:** Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

##### UNIT-VIII:

**Multimedia Networks:** Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MOD).

##### TEXT BOOKS:

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI/Pearson Education.
2. Essentials ActionScript 2.0, Colin Mook, SPD O,REILLY.

**REFERENCE BOOKS:**

1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
2. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
3. Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press).
4. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
5. Multimedia Basics by Weixel Thomson
6. Multimedia Technology and Applications, David Hilman , Galgotia

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

#### SOFTWARE TESTING METHODOLOGIES

##### **UNIT-I:**

Introduction:- Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

##### **UNIT-II:**

Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

##### **UNIT-III:**

Transaction Flow Testing:-transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

##### **UNIT-IV:**

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

##### **UNIT-V:**

Paths, Path products and Regular expressions:- path products & path \_expression, reduction procedure, applications, regular expressions & flow anomaly detection.

##### **UNIT-VI:**

Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.

##### **UNIT-VII:**

State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips.

##### **UNIT-VIII:**

Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools.

**TEXT BOOKS:**

1. Software testing techniques - Baris Beizer, International Thomson computer press, second edition.
2. Software Testing- Yogesh Singh, CAMBRIDGE

**REFERENCE BOOKS:**

1. Introduction to Software Testing, Paul Amman, Jeff Offutt, CAMBRIDGE
2. Effective Software testing, 50 Specific ways to improve your testing, Elfriede Dustin, PEA

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

### NEURAL NETWORKS & SOFT COMPUTING

#### 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 Networks (Chapter-1 from Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2<sup>nd</sup> edition 2004)

#### 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, (Chapter-2 from Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2<sup>nd</sup> edition 2004)

#### UNIT-III:

**Classical & Fuzzy Sets:** Introduction to classical sets – properties, operations and relations; Fuzzy sets – memberships, uncertainty, operations, properties, fuzzy relations, cardinalities, membership functions (Chapter-6 from Neural Networks, Fuzzy Logic, Genetic Algorithms: Synthesis and Applications by Rajasekharan and Pai, PHI Publications).

#### UNIT-IV:

**Fuzzy Logic System Components:** Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods (Chapter-7 from Neural Networks, Fuzzy Logic, Genetic Algorithms: Synthesis and Applications by Rajasekharan and Pai, PHI Publications).

#### 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 (Chapter-2 of Machine Learning, Tom M. Mitchell, MGH).

#### UNIT-VI:

**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 (Chapter-3 of Machine Learning, Tom M. Mitchell, MGH).

#### UNIT-VII:

**Genetic Algorithms-1:** Motivation, Genetic Algorithms, An Illustrative Example, Hypothesis Space Search (Chapter-9 from Machine Learning, Tom M. Mitchell, MGH).



**UNIT-VIII:**

**Genetic Algorithms-2:** Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms (Chapter-9 from Machine Learning, Tom M. Mitchell, MGH).

**TEXT BOOKS:**

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

\*\*\*



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**IV Year B.Tech. Computer Science Engineering. II-Sem.**

**SOCIAL NETWORKS AND THE SEMANTIC WEB**

**UNIT-I:**

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

**UNIT-II:**

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

**UNIT-III:**

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

**UNIT-IV:**

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

**UNIT-V:**

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

**UNIT-VI:**

**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-VII:**

**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.

**UNIT-VIII:**

**The Perfect Storm:** Looking back-the story of Katrina People Finder, Looking ahead-a Second Life.

**TEXT BOOK:**

1. Peter Mika, "Social Networks and the Semantic Web", Springer International Edition.

\*\*\*



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**IV Year B.Tech. Computer Science Engineering. II-Sem.**

**PARALLEL COMPUTING**

**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-2:** 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. Hyper Quick sort on hypercube multi computers, merge sort on shuffle-exchange ID,

**UNIT-VII:**

**Searching-1:** Parallel search operations. Ellis algorithm and Manber and ladner's Algorithms for dictionary operations.

**UNIT-VIII:**

**Searching-2:** Parallel algorithms for Graph searching, All Pairs shortest paths and minimum cost spanning tree.

**TEXT BOOKS:**

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

\*\*\*



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**

**IV Year B.Tech. Computer Science Engineering. II-Sem.**

**E - COMMERCE**

**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.

**UNIT-VII:**

Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering.

**UNIT-VIII:**

Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processings, Desktop video conferencing.

**TEXT BOOKS:**

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

**REFERENCE 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.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

\*\*\*



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### IV Year B.Tech. Computer Science Engineering. II-Sem.

#### DISTRIBUTED SYSTEMS

##### UNIT-I:

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

##### UNIT-II:

**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-III:

**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-IV:

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

##### UNIT-V:

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

##### UNIT-VI:

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

##### UNIT-VII:

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

**UNIT-VIII:**

**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 Sigal, "Distributed Computing, Principles, Algorithms and Systems", Cambridge
2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems- Concepts and Design", Fourth Edition, Pearson Publication

\*\*\*



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**

**IV Year B.Tech. Computer Science Engineering. II-Sem.**

**PROJECT**

**\*\*\***