

**NOORUL ISLAM CENTRE FOR HIGHER EDUCATION**

**NOORUL ISLAM UNIVERSITY**

**DEPARTMENT OF SOFTWARE ENGINEERING**

**M.PHIL. COMPUTER SCIENCE**

**CURRICULUM & SYLLABUS**

**SEMESTER - I**

SL. No.	SUBJECT CODE	SUBJECT	L	T	P	C
<b>THEORY</b>						
1.	GE401	Teaching Methodology	4	1	0	5
2.	CS401	Research Methodology in Computer Science	4	1	0	5
3.	CS402	Advanced Paper in Computer Science	4	1	0	5
<b>TOTAL</b>			12	3	0	15

**GE401 TEACHING METHODOLOGY****4 1 0 5****OBJECTIVES**

1. To understand the concepts and Practices of Teaching Methodology in Higher Education
2. To understand the Concept and Practices of Educational Psychology
3. To develop the awareness in modern teaching practices and evaluation
4. To provide systematic knowledge about motivation and emotion

**UNIT - I****15**

Higher Education - Teaching Technology: Objectives and Role of Higher Education- Learning and Learning Hierarchy - Information Processing – Learning Events and Outcomes. Teaching Technology - Meaning, concept and scope – Instructional Designs: Objectives based, Skill based, Competency based, Learning style based and Model based Large Group Techniques: Lecture, Modified Lecture, Panel Discussion, Team Teaching, Project Approach and Workshop – Simulation, Role Playing, Brain Storming, Case formulation, analysis and Discussion. Concept of Micro – teaching - Steps - Micro-teaching Cycle - Rationale of Micro-teaching Procedure - Phase of Micro-teaching.

**UNIT – II****10**

Educational Evaluation: Methods of Evaluation -Self Evaluation – Analysis of Teaching- Identification of Teaching Skills - Core Teaching Skills-Teaching Skills and their Specification-Teacher Evaluation- Methods. The measurement and evaluation process - concept - scope and need - Basics - characteristics of good measuring instruments - validity - Objectivity - reliability usability and norms. Models in educational evaluation - 3d model - total reflection model and individual judgment model. - scores and methods of feed back to students - new trends in evaluation.

**UNIT –III****10**

Educational Psychology : Meaning and Definition - modern psychology - Study of psychology: Structuralism, Functionalism, and Behaviorism. - Branches of Psychology - Educational Psychology -Concepts, Nature and Scope - Importance of Educational Psychology for the Teacher. Key perspectives in psychology: The facets of behavior - New trends in psychology - Research methods in psychology: Observation, Correlation and the Experimental method - Ethical issues in psychological research. Group Dynamics- Competition and Co-operation – Group Behaviour- Leadership Traits – Classroom Climate.

**UNIT – IV****15**

Motivation and Emotion : Motivation and Learning - Functions of Motives - Kinds of Motives - Theories of Motivation - Hull's Drive education, Maslow's Hierarchy of Needs, Achievement - Motivation - Carl Rogers: self theory – McClelland: Achievement Motivation - Components - Fear of Failure and Hope of Success - Motivation in the classroom context - Praise and Blame, Rewards and Punishments - Feedback / Knowledge of Results - Level of Aspiration - Achievement Motivation - Emotions, Expression and Impact - Relationship between emotion and cognition. - Levels of aspiration and its psychological implications.

**UNIT – V****10**

ICT Enabled Teaching – Meaning and Scope. Electronic Media in Education: Concept, Selection, Use and Variety-e-Learning Resources: e-Learning, e-books, e-journals etc-Web-based Learning: Access and Teaching Issues. Conducting lessons using interactive

whiteboards / Electronic Board – conducting an online class / online discussion - virtual Classroom – Video conferencing – Building Animation Tools

**Total Hours: 60**

**REFERENCE BOOKS:**

1. Aggarwal.J.C. (2008) Essentials of Educational Psychology (2nd Edition) Vikas Publishing House Pvt. Ltd., New Delhi.
2. Baron A. Robert (2000) Psychology. Prentice-Hall of India, New Delhi.
3. Chauhan. S. S. (2007) Advanced Educational Psychology (7th Edition), Vikas Publishing House Pvt. Ltd. New Delhi.
4. Dennis Child (1973) Psychology and the Teacher. Holt Rinehart and Winston, New York.
5. Hurlock B. Elizabeth (1980) Adolescent Development. Tata McGraw Hill, New Delhi.
6. Hurlock B.Elizabeth (1980) Developmental Psychology. Tata McGraw Hill, New Delhi.
7. John.W.Santrock (2006) Educational Psychology, Mc graw-hill Higher Education, New Delhi.
8. Mangal. S. K (2007) Advanced Educational Psychology (2nd Edition), Prentice-Hall of India Pvt. Ltd., New Delhi
9. Vedanayagam, E.G. (1989) Teaching Technology for College Teachers. New Delhi: Sterling Publishers (p) Ltd.
10. Rajasekar, S. (2005) Computer Education and Educational Computing, Hyderabad: Neelkamal Publications.
11. Kumar, K. L. (1997) Educational Technology, New Delhi: New Age International (p) Ltd.
12. SampathKumar, K. Paneerselvam, A and Santhanam, S. (1990) Introduction to Educational Technology, New Delhi: Sterling Publishers (Pvt) Ltd.
13. Tony Bates, A.W. (2005) Technology, e-Learning and Distance Education, New York: Routledge.

CS401	<b>RESEARCH METHODOLOGY IN COMPUTER SCIENCE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		4	1	0	5

**UNIT I**

Thesis Writing: Research types – objectives and approaches – Literature collection, Web browsing – Software tools – Writing review and journal articles – manuscript publication  
 Planning a thesis – general format – page and chapter format – footnotes – tables and figures – references and appendices

**UNIT II**

Analysis of algorithm: The role of algorithm in computing – Sorting Techniques – Analyzing and designing algorithms – growth of functions – introduction to NP – completeness

**UNIT III**

Formal Languages and Finite Automata: Context free grammars – Derivation trees – Simplification of context free Grammars – Chomsky normal form – Greiback normal form – The pumping lemma for context free languages

Finite state systems – Basic definitions – Non deterministic finite automata – Finite automata with epsilon moves – Regular expressions – Applications of finite Automata (Stress on theorem statement and problems only, no proof for theorems)

#### **UNIT IV**

Probability and Statistical Analysis: Probability – Fail time data analysis – Hazard models – Conditional probability – Bayes rule – System reliability – Stochastic process

#### **UNIT V**

Logics – Relations and Functions: Propositions – Precedence rules for operators – Laws of equivalence – Natural deduction system – Developing natural deduction system proofs  
Relation properties – Matrix and Graph – Graph Notations for relations – Partition and covering – Equivalence relation – Compatibility relations – Partial ordering – Functions – Components – Composition of function – Inverse functions – Binary and n-ary operations 3

#### **TEXT BOOKS**

1. Kothari C. R. Research Methodology – methods and techniques, 2nd Edition, Wishwa Prakashjan New Delhi 1999
2. Elis Horowitz and Sartaj Sahni, „Fundamentals of Computer algorithms“, Galgotia Publications, New Delhi 2000
3. John E. Hopcroft, Jeffery D. Ullman, „Introduction to Automata Theory Language and Computation“, Narosa Publishing House, 1979
4. L.S. Srinath, „Reliability Engineering“, Third Edition, Affiliated East, West press pvt. Ltd, New Delhi, 2005
5. David Gries, „The Science of Programming“ Narosa Publishing House, 1981

#### **REFERENCE BOOKS:**

1. Berny H. Durston, M. Poole, „Thesis and Assignment writing“, Wiley Eastern Ltd. ND 1970
2. Misra R.P. Research Methodology – A Hand Book, Concept publishing Company, New Delhi 1988
3. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest „Introduction to Algorithms“, Prentice Hall of India, 1998
4. E. Balagurusamy, „Reliability Engineering“, Tata Mc Graw Hill Publishing Ltd., New Delhi 2003
5. Leon S. Levy, „Discrete structures of Computer Science“, Wiley Eastern Ltd., 1980

**CS402**

**ADVANCED PAPER IN COMPUTER SCIENCE**

**4 1 0 5**

#### **UNIT I**

Security problems in Computing – Cryptography – program security – Database security – Security in Networks

#### **UNIT II**

Processes Concepts – Scheduling – Operations – Cooperating Processes - Interprocess Communication.

Threads – Overview – Multithreading Models – Issues CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling algorithms – Multiprocessor Scheduling – Real -Time Scheduling Process synchronization Background – The critical section Problem – Synchronization Hardware – Semaphores – Classical Problems of Synchronization – Critical Regions – Monitors.

### **UNIT III**

Fundamental – Remote procedure cells – Distributed shared memory – Synchronization. Grid Computing organization and their role – Grid computing anatomy – Merging the Grid service architecture with web services architecture

### **UNIT IV**

Distributed Databases – Homogeneous and Heterogeneous databases – Distributed data storage – distributed transactions – commit protocols – concurrent control – availability – Distributed theory processing Heterogeneous distributed databases – Directory systems

### **UNIT V**

Fundamentals of Parallel processing – MIMD computers or Multiprocessor 4.1 – 4.2, 4.3

### **TEXT BOOKS:**

1. Security in Computing, Charles P. Pfleeger, & Shani Lawrence Pfeeger)
2. Joshy Joseph, Graig Felenstern „Grid Computing“ – Pearsons 2004
3. Distributed Operating Systems, Pradeep K. Sinha, PHI, 2004
4. Abraham fiberschatz & Hendry F. Korths “Data base systems concepts” Mc Graw Hill International fifth edition, 2006
5. Distributed memory multiprocessors Harry F. Jordan Gita Alaghband
6. Implementing synchronization and data sharing Harry F. Jordan Gita Alaghband
7. Abraham Silberschatz, Peter BaerGalvin and Greg Gagne, Operating System Concepts, Sixth Edition, John Wiley and Sons and Inc., 2002.

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CURRICULUM & SYLLABUS

SEMESTER - II

SL. No.	SUBJECT CODE	SUBJECT	L	T	P	C
<b>THEORY</b>						
1.	XxEx1	<b>ELECTIVE – 1</b>	4	1	0	5
<b>PROJECT</b>						
2.	CS4P1	Dissertation	0	0	30	15
<b>TOTAL</b>			4	1	30	20

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**CURRICULUM & SYLLABUS**

**LIST OF ELECTIVES**

SL. No.	SUBJECT CODE	SUBJECT	L	T	P	C
<b>THEORY</b>						
1.	CS4A1	Data Mining and Warehousing	4	1	0	5
2.	CS4A2	Digital Image Processing	4	1	0	5
3.	CS4A3	Wireless Technology	4	1	0	5
4.	CS4A4	Natural Language Processing	4	1	0	5
5.	CS4A5	Data Compression	4	1	0	5
6.	CS4A6	Mobile Computing	4	1	0	5
7.	CS4A7	Soft Computing	4	1	0	5
8.	CS4A8	Advanced Networking	4	1	0	5
9.	CS4A9	Virtualization And Cloud Computing	4	1	0	5
10	CS4B1	Genetic Algorithms	4	1	0	5

## LIST OF ELECTIVES

**CS4A1                      DATA MINING AND WAREHOUSING                      4    1    0    5**

**UNIT - I**

Data Warehousing Introduction – Definition-Architecture-Warehouse Schema - Warehouse server-OLAP operations. Data Warehouse technology – Hardware and operating system-Warehousing Software – Extraction tools – Transformation tools – Data quality tools – Data loaders – Data Access and retrieval tools – Data Modelling tools – Fact tables and dimensions Data warehousing case studies : Data warehousing in Government , Tourism, Industry , Genomics data.

**UNIT - II**

Data Mining definition – DM Techniques – current trends in data mining – Different forms of Knowledge – Data selection , cleaning, Integration , Transformation, Reduction and Enrichment . Data: Types of data - Data Quality - Data Preprocessing - Measures of similarity and dissimilarity. Exploration : Summary statistics – Visualization.

**UNIT - III**

Association rules : Introduction – Methods to discover association rule – Apriori algorithm Partition Algorithm – Pincher search algorithm – Dynamic Item set algorithm – FP Tree growth algorithm. Classification : Decision Tree classification – Bayesian Classification – Classification by Back Propogation.

**UNIT - IV**

Clustering Techniques : Introduction – Clustering Paradigms – Partitioning Algorithms – K means & K Mediod algorithms – CLARA – CLARANS – Hierarchical clustering – DBSCAN – BIRCH – Categorical Clustering algorithms – STIRR – ROCK – CACTUS. Introduction to machine learning – Supervised learning – Unsupervised learning – Machine learning and data mining. Neural Networks : Introduction – Use of NN – Working of NN Genetic Algorithm : Introduction –Working of GA

**UNIT – V**

Web Mining : Introduction – Web Content Mining – Web structure mining – web usage mining – Text Mining – Text Clustering Temporal Mining -spatial mining – Visual data mining – Knowledge mining.

**TEXT BOOKS:**

1. Arun k Pujari , “Data Mining Techniques”, University press , edition 2001.
2. Jaiwei Han, Michelinne Kamber , “Data Mining : Concepts and Techniques “
3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, “Introduction to Data Mining”, 2007.

**REFERENCE BOOKS :**

1. David Hand, Heikki Mannila , Padhraic smyth, “Principles of Data Mining”, the MIT Press, Massachusetts Institute of Technology , Cambridge.
2. Usama M Fayyad, Gregory Piatskey Sharpio, Padhr Smyth, Ramasamy Uthurusamy , “Advances in Knowledge discovery and data mining”.
3. Mehmed Kantardzix, ”Data Mining : Concepts Models, methods and algorithms”.
4. Mark Humphries , Michal W Hawkins & Michelle C dy, “Data warehousing architecture and implementation”, Prentice hall of India, 1999.



CS4A2

DIGITAL IMAGE PROCESSING

4 1 0 5

**UNIT - I**

Digital image processing – fundamental steps in image processing – elements of image processing systems. Digital image fundamentals: A simple image model – sampling and quantization – some basic relationships between pixels. Introduction to Fourier transform – the discrete Fourier transform – properties of the two-dimensional Fourier transform.

Image Enhancement: Enhancement by point processing – spatial filtering – enhancement in the frequency domain – generation of spatial masks from frequency domain specifications – color image processing

**UNIT - II**

Image restoration: Degradation model – diagonalisation of circulant and block circulant matrices – Algebraic approach to restoration – inverse filtering. Image compression:

Fundamentals – image compression models – error-free compression – lossy compression – image compression standards.

**UNIT - III**

Image segmentation: Detection of discontinuities – edge linking and boundary detection – thresholding - region oriented segmentation. Representation and description: representation schemes – boundary descriptors – regional descriptors. Elements of image analysis – Patterns and Pattern classes – decision theoretic methods – structural methods – interpretation

**UNIT - IV**

Image processing – pattern recognition – relationship between image processing and pattern recognition. Object detection: introduction. Shape analysis: introduction – convex hull – convex hull based representation – fractals – fractals based image shape representation.

**UNIT - V**

Wavelets: introduction – properties of wavelets – fast wavelet transform – wavelet decomposition structures and coefficients – inverse fast wavelet transform – application of wavelets in image processing

**TEXT BOOKS :**

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, “Digital Image processing using MATLAB”, Pearson Education, 2004.
2. Rafael C. Gonzalez, Richard E. Woods, “Digital Image processing”, 2<sup>nd</sup> ed., Prentice Hall, NJ., 2002.
3. Russ J. C., “The image processing handbook”, 3<sup>rd</sup> ed., CRC Press, 1999

CS4A3

WIRELESS TECHNOLOGY

4 1 0 5

**UNIT I**

Characteristics of the Wireless Medium – Introduction – Radio Propagation Mechanisms – Path Loss Modeling and Signal Coverage – Channel Measurement and Modeling Techniques – Simulation of the radio Channel – What is db.

Applied Wireless Transmission Techniques. Short distance Base Band – UWB Pulse – carrier modulated – Digital Cellular Transmissions – Spread spectrum Transmissions.

High speed modems for spread spectrum Technology coding Techniques for wireless Transmissions.

**UNIT II**

Wireless Medium Access Alternatives – Fixed Assignment Access for Voice- Oriented Networks. Random access for data oriented Networks - Integration of Voice and Data Traffic.

Introduction to Wireless Networks – Wireless Network Topologies – Cellular Topology - Cell fundamentals - Capacity expansion techniques – Network Planning for CDMA Systems.

**UNIT III**

Mobility Management – Radio Resources and Power Management – Security in Wireless Networks GSM and TDMA Technology - Introduction to GSM – Mechanisms to support a mobile environment – communications in the infrastructure.

**UNIT IV**

CDMA technology – Reference Architecture – IMT 2000 - Mobile Data Networks – Data oriented CDPD Network – GPRS and Higher data rates - SMS in GSM – Mobile Application Protocols.

**UNIT V**

IEEE 802.11 WLAN – Physical layer – MAC sub layer – MAC Management Sub layer - Adhoc Networking – IEEE 802.15 – Home RF – Bluetooth – Wireless Geo location – Wireless Geo location System Architecture.

**TEXT BOOK**

1. Kaveh Pahlavan, Prashant Krishnamurthy “Principles of Wireless Networks”, Pearson Education Delhi, 2002.

**REFERENCES**

1. Theodore S.Rappaport, “Wireless Communications : Principles and Practice”, Pearson Education Delhi, 2002.
2. William Stallings, “Wireless Communications and Networks”, Pearson Education Delhi, 2002.
3. Martyn Mallick, “Mobile and Wireless Design Essentials”, Wiley, 2003.
4. Kamilia Feher, “Wireless Digital Communications”, Prentice Hall of India, Delhi, 2002.

**CS4A4                      NATURAL LANGUAGE PROCESSING                      4   1   0   5****UNIT - I**

Natural Language Processing (NLP) – open problems – major goal – language structure – language analyzer – morphological analyzer – local world grouper (LWG) – core parser – requirements of computational grammars – computational aspect – system aspect – large system aspect – morphological analysis – morphological generation using paradigms – morphological analysis using paradigms – speeding up morphological analysis by compilation – morphological analyzer – additional issues – local word grouping – verb groups – noun groups – strategy for grammar development – semantics in stages.

**UNIT - II**

Paninian grammar – semantic model – free word order and vibhakti – paninian theory – karaka relations – active passive – control – karaka to vibhakti mapping – karaka sharing.

**UNIT - III**

Machine translation – survey – is MT possible? – Possible approaches – current status – anusaraka or language accessor – cutting the Gordian knot – structure of anusaraka systems – user interface – linguistic area – anusaraka output – language bridges.

**UNIT - IV**

Lexical functional grammar – active passive and dative constructions – WH movements in questions – LFG formalism – well formedness conditions – handling WH movements in questions – computational aspects – features and feature structures – unification – other constraints – CFG and Indian languages – functional specification – lexicalized grammars and locality – lexicalized tree substitution grammar – lexicalized tree adjoining grammar – feature structures – mathematical aspects

**UNIT - V**

Comparing TAG with PG – similarities between TAG and PG – differences between TAG and PG – Government and binding – GB modules – X-bar theory – theta theory – Government – Case theory – bounding theory – empty category principle (ECP) – binding theory – constraints on movement – GB parsing – comparing GB with PG

**Test Books:**

1. Akshar Bharati, Vineet Chaitanya, Rajeev Sangal, “Natural Language Processing – A Paninian Perspective”, Prentice Hall of India, 2000
2. James Allen, Natural Language Understanding, Pearson Education, 3<sup>rd</sup> ed., 2005

CS4A5

DATA COMPRESSION

4 1 0 5

**UNIT-I : Introduction**

Compression Techniques – Lossy compression & Lossless compression, modeling and compression Mathematical modeling for Lossless compression- Physical models, probability models, Markov Models and composite source models. Mathematical modeling for Lossy compression – physical models, Probability models and linear systems models.

**UNIT – II : Different Methods of Compression**

**Basic Techniques** : Run length encoding, RLE Text compression, RLE image compression and scalar quantization.

**Statistical Methods** : Information theory concepts, Huffman coding, Adaptive Huffman coding, facsimile compression Arithmetic coding and Adaptive, Arithmetic coding and Text compression.

**Dictionary methods** : String compression, LZ 77, LZSS, LZ78,LZW, Unix compression, GIF image, ARC and PKZIP, Data compression patterns.

**Wavelet methods** : Fourier Image compression, Multi Resolution decomposition and JPEG 2000.

**UNIT-III : Image Compression**

Intuitive Methods, Image Transforms, JPEG, Progressive Image compression, Vector quantization, Adaptive Vector Quantization, Block Matching, Block Truncation coding. Context Tree weighting, Block Decomposition, Binary Tree predictive coding, Quad Trees and Finite Automata Methods.

**UNIT –IV : Video Compression**

Analog Video, Composite and Components Video, Digital Video, Video compression, MPEG and H.261.

**UNIT – V : Audio Compression**

Sound, Digital Audio, The Human Auditory System,  $\mu$  -Law and A-Law companding, ADPCM Audio compression and MPEPG-1 Audio Layers.

**TEXT BOOKS :**

1. David salomon, “Data compression – The complete Reference”, Springer Publications(2<sup>nd</sup> Edition)
2. Mark Nelson and Jean-Loup Gailly, “The Data compression Book”, Mark Nelson and Jean-Loup Gailly, BPB publications (2<sup>nd</sup> Edition)
3. Khalid Sayood, “Introduction to Data Compression”,Harcout India(P) Ltd,New Delhi

**CS4A6****MOBILE COMPUTING****4 1 0 5****Unit I INTRODUCTION**

Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmissions – Multiplexing – Spread Spectrum and Cellular Systems – Medium Access Control – Comparisons.

**Unit II TELECOMMUNICATION SYSTEMS**

Telecommunication Systems – GSM – Architecture – Sessions – Protocols – Hand Over and Security – UMTS and IMT-2000 – Satellite Systems.

**Unit III WIRELESS LAN**

IEEE 802.11 – HiperLAN – Bluetooth – MAC layer – Security and Link Management

**Unit IV MOBILE IP**

Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies.

**Unit V WIRELESS APPLICATION PROTOCOL**

Wireless Application Protocol (WAP) – Architecture – XML – WML Script – Applications.

**TEXT BOOK**

1. Jochen Schiller, “Mobile Communications”, Pearson Education, Delhi, 2000.

**REFERENCE**

1. Sandeep Singhal, Thomas Bridgman, Lalitha Suryanarayana, Danil Mouney, Jari Alvinen, David Bevis, Jim Chan and Stetan Hild, “ The Wireless Application Protocol : Writing Applications for the Mobile Internet”, Pearson Education Delhi, 2001.

**CS4A7****SOFT COMPUTING****4 1 0 5****UNIT I INTRODUCTION**

Soft computing paradigms – Neural network – Fuzzy type – Derivation free optimization methods of genetics algorithms – Soft computing characteristics.

**UNIT II FUZZY LOGIC**

Sets – Properties – Arithmetics - Members function – Fuzzy relations – Relation equations – Fuzzy measures – Types of uncertainty – Members of uncertainties – Measures of fuzziness – Probabilities Possibility – Measures of fuzzy events.

**UNIT III NEURAL COMPUTING**

Neuron modeling – Learning in Simple Neuron – Perception earning curve – Proof – Limitations of perception.

#### **UNIT IV NEURAL NETWORKS**

Multi-level perception – Algorithms – Visualizing network behaviour – B:PN – Self organizing network – Kohonen algorithms – Hopfield network – Adaptive resonance theory – Pattern classification.

#### **UNIT V GENTIC ALGORITHMS**

Introduction – Biological terminology – Search space and fitness landscapes – Elements of genetic algorithms – Genetic algorithms in problem solving.

#### **TEXT BOOKS**

1. Kauffmann. A., “Theory of Fuzzy Subsets”, Academic Press, 1989.
2. R.Beale C.T.Jacson, “Neural Computing- An introduction”, Adam Hilger, 1990.
3. Melanie Mitchell, “An Introduction to Genetic Algorithms”, Prentice Hall of India, 1996.

#### **REFERENCES**

1. J.S.Jang, C.T.Sun, E. Mizutani, “Neuro – Fuzzy and Soft Computing”, Matlah Curriculam Series, Prentice International, 1997.
2. Simon Havkin, “Neural Networks – A Comprehensive Foundation”, Prentice Hall of Inda, 1994.

**CS4A8**

**ADVANCED NETWORKING**

**4 1 0 5**

#### **Unit – I : Circuit Switching Networks**

AT & T’s Dynamic Routing Network, Routing in Telephone Network – Dynamic Non Hierarchical Routing – Trunk Status Map Routing – Real Time Network Routing, Dynamic Alternative Routing – Distributed Adaptive Dynamic Routing – Optimized Dynamic Routing.

#### **Unit – II : Packet Switching Networks**

Distance Vector Routing-Link State Routing-Inter Domain Routing – Classless Interdomain Routing (CIDR), Interior Gateway Routing Protocols(IGRP) – Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Exterior Gateway Routing Protocol(EGRP)–Border Gateway Protocol(BGP), Apple Talk Routing and SNA Routing

#### **UNIT – III : High Speed Networks**

Routing in optical networks- The optical layer, Node Designs, Network design and operation, Optical layer cost tradeoffs, Routing and wavelength assignment, Architectural variations, Routing in ATM networks – ATM address structure, ATM Routing, PNNI protocol, PNNI signaling protocol, Routing in the PLANET network and Deflection Routing.

#### **Unit – IV : Security and Cryptography**

Introduction to Security - Security Attacks, services and Mechanisms – Data Encryption Standard - Advanced Encryption Standard–Public–Key Cryptography and RSA – Message Authentication and Hash Functions – Hash and MAC algorithms – Digital Signatures and Authentication Protocols

**Unit – V : Network Security**

Authentication Applications – Electronic Mail security – IP Security – Web security – Intruders – Malicious Software – Firewalls.

**TEXT BOOKS :**

1. M Steen Strub, “Routing in Communication Networks”, PH International, NY 1995.
2. William Stallings, “ISDN & Broadband ISDN with Frame Relay and ATM”, PHI, ND, 2004.
3. William Stallings, “Cryptography and Network Security”, PHI, 2006

**REFERENCE BOOKS :**

1. “Internetworking Technologies Hand Book”, Fourth Edition, Inc. (CISCO System, ILSG Cisco System 2003)
2. William Stallings, “High Speed Networks TCP/IP and ATM Design Principles”, PH International, NY, 1998.
3. “Behrouy A Ferouzan”, Data Communications and Networking (3/e) TMH, 2004
4. Charlie Kaufman, Radia Rerlman Mike Specines, “Network Security – Private Communication in a Public World”, PHI (2/e) 2002.

CS4A9

**VIRTUALIZATION AND CLOUD  
COMPUTING**

4 1 0 5

**UNIT I CLOUD COMPUTING**

Understanding the Cloud Computing – Cloud Architecture – Cloud Storage – Advantages, Disadvantages of Cloud Computing – Companies in the Cloud Today – Developing Cloud Services – Web:Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On:Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds

**UNIT II CLOUD COMPUTING FOR EVERYONE**

Centralizing Email Communications – Collaborating on Schedules, To:Do Lists, Contact Lists and Group Projects and Events – Cloud Computing for the Community and Corporation, Using Cloud Services: Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications, Online Planning and Task Management – Collaborating on Event Management, Contact Management, Project Management, Word Processing and Databases – Storing and Sharing Files

**UNIT III VIRTUALIZATION & CLOUD COMPUTING \***

Virtualization & Cloud Computing Overview – Case Study: Enterprise Virtualization & Cloud Computing – Definitions – Hypervisor / Virtual Machine Monitor Architecture – CPU Virtualization Extensions – Network and Storage Virtualization Architecture

**UNIT IV VIRTUALIZED ENTERPRISE \***

Smashing the Virtualized Stack – Case Study: Owning the Virtualized Enterprise – CPU & Chipsets – VMM/Hypervisor/Host – VMs/Guest – Control & Management planes & APIs.

## **UNIT V CLOUD SECURITY AND PRIVACY**

Infrastructure security – Data Security and Storage – Identity and access management – Security management in the cloud – privacy – Security as a cloud service.

### **REFERENCES**

1. Michael Miller, Cloud Computing: Web:Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Christofer Hoff, Rich Mogull, Craig Balding, Hacking Exposed: Virtualization & Cloud Computing: Secrets & Solutions [Paperback], McGraw: Hill Osborne (20 Jan 2012) \*
3. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On:demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
4. Tim Mather, Subra Kumaraswamy, Shahed Latif, Cloud Security and Privacy – An Enterprise Perspective on Risks and Compliance, By O'Reilly Media, 2009

**CS4B1**

**GENETIC ALGORITHMS**

**4 1 0 5**

### **UNIT – 1 OVERVIEW OF GENETIC ALGORITHMS**

The appeal of evolution – Search spaces and fitness landscapes – Elements of genetic algorithms – Genetic algorithms and traditional search methods – A simple genetic algorithm – Applications and working of genetic algorithms.

### **UNIT –2 IMPLEMENTING A GENETIC ALGORITHM**

Usage of a genetic algorithm – Encoding a problem for a genetic algorithm – Adapting the encoding – Selection methods – Genetic operators – Parameters for genetic algorithms.

### **UNIT – 3 GENETIC ALGORITHMS IN PROBLEM SOLVING**

Evolving cellular automata – Data analysis and prediction – Evolving Neural Networks.

### **UNIT – 4 GENETIC ALGORITHMS IN SCIENTIFIC MODELS**

Modeling interactions between learning and evolution – Modeling Ecosystems – Measuring Evolutionary activity.

### **UNIT – 5 THEORETICAL FOUNDATIONS OF GENETIC ALGORITHMS**

Schemes and the two-armed Bandit problem – Exact mathematical models of simple genetic algorithms – Statistical mechanics approaches.

### **TEXT BOOK**

1. Mitchell.M., “An Introduction to Genetic Algorithms”, Prentice Hall of India, 1998.

### **REFERENCE**

1. Goldberg.D.E., “Genetic Algorithms in Search, Optimization and Machine Learning”, Addison Wesley. 1989.