

Anna University Syllabus for All Branches , All Semester : Downloaded from www.AnnaUnivEdu.Org

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Applicable for all colleges affiliated to anna university.

SEMESTER VIII

(Applicable to the students admitted from the Academic year 2008–2009 onwards)

Code No.	Course Title	L	T	P	C
THEORY					
	Elective V	3	0	0	3
	Elective VI	3	0	0	3
PRACTICAL					
CS2451	Project Work	0	0	12	6
TOTAL		6	0	12	12

SEMESTER VIII – Elective V

Code No.	Course Title	L	T	P	C
GE2071	<u>Intellectual Property Rights</u>	3	0	0	3
CS2051	<u>Graph Theory</u>	3	0	0	3
IT2042	<u>Information Security</u>	3	0	0	3
CS2053	<u>Soft Computing</u>	3	0	0	3
IT2023	<u>Digital Image Processing</u>	3	0	0	3
CS2055	<u>Software Quality Assurance</u>	3	0	0	3
CS2056	<u>Distributed Systems</u>	3	0	0	3
CS2057	<u>Knowledge Based Decision Support Systems</u>	3	0	0	3
GE2025	<u>Professional Ethics in Engineering</u>	3	0	0	3
GE2023	<u>Fundamental of Nano Science</u>	3	0	0	3

SEMESTER VIII – Elective VI

Code No.	Course Title	L	T	P	C
GE2072	<u>Indian Constitution and Society</u>	3	0	0	3
CS2060	<u>High Speed Networks</u>	3	0	0	3
CS2061	<u>Robotics</u>	3	0	0	3
IT2403	<u>Software Project Management</u>	3	0	0	3
CS2062	<u>Quantum Computing</u>	3	0	0	3
CS2063	<u>Grid Computing</u>	3	0	0	3

CS2064	<u>Agent Based Intelligent Systems</u>	3	0	0	3
IT2033	<u>Bio Informatics</u>	3	0	0	3
IT2064	<u>Speech Processing</u>	3	0	0	3

CS2045

WIRELESS NETWORKS

L T P C
3 0 0 3

UNIT I WIRELESS COMMUNICATION

7

Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation - MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks

UNIT II WIRELESS LAN

9

IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - Wireless Local Loop

UNIT III MOBILE COMMUNICATION SYSTEMS

11

GSM-architecture-Location tracking and call setup- Mobility management- Handover- Security-GSM SMS –International roaming for GSM- call recording functions-subscriber and service data mgt –Mobile Number portability -VoIP service for Mobile Networks – GPRS –Architecture-GPRS procedures-attach and detach procedures-PDP context procedure-combined RA/LA update procedures-Billing

UNIT IV MOBILE NETWORK AND TRANSPORT LAYERS

9

Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective Retransmission – Transaction Oriented TCP- TCP over 2.5 / 3G wireless Networks

UNIT V APPLICATION LAYER

9

WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile- caching model-wireless bearers for WAP - WML – WMLScripts - WTA - iMode- SyncML

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Jochen Schiller, “Mobile Communications”, Second Edition, Pearson Education, 2003.
2. William Stallings, “Wireless Communications and Networks”, Pearson Education, 2002.

REFERENCES:

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, First Edition, Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.
3. C.K.Toth, “AdHoc Mobile Wireless Networks”, First Edition, Pearson Education, 2002.

**GE2071 INTELLECTUAL PROPERTY RIGHTS (IPR) L T P C
3 0 0 3**

UNIT I 5
Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property (i). Movable Property ii. Immovable Property and iii. Intellectual Property.

UNIT II 10
IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures.

UNIT III 10
International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT).

UNIT IV 10
Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition.

UNIT V 10
Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Subbaram N.R. “Handbook of Indian Patent Law and Practice “, S. Viswanathan Printers and Publishers Pvt. Ltd., 1998.

REFERENCES:

1. Eli Whitney, United States Patent Number: 72X, Cotton Gin, March 14, 1794.
2. Intellectual Property Today: Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000. www.ipmatters.net/features/000707_gibbs.html.

**CS2051 GRAPH THEORY L T P C
3 0 0 3**

UNIT I INTRODUCTION 9
Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits – Connectedness – Components – Euler Graphs – Hamiltonian Paths and Circuits – Trees – Properties of trees – Distance and Centers in Tree – Rooted and Binary Trees.

UNIT II TREES, CONNECTIVITY, PLANARITY 9

Spanning trees – Fundamental Circuits – Spanning Trees in a Weighted Graph – Cut Sets – Properties of Cut Set – All Cut Sets – Fundamental Circuits and Cut Sets – Connectivity and Separability – Network flows – 1-Isomorphism – 2-Isomorphism – Combinational and Geometric Graphs – Planer Graphs – Different Representation of a Planer Graph.

UNIT III MATRICES, COLOURING AND DIRECTED GRAPH 9

Incidence matrix – Submatrices – Circuit Matrix – Path Matrix – Adjacency Matrix – Chromatic Number – Chromatic partitioning – Chromatic polynomial – Matching – Covering – Four Color Problem – Directed Graphs – Types of Directed Graphs – Digraphs and Binary Relations – Directed Paths and Connectedness – Euler Graphs – Adjacency Matrix of a Digraph.

UNIT IV ALGORITHMS 9

Algorithms: Connectedness and Components – Spanning tree – Finding all Spanning Trees of a Graph – Set of Fundamental Circuits – Cut Vertices and Separability – Directed Circuits.

UNIT V ALGORITHMS 9

Algorithms: Shortest Path Algorithm – DFS – Planarity Testing – Isomorphism.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.

REFERENCES:

1. R.J. Wilson, "Introduction to Graph Theory", Fourth Edition, Pearson Education, 2003.

IT2042

INFORMATION SECURITY

**L T P C
3 0 0 3**

AIM

To study the critical need for ensuring Information Security in Organizations

OBJECTIVES

- To understand the basics of Information Security
- To know the legal, ethical and professional issues in Information Security
- To know the aspects of risk management
- To become aware of various standards in this area
- To know the technological aspects of Information Security

UNIT I	INTRODUCTION	9
History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC		
UNIT II	SECURITY INVESTIGATION	9
Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues		
UNIT III	SECURITY ANALYSIS	9
Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk		
UNIT IV	LOGICAL DESIGN	9
Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity		
UNIT V	PHYSICAL DESIGN	9
Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel		

TOTAL: 45 PERIODS

TEXT BOOK:

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2003

REFERENCES:

1. Micki Krause, Harold F. Tipton, "Handbook of Information Security Management", Vol 1-3 CRC Press LLC, 2004.
2. Stuart Mc Clure, Joel Scrambray, George Kurtz, "Hacking Exposed", Tata McGraw-Hill, 2003
3. Matt Bishop, "Computer Security Art and Science", Pearson/PHI, 2002.

CS2060	HIGH SPEED NETWORKS	L T P C
		3 0 0 3

UNIT I	HIGH SPEED NETWORKS	9
Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection – ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet – Gigabit Ethernet– Fibre Channel – Wireless LAN's, WiFi and WiMax Networks applications, requirements – Architecture of 802.11.		
UNIT II	CONGESTION AND TRAFFIC MANAGEMENT	8
Queuing Analysis – Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.		

UNIT III TCP AND ATM CONGESTION CONTROL 12

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats – ABR Capacity allocations – GFR traffic management.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 8

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated Services.

UNIT V PROTOCOLS FOR QOS SUPPORT 8

RSVP – Goals & Characteristics, Data Flow, RSVP operations – Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking – Protocol details – RTP – Protocol Architecture – Data Transfer Protocol– RTCP.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. William Stallings, "High speed networks and internet", Second Edition, Pearson Education, 2002.

REFERENCES:

1. Warland, Pravin Varaiya, "High performance communication networks", Second Edition , Jean Harcourt Asia Pvt. Ltd. , 2001.
2. Irvan Pepelnjk, Jim Guichard, Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.
3. Abhijit S. Pandya, Ercan Sea, "ATM Technology for Broad Band Telecommunication Networks", CRC Press, New York, 2004.

CS2061

ROBOTICS

**L T P C
3 0 0 3**

UNIT I SCOPE OF ROBOTS 4

The scope of industrial Robots - Definition of an industrial robot - Need for industrial robots - applications.

UNIT II ROBOT COMPONENTS 9

Fundamentals opf Robot Technology - Automation and Robotics - Robot anatomy - Work volume - Precsion of movement - End effectors - Sensors.

UNIT III ROBOT PROGRAMMING 9

Robot Programming - Methods - interlocks textual languages. Characteristics of Robot level languages, characteristic of task level languages.

UNIT IV ROBOT WORK CELL 9

Robot Cell Design and Control - Remote Cemter compliance - Safety in Robotics.

UNIT V FUTURE TRENDS**14**

Advanced robotics, Advanced robotics in Space - Specific features of space robotics systems - long-term technical developments, Advanced robotics in under - water operations. Robotics Technology of the Future - Future Applications.

TOTAL : 45 PERIODS**TEXT BOOK**

1. Barry Leatham - Jones, "Elements of industrial Robotics" PITMAN Publishing, 987.

REFERENCES

1. Mikell P.Groover, Mitchell Weiss, Roger N.Nagel Nicholas G.Odrey, "Industrial Robotics Technology, Programming and Applications ", McGraw Hill Book Company 1986.
2. Fu K.S. Gonzaleaz R.C. and Lee C.S.G., "Robotics Control Sensing, Visioon and Intelligence " McGraw Hill International Editions, 1987.
3. Bernard Hodges and Paul Hallam, " Industrial Robotics", British Library Cataloging in Publication 1990.
4. Deb, S.R. Robotics Technology and flexible automation, Tata Mc GrawHill, 1994.

CS2053**SOFT COMPUTING****L T P C
3 0 0 3****UNIT I FUZZY SET THEORY****10**

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT II OPTIMIZATION**8**

Derivative-based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton’s Method – Step Size Determination – Derivative-free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT III ARTIFICIAL INTELLIGENCE**10**

Introduction, Knowledge Representation – Reasoning, Issues and Acquisition: Propositional and Predicate Calculus Rule Based knowledge Representation Symbolic Reasoning Under Uncertainty Basic knowledge Representation Issues Knowledge acquisition – Heuristic Search: Techniques for Heuristic search Heuristic Classification - State Space Search: Strategies Implementation of Graph Search Search based on Recursion Patent-directed Search Production System and Learning.

UNIT IV NEURO FUZZY MODELING 9
Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE 8
Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI, 2004, Pearson Education 2004.
2. N.P.Padhy, “Artificial Intelligence and Intelligent Systems”, Oxford University Press, 2006.

REFERENCES:

1. Elaine Rich & Kevin Knight, Artificial Intelligence, Second Edition, Tata Mcgraw Hill Publishing Comp., 2006, New Delhi.
2. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hill, 1997.
3. Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, N.Y., 1989.
4. S. Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003.
5. R.Eberhart, P.Simpson and R.Dobbins, “Computational Intelligence - PC Tools”, AP Professional, Boston, 1996.
6. Amit Konar, “Artificial Intelligence and Soft Computing Behaviour and Cognitive model of the human brain”, CRC Press, 2008.

**IT2023 DIGITAL IMAGE PROCESSING L T P C
3 0 0 3**

AIM:

The aim is to inculcate a basic training in the processing of images for practical applications in the domain of medical, remoting sessions and in general.

OBJECTIVES:

- To introduce basic concepts in acquiring, storage and Process of images
- To introduce for enhancing the quality of images.
- To introduce techniques for extraction and processing of region of interest
- To introduce case studies of Image Processing.

UNIT I FUNDAMENTALS OF IMAGE PROCESSING 9
Introduction – Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Colour Fundamentals and Models, File Formats, Image operations – Arithmetic, Geometric and Morphological.

UNIT II IMAGE ENHANCEMENT 9
 Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening. Frequency Domain : Filtering in Frequency Domain – DFT, FFT, DCT – Smoothing and Sharpening filters – Homomorphic Filtering.

UNIT III IMAGE SEGMENTATION AND FEATURE ANALYSIS 9
 Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Morphological WaterSheds – Motion Segmentation, Feature Analysis and Extraction.

UNIT IV MULTI RESOLUTION ANALYSIS AND COMPRESSIONS 9
 Multi Resolution Analysis : Image Pyramids – Multi resolution expansion – Wavelet Transforms.
 Image Compression : Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards.

UNIT V APPLICATIONS OF IMAGE PROCESSING 9
 Image Classification – Image Recognition – Image Understanding – Video Motion Analysis – Image Fusion – Steganography – Digital Compositing – Mosaics – Colour Image Processing..

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing” Second Edition, Pearson Education, 2003.

REFERENCES:

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, “Image Processing, Analysis and Machine Vision”, Second Edition, Thomson Learning, 2001
2. Anil K.Jain, “Fundamentals of Digital Image Processing”, PHI, 2006.
3. Sanjit K. Mitra, & Giovanni L. Sicuranza, “Non Linear Image Processing”, Elsevier, 2007.
4. Richard O. Duda, Peter E. HOF, David G. Stork, “Pattern Classification” Wiley Student Edition, 2006.

**CS2055 SOFTWARE QUALITY ASSURANCE L T P C
 3 0 0 3**

UNIT I FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE 9
 The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management

UNIT II MANAGING SOFTWARE QUALITY 9
 Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management

UNIT III SOFTWARE QUALITY ASSURANCE METRICS 9
 Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis

UNIT IV SOFTWARE QUALITY PROGRAM 9
Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning – An Overview – Purpose & Scope.

UNIT V SOFTWARE QUALITY ASSURANCE STANDARDIZATION 9
Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's CMM

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Mordechai Ben-Menachem / Garry S Marliss, "Software Quality", Vikas Publishing House, Pvt, Ltd., New Delhi.(UNIT III to V)
2. Watts S Humphrey, " Managing the Software Process", Pearson Education Inc.(UNIT I and II)

REFERENCES:

1. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", Third Edition, Artech House Publishers 2007
2. Nina S Godbole, "Software Quality Assurance: Principles and Practice", Alpha Science International, Ltd, 2004

**IT2403 SOFTWARE PROJECT MANAGEMENT L T P C
3 0 0 3**

UNIT I INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT 9
Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

UNIT II PROJECT EVALUATION 9
Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

UNIT III ACTIVITY PLANNING 9
Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

UNIT IV MONITORING AND CONTROL 9
Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT V MANAGING PEOPLE AND ORGANIZING TEAMS 9

Introduction – Understanding Behavior – Organizational Behaviour:A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Bob Hughes, Mikecoterell, "Software Project Management", Third Edition, Tata McGraw Hill, 2004.

REFERENCES:

1. Ramesh, Gopaldaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Royce, "Software Project Management", Pearson Education, 1999.
3. Jalote, "Software Project Manangement in Practive", Pearson Education, 2002.

**CS2056 DISTRIBUTED SYSTEMS LT P C
3 0 0 3**

UNIT I 9

Characterization of Distributed Systems-Introduction-Examples-Resource Sharing and the Web-Challenges.
System Models-Architectural-Fundamental.
Interprocess Communication-Introduction-API for Internet protocols-External data representation and marshalling--Client-server communication-Group communication-Case study: Interprocess Communication in UNIX.

UNIT II 9

Distributed Objects and Remote Invocation-Introduction-Communication between distributed objects-Remote procedure calls-Events and notifications-Case study: Java RMI.
Operating System Support-Introduction-OS layer-Protection-Processes and threads-Communication and invocation OS architecture.

UNIT III 9

Distributed File Systems-Introduction-File service architecture-Case Study:Sun Network File System-Enhancements and further developments.
Name Services-Introduction-Name Services and the Domain Name System-Directory Services-Case Study: Global Name Service.

UNIT IV 9

Time and Global States-Introduction-Clocks, events and process states-Synchronizing physical clocks-Logical time and logical clocks-Global states-Distributed debugging.
Coordination and Agreement-Introduction-Distributed mutual exclusion-Elections-Multicast communication-Consensus and related problems.

UNIT V**9**

Distributed Shared Memory-Introduction-Design and implementation issues-Sequential consistency and Ivy case study Release consistency and Munin case study-Other consistency models.

CORBA Case Study- Introduction-CORBA RMI-CORBA services.

TOTAL: 45 PERIODS**TEXT BOOK:**

1. George Coulouris, Jean Dollimore, Tim Kindberg, , "Distributed Systems: Concepts and Design", 4th Edition, Pearson Education, 2005.

REFERENCES:

1. A.tS. Tanenbaum and M. V. Steen, "Distributed Systems: Principles and Paradigms", Second Edition, Prentice Hall, 2006.
2. M.L.Liu, "Distributed Computing Principles and Applications", Pearson Addison Wesley, 2004.
3. Mukesh Singhal, "Advanced Concepts In Operating Systems", McGrawHill Series in Computer Science, 1994.
4. Nancy A. Lynch, "Distributed Algorithms", The Morgan Kaufmann Series in Data Management System, Morgan Kaufmann Publishers, 2000.

CS2062**QUANTUM COMPUTING****L T P C****3 0 0 3****UNIT I FOUNDATION****9**

Overview of traditional computing – Church-Turing thesis – circuit model of computation – reversible computation – quantum physics – quantum physics and computation – Dirac notation and Hilbert Spaces – dual vectors – operators – the spectral theorem – functions of operators – tensor products – Schmidt decomposition theorem

UNIT II QUBITS AND QUANTUM MODEL OF COMPUTATION**9**

State of a quantum system – time evolution of a closed system – composite systems – measurement – mixed states and general quantum operations – quantum circuit model – quantum gates – universal sets of quantum gates – unitary transformations – quantum circuits

UNIT III QUANTUM ALGORITHMS – I**9**

Superdense coding – quantum teleportation – applications of teleportation – probabilistic versus quantum algorithms – phase kick-back – the Deutsch algorithm – the Deutsch-Jozsa algorithm – Simon's algorithm – Quantum phase estimation and quantum Fourier Transform – eigenvalue estimation

UNIT IV QUANTUM ALGORITHMS – II**9**

Order-finding problem – eigenvalue estimation approach to order finding – Shor's algorithm for order finding – finding discrete logarithms – hidden subgroups – Grover's quantum search algorithm – amplitude amplification – quantum amplitude estimation – quantum counting – searching without knowing the success probability

REFERENCES:

1. Decision Support Systems – V.S. Janakiraman & K. Sarukesi
2. Decision Support systems and Data warehouse Systems by Efrem G Mallach- Mc Graw Hill

CS 2063

GRID COMPUTING

L T P C
3 0 0 3

UNIT I	CONCEPTS AND ARCHITECTURE	9
Introduction-Parallel and Distributed Computing-Cluster Computing-Grid Computing- Anatomy and Physiology of Grid-Review of Web Services-OGSA-WSRF.		
UNIT II	GRID MONITORING	9
Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems- Grid ICE – JAMM -MDS-Network Weather Service-R-GMA-Other Monitoring Systems- Ganglia and GridMon		
UNIT III	GRID SECURITY AND RESOURCE MANAGEMENT	9
Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management-Scheduling Paradigms- Working principles of Scheduling -A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.		
UNIT IV	DATA MANAGEMENT AND GRID PORTALS	9
Data Management-Categories and Origins of Structured Data-Data Management Challenges-Architectural Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals.		
UNIT V	GRID MIDDLEWARE	9
List of globally available Middlewares - Case Studies-Recent version of Globus Toolkit and gLite - Architecture, Components and Features.		

TOTAL: 45 PERIODS

TEXT BOOK:

1. Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons ,2005.

REFERENCES:

1. Ian Foster & Carl Kesselman, The Grid 2 – Blueprint for a New Computing Infrascture , Morgan Kaufman – 2004
2. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education 2004.
3. Fran Berman,Geoffrey Fox, Anthony J.G.Hey, “Grid Computing: Making the Global Infrastructure a reality”, John Wiley and sons, 2003.

CS2064 **AGENT BASED INTELLIGENT SYSTEMS** **L T P C**
3 0 0 3

UNIT I **INTRODUCTION** **9**

Definitions - Foundations - History - Intelligent Agents-Problem Solving-Searching - Heuristics -Constraint Satisfaction Problems - Game playing.

UNIT II **KNOWLEDGE REPRESENTATION AND REASONING** **9**

Logical Agents-First order logic-First Order Inference-Unification-Chaining- Resolution Strategies-Knowledge Representation-Objects-Actions-Events

UNIT III **PLANNING AGENTS** **9**

Planning Problem-State Space Search-Partial Order Planning-Graphs-Nondeterministic Domains-Conditional Planning-Continuous Planning-MultiAgent Planning.

UNIT IV **AGENTS AND UNCERTAINTY** **9**

Acting under uncertainty – Probability Notation-Bayes Rule and use - Bayesian Networks-Other Approaches-Time and Uncertainty-Temporal Models- Utility Theory - Decision Network – Complex Decisions.

UNIT V **HIGHER LEVEL AGENTS** **9**

Knowledge in Learning-Relevance Information-Statistical Learning Methods-Reinforcement Learning-Communication-Formal Grammar-Augmented Grammars-Future of AI.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Stuart Russell and Peter Norvig, “Artificial Intelligence - A Modern Approach”,2nd Edition, Prentice Hall, 2002

REFERENCES:

1. Michael Wooldridge, “An Introduction to Multi Agent System”, John Wiley, 2002.
2. Patrick Henry Winston, Artificial Intelligence, 3rd Edition, AW, 1999.
3. Nils.J.Nilsson, Principles of Artificial Intelligence, Narosa Publishing House, 1992

GE2025 **PROFESSIONAL ETHICS IN ENGINEERING** **L T P C**
3 0 0 3

UNIT I **ENGINEERING ETHICS** **9**

Senses of ‘Engineering Ethics’ – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories

UNIT II **ENGINEERING AS SOCIAL EXPERIMENTATION** **9**

Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study

UNIT III ENGINEER'S RESPONSIBILITY FOR SAFETY 9
Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk – The Government Regulator's Approach to Risk - Chernobyl Case Studies and Bhopal

UNIT IV RESPONSIBILITIES AND RIGHTS 9
Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) - Discrimination

UNIT V GLOBAL ISSUES 9
Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics - Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty – Moral Leadership – Sample Code of Conduct

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York, 2005.
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Thompson Learning, 2000.

REFERENCES:

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 1999.
2. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, 2003
3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, 2001.
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics – An Indian Perspective", Biztantra, New Delhi, 2004.
5. David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press, (2003)

**GE2023 FUNDAMENTALS OF NANOSCIENCE L T P C
3 0 0 3**

UNIT I INTRODUCTION 10
Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II PREPARATION METHODS 10
Bottom-up Synthesis-Top-down Approach: Precipitation, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

- UNIT III PATTERNING AND LITHOGRAPHY FOR NANOSCALE DEVICES 5**
Introduction to optical/UV electron beam and X-ray Lithography systems and processes, Wet etching, dry (Plasma /reactive ion) etching, Etch resists-dip pen lithography
- UNIT IV PREPARATION ENVIRONMENTS 10**
Clean rooms: specifications and design, air and water purity, requirements for particular processes, Vibration free environments: Services and facilities required. Working practices, sample cleaning, Chemical purification, chemical and biological contamination, Safety issues, flammable and toxic hazards, biohazards.
- UNIT V CHARECTERISATION TECHNIQUES 10**
X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation

TOTAL: 45 PERIODS

TEXT BOOKS:

1. A.S. Edelstein and R.C. Cammearata, eds., Nanomaterials: Synthesis, Properties and Applications, (Institute of Physics Publishing, Bristol and Philadelphia, 1996)
2. N John Dinardo, Nanoscale charecterisation of surfaces & Interfaces, Second edition, Weinheim Cambridge, Wiley-VCH, 2000

REFERENCES:

1. G Timp (Editor), Nanotechnology, AIP press/Springer, 1999
2. Akhlesh Lakhtakia (Editor) The Hand Book of Nano Technology, "Nanometer Structure", Theory, Modeling and Simulations. Prentice-Hall of India (P) Ltd, New Delhi, 2007.

**GE2072 INDIAN CONSTITUTION AND SOCIETY L T P C
3 0 0 3**

UNIT I 9
Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.

UNIT II 9
Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.

UNIT III 9
State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts.

UNIT IV **9**
Indian Federal System – Center – State Relations – President’s Rule – Constitutional Amendments – Constitutional Functionaries - Assessment of working of the Parliamentary System in India.

UNIT V **9**
Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Durga Das Basu, “Introduction to the Constitution of India “, Prentice Hall of India, New Delhi.
2. R.C.Agarwal, (1997) “Indian Political System”, S.Chand and Company, New Delhi.
3. Maciver and Page, “ Society: An Introduction Analysis “, Mac Milan India Ltd., New Delhi.
4. K.L.Sharma, (1997) “Social Stratification in India: Issues and Themes”, Jawaharlal Nehru University, New Delhi.

REFERENCES:

1. Sharma, Brij Kishore, “ Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.
2. U.R.Gahai, “Indian Political System “, New Academic Publishing House, Jalaendhar.
3. R.N. Sharma, “Indian Social Problems “, Media Promoters and Publishers Pvt. Ltd.

IT2033

BIO INFORMATICS

L T P C
3 0 0 3

UNIT I **9**
Introduction to molecular biology – the genetic material – gene structure – protein structure – chemical bonds – molecular biology tools – genomic information content

UNIT II **9**
Data searches – simple alignments – gaps – scoring matrices – dynamic programming – global and local alignments – database searches – multiple sequence alignments
Patterns for substitutions – estimating substitution numbers – evolutionary rates – molecular clocks – evolution in organelles

UNIT III **9**
Phylogenetics – history and advantages – phylogenetic trees – distance matrix methods – maximum likelihood approaches – multiple sequence alignments – Parsimony – ancestral sequences – strategies for faster searches – consensus trees – tree confidence – comparison of phylogenetic methods – molecular phylogenies

UNIT IV **9**
Genomics – prokaryotic genomes: prokaryotic gene structure – GC content - gene density – eukaryotic genomes: gene structure – open reading frames – GC content – gene expression – transposition – repeated elements – gene density

UNIT V **9**
Amino acids – polypeptide composition – secondary structure – tertiary and quaternary structure – algorithms for modeling protein folding – structure prediction – predicting RNA secondary structures
Proteomics – protein classification – experimental techniques – inhibitors and drug design – ligand screening – NMR structures – empirical methods and prediction techniques – post-translational modification prediction

TOTAL: 45 PERIODS

TEXT BOOK:

1. D. E. Krane and M. L. Raymer, “Fundamental concepts of Bioinformatics”, Pearson Education, 2003.

REFERENCES:

1. Arthur M. Lesk, “Introduction to Bioinformatics”, Second Edition, Oxford University Press, 2005.
2. T. K. Attwood, D. J. Parry-Smith, and S. Phukan, “Introduction to Bioinformatics”, Pearson Education, 1999.
3. Vittal R. Srinivas, “Bioinformatics – A Modern Approach”, Prentice-Hall of India Pvt. Ltd., 2005.

IT2064

SPEECH PROCESSING

L T P C
3 0 0 3

UNIT I **MECHANICS OF SPEECH** **9**
Speech production: Mechanism of speech production, Acoustic phonetics - Digital models for speech signals - Representations of speech waveform: Sampling speech signals, basics of quantization, delta modulation, and Differential PCM - Auditory perception: psycho acoustics.

UNIT II **TIME DOMAIN METHODS FOR SPEECH PROCESSING** **9**
Time domain parameters of Speech signal – Methods for extracting the parameters Energy, Average Magnitude, Zero crossing Rate – Silence Discrimination using ZCR and energy – Short Time Auto Correlation Function – Pitch period estimation using Auto Correlation Function.

UNIT III **FREQUENCY DOMAIN METHOD FOR SPEECH PROCESSING** **9**
Short Time Fourier analysis: Fourier transform and linear filtering interpretations, Sampling rates - Spectrographic displays - Pitch and formant extraction - Analysis by Synthesis - Analysis synthesis systems: Phase vocoder, Channel Vocoder - Homomorphic speech analysis: Cepstral analysis of Speech, Formant and Pitch Estimation, Homomorphic Vocoders.

UNIT IV LINEAR PREDICTIVE ANALYSIS OF SPEECH

9

Basic Principles of linear predictive analysis – Auto correlation method – Covariance method – Solution of LPC equations – Cholesky method – Durbin's Recursive algorithm – Application of LPC parameters – Pitch detection using LPC parameters – Formant analysis – VELP – CELP.

UNIT V APPLICATION OF SPEECH & AUDIO SIGNAL PROCESSING

9

Algorithms: Dynamic time warping, K-means clustering and Vector quantization, Gaussian mixture modeling, hidden Markov modeling - Automatic Speech Recognition: Feature Extraction for ASR, Deterministic sequence recognition, Statistical Sequence recognition, Language models - Speaker identification and verification – Voice response system – Speech synthesis: basics of articulatory, source-filter, and concatenative synthesis – VOIP .

**TEXT
BOOKS:**

TOTAL : 45 PERIODS

1. L. R. Rabiner and R. W. Schaffer, "Digital Processing of Speech signals", Prentice Hall, 1978.
2. Ben Gold and Nelson Morgan, "Speech and Audio Signal Processing", John Wiley and Sons Inc., Singapore, 2004.

REFERENCES:

1. Quatieri, "Discrete-time Speech Signal Processing", Prentice Hall, 2001.
2. L.R. Rabiner and B. H. Juang, "Fundamentals of speech recognition", Prentice Hall, 1993.

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