

SCHEME OF EXAMINATION

&

DETAILED SYALLBUS

for

B. Tech./M. Tech. (Dual Degree) programme
[9th – 12th Semester]

In

Information Technology



Guru Gobind Singh Indraprastha University
Kashmere Gate, Delhi [INDIA] –110 403
www.ipu.ac.in

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SCHEME OF EXAMINATION

Ninth Semester

| Course Code | Subject Name | L | T/P | Credits |
|--------------------------|---|-----------|------------|----------------|
| ITR-707 | Network Management & Security | 4 | - | 4 |
| ITR 719 | Cellular & Mobile Communication | 4 | - | 4 |
| ITR-731 | Advanced Software Project Management | 4 | - | 4 |
| | Elective-I | 4 | - | 4 |
| | Elective-II | 4 | - | 4 |
| Practicals | | | | |
| IT-551 | Network Management & Security Lab | | 4 | 2 |
| IT-553 | Cellular & Mobile Communication Lab | | 4 | 2 |
| IT-555 | Advanced Software Project Management Lab | | 4 | 2 |
| Total | | 20 | 12 | 26 |
| List of Electives | | | | |
| IT-501 | Intelligent Systems | 4 | - | 4 |
| IT-503 | Optical Communication | 4 | - | 4 |
| IT-505 | Programming with AVR Microcontroller | 4 | - | 4 |
| IT-507 | Project Work | 4 | - | 4 |
| ITR-705 | Software Reusability | 4 | - | 4 |
| ITR-709 | Software Quality Management | 4 | - | 4 |
| ITR-721 | Satellite Communication | 4 | - | 4 |
| ITR-729 | Information Storage & Management | 4 | - | 4 |
| MS-235 | Enterprise Resource Planning | 4 | - | 4 |
| BAEP-705 | Nano Science & Engineering | 4 | - | 4 |
| BAEP-707 | Introduction to Quantum Information and Computation | 4 | - | 4 |
| HCS-607 | Nonverbal Communication | 4 | - | 4 |

Note: A candidate can also choose an elective form the B. Tech. seventh semester, provided that he has not opted for it earlier.

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SCHEME OF EXAMINATION

Tenth Semester

| Course Code | Subject Name | L | T/P | Credits |
|--------------------------|---|-----------|------------|----------------|
| IT-502 | Distributed DBMS | 4 | - | 4 |
| ITR-630 | Enterprise computing in JAVA | 4 | - | 4 |
| | Elective-I | 4 | - | 4 |
| | Elective-II | 4 | - | 4 |
| | Elective-III | 4 | - | 4 |
| Practicals | | | | |
| IT-552 | Advanced DBMS Lab. | - | 4 | 2 |
| IT-554 | Enterprise computing in JAVA Lab. | - | 4 | 2 |
| IT-556 | Lab. Based on Elective Subjects | - | 4 | 2 |
| Total | | 20 | 12 | 26 |
| List of Electives | | | | |
| IT-504 | Advanced Semantic Web | 4 | - | 4 |
| IT-506 | Service Oriented Architecture | 4 | - | 4 |
| IT-508 | Project Work | | | |
| ITR-606 | Wireless Mobile Networks | 4 | - | 4 |
| ITR-608 | VLSI Design | 4 | - | 4 |
| ITR-612 | Real Time Systems & Software | 4 | - | 4 |
| ITR-616 | Software Metrics | 4 | - | 4 |
| ITR-618 | Software Requirement & Estimation | 4 | - | 4 |
| ITR-620 | Neural Networks | 4 | - | 4 |
| ITR-622 | Network Programming | 4 | - | 4 |
| ITR-624 | Fuzzy Logic & Design | 4 | - | 4 |
| ITR-626 | Genetic Algorithms | 4 | - | 4 |
| ITR-628 | Information Theory & Coding | 4 | - | 4 |
| HCS-606 | Interpersonal Communication & Personality Development | 4 | - | 4 |
| HCS-702 | Research Methodology | 4 | - | 4 |

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SCHEME OF EXAMINATION

Eleventh Semester

| Course Code | Subject Name | L | T/P | Credits |
|--------------------|--|----------|------------|----------------|
| IT-951 | Dissertation Work -1 (Survey and formulation of the Problem) | - | - | 20 |
| IT-953* | Seminar & Progress Work | - | - | 08 |
| Total | | | | 28 |

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SCHEME OF EXAMINATION

Twelfth Semester

| Course Code | Subject Name | L | T/P | Credits |
|--------------------|---------------------|----------|------------|----------------|
| IT-952 | Dissertation | - | - | 24 |
| IT-956* | Comprehensive Viva | - | - | 04 |
| Total | | | | 28 |

- Note:**
1. ‘*’ marked papers are NUES papers
 2. **Total number of credits in B. Tech./M. Tech. (Dual Degree)=210/108**
 3. **Minimum Number of credits to be earned for the award of the degree of M. Tech. (Dual Degree) = 300.**
 4. **Minimum number of credits to be earned by the students directly admitted to the M. Tech. programme through lateral entry = 100**

NINTH SEMESTER

| | | | | |
|------------------|--|----------|------------|----------|
| ITR – 707 | Network Management and Security | L | T/P | C |
| | | 4 | 0 | 4 |

Unit-1

Introduction

Classical security Techniques and Computer Network Security Concepts. Confidentiality and Security, Security Policy and Operations Life Cycle, Security System Development and Operations

Secure Networking Threats

The Attack Process. Attacker Types. Vulnerability Types. Attack Results. Attack Taxonomy. Threats to Security: Physical security, Biometric systems, monitoring controls, and Data security and intrusion and detection systems.

Unit-2

Encryption Techniques

Conventional techniques, Modern techniques, DES, DES chaining, Triple DES, RSA algorithm, Key management. Message Authentication and Hash Algorithm, Authentication requirements and functions secure Hash Algorithm, Message digest algorithm, digital signatures. AES Algorithms.

Unit-3

Designing Secure Networks

Components of a Hardening Strategy. Network Devices. Host Operating Systems. Applications. Appliance-Based Network Services. Rogue Device Detection, Network Security Technologies The Difficulties of Secure Networking. Security Technologies. Emerging Security Technologies General Design Considerations, Layer 2 Security Considerations. IP Addressing Design Considerations. ICMP Design Considerations. Routing Considerations. Transport Protocol Design Considerations

Network Security Platform Options

Network Security Platform Options. Network Security Device Best Practices, Common Application Design Considerations. E-Mail. DNS. HTTP/HTTPS. FTP. Instant Messaging.

Unit-4

IPsec VPN Design Considerations

VPN Basics. Types of IPsec VPNs. IPsec Modes of Operation and Security Options. Topology Considerations. Design Considerations. Site-to-Site Deployment Examples.

Secure Network Management and Network Security Management

Organizational Realities. Protocol Capabilities. Tool Capabilities. Secure Management Design Options. Network Security Management, Firewalls, Trusted systems, IT act and cyber laws.

Text Books:

1. Sean Convery, “ Network Security Architectures, Published by Cisco Press, First Ed. 2004
2. William Stallong “Cryptography and Network Security” Fourth Ed., Prentice Hall, 2006

Reference Books:

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing” 3rd Edition, Prentice Hall, 2003
2. Jeff Crume “Inside Internet Security” Addison Wesley, 2003

Unit-1

Introduction to Cellular Mobile Systems

A basic cellular system, performance criteria, uniqueness of mobile radio environment, operation of cellular systems, planning of cellular system, overview of generations of cellular systems.

Unit-2

Elements of Cellular Radio Systems Design and interference

General description of the problem, concept of frequency reuse channels, co-channel interference reduction factor, desired C/I from a normal case in an omni directional antenna system, cell splitting, consideration of the components of cellular systems, introduction to co-channel interference, co-channel measurement design of antenna system, antenna parameter and their effects.

Unit-3

Cell Coverage for Signal & antenna structures

General introduction, obtaining the mobile point to point mode, propagation over water or flat open area, foliage loss, propagation near in distance, long distance propagation, point to point prediction model-characteristics, cell site, antenna heights and signal coverage cells, mobile to mobile propagation,

Characteristics of basic antenna structures, antenna at cell site, mobile antennas.

Frequency Management & Channel Assignment, Hand Off & Dropped Calls

Frequency management, fixed channel assignment, non-fixed channel assignment, traffic & channel assignment. Why hand off, types of hand off and their characteristics, dropped call rates & their evaluation.

Unit-4

Modulation method and coding for error detection and correction

Introduction to Digital modulation techniques, modulation methods in cellular wireless systems, OFDM. Block coding, convolution coding and Turbo coding.

Multiple access techniques: FDMA, TDMA, CDMA, Time-division multiple access (TDMA), code division multiple access (CDMA), CDMA capacity, probability of bit error considerations, CDMA compared with TDMA

Spread spectrum Techniques:

Direct sequence spread spectrum, Frequency Hopping Spread spectrum techniques.

TEXT BOOKS:

1. C. Y. Lee and William, "Mobile Cellular Telecommunications", 2nd Ed, McGraw Hill. 2001
2. Mischa Schwartz, "Mobile Wireless Communications", Cambridge Univ. Press, UK, 2005.

REFERENCES:

1. Mobile Communication Hand Book", 2nd Edition, IEEE Press. 2002
2. Theodore S Rappaport, "Wireless Communication Principles and Practice", 2nd Ed, Pearson Education. 2002
3. Lawrence Harte, "3G Wireless Demystified", McGraw Hill Publications. 2000
4. Kaveh Pahlavan and Prashant Krishnamurthy, "Principles of Wireless Networks", PHI.2000

Unit-1

Introduction to Software Project Management:

Software development as a project; Stakeholders in software project; Software product, process, resources, quality, and cost; Objectives, issues, and problems relating to software projects.

Overview of Project Planning:

Steps in project planning; Defining scope and objectives; work breakdown structure; Deliverables and other products; time, cost, and resource estimation; Alternatives in planning

Project Evaluation:

Strategic assessment; Technical assessment; Cost-benefit analysis; Cash flow forecasting; Cost-benefit evaluation techniques; Break-even analysis; Risk evaluation

Selection of Appropriate Project Approach:

Choosing development technology and methodology; choice of process model; Rapid application development; Waterfall model; V-process model; Spiral model; Prototyping; Incremental delivery.

Unit-2

Software Effort Estimation

Problem in software estimation; Effort estimation techniques; Expert judgement; Estimation by analogy; Delphi technique; Algorithmic methods; Top-down and bottom-up estimation; Function point analysis; Object points; COCOMO model.

Activity Planning

Network planning model; Activity-on-arrow network; Precedence network; Forward pass; Backward pass; Critical path; Slack and float.

Risk Analysis and Management

Nature and categories of risk in software development; risk Identification; Risk assessment; Risk mitigation, monitoring, and management; Evaluating schedule risk using PERT.

Unit-3

Resource Allocation

Nature of project resources; Identifying resource requirement of activities; Allocating and scheduling resources; cost of resources; Standard, planned, and actual cost; Cost variance; time-cost trade-off.

Project Tracking and Control

Measurement of physical and financial progress; Earned value analysis; Status reports; Milestone reports; Change control.

Contact Management

Outsourcing of products and services; Types of contracts; Stages in contract placement; Terms of contract; Contract monitoring; Acceptance testing

Unit-4

Managing People and Organizing Teams

Organizational behaviour; Recruitment and placement; Motivation; Group behaviour; Individual and group decision making; Leadership and leadership styles; forms of organizational structures.

Software Quality Assurance

Planning for quality; Product versus process quality management; Procedural and quantitative approaches; Defect analysis and prevention; Statistical process control; Pareto analysis; Causal analysis; Quality standards; ISO 9000; Capability Maturity Model; Quality audit.

Configuration Management

Configuration management process; Software configuration items; Version control; change control; Configuration audit; Status reporting.

Text:

1. Bob Hughes and Mike Cotterell, "Software Project Management", Third Edition 2002, McGraw-Hill
2. Pankaj Jalote, "Software Project Management in Practice", 2002, Pearson Education Asia.

Reference:

1. Roger S. Pressman, "Software Engineering: A practitioner's Approach", Fifth Edition 2001 McGraw-Hill
2. Robert T. Futrell, Donald F. Shafer, and Linda I. Shafer, "Quality Software Project Management" 2002, Pearson Education Asia.
3. Ramesh Gopaldaswamy, "Managing Global Software Projects", 2003, Tata McGraw-Hill

Unit-1

Data, information and knowledge. Model of an intelligent system. Models of knowledge representations: Representation and reasoning in logic. Semantic representations: semantic networks, frames; Frame/ script systems; Conceptual dependency and conceptual graphs.

Unit-2

Ontologies. Knowledge based systems: Software architecture of a knowledge-based system, Rule-based programming and production systems, Rule chaining and inference control, Inference: reasoning about knowledge, Temporal reasoning, Inference under uncertainty: Bayesian techniques, Fuzzy reasoning, Case-based reasoning.

Unit-3

Intelligent agents, the agent metaphor and attributes of agent hood, Agent theory and languages, Inter-agent communication, Ontological issues. Alternatives to the symbolic approach:

Unit-4

Planning, intelligent interfaces, user-modeling, Practical implications of choosing and applying AI solutions. Knowledge representation and the Web, Semantic Web

Text Books

1. Russel, S., Norvig, P.: Artificial Intelligence, a Modern Approach, Pearson Education
2. Mitchel, T.: Machine Learning. McGraw Hill
3. G. Weiss, *Multiagent Systems*, MIT Press, 1999.
4. M. Wooldridge, *An Introduction to MultiAgent Systems*, J. Wiley & Sons

Unit-1

Introduction: concepts of information, general communication systems, evolution of optical fiber communication systems, advantages, disadvantages of optical fiber, communication systems.

Wave propagation in dielectric waveguide: snell's law, internal reflection, dielectric slab wave guide, numerical aperture, propagation of model & rays. step-index fibers, graded index fibers.

Unit-2

Attenuation in optics fibers: Fiber attenuation, connectors & splices, bending losses, Absorption, scattering, very low loss materials, plastic & polymer-clad-silica fibers.

Wave propagation in fibers: wave propagation in step index & graded index fiber, fiber dispersion, single mode fibers, multimode fibers, dispersion shifted fiber, dispersion flattened fiber, polarization.

Unit-3

Optical sources & detectors: principles of light emitting diodes (LED's), design of LED's for optical fiber communications, semiconductor LASER for optical fiber communication system, principles of semiconductor photodiode detectors, PIN photodiode, Avalanche photodiode detectors.

Optical fiber communication system: telecommunication, local distribution series, computer networks local data transmission & telemetry, digital optical fiber communication system, first & second generation system, future system.

Unit-4

Advanced multiplexing strategies: Optical TDM, subscriber multiplexing (SCM), WDM

Optical networking: data communication networks, network topologies, MAC protocols, Network Architecture- SONET/TDMH, optical transport network, optical access network, optical premise network.

Reference Books :

1. Senior J., optical fiber communications, principles & practice, PHI.
2. Keiser G., optical fiber communications, McGraw-hill.
3. Gowar J., optical communication systems, PHI.
4. William B. Jones jr., Introduction to optical fiber communication systems, Holt, Rinehart and Winston, Inc.

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|---------------|---|----------|------------|----------|
| IT-505 | Programming with AVR microcontroller | L | T/P | C |
| | | 4 | 0 | 4 |

Unit-1

Microcontroller architecture, The AVR RISC Microcontroller Architecture: AVR family architecture, Register File, Memory access and instruction Execution, I/O Memory, I/O Ports.

Unit-2

AVR Instruction Set: Program and data addressing modes, Arithmetic & Logic Instruction, Program Control Instruction, Data Transfer Instruction

AVR Hardware Design Issues: Power source, Operating clock sources, Reset circuit

Unit-3

Hardware & Software Interfacing with AVR: Lights & switches, Stack operation in AVR Processors, Implementing Combinational Logic, Connecting the AVR to the PC serial port, Expanding I/O, Interfacing analog to Digital converters and DAC, Interfacing with LED/LCD displays, Stepper motor interface with AVR.

Unit-4

Communication links for the AVR Processor: RS-232 Link, RS-422/423 link, SPI and microwave bus, IrDA Data link, CAN

AVR System Development tool: Code assembler, Code simulator, Evaluation boards, AVR emulator, Device Programmer

TEXT BOOKS:

1. Dhananjay V. Gadre, "Programming and Customizing the AVR Microcontroller", TMH 2003.

Code No: IT-507

| L | T/P | C |
|----------|------------|----------|
| 4 | 0 | 4 |

Lab: Project Work

The student will submit a synopsis at the beginning of the semester for approval to the school project committee in a specified format. The student will have to present the progress of the work through seminars and progress report. A report must be submitted to the school for evaluation purpose at the end of the semester in a specified format.

Unit-1

Introduction: Software Reuse success factors

Architecture Style: Object-oriented software engineering, application & component systems, use case components, object components, layered architecture.

Unit-2

Reuse processes: Object oriented business engineering, applying business engineering to define processes & organization, application family engineering, component system engineering, application system engineering

Unit-3

Organizing a reuse business: Its transaction, Management, working

Component based software development: component definition, component metamodel, component engineering vs application engineering

Unit-4

Component based and Model driven development using UML: Component specification, context realization, component realization

Text Books:

1. Ivan Jacobson, Griss Jacobson, Patrick Johnsson, “Software Reuse: Architecture, Process and Organization for business Success, ACM press books, 1997

Reference Books:

2. Joffrey S. Poutin, “Measuring Software Reuse: Principles Practices, Economic Models”, Addison Wesley, 2001
3. Hans-Gerhard Gross, “Component based Software testing with UML”, Springer-Verlag, Berlin, 2005

Unit-1

Concepts and Overview: Concepts of Software Quality, Quality Attributes, Software Quality Control and Software Quality Assurance, Evolution of SQA, Major SQA activities, Major SQA issues, Zero defect Software.

Software Quality Assurance: The Philosophy of Assurance, The Meaning of Quality, The Relationship of Assurance to the Software Life-Cycle, SQA Techniques.

Unit-2

Tailoring the Software Quality Assurance Program: Reviews, Walkthrough, Inspection, and Configuration Audits.

Evaluation: Software Requirements, Preliminary design, Detailed design, Coding and Unit Test, Integration and Testing, System Testing, types of Evaluations.

Configuration Management: Maintaining Product Integrity, Change Management, Version Control, Metrics, Configuration Management Planning.

Unit-3

Error Reporting: Identification of Defect, Analysis of Defect, Correction of Defect, Implementation of Correction, Regression Testing, Categorization of Defect, Relationship of Development Phases.

Trend Analysis: Error Quality, Error Frequency, Program Unit Complexity, Compilation Frequency.

Unit-4

Corrective Action as to Cause: Identifying the Requirement for Corrective Action, Determining the Action to be Taken, Implementing the Correcting the corrective Action, Periodic Review of Actions Taken.

Traceability, Records, Software Quality Program Planning, Social Factors: Accuracy, Authority, Benefit, Communication, Consistency, and Retaliation.

Text Books:

1. Robert Dunn, “Software Quality Concepts and Plans”, Prentice-Hall, 2003.
2. Alan Gillies, “Software Quality, Theory and Management”, Chapman and Hall, 2004.

Reference Books:

1. Michael Dyer, “The Cleanroom approach to Quality Software Engineering”, Wiley & Sons, 1992.
2. Daniel Freedman, Gerald Weinberg, “Handbook of Walkthroughs, Inspections and Technical Reviews”, Dorset House Publishing, 1990.
3. Tom Gilb, “Principles of Software Engineering Management”, Addison-Wesley, 1988.
4. Tom Gilb, Dorothy Graham, “Software Inspection” Addison-Wesley, 1993.
5. Watts Humphrey, “Managing the Software Process”, Addison-Wesley, 1990.
6. Watts Humphrey, “A Discipline for Software Engineering”, Addison-Wesley, 1995.
7. Arthur Lowell, “Improving Software Quality An Insiders guide to TQM”, 1993, Wiley & Sons.

Unit-1

Introduction:

Origin and brief history of satellite communications, An overview of satellite system engineering, satellite frequency bands for communication.

Orbital theory:

Orbital mechanics, locating the satellite in the orbit w.r.t. earth look angle determination. Azimuth & elevation calculations.

Unit-2

Spacecraft systems:

Attitude and orbit control system, telemetry , tracking and command (TT&C), communications subsystems, transponders, spacecraft antennas.

Satellite link design:

Basic transmission theory, noise figure and noise temperature, C/N ratio, satellite down link design, satellite uplink design.

Unit-3

Modulation, Multiplexing, Multiple access Techniques:

Analog telephone transmission, Fm theory, FM Detector theory, analog TV transmission, S/N ratio Calculation for satellite TV linking, Digital transmission, baseband and bandpass transmission of digital data, BPSK, QPSK , FDM, TDM, Access techniques : FDMA, TDMA, CDMA.

Unit-4

Encoding & FEC for Digital satellite links:

Channel capacity, error detection coding, linear block, binary cyclic codes, convolution codes.

Satellite Systems:

Satellite Earth station Technology, satellite mobile communication, VSAT technology, Direct Broadcast by satellite (DBS).

Reference Books:

1. Timothy Pratt , Charles W. Bostian, “Satellite communication”, John Wiley & sons publication, 2003
2. J.J. Spilker, “Digital Communication by satellite , PHI Publication, 1997
3. J. Martin, “Communication satellite systems”, PHI publication, 2001

Unit-1

Complexity of Information Management: Proliferation of Data, Data Center Evolution, Managing Complexity, I/O and the five pillars of technology, Storage Infrastructure, Evolution of Storage

Unit-2

Storage Systems Architecture: Modern Storage Systems, Storage Systems, Intelligent Disk Subsystems , Physical Disks , Back End ,Cache ,Front End , Host Environment

Introduction to Networked Storage: Storage Networking Overview, Direct Attached Storage, Storage Area Networks, Case study – Applying SAN concepts, Network Attached Storage, Case study – Applying NAS concepts, IP SAN, CAS, Hybrid Network Storage Based Solutions/ Emerging Technologies, Case study – Applying SAN, NAS, IP SAN concepts

Unit-3

Introduction to Information Availability: Business Continuity Overview, Data Availability, Business Continuity – Local, Case study – Applying local information availability strategies, Business Continuity – Remote, Case study – Applying remote information availability strategies, Disaster Recovery

Unit-4

Managing and Monitoring: Monitoring in the Data Center, Case study – Monitoring exercise, Management in the Data Center, Case study – Managing exercise

Case Studies must be supported by laboratory

Text Book:

1. Marc Farley Osborne, "Building Storage Networks", Tata McGrawHill, 2001
2. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, 2003
3. NIIT, "Introduction to Information Security Risk Management" , Prentice-Hall of India, 2000

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|---------------|-------------------------------------|----------|------------|----------|
| MS-235 | Enterprise Resource Planning | L | T/P | C |
| | | 4 | 0 | 4 |

Objectives: This course aims at providing overall knowledge regarding the concepts and structure of ERP systems and imparts necessary managerial skills for ERP implementation in a business enterprise.

Course Contents:

Unit-1

ERP: Enterprise Perspective: An Overview, Features of ERP, MIS Integration, ERP drivers, Trends in ERP, ERP in India. (8 Hours)

Unit-2

ERP: System Perspective: Management Information System, Operations Support System, DSS, Transaction Processing System, Network Structure of ERP System, ERP Work flow, Process modeling for ERP Systems, Communication in ERP Systems, OLTP, (On Line Transaction Processing), OLAP (On Line Analytical Processing), Enterprise Integration Application Tools for ERP. (12 Hours)

Unit-3

ERP: Resource Management Perspective: Business Modules in ERP Packages, Finance, Production, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution, Resource Management, Business Process Reengineering, Relationship between ERP & BPR, ERP Implementation Life Cycle, Implementation methodology, ERP Project Management & Monitoring. (12 Hours)

Unit-4

ERP: Key Issues: ERP and E-Commerce, ERP Culture, ERP and CRM, ERP and SCM, ERP Selection Issues, ERP in Public Sector Enterprises, Pre and Post Implementation Issues, ERP Vendors, Key ERP Consultants in India, Future Directions in ERP. (10 Hours)

Text Books:

1. Alexis, Leon (1st Edition, 2000). ERP Demystified. Tata McGraw Hill.
2. Garg, V.K. and Venket, Krishna, N.K., (1st edition, 1997). ERP Concepts and Practices, PHI Publications.
3. Sadagopan, S. (1st Edition, 1999). ERP: A Managerial perspective. Tata McGraw Hill.

Reference Books:

1. Langanalter, A. Gary (1st Edition, 2000). Enterprise Resources Planning and Beyond. St. Lucie Press, USA.
2. Imhoff, C. Loftis Lisa & Geiger, G. Jonathan (1st Edition, 2001). Building the Customer Centric Enterprise. John Wiley & Sons.
3. Shankar, Ravi & Jaiswal, S. (1st Edition, 1999). Enterprise Resource Planning. Galgotia Publications.
4. Diwan, Parag & Sharma, Sunil (1st Edition, 1999). Enterprise Resource Planning: A Manager's Guide. Excel Books.

Unit -1

Section-A

Introduction of nano science and technology, Scope of nano Science and Technology

Section –B

Properties Of nano particles: - Optical properties, Magnetic Properties, Heat Capacity etc.

Unit-II

Synthesis and fabrication of nano particles :Ball milling ,Thermal evaporation, chemical vapor deposition, Biological method

Unit-III

Characterization Of Nano Particles: X-ray diffraction, Scanning Electron Microscopy, tunneling Electron Microscopy, EDX Analysis

Unit -IV

Nano Device And modelling

BAEP- 707 Introductions to Quantum Information and Computation

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Unit-1

Introduction

Computers as physical systems, technological issues, Introduction to Turing machines-classical probabilistic and deterministic Turing machines, Quantum Turing machines; introduction to computability, complexity, classical complexity and quantum complexity classes

Unit-2

Quantum Physics and Computers

Review of Quantum Mechanics- state vectors, superpositions, unitary operators, hermitian operators, Schrödinger equation, Hamiltonian evolution, the concept of quantum measurement, the concept of qubits, quantum registers and quantum gates

Unit-3

Quantum Algorithms

Introduction to quantum algorithms, Deutsch's algorithm, Shor's algorithm and Grover's search Algorithm, Physical implementation of simple quantum gates.

Unit-4

Quantum Cryptography and Quantum Teleportation, real physical systems and technological feasibility

Heisenberg uncertainty principle, polarization states of photons, quantum cryptography using polarized photons, entanglements, introduction to the EPR paradox, BELL's theorem, Bell basis, teleportation of a single qubit, review of some current experiments and candidate physical systems, technological feasibility of a quantum computer and the limitations imposed by noise.

OBJECTIVE:

This course will teach the students how to read *non verbal* language at all levels. The students will be exposed to importance of body language as a means of effective communication and trained to use body language to (a) increase personal impact over the listeners and build rapport with others (b) read and interpret other people's signals, and (c) help control tension and conflict in interactive/communicative *situations*.

COURSE CONTENTS:

- Unit I: Introduction:** Concept and Scope of Non-Verbal Communication: Definitions and Principals; Domains of Non-Verbal Communication: Body Language, Sign Language (i.e. Traffic signals etc), Cultural Conventions, Customs, Space and Time Conventions etc; Clothing and Personal Appearance; Scope and Significance of Non-Verbal Communication
- Unit II: Body Language:** Concept, Scope and Significance as Communicative Tool; Facial Expressions and Eyes, Gestures, Postures, Gait and Space, Physical Environment.
- Unit III: Body Language in Inter-Personal Relationships:** Personal Body Language Awareness: Initial Diagnostic of Personal Body Language; Trainer and Group Feedback; Reading and Responding to Signals from Other People's Body Language; Improving Body Language for Effective Communication
- Unit IV: Non Verbal Communication & Culture:** Socio-Cultural Influence on Body Language: Ritual, Symbols and Taboos; Historical Perspective on Non-Verbal Communication and Socio-Geographical Space

Recommended Reading:

1. Pease, Allan. *Body Language: How to Read other's Thoughts by Their Gestures*. New Delhi: Sudha Publication, 2003
2. Ribbens, Geoff and Richard Thompson. *Body Language*. New York: Hodder & Stoughton, 2007
3. Morris, Desmond. *The Pocket Guide to Man Watching*. London: Grafton Books.

Practicals:

| | | | |
|---|----------|------------|----------|
| Course Code: IT 551 | L | T/P | C |
| Course Title: Network Management & Security Lab. | 0 | 4 | 2 |

Practicals based on ITR- 707

| | | | |
|---|----------|------------|----------|
| Course Code: IT 553 | L | T/P | C |
| Course Title: Cellular & Mobile Communication Lab. | 0 | 4 | 2 |

Practicals based on ITR- 719

| | | | |
|--|----------|------------|----------|
| Course Code: IT 555 | L | T/P | C |
| Course Title: Advanced Software Project Management Lab. | 0 | 4 | 2 |

Practicals based on ITR- 731

TENTH SEMESTER

| | | | | |
|---------------|---|----------|------------|----------|
| IT-502 | Distributed Database Management System | L | T/P | C |
| | | 4 | 0 | 4 |

Unit-1

Object Relational and Extended Relational Databases : Database design for an ORDBMS , Nested relations and collections , Storage and access methods , Query processing and optimization , An overview of SQL3 , Implementation issues for extended type , Systems comparison of RDBMS , Comparison of OODBMS and ORDBMS

Unit-2

Paralled and Distributed Databases and Client–Server Architecture : Architectures for parallel databases , Parallel query evaluation , Parallelizing individual operations , Sorting Joins , Distributed database concepts , Data fragmentation , Replication and allocation techniques for distributed database design , Query processing in distributed databases , Concurrency control and recovery in distributed databases , An overview of client–server architecture

Unit-3

Databases on the Web and Semi–Structured Data: Web interfaces to the web
Overview of XML , Structure of XML data , Document Schema , Querying XML data , Storage of XML data , XML applications , The semi–structured data model , Implementation issues

Unit-4

Enhanced Data Models for Advanced Applications : Active database concepts , Temporal database concepts , Spatial databases: concept and architecture , Deductive databases and query processing , Mobile databases , Geographic information systems

Textbooks

1. Elmsari and Navathe, Fundamentals of Database Systems
2. Ramakrishnan and Gehrke, Database Management Systems

References

1. Korth, Silberschatz, Sudarshan, Database System Concepts
2. Rob and Coronel, Database Systems: Design, Implementation and Management
3. Date C.J Introduction to Database Systems

Unit-1

J2EE: Introduction to J2EE, Building J2EE Applications, JDBC, Servlets and Web Applications, Java Server Pages and Model/View/Controller, J2EE Web Services Overview, Introduction to EJB, Session EJBs, Entity EJBs, JMS and message driven Beans, Transactions and Security, Application Servers (Case Study of any one of IBM Websphere, BEA Weblogic, JBoss)

Unit-2

Hibernate: Principles of Object Relational Mapping, Hibernate configuration, HQL making objects persistent, Hibernate semantics, Session management, flushing, concurrency and Hibernate, Optimistic and Pessimistic Locking, Object mapping Mapping simple properties, Single and multi valued associations, Bi-directional associations, Indexed collections, Using Hibernate Template, Querying, Session management, Transaction integration and demarcation.

Unit-3

Spring: Introduction of Spring Framework: Spring Architecture, Spring Framework definition, Spring & MVC, Factory Pattern, BeanFactory, Spring Context definition, Inversion of Control (IoC), Spring AOP, Application Context and BeanFactory, Spring ORM, Mapping API for JDO, Hibernate, Hibernate Mapping, JDO Mapping, iBATIS, Spring Abstract Transaction layer, Employing Spring transaction, Using EJB declarative transactions, Integration process, integrating Spring MVC in web application, MVC in web application, MVC Framework.

Unit-4

Web Services: Introduction to XML, Service-Oriented Architectures SOAP, SOAP message structure, handling errors WSDL, UDDI, Java Web Service implementations JAX-RPC, Web service clients in Java, Introduction to Ajax.

Text Books:

1. Jim Farley, William Crawford, O'Reilly and Associates, "Java Enterprise in a Nutshell", 2005
2. Brett McLaughlin, O'Reilly, "Java and XML, 2nd Edition, 2001

Reference Books:

3. Elliott Rusty Harold and W. Scott Means, O'Reilly, "XML in a Nutshell", 2001
4. James Cooper, "Java Design Patterns: A Tutorial", Addison Wesley
5. Govind Sesadri, "Enterprise java Computing: Application and Architectures", Cambridge University Publications, 1999

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| IT- 504 | Advanced Semantic Web Technology | L | T/P | C |
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Unit-1

Semantic Web : Introduction , growth and evolution , goals and vision , need , problems , applications , it's relation with Artificial Intelligence.

Architecture : Ontology, RDF, XML, URI and other components.

Unit-2

Ontologies: Role of Ontology in intelligent information retrieval on web, OWL, Ontologies for different applications.

Unit-3

Semantics : Kinds of semantics , use of semantics

Search Engines : Role of search Engines in intelligent retrieval of information on web.

Unit-4

Semantic web browsers : Role of semantic web browsers

Issues in semantic web research and proposed solutions.

Text:

1. Tim Berner's Lee, "Weaving the web: The original design and ultimate destiny of www", Harper Business (imprint of Harper Collins) .
2. Michael C Daconta, Leo, Kelvin Smith , "The Semantic Web:A guide to the future of XML, Web services, and knowledge management", Wiley.
3. Vladimir Geroimenko, Chaommei Chin, "Visualizing the Semantic Web", Springer.
4. Jorge Cardoso, "Semantic Web Services, theory tools and application", Information Science Reference.
5. Amit Sheth , Miltiadis D. Lytras, "Semantic Web-Based Information Systems: state-of-art Applications", CyberTech Publishing.
6. David Taniar , Johanna Wenny Rahayu, " Web Semantics & Ontology", IGI Publishing

References:

1. Dieter Fensel, James Hendler, Henry Lieberman, Tim Berner's Lee "Spinning the Semantic Web", MIT press
2. Grigoris Antonion, Frank Van Harmalen, "Semantic Web primer", MIT press
Thomas B Passin, "Explorer's guide to Semantic Web", Hanning
3. A.F. Salam , Jason Stevens, " Semantic Web Technologies and E-Business: Towards the Integrated Virtual Organization and Business Process Automation", IGI Publishing.
4. Dan Zambonini , " The 7 (f)laws of the Semantic Web", O'Reilly XML Blog

IT-506

Service Oriented Architecture

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Unit-1

Introduction : Computing with Services , Basic Standards for Web Services: XML and XML Schema, SOAP, WSDL, UDDI , Enterprise Architectures , Principles of Service-Oriented Computing

Unit-2

Modeling and Representation: Ontologies, KR, UML, Resource Description Framework, RDF, RDFS, N-Triples, Web Ontology Language, OWL , Ontology Management, UBL, IEEE SUO, Consensus

Unit-3

Execution Models, CORBA, P2P, Jini, Transaction Concepts, ACID, Schedules, Serializability, Extensions , Coordination Frameworks for Web Services, WSCL, WSCI, WS-Coordination, BTP , Process Specifications, Workflows, BPEL4WS, BPML, ebXML, PSL , Formal Specification and Enactment

Unit-4

Semantic Service Selection , Social Service Selection: Reputation and Trust
Economic Service Selection: Markets and Auctions , Building SOC Applications
Service Management: WSMF, WSDM, Robustness , Security: SAML, WS-Security, WS-Trust, XACML

Text Book

1. Munindar P. Singh and Michael N. Huhns, **Service-Oriented Computing**, Wiley & Sons.
2. Thomas Erl , **Service-Oriented Architecture (SOA): Concepts, Technology, and Design** , Prentice Hall

Code No: IT-508
Lab: Project Work

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The student will submit a synopsis at the beginning of the semester for approval to the school project committee in a specified format. The student will have to present the progress of the work through seminars and progress report. A report must be submitted to the school for evaluation purpose at the end of the semester in a specified format.

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| ITR-606 | Wireless Mobile Networks | L | T/P | C |
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Unit - I

Introduction to Personal Communication Services (PCS): PCS architecture, Mobility management, Networks signaling.

Global system for Mobile Communication (GSM) system overview: GSM Architecture, Mobility Management, Network signaling.

Unit - II

General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes.

Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.

Unit - III

Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, Wireless Markup Languages (WML)

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.

Unit – IV

Wireless local Loop (WLL): Introduction to WLL architecture, WLL technologies.

Global Mobile Satellite Systems: Case studies of IRIDIUM and GLOBALSTAR systems.

Bluetooth technology and Wi-Max

Text Books:

1. “Wireless and mobile Networks Architecture,” by Yi –Bing Lin & Imrich Chlamatac, John Wiley & Sons, 2001.
2. “Mobile & Personnel communication Systems and Services”, By Raj Pandya, Prentice Hall India, 2001.
3. “Wireless Communication- Principles and practices,” 2nd Ed., Theodore S. Rappaport, Pearson Education Pvt. Ltd, 2003.
4. “Mobile communications,” Jochen Schiller, Pearson Education Pvt. Ltd., 2002.
5. “ The Wireless Application Protocol,” Singhal & Bridgman et. al., Pearson Education, 2004.

References:

1. “Principles of Mobile Computing,” 2nd Ed., Hensmann, Merk, & Stober, Springer International Edition, 2003.
2. “Mobile Computing,” Talukdar & Yaragal, TMH, 2005.
3. “3G Wireless Networks,” Smith & Collins, TMH, 2007.

Unit-1

Introduction to Transistor Theory: BJT, FET, CMOS

Logic Design with MOSFETs: MOSFET as switches, Complex Logic gates in CMOS, Transmission Gate Circuits, Clocking and Dataflow control. Physical Structure of CMOS Integrated circuits, Fabrication Structure of CMOS Integrated Circuits, Elements of Physical Design: Layout of basic structures, Cell concepts, FET sizing and the unit transistor, Physical design of Logic gates.

Unit-2

Electrical Characteristics of MOSFETs: FET RC Model, Modeling of Small MOSFETs, Electronic analysis of CMOS Logic gates: DC characteristics of the CMOS inverter, inverter switching characteristics, power dissipation, dc characteristics: AND and NOR gates, NAND and NOR transient response, Analysis of Complex Logic gates, gate design for transient performance, transmission gates and pass transistors, gate delays, driving large capacitive loads

Unit-3

System-level physical design: Large scale physical design, Interconnect delay modeling, crosstalk, interconnect scaling, Floorplanning and Routing, Input and Output Circuits, Power distribution and consumption.

Unit-4

VLSI Clocking and System Design: Clocked Flip-flops, CMOS clocking styles, pipelined systems, clock generation and distribution and distribution.

TEXT BOOKS:

1. Neil H E Weste and Kamran Esraghian, "Principles of digital VLSI design – A system perspective", Addison Wesley, 2004

REFERENCES:

1. Demassa & Ciccone, "Digital Integrated Circuits", Willey Pub.
2. Neil H.E. Weste and Kamran Eshraghian, "Principles of CMOS VLSI Design – A System Perspective", Addison Wesley Pub
3. Wayne Wolf, "Modern VLSI Design: system on silicon", Addison Wesley Longman Publisher
4. Douglas A. Pucknell & Kamran Eshranghian, "Basic VLSI Design", PHI
5. Jan M. Rabaey, "Digital Integrated Circuits: A Design Perspective", PHI
6. Sze, S.M., Wiley, "Semiconductor Devices: Physics And Technology", 1985
7. P Antognetti, G Massobrio, "Semiconductor device modeling with SPICE", McGraw-Hill

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| ITR-612 | Real time Systems & Software | L | T/P | C |
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Unit-1

Real time system: Hard vs Soft, Reference model of RTS, Periodic task model, Resource parameters of Jobs

Unit-2

Scheduling: clock driven, weighted RR approach, Priority approach, Dynamic vs static, EDF and LST algorithm, Clock Driven scheduling in detail

Unit-3

Priority driven scheduling of periodic task in detail: RM and DM algorithm, Scheduling aperiodic and sporadic jobs in priority driven systems in detail

Unit-4

Resource and resource Access Control, Multiprocessor scheduling, Resource access control and synchronization, Real Time Communication, OS

Text Book:

1. Alan C. Shaw, “Real – Time Systems and software”, John Wiley & Sons Inc,2001

References:

1. Jane W. S. Liu, “Real Time Systems”, Pearson Education, 2006
2. Phillip a. Laplante, “Real-Time systems: Design and analysis” Wiley, 2006

Unit-1

Introduction:

What is measurement and why do it? Measurement in software engineering, scope of software metrics.

The Basics of Measurement:

Representational theory, Measurement & Models, Measurement Scales and Scale Types, Meaningfulness in Measurement

Unit-2

A Goal Framework for Software Measurement:

Classifying software measures, Determining what to measure, Applying the framework

Empirical Investigation & Data Collection:

Four Principles of Investigation, Planning formal experiments, What is good data, How to define the data, How to collect data, When to collect data.

Unit-3

Analyzing Software Measurement Data:

Analyzing the results of experiments, Analysis Techniques, Overview of statistical tests.

Measuring Internal Product Attributes, Size and Structure:

Aspects of Software Size, Length, Reuse, Functionality, Complexity, Types of Structural Measures, Modularity and information flow attributes, Object Oriented Metrics

Unit-4

Measuring External Product Attributes:

Modeling Software Quality, Measuring aspects of quality

Measurement and Management:

Planning a measurement program, Measurement in practice, empirical research in software engineering.

Text Book:

1. Norman E. Fenton & Shari Lawrence Pfeiffer, "Software Metrics", Thomson Computer Press, 1996.
2. Norman E. Fenton, "Software Metrics: A Rigorous and Practical Approach", International Thomson Computer Press, 1996.
3. B. Henderson-Sellers, "Object-Oriented Metrics, Measures of Complexity", Prentice Hall, 1996.
4. Kishore, Swapna, "Software Requirement and Estimation", Tata McGraw Hill, 2001

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| ITR - 618 | Software Requirement & Estimation | L | T/P | C |
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Unit-1

Introduction to software life cycle, management activities in a software project

Requirements engineering: Requirements Elicitation, Requirement Elicitation techniques, Requirement Analysis, Requirement Analysis Models, Requirement Documentation, Requirement Management

Unit-2

Size Estimation: Function Point Analysis, Mask II FPA, LOC estimation, Conversion between size measures

Unit-3

Effort, schedule & cost estimation: Estimation factors, COCOMO-II, Putnam Estimation Model, Estimation by Analogy, Validating Software Estimates

Unit-4

Tools: Software Estimation Tools

Industry Resources; IFPUG, UQAM-SEMRL, COSMIC, IEEE, COCOMO

Reference Book:

1. Kishore, Swapna, "Software Requirements and Estimation", Tata McGraw Hill, 2001
2. Norman E. Fenton, "Software Metrics: A Rigorous and Practical Approach", International Thomson Computer Press, 1996.
3. B. Henderson-Sellers, "Object-Oriented Metrics, Measures of Complexity", Prentice Hall, 1996.

Unit-1

Biological analogy, Architecture classification, Neural Models, Learning Paradigm and Rule, single unit mapping and the perception.

Unit-2

Feed forward networks – Review of optimization methods, back propagation, variation on Backpropagation, FFANN mapping capability, properties of FFANN's Generalization.

Unit-3

PCA, SOM, LVQ, Adaptive Resonance Networks.

Unit-4

Hopfield Networks, Associative Memories, RBF Networks.

Applications of Artificial Neural Networks: Regression, applications to function approximation, Classification, Blind Source Separation.

Text Book:

1. Haykin S., "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.

References:

1. Anderson J.A., "An Introduction to Neural Networks", PHI, 1999.
2. Hertz J, Krogh A, R.G. Palmer, "Introduction to the Theory of Neural Computation", Addison-Wesley, California, 1991.
3. Addison-Wesley, California, 1991.
4. Hertz J, Krogh A, R.G. Palmer, "Introduction to the Theory of Neural Computation", Addison-Wesley, California, 1991.
5. Freeman J.A., D.M. Skapura, "Neural Networks: Algorithms, Applications and Programming Techniques", Addison-Wesley, Reading, Mass, (1992).
6. Golden R.M., "Mathematical Methods for Neural Network Analysis and Design", MIT Press, Cambridge, MA, 1996.
7. Cherkassky V., F. Kulier, "Learning from Data-Concepts, Theory and Methods", John Wiley, New York, 1998.
8. Anderson J.A., E. Rosenfield, "Neurocomputing: Foundations of Research, MIT Press, Cambridge, MA, 1988.
9. Kohonen T., "Self-Organizing Maps", 2nd Ed., Springer Verlag, Berlin, 1997.
10. Patterson D.W., "Artificial Neural Networks: Theory and Applications", Prentice Hall, Singapore, 1995.
11. Vapnik V.N., "Estimation of Dependencies Based on Empirical Data", Springer Verlag, Berlin, 1982.
12. Vapnik V.N., "The Nature of Statistical Learning Theory", Springer Verlag, New York, 1995.
13. Vapnik V.N., "Statistical Learning Theory: Inference from Small Samples", John Wley, 1998.

Unit-1

Introduction to Systems Programming: Files, System Files, File Formats, Buffered I/O, Directories, File System, Inodes, links,fcntl, links, locks, Device I/O, Terminal I/O, ioctl(), Files and Devices ,Signals, video I/O ,Multi-Tasking

Unit-2

Processes and Inter-Process Communication: timers, polling vs interrupts, environment, fork, exec, wait, environment, exit and wait, pipe, fifos, message queues, semaphore

Unit-3

Network Programming: Sockets, Operation, Socket types, Domains Name Binding, Closing Sockets, I/O Multiplexing, Client/Server Models, Connection Based Services, Handling Out of Band Data, Connectionless Services, Design issues of Concurrent and iterative servers, Socket options

Unit-4

XDR and Remote Procedure Calls, Network Programming at the level of Programming Language (can use Java or Python as case study)

Text Book:

1. Unix Network Programming, W. Richard Stevens, Prentice Hall, 1998

References:

1. Internetworking with TCP/IP, Volume3, Douglas Comer, Prentice Hall, 2000
2. Internetworking with TCP/IP, Volume1, Douglas Comer, Prentice Hall, 2000

Unit-1

Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, α -cuts, Properties of α -cuts, Decomposition Theorems, Extension Principle.

Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

Unit-2

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Fuzzy Relations: Crisp & Fuzzy Relations, Projections & Cylindric Extensions, Binary Fuzzy Relations, Binary Relations on single set, Equivalence, Compatibility & Ordering Relations, Morphisms, Fuzzy Relation Equations.

Unit-3

Possibility Theory: Fuzzy Measures, Evidence & Possibility Theory, Possibility versus Probability Theory.

Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

Unit-4

Uncertainty based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp sets, Fuzziness of Fuzzy Sets.

Applications of Fuzzy Logic:

Text Book:

1. G.J.Klir , Yuan, "Fuzzy Sets and fuzzy logic, Theory and applications", Prentice Hall India, 1995.

Reference Books:

1. John Yen, Reza Langari, "Fuzzy Logic Intelligence, Control and Information", Pearson Education, 2006.
2. Ross, "Fuzzy Logic with Engineering Applications", 2nd Edition, John Wiley, 2004.
3. H. Zimmermann, "Fuzzy Set Theory and its applications", 2nd Edition, Allied Publishers, 1996.

Unit-1**Introduction**

A brief history of evolutionary computation, Elements of Genetic Algorithms, A simple genetic algorithm, Applications of genetic algorithms

Genetic Algorithms in Scientific models

Evolving computer programs, data analysis & prediction, evolving neural networks, Modeling interaction between learning & evolution, modeling sexual selection, measuring evolutionary activity.

Unit-2**Theoretical Foundation of genetic algorithm**

Schemas & Two-Armed and k-armed problem, royal roads, exact mathematical models of simple genetic algorithms, Statistical- Mechanics Approaches.

Unit-3**Computer Implementation of Genetic Algorithm**

Data structures, Reproduction, crossover & mutation, mapping objective functions to fitness form, fitness scaling, coding, a multiparameter, mapped, fixed point coding, discretization and constraints.

Some applications of genetic algorithms

The risk of genetic algorithms, De Jong & function optimization, Improvement in basic techniques, current application of genetic algorithms

Unit-4**Advanced operators & techniques in genetic search**

Dominance, duplicity, & abeyance, inversion & other reordering operators. Other micro operators, Niche & speciation, multiobjective optimization, knowledge based techniques, genetic algorithms & parallel processors.

Text Book:

1. David E. Goldberg, "Genetic algorithms in search, optimization & Machine Learning" Pearson Education, 2006

Reference Books:

1. Melanle Mitchell, "An introduction to genetic algorithms", Prentice Hall India, 2002.
2. Michael D. Vose, "The simple genetic algorithm foundations and theory, Prentice Hall, 1999
3. Masatoshi Sakawa, "Genetic Algorithms & Fuzzy Multiobjective Optimization", Kluwer Academic Publisher, 2001
4. D. Quagliarella, J Periaux, C Poloni & G Winter, "Genetic Algorithms in Engineering & Computer science", John Wiley & Sons, First edition, 1997
5. Pinaki Mzumder, Elizabeth M. Raudnick, "Genetic Algorithms for VLSI design, layout and test automation", Pearson Education, 2006

Unit-1

Information, channel capacity, The concept of amount of information, entropy, Information rate, Conditional and joint entropies.

Unit-2

Source coding: Noise less coding, Shannon's first fundamental theorem, Discrete memory less channel, Mutual information, Sources with finite memory, Markov sources, Shannon's second fundamental theorem on coding, Huffman coding, Lempel – Ziv algorithm, Shannon-Fano algorithm.

Unit-3

Channel coding: Error detecting codes, Hamming distance, Error correcting codes, Repetition codes, Linear block codes, binary cyclic codes, BCH codes, Reed-Solomon codes, Golay codes.

Unit-4

Convolution Coding: Code tree, state diagram, Trellis diagram, Maximum-Likelihood decoding – Viterbi's algorithm, sequential decoding.

Network information theory, introduction to Cryptography

Text Books:

1. T M Gover, J M Thomas, "Elements of Information Theory", Wiley , 1991
2. S. Haykin, "Digital Communication", Wiley. 2002
3. J.G.Proakis, "Digital Communications", Mc Graw Hill, 2002

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|------------------|--|----------|------------|----------|
| HCS - 606 | Interpersonal Communication & | L | T/P | C |
| | Personality Development | 4 | 0 | 4 |

Objective: To offer the learner a relevant, systematic for developing self understanding, promoting socially sensitive personal growth, understand and integrate responsibly with the environment and develop commensurate communication skills.

UNIT I

Interpersonal Effectiveness: Means of Contact, Dealing with Others (**Techniques on how to talk, listen, criticize, compliment, thank and converse effectively**), Perception of Self and Others, Barriers in communication, **Relationship Management** , Conflict Resolution, Ethical and Moral Responsibilities.

UNIT II

Personality Enhancement: Self Esteem, Self-Improvement, Positive Attitudes, Communication Channels, Self and Time Management, Standards of Conduct, Negotiating Diversity, Social and Personal Ethics.

UNIT III

Communication in Groups: Understanding Groups, Group Dynamics and Types, Group Formation, Key Factors in Groups, Communicating in Groups, Intra Group Relationships, Problem Solving and Conflict Management, Leadership, Small Group Communication: Presentations on topics/small activities like role play, case study etc.

UNIT IV

Literature and Media as Case Studies in Interpersonal Communication & Personality Development: A detailed study and analysis of the following texts:

1. *My Experiments with Truth* by M.K. Gandhi
2. Selected tales from *Panchtantra* by Vishnu Sharma
3. The movie - *Chak-De India*

Recommended Texts

1. Dimpleby, Richard and Graeme Burton. *More than Words: An Introduction to Communication*. London and New York: Routledge, 2001 (rpt, third edition).
2. Wallace, Harold R. and L. Ann Masters. *Personal Development for Life and Work*. Singapore: Thompson, 2006.

Unit I**Theoretical Moorings:**

Definitions; Characteristics; Types; Applications; Objectives; Modes of Enquiry; Research Process.

Unit II**Methodology:**

Formulating Research Problems; Reviewing Literature; Identifying Variables; Constructing Hypothesis; Data Collection and Processing; Ethical Issues

Unit III**Documentation:**

Writing Research Proposal; Writing Research Report/Thesis and Research Paper: Developing the Thesis; Formatting, Inside Citations, References, Bibliography

Unit IV**Assignments:**

Review of Literature on given research domain/problem; Use of Library Resources; Preparation of Bibliography/References; Submission of Research Proposals; Writing Research Papers/Articles

Recommended Texts:

1. Ranjit Kumar, *Research Methodology*, Delhi:Pearson Education, 2006
2. Joseph Gibaldi, *MLA Handbook for Writers of Research Papers*, New Delhi: Affiliated East West Press, 1999 (5th edition).
3. Norman Fairclough, *Analysing Discourse: Textual Analysis for Social Research*, London: Routledge, 2003/2007.

Practicals:

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| Course Code: IT 552 | L | T/P | C |
| Course Title: Advanced DBMS Lab. | 0 | 4 | 2 |

Practicals based on IT 502

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| Course Code: IT 554 | L | T/P | C |
| Course Title: Enterprise computing in JAVA lab. | 0 | 4 | 2 |

Practicals based on ITR- 630

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| Course Code: IT 556 | L | T/P | C |
| | 0 | 4 | 2 |

Lab. Based on Elective Subjects.

ELEVENTH SEMESTER

Code No: IT-951 **C**

Subject: Dissertation work – I (Survey and formulation of the Problem) **20**

The student will submit a synopsis at the beginning of the semester for the approval from the school project committee in a specified format. Synopsis must be submitted within a two weeks. The first defense, for the dissertation work, should be held with in a one month. Dissertation Report must be submitted in a specified format to the school for evaluation purpose.

Code No: IT-953 **C**

Subject: Seminar & Progress Report **8**

The student will have to present the progress of the project work through seminars and progress reports at the interval of four weeks.

TWELFTH SEMESTER

Code No: IT-952 **C**

Subject: Dissertation work **24**

The student will submit a synopsis at the beginning of the semester for the approval from the school project committee in a specified format. Synopsis must be submitted within a two weeks. The first defense, for the dissertation work, should be held within a one month. Dissertation Report must be submitted in a specified format to the school for evaluation purpose.

Code No: IT-956 **C**

Subject: Comprehensive Viva **4**