**SEMESTER VIII**

(Applicable to the students admitted from the Academic year 2006 – 2007 onwards)

| Code No. | Course Title | L | T | P | M |
|---|---|---|---|---|---|
| **THEORY** | | | | | |
| 1 | Software Testing | 4 | 0 | 0 | 100 |
| 2 | Elective IV | 4 | 0 | 0 | 100 |
| 3 | Elective V | 4 | 0 | 0 | 100 |
| **PRACTICAL** | | | | | |
| 1 | Project Work | 0 | 0 | 12 | 200 |

## SEMESTER VIII

## SOFTWARE TESTING

| | | |
|---|---|---|
| **1.** | **Introduction:** Software testing – Role of software testing – A structural approach to testing – Test strategy – methods for developing test strategy Testing methodologies. | **9** |
| **2.** | **Life Cycle Testing Approach:** Test plan – Requirements testing – Walk through test tool – Risk matrix test tool – Testing for requirements phase and design phase – Design renew test tool – Test data and volume test tools. | **9** |
| **3.** | **Installation:** Installation phase testing – Tools for acceptance test – Software acceptance process – Software maintenance – Methodologies for testing – Training and change installation. | **9** |
| **4.** | **Testing Methods:** Tools and techniques – Cost estimate – For testing – Testing phase of life cycle – Point accumulation tracking system – Performance analysis of testing – Inspection plan and test plan documents. | **9** |
| **5.** | **Testing Strategy:** Rapid prototyping – Spiral testing – Tool selection processes – Structural system testing – Documentation of test results – Test effectiveness evaluation – Test measurement process – Test metrics. | **9** |

**TOTAL HOURS: 45**

**Text Book:**


**1.** William Perry, "Effective Methods for Software Testing", John Wiley & Sons, USA, 1995.

**2.** Ron Patton, "Software Testing", Techmedia.


**Reference:**


**1.** T.I. Thai, "Learning DCOM", O'Reilly, 1999.

**2.** F.E. Redmond, "DCOM: Microsoft Distributed Component Object Model", IDG Books Worldwide Inc., 1997.

**3.** D. Box, "Essential COM", Addison Wesley, 1999.

## ELECTIVE

## SEMESTER VIII

# PARALLEL COMPUTING

**AIM**

To study the scalability & clustering issues, understand the technologies used for parallel computation, study the different inter connection networks and the different software programming models.

**OBJECTIVES**

- To study the scalability and clustering issues and the technology necessary for them.
- To understand the technologies enabling parallel computing.
- To study the different types of interconnection networks.
- To study the different parallel programming models.
- To study the software support needed for shared memory programming.

**UNIT I SCALABILITY AND CLUSTERING 9**

Evolution of Computer Architecture – Dimensions of Scalability – Parallel Computer Models – Basic Concepts Of Clustering – Scalable Design Principles – Parallel Programming Overview – Processes, Tasks and Threads – Parallelism Issues – Interaction / Communication Issues – Semantic Issues In Parallel Programs.

**UNIT II ENABLING TECHNOLOGIES 9**

System Development Trends – Principles of Processor Design – Microprocessor Architecture Families – Hierarchical Memory Technology – Cache Coherence Protocols – Shared Memory Consistency – Distributed Cache Memory Architecture – Latency Tolerance Techniques – Multithreaded Latency Hiding.

**UNIT III SYSTEM INTERCONNECTS 9**

Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms.

**UNIT IV PARALLEL PROGRAMMING 9**

Paradigms And Programmability – Parallel Programming Models – Shared Memory Programming.

**UNIT V MESSAGE PASSING PROGRAMMING 9**

Message Passing Paradigm – Message Passing Interface – Parallel Virtual Machine.

**TOTAL : 45**

**TEXT BOOK**

1. Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw-Hill, New Delhi, 2003.

**REFERENCES**

1. David E. Culler & Jaswinder Pal Singh, “Parallel Computing Architecture: A Hardware/Software Approach”, Morgan Kaufman Publishers, 1999.
2. Michael J. Quinn, “Parallel Programming in C with MPI & OpenMP”, Tata McGraw-Hill, New Delhi, 2003.

3. Kai Hwang, "Advanced Computer Architecture" Tata McGraw-Hill, New Delhi, 2003.

## SOFT COMPUTING

**AIM**

To introduce the techniques of soft computing and adaptive neuro-fuzzy inferencing systems which differ from conventional AI and computing in terms of its tolerance to imprecision and uncertainty.

**OBJECTIVES**

- To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience
- To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems
- To provide the mathematical background for carrying out the optimization associated with neural network learning
- To familiarize with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations
- To introduce case studies utilizing the above and illustrate the intelligent behavior of programs based on soft computing

**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 NEURAL NETWORKS 10**

Supervised Learning Neural Networks – Perceptrons - Adaline – Backpropagation Mutilayer Perceptrons – Radial Basis Function Networks – Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian 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**

**TEXT BOOK**

1. J.S.R.Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI, 2004, Pearson Education 2004.

**REFERENCES**

1. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill, 1997.
2. Davis E.Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y., 1989.
3. S. Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.
4. R.Eberhart, P.Simpson and R.Dobbins, "Computational Intelligence - PC Tools", AP Professional, Boston, 1996.

## HIGH SPEED NETWORKS

**AIM**

To highlight the features of different technologies involved in High Speed Networking and their performance.

**OBJECTIVES**

- Students will get an introduction about ATM and Frame relay.
- Students will be provided with an up-to-date survey of developments in High Speed Networks.
- Enable the students to know techniques involved to support real-time traffic and congestion control.
- Students will be provided with different levels of quality of service (Q.S) to different applications.

***UNIT I HIGH SPEED NETWORKS 8***

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: 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**

**TEXTBOOK**

1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Education, Second Edition, 2002. [Chapter – 4-6, 8, 10, 12, 13, 17,18]

**REFERENCES**


1. Warland & Pravin Varaiya, “HIGH PERFORMANCE COMMUNICATION NETWORKS”, Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
2. Irvan Pepelnjk, Jim Guichard and Jeff Apcar, “MPLS and VPN architecture”, Cisco Press, Volume 1 and 2, 2003

## DIGITAL IMAGE PROCESSING

**AIM**

To introduce the student to various image processing techniques.

**OBJECTIVES**

- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement techniques
- To study image restoration procedures.
- To study the image compression procedures.
- To study the image segmentation and representation techniques.

**UNIT I DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS 9**

Elements of visual perception – Image sampling and quantization Basic relationship between pixels – Basic geometric transformations-Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT – Separable Image Transforms -Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms.

**UNIT II IMAGE ENHANCEMENT TECHNIQUES 9**

Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters – Frequency domain filters : Smoothing – Sharpening filters – Homomorphic filtering.

**UNIT III IMAGE RESTORATION: 9**

Model of Image Degradation/restoration process – Noise models – Inverse filtering -Least mean square filtering – Constrained least mean square filtering – Blind image restoration – Pseudo inverse – Singular value decomposition.

**UNIT IV IMAGE COMPRESSION 9**

Lossless compression: Variable length coding – LZW coding – Bit plane coding- predictive coding-DPCM. Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards: JPEG, MPEG,Basics of Vector quantization.

**UNIT V IMAGE SEGMENTATION AND REPRESENTATION 9**

Edge detection –Thresholding - Region Based segmentation – Boundary representation: chair codes-Polygonal approximation –Boundary segments –boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors –Simple descriptors- Texture

**TOTAL : 45**

**TEXT BOOKS**

1. Rafael C Gonzalez, Richard E Woods 2nd Edition, Digital Image Processing - Pearson Education 2003.

**REFERENCES**

1. William K Pratt, Digital Image Processing John Willey (2001)
2. Image Processing Analysis and Machine Vision – Millman Sonka, Vaclav hlavac, Roger Boyle, Broos/colic, Thompson Learniy (1999).
3. A.K. Jain, PHI, New Delhi (1995)-Fundamentals of Digital Image Processing.
4. Chanda Dutta Magundar – Digital Image Processing and Applications, Prentice Hall of India, 2000

## ROBOTICS

**AIM**

Robots are slowly and steadily replacing human beings in many fields. The aim of this course is to introduce the students into this area so that they could use the same when they enter the industries.

**OBJECTIVE**

The course has been so designed to give the students an overall view of the mechanical components

- The mathematics associated with the same.
- Actuators and sensors necessary for the functioning of the robot.

**UNIT I ROBOTIC MANIPULATION 8**

Robotic manipulation – Automation and Robots – Robot Classification – Applications – Robot Specifications – Notation. Direct Kinematics: The ARM Equation – Dot and Cross products – Coordinate frames – Rotations – Homogeneous coordinates – Link coordinates – The arm equation – A five-axis articulated robot (Rhino XR-3) – A four-axis SCARA Robot (Adept One) – A six-axis articulated Robot (Intelledex 660). Inverse Kinematics: Solving the arm equation – The inverse kinematics problem – General properties of solutions – Tool configuration – Inverse kinematics of a five-axis articulated robot (Rhino XR-3) – Inverse kinematics of a four-axis SCARA robot (Adept one) - Inverse kinematics of a six-axis articulated robot (Intelledex 660) - Inverse kinematics of a three-axis articulated robot – A robotic work cell.

**UNIT II DYNAMIC OF ROBOTS**
**12**

Workspace analysis and trajectory planning: Workspace analysis – Work envelop of a five-axis articulated robot – Work envelope of a four-axis SCARA robot – Workspace fixtures – The pick-and-place operation – Continuous-path motion – Interpolated motion – Straight-line motion. Differential motion and statics: The tool-configuration Jacobian matrix – Joint-space singularities – Generalized Inverses – Resolved-Motion rate control:n<=6 – Rate control of redundant robots:n>6 – rate control using {1}-inverses – The manipulator Jacobian – Induced joint torques and forces. Manipulator Dynamics: Lagrange's equation – Kinetic and Potential energy – Generalized force – Lagrange -Euler dynamic model – Dynamic model of a two-axis planar articulated robot - Dynamic model of a three-axis SCARA robot – Direct and Inverse dynamics – Recursive Newton-Euler formulation – Dyamic model of a one-axis robot.

**UNIT III ROBOT CONTROL 6**

Robot control: The control problem – State equation – Constant solutions – Linear feedback systems - Single-axis PID control – PD-Gravity control – Computed-Torque control – Variable-Structure control – Impedance control

**UNIT IV SENSORS AND ACTUATORS 9**

Actuators - Introduction – Characteristics of actuating systems – Comparison of actuating systems – Hydraulic devices – Pneumatic devices – Electric motors – Microprocessor control of electric motors – Magnetostricitve actuators – Shape-memory type metals – Speed reduction. Sensors – Introduction – Sensor characteristics – Position sensors – Velocity sensors – Acceleration sensors – Force and pressure sensors – Torque sensors – Microswitches – Light and Infrared sensors – Touch and Tactile sensors – Proximity sensors – Range-finders – Sniff sensors – Vision systems – Voice Recognition devices – Voice synthesizers – Remote center compliance device.

**UNIT V VISION AND TASK PLANNING 9**

Robot vision – Image representation – Template matching – Polyhedral objects – Shape analysis – Segmentation – Iterative processing – Perspective Transformations – Structured illumination –Camera calibration. Task planning: Task-level programming – Uncertainty – Configuration space – Gross-Motion planning – Grasp planning – Fine-Motion planning – Simulation of planar motion – A task-planning problem.

**TOTAL : 45**

**TEXT BOOKS**


1. Robert J.Schilling, "Fundamentals of Robotics – Analysis & Control", Prentice Hall of India Pvt. Ltd., 2002. (Chapters 1 to 9 – Unit I, II, III, V)
2. Saeed B.Niku, "Introduction to Robotics – Analysis, Systems, Applications", Prentice Hall of India Pvt. Ltd., 2003. (Chapters 6 & 7 – Unit IV)

## COMPONENT BASED TECHNOLOGY

**AIM**

To introduce different software components and their application.

**OBJECTIVE**

- Introduces in depth JAVA, Corba and .Net Components
- Deals with Fundamental properties of components, technology and architecture and middleware.
- Component Frameworks and Development are covered indepth.

**UNIT I INTRODUCTION 9**

Software Components – objects – fundamental properties of Component technology – modules – interfaces – callbacks – directory services – component architecture – components and middleware

**UNIT II JAVA BASED COMPONENT TECHNOLOGIES 9**

Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP

**UNIT III CORBA COMPONENT TECHNOLOGIES 9**

Java and CORBA – Interface Definition language – Object Request Broker – system object model – portable object adapter – CORBA services – CORBA component model – containers – application server – model driven architecture

**UNIT IV . NET BASED COMPONENT TECHNOLOGIES 9**

COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces – connectable objects – OLE containers and servers – Active X controls – .NET components - assemblies – appdomains – contexts – reflection – remoting

**UNIT V COMPONENT FRAMEWORKS AND DEVELOPMENT 9**

Connectors – contexts – EJB containers – CLR contexts and channels – Black Box component framework – directory objects – cross-development environment – component-oriented programming – Component design and implementation tools – testing tools - assembly tools

**TOTAL : 45**

**TEXT BOOK**

1. Clemens Szyperski, “Component Software: Beyond Object-Oriented Programming”, Pearson Education publishers, 2003

**REFERENCES**

1. Ed Roman, “Mastering Enterprise Java Beans”, John Wiley & Sons Inc., 1999.
2. Mowbray, “Inside CORBA”, Pearson Education, 2003.
3. Freeze, “Visual Basic Development Guide for COM & COM+”, BPB Publication, 2001.
4. Hortsamann, Cornell, “CORE JAVA Vol-II” Sun Press, 2002.

## SOFTWARE QUALITY MANAGEMENT

**AIM**

To introduce an integrated approach to software development incorporating quality management methodologies.

**OBJECTIVE**

- Software quality models
- Quality measurement and metrics
- Quality plan, implementation and documentation
- Quality tools including CASE tools
- Quality control and reliability of quality process
- Quality management system models
- Complexity metrics and Customer Satisfaction
- International quality standards – ISO, CMM

**UNIT I INTRODUCTION TO SOFTWARE QUALITY 9**

**Software Quality – Hierarchical models of Boehm and McCall – Quality measurement – Metrics measurement and analysis – Gilb's approach – GQM Model**

**UNIT II SOFTWARE QUALITY ASSURANCE 9**

Quality tasks – SQA plan – Teams – Characteristics – Implementation – Documentation – Reviews and Audits

**UNIT III QUALITY CONTROL AND RELIABILITY 9**

Tools for Quality – Ishikawa's basic tools – CASE tools – Defect prevention and removal – Reliability models – Rayleigh model – Reliability growth models for quality assessment

**UNIT IV QUALITY MANAGEMENT SYSTEM 9**

Elements of QMS – Rayleigh model framework – Reliability Growth models for QMS – Complexity metrics and models – Customer satisfaction analysis.

**UNIT V QUALITY STANDARDS 9**

Need for standards – ISO 9000 Series – ISO 9000-3 for software development – CMM and CMMI – Six Sigma concepts.

**TOTAL : 45**

**TEXT BOOKS**


1. Allan C. Gillies, "Software Quality: Theory and Management", Thomson Learning, 2003. (UI : Ch 1-4 ; UV : Ch 7-8)
2. Stephen H. Kan, "Metrics and Models in Software Quality Engineering", Pearson Education (Singapore) Pte Ltd., 2002. (UI : Ch 3-4; UIII : Ch 5-8 ; UIV : Ch 9-11)


**REFERENCES**


1. Norman E. Fenton and Shari Lawrence Pfleeger, "Software Metrics" Thomson, 2003
2. Mordechai Ben – Menachem and Garry S.Marliss, "*Software Quality*", Thomson Asia Pte Ltd, 2003.
3. Mary Beth Chrissis, Mike Konrad and Sandy Shrum, "*CMMI*", Pearson Education (Singapore) Pte Ltd, 2003.
4. ISO 9000-3 "*Notes for the application of the ISO 9001 Standard to software development*".

## QUANTUM COMPUTING

**AIM**

To understand the fundamental principles of quantum computing.

**OBJECTIVES**

- To understand the building blocks of a quantum computer.
- To understand the principles, quantum information and limitation of quantum operations formalizing.
- To understand the quantum error and its correction.

**UNIT I FUNDAMENTAL CONCEPTS 9**

Global Perspectives, Quantum Bits, Quantum Computation, Quantum Algorithms, Quantum Information, Postulates of Quantum Mechanisms.

**UNIT II QUANTUM COMPUTATION 9**

Quantum Circuits – Quantum algorithms, Single Orbit operations, Control Operations, Measurement, Universal Quantum Gates, Simulation of Quantum Systems, Quantum Fourier transform, Phase estimation, Applications, Quantum search algorithms – Quantum counting – Speeding up the solution of NP – complete problems – Quantum Search for an unstructured database.

**UNIT III QUANTUM COMPUTERS 9**

Guiding Principles, Conditions for Quantum Computation, Harmonic Oscillator Quantum Computer, Optical Photon Quantum Computer – Optical cavity Quantum electrodynamics, Ion traps, Nuclear Magnetic resonance.

**UNIT IV QUANTUM INFORMATIONS 9**

Quantum noise and Quantum Operations – Classical Noise and Markov Processes, Quantum Operations, Examples of Quantum noise and Quantum Operations – Applications of Quantum operations, Limitations of the Quantum operations formalism, Distance Measures for Quantum information.

**UNIT V QUANTUM ERROR CORRECTION 9**

Introduction, Shor code, Theory of Quantum Error –Correction, Constructing Quantum Codes, Stabilizer codes, Fault – Tolerant Quantum Computation, Entropy and information – Shannon Entropy, Basic properties of Entropy, Von Neumann, Strong Sub Additivity, Data Compression, Entanglement as a physical resource.

**TOTAL : 45**

**TEXT BOOK**

1. Micheal A. Nielsen. & Issac L. Chiang, “Quantum Computation and Quantum Information”, Cambridge University Press, Fint South Asian edition, 2002.

## KNOWLEDGE BASED DECISION SUPPORT SYSTEM

**AIM**

There has been a radical shift in the management parlance. Organizations can use Intranets and Internets to analyze various aspects about the performance and predict the future. This course aims at exposing the student to one of the important applications of the computer.

**OBJECTIVE**

The course has been so designed as to include.

- Development of support system
- Methods of managing knowledge
- Intelligent decision system development

**UNIT I INTRODUCTION 9**

Decision making, Systems, Modeling, and support – Introduction and Definition – Systems – Models – Modeling process – Decision making: The intelligence phase – The design phase - The choice phase – Evaluation: The implementation phase –Alternative Decision – Making models – Decision support systems – Decision makers - Case applications.

**UNIT II DECISION SUPPORT SYSTEM DEVELOPMENT**

**9**

Decision Support System Development**:** Introduction - Life cycle – Methodologies – prototype – Technology Levels and Tools – Development platforms – Tool selection – Developing DSS
Enterprise systems: Concepts and Definition – Evolution of information systems – Information needs – Characteristics and capabilities – Comparing and Integrating EIS and DSS – EIS data access, Data Warehouse, OLAP, Multidimensional analysis, Presentation and the web – Including soft information enterprise on systems - Organizational DSS – supply and value chains and decision support – supply chain problems and solutions – computerized systems MRP, ERP, SCM – frontline decision support systems.

**UNIT III KNOWLEDGE MANAGEMENT**

**9**

Introduction – Organizational learning and memory – Knowledge management –Development –methods, Technologies, and Tools – success –Knowledge management and Artificial intelligence – Electronic document management.

Knowledge acquisition and validation: Knowledge engineering – Scope – Acquisition methods - Interviews – Tracking methods – Observation and other methods – Grid analysis – Machine Learning: Rule induction, case-based reasoning – Neural computing – Intelligent agents – Selection of an appropriate knowledge acquisition methods – Multiple experts – Validation and verification of the knowledge base – Analysis, coding, documenting, and diagramming – Numeric and documented knowledge acquisition – Knowledge acquisition and the Internet/Intranets.

Knowledge representation: Introduction – Representation in logic and other schemas – Semantic networks – Production rules – Frames – Multiple knowledge representation – Experimental knowledge representations - Representing uncertainty.

**UNIT IV INTELLIGENT SYSTEM DEVELOPMENT 9**

Inference Techniques: Reasoning in artificial intelligence – Inference with rules: The Inference tree – Inference with frames – Model-based and case-based reasoning - Explanation and Meta knowledge – Inference with uncertainty – Representing uncertainty – Probabilities and related approaches – Theory of certainty – Approximate reasoning using fuzzy logic.

Intelligent Systems Development: Prototyping: Project Initialization – System analysis and design – Software classification: Building expert systems with tools – Shells and environments – Software selection – Hardware –Rapid prototyping and a demonstration prototype - System development –Implementation – Post implementation.

**UNIT V MANAGEMENT SUPPORT SYSTEMS**

**9**

Implementing and integrating management support systems – Implementation: The major issues - Strategies – System integration – Generic models MSS, DSS, ES – Integrating EIS, DSS and ES, and global integration – Intelligent DSS – Intelligent modeling and model management – Examples of integrated systems – Problems and issues in integration.

Impacts of Management Support Systems – Introduction – overview – Organizational structure and related areas – MSS support to business process reengineering – Personnel management issues – Impact on individuals – Productivity, quality, and competitiveness – decision making and the manager manager's job – Issues of legality, privacy, and ethics – Intelligent systems and employment levels – Internet communication – other societal impacts – managerial implications and social responsibilities –

**TOTAL : 45**

**TEXT BOOK**

1. Efrain Turban, Jay E.Aronson, "Decision Support Systems and Intelligent Systems" 6th Edition, Pearson Education, 2001.

**REFERENCES**

1. Ganesh Natarajan, Sandhya Shekhar, "Knowledge management – Enabling Business Growth", Tata McGraw-Hill, 2002.
2. George M.Marakas, "Decision Support System", Prentice Hall, India, 2003.
3. Efrem A.Mallach, "Decision Support and Data Warehouse Systems", Tata McGraw-Hill, 2002.

## GRID COMPUTING

**AIM**

To understand the technology application and tool kits for grid computing

**OBJECTIVES**

- To understand the genecise of grid computing
- To knoew the application of grid computing
- To understanding the technology and tool kits to facilitated the grid computing

**UNIT I GRID COMPUTING 9**

Introduction - Definition and Scope of grid computing

**UNIT II GRID COMPUTING INITIALIVES 9**

Grid Computing Organizations and their roles – Grid Computing analog – Grid Computing road map.

**UNIT III GRID COMPUTING APPLICATIONS 9**

Merging the Grid sources – Architecture with the Web Devices Architecture.

**UNIT IV TECHNOLOGIES 9**

OGSA – Sample use cases – OGSA platform components – OGSI – OGSA Basic Services.

**UNIT V GRID COMPUTING TOOL KITS 9**

Globus GT 3 Toolkit – Architecture, Programming model, High level services – OGSI .Net middleware Solutions.

**TOTAL : 45 HRS**

**TEXTBOOK**

1. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson/PHI PTR-2003.

**REFERENCE BOOK**

1. Ahmar Abbas, “Grid Computing: A Practical Guide to technology and Applications”, Charles River media – 2003.