

UNITWISE SYLLABUS

1. **Internet Basics:** Overview of Internet, History, Web System Architecture – two-tier, three-tier and n-tier architecture, Internet vs. Intranet, Uniform Resource Locator, Protocol used in Internet – TCP/IP, HTTP, HTTPS, SMTP, POP, PPP, Services on the Internet - E-mail, Usenet, FTP, Search Engines, Web Browsers; Web Servers Introduction to J2EE, J2EE best practices.
2. **Java Database Connectivity, HTML and XML:** Java Database Connectivity – Different Types of Drivers, JDBC API's, Establishing a Connection, Statements & its Type, Result Set, Transactions Processing, Metadata. Basic Concept of HTML, Skeleton of a Web Page, Creating a Form, Overview of XML, XML Development Goal, Structure of XML Document, Parsing XML Documents – DOM and SAX.
3. **Java Servlet Programming:** Overview of CGI Programming, Benefits of Using Java Servlet, Servlet API Overview, Servlet Life Cycle, Servlet Implementation, Servlet Configuration, Servlet Exception, Deployment Descriptor, Servlet Deployment, Requests & Responses, Servlets & JDBC, Working with Cookies, Tracking Sessions, Context and Collaboration.
4. **Java Server Pages Basics and Architecture:** Introduction to Java Server Pages (JSP), JSP Tags, Directives, Scripting Elements, Standard Actions, Implicit Objects, Scope, JSP with Beans, JSP and Databases, Creating Custom JSP Tag Libraries using Nested Tags, Cookies User Sessions, Cookies and Session Objects.
5. **Introduction to Tomcat and EJB:** Web Container, Apache Tomcat Server, Architecture of Tomcat, Installing and Configuring Tomcat Server, Deeper Look-into Deployment Descriptors, The EJB Container, EJB Classes, EJB Interfaces, Session Java Bean, Entity Java Bean and Message-Driven Bean, The JAR Utility, Understanding JAR, WAR and EAR File Formats.

Text Books

1. Jim Keogh: J2EE : The Complete Reference, Tata McGraw Hill.
2. Wrox Press: Professional JSP J2EE 1.3 Edition, Shroff Publishers.
3. Patrick Niemeyer Denial Leuck: Learning Java, O'Reilly Publication

b) **Objectives:** Subject-specific skills: By the end of this course, the student must be able to:

1. Use various symbolic knowledge representations to specify domains and reasoning tasks of a situated software agent.
2. Use different logical systems for inference over formal domain representations, and trace how a particular inference algorithm works on a given problem specification.
3. Understand the conceptual and computational trade-offs between the expressiveness of different formal representations.
4. To recognize when AI techniques are necessary, to apply standard AI techniques to solve problems
5. To introduce programming in the Prolog language and use key logic-based techniques for solving different AI problems
6. To understand non-monotonic reasoning or reasoning under uncertainty.

AI & Prolog Programming

UNITWISE SYLLABUS

1. **AI history and applications:** Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Defining AI: Acting Humanly (Turing Test Approach), Thinking Humanly (Cognitive Modeling Approach), Thinking Rationally (laws of thought approach), Acting Rationally (Rational Agent Approach); Foundations of Artificial Intelligence; AI techniques, Expert Systems, Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Introduction to Computer vision, Natural Language Processing, Machine learning, Soft Computing etc.
2. **Problem solving using Search :** Searching for solutions, Uninformed Search Strategies: Breadth-first Search, Depth-first Search, Depth-limited Search, Iterative Deepening depth-first search, Comparing uninformed search strategies; constraint satisfaction problems, **Heuristic Search Techniques:** Hill Climbing, Simulated Annealing, Best First Search; OR Graphs, Heuristic Functions, A* Algorithm, AND-OR Graphs, AO* Algorithm, **Adversarial Search:** Zero-sum perfect information Games, Optimal Decisions and Strategies in Games, Mini-max Algorithm, Alpha-beta Pruning, Imperfect Real-time decisions, Games that include chance, State of the art game programs.
3. **Knowledge Representation & Reasoning:** Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Representations and mappings, Approaches to Knowledge Representation, Procedural versus Declarative Knowledge; Predicate Logic: Representing Simple facts, Instance and is-a relationships in Logic, Proposition versus Predicate Logic, Computable Functions and Predicates, Rules of Inferences and Resolution-refutation, Logic Programming and Horn Clauses; Weak Slot-and-Filler Structures: Semantic Nets, Frames; Introduction to Semantic Web and ontologies, Strong Slot-and-Filler Structures: Conceptual Dependency, Scripts
4. **AI Programming Language (PROLOG):** Introduction, How Prolog Works, Backtracking, CUT and FAIL operators, Built-in Goals, Negation, Lists, Syntax and built-in Functions, Basic list manipulation

functions in PROLOG, Predicates and Conditionals, Input, Output and Local Variables, Iteration and Recursion, recursive Lists processing, Search in Prolog: Breadth-first, depth-first, Best-first search for AI problem solving

5. **Probabilistic/Statistical Reasoning:** Probability and Bayes' Theorem, Certainty Factors and Rule-Based Systems, Bayesian Networks, Exact and approximate inference in Bayesian networks, Markov chains, Dempster-Shafer theory, Quantifying uncertainty, Intro to Fuzzy Logic; Non-monotonic Reasoning, Truth Maintenance Systems, probabilistic reasoning over time.

Text Books

1. Stuart Russel and Peter Norvig: Artificial Intelligence—A Modern Approach, 3rd Ed., 2012, Pearson Education, ISBN: 0-13-790395-2
2. Elaine Rich, Kevin Knight and B. Nair: Artificial Intelligence, 2009, Tata McGraw Hill, 3rd Ed, ISBN-10: 0-07-008770-9
3. Dan W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall of India.
4. Ivan Bratko: PROLOG Programming, 3rd Ed., 2001, Pearson Education, ISBN: 81-7808-257-8

Reference Books

1. Michael Negnevitsky, Artificial Intelligence-A guide to intelligent systems", 2nd edition, Pearson Education
2. E. Charniak and D McDermott, "Introduction to Artificial Intelligence", Pearson Education
3. David Poole, Alan Mackworth, Randy Goebel, "Computational Intelligence : a logical approach", Oxford University Press, 2004.
4. George F. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education, 2002.
5. J. Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers, 1998.

c) Outline

Week

Topics

Week 1: Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence

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2. Produce specific sections of the plan used to manage the software development and maintenance efforts.
 3. Evaluate software project management practices within an organization and recommend practical improvements based upon your evaluation.
 4. Apply schedule and cost techniques to determine a Basis for estimate.

Software project management with miniproject
UNITWISE SYLLABUS

1. **Introduction:** Introduction and Software Project Planning Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.
2. **Project Organization and Scheduling Project Elements:** Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.
3. **Project Monitoring and Control:** Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.
4. **Software Quality Assurance:** Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.
5. **Project Management and Project Management Tools:** Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

Text-Books

1. Royce, Software Project Management, Pearson Education.
2. Rizvi and Aggarwal, Software Project Management: Principles & Practices, Khanna Book Publishing Company, New Delhi
3. Pankaj Jalote, Software Project Management in Practice, , Pearson
4. Roger S. Pressman ,Software Engineering: A practical Approach,, McGraw-Hill

Reference Books

1. M. Cotterell, Software Project Management, Tata McGraw-Hill Publication.
2. S. A. Kelkar, Software Project Management, PHI Publication.
3. Mantel et al, Project Management – Core text Book, Wiley
4. Nageswara Rao Pusuluri, Software Testing Concepts and Tools, , DreamTech
5. Kieron Conway, Software Project Management, Dreamtech Press

c) Outline

Week	Topics
Week 1	Introduction and Software Project Planning Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives.
Week 2	Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan.
Week 3	Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.
Week 4	Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle.
Week 5	Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques.
Week 6	Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.
Week 7	Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI).
Week 8	Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

5. Will be able to demonstrate the concept of Operating systems.

UNITWISE SYLLABUS

1. **Big Data Processing Architectures:** Big Data Technologies, Data Driven Architecture, Information Management and Lifecycle, Big Data Analytics, Visualization and Data Scientist, Implementing The "Big Data" Data., Understanding Big Data Analysis with Machine Learning, The Evolution of Analytic Scalability, The Evolution of Analytic Processes, Creating a Culture of Innovation and Discovery, Think Bigger. Choices in Setting up R for Business Analytics, R Interfaces, Manipulating Data, Exploring Data, Building Regression Models, Forecasting and Time Series Models.
2. **Design Patterns and MapReduce:** Design Patterns, MapReduce History, MapReduce and Hadoop, Refresher, Hadoop Example: Word Count, Pig and Hive, Writing Hadoop Map Reduce Programs, Integrating R and Hadoop, Learning Data Analytics with R and Hadoop.
3. **Introduction To cloud:** Virtualization concepts, Types of Virtualization & its benefits, Introduction to Various Virtualization OS , Vmware , KVM etc, HA/DR using Virtualization , Moving VMs, SAN backend concepts, Cloud Fundamentals, Cloud Building Blocks, Understanding Public & Private cloud environments, Cloud as IaaS, PaaS , SaaS Private Cloud Environment , Basics of Private cloud infrastructure QRM cloud demo, Public Cloud Environment
4. **Understanding & exploring:** Amazon Web services, Managing and Creating Amazon EC2 instances, Managing and Creating Amazon EBS volumes, Tata Cloud details & demo, Managing Hybrid Cloud environment, Setting up your own Cloud, How to build private cloud using open source tools, Understanding various cloud plugins, Setting up your own cloud environment, Auto provisioning, Custom images, Integrating tools like Nagios, Integration of Public and Private cloud, Future directions, Cloud Domain and scope of work, Cloud Computing Programming Introduction, Trends and market of cloud.
5. **Cloud Computing:** The Cloud, Cloud Application Architectures, The Value of Cloud Computing, Cloud Infrastructure Models, An Overview of Amazon Web Services, Amazon Cloud Computing: Amazon S3, Amazon EC2, Before The Move Into The Cloud: Know Your Software Licenses , The Shift to a Cloud Cost Model, Service Levels for Cloud Applications, Security, Disaster Recovery. Security: Data Security, Network Security, Host Security, Compromise Response, Disaster Recovery: Disaster Recovery Planning, Disasters in the Cloud, Disaster Management, Scaling A Cloud Infrastructure: Capacity Planning, Cloud Scale.

Text Books

1. Data Warehousing in the Age of Big Data by Krish Krishnan, Morgan Kaufmann, 2013.
2. Big Data Analytics with R and Hadoop by Vignesh Prajapati, 2013.
3. Cloud Computing : A Practical Approach by Anthony T. Velte Toby J. Velte, Robert Elsenpeter, 2010 by The McGraw-Hill.
4. Cloud Computing: SaaS, PaaS, IaaS, Virtualization and more. by Dr. Kris Jamsa.

Reference Books

1. Principles of Big Data Preparing, Sharing, and Analyzing Complex Information, 1st Edition, by J Berman, published by Morgan Kaufmann, 2013 .
2. "Big Data Analytics - From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph" By David Loshin, Morgan Kaufmann, 2013.
3. Big Data Application Architecture Q&A: a Problem - Solution Approach Nitin Sawant, Himanshu Shah, 2013.
4. Big Data Now: Current Perspectives from O'Reilly Radar By O'Reilly Radar Team, 2011.
5. Cloud Computing Bible by Barrie Sosinsky, Published by Wiley Publishing, 2011.
6. Cloud Computing for Dummies by Judith Hurwitz, Robin Bloor, Marcia Kaufman, and Dr. Fern Halper, Wiley Publishing, 2010.
7. Cloud Computing Theory And Practice Danc. Marinercus, Elsevier, 2013
8. Gary Lee, "Cloud Networking - Understanding Cloud-based Data Center Networks", Elsevier, 2014

c) Outline

Week	Topics
Week 1:	Big Data Processing Architectures, Big Data Technologies, Data Driven Architecture, Information Management and Lifecycle, Big Data Analytics.
Week 2:	Understanding Big Data Analysis with Machine Learning, The Evolution of Analytic Scalability, The Evolution of Analytic Processes

2. Differentiate between different types of group work.
3. Describe several models of human development, treatment, and their application to groups.
4. Understand and describe major group dynamic factors, including leadership, membership, and group developmental stages.
5. Understand groups as systems or interactive teams.
6. Understand ethical guidelines for group counselors and related issues.
7. Describe factors involved in planning, selecting, and conducting groups.
8. Describe and understand the interrelationship among major group dynamic factors.
9. Discuss the differential application of various group dynamic principles to different types of groups and group situations.
10. Demonstrate appropriate involvement, support, and feedback as a small group member and understand the impact of one's personal and interpersonal style on others in groups.
11. Appreciate differences among persons and understand the dynamic tension between the need to work together and the need to prize individuality in groups.
12. Be aware of professional training standards for group leaders.

Leadership, Interpersonal & Group Dynamics
UNITWISE SYLLABUS

1. **An Introduction to Leadership Processes:** Introduction Concept and meaning of leadership, Theories of Leadership: Traditional and Modern theories of leadership, Emotional Intelligence
2. **Managing Leadership in Modern Times:** Leadership Styles, Roles and Activities of Leadership, Leadership Skills
3. **Group Processes:** Groups, Group Development, Group Dynamics, Group Cohesiveness, Types of Teams, Creating Effective Teams, Conflict: Sources, Patterns, Levels and Resolution. Stress: Emergence and causes of Stress; Effects of stress and Intra-individual conflict, Coping Strategies, Negotiating Skills. Organizational Power and Politics
4. **Inter Group Processes:** Communication and Feedback: Role of communication, non-verbal communication, interpersonal communication, interactive communication. Decision Making: Decision-Making Process, types of decision making, Transactional Analysis (TA), Johari Window
5. **Organizational Processes:** Organization Culture Concept and Determinants, Organizational Effectiveness: Concept and Measurement, Organizational Change Access to Files, Command Line Arguments.

Text Books

1. Robbins, Stephen P. (2000) Organizational Behaviour, Prentice Hall, New Delhi
2. Aswathappa, K. (2000). Organisation Behaviour, Himalaya Publishing House, New Delhi.
3. Mc Shane, L.S., Von, Glinow A.M., Sharma, R.R. (2010). Organizational Behaviour. Tata McGraw-Hill, New Delhi
4. Prasad, L. M. (2000). Organisational Behaviour. Sultan Chand & Sons, New Delhi.

Reference Books

1. Hersey, Paul, Blanchard, K.H. and Johnson, Dewey E. (2011). Management of Organizational Behavior: Leading Human Resources. PHI Learning Pvt. Ltd., New Delhi
2. Newstorm, John W. and Keith Davis (1998). Organizational Behaviour: Human Behaviour at Work. Tata McGraw-Hill, New Delhi.
3. Corey, M.S., & Corey, G. (2006 or 2010). Groups: Process and Practice (7th or 8th edition). Belmont, CA: Thomson/Brooks Cole.
4. Cloud, H., & Townsend, J. Making small groups work: What every small group leader needs to know. Grand Rapids, MI: Zondervan.
5. Dimock, H.G. (1987) Groups: Leadership and group Development. San Diego, University Associates.
6. Napier, R.W., & Gershenfeld, M. K. (1987). Groups: Theory and Experience. Boston: Houghton, Mifflin Company.
7. Yalom, I.D., (1985). The Theory and Practice of Group Psychotherapy. New York: Basic Books.

c) Outline

Week	Topics
Week 1:	Introduction Concept and meaning of leadership
Week 2:	Theories of Leadership: Traditional and Modern theories of leadership,
Week 3:	Emotional Intelligence, Leadership Styles
Week 4:	Roles and Activities of Leadership, Leadership Skills
Week 5:	Groups, Group Development, Group Dynamics, Group Cohesiveness
Week 6:	Types of Teams, Creating Effective Teams,
Week 7:	Conflict: Sources, Patterns, Levels and Resolution
Week 8:	Stress: Emergence and causes of Stress; Effects of stress and Intra-individual conflict
Week 9:	Coping Strategies, Negotiating Skills. Organizational Power and Politics
Week 10:	Inter Group Processes, Communication and Feedback: Role of communication, non-verbal communication