

# Semester-7

## **CSE-401 E                      Advanced Computer Architecture**

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Class Work:	50
Exam:	100
Total:	150
Duration of Exam:	3 Hrs.

**Unit-1: Architecture And Machines:** Some definition and terms, interpretation and microprogramming. The instruction set, Basic data types, Instructions, Addressing and Memory. Virtual to real mapping. Basic Instruction Timing.

**Unit-2: Time, Area And Instruction Sets:** Time, cost-area, technology state of the Art, The Economics of a processor project: A study, Instruction sets, Professor Evaluation Matrix

**Unit-3: Cache Memory Notion:** Basic Notion, Cache Organization, Cache Data, adjusting the data for cache organization, write policies, strategies for line replacement at miss time, Cache Environment, other types of Cache. Split I and D-Caches, on chip caches, Two level Caches, write assembly Cache, Cache references per instruction, technology dependent Cache considerations, virtual to real translation, overlapping the Tcycle in V-R Translation, studies. Design summary.

**Unit-4: Memory System Design:** The physical memory, models of simple processor memory interaction, processor memory modeling using queuing theory, open, closed and mixed-queue models, waiting time, performance, and buffer size, review and selection of queuing models, processors with cache.

**Unit-5: Concurrent Processors:** Vector Processors, Vector Memory, Multiple Issue Machines, Comparing vector and Multiple Issue processors.

**Shared Memory Multiprocessors:** Basic issues, partitioning, synchronization and coherency, Type of shared Memory multiprocessors, Memory Coherence in shared Memory Multiprocessors.

### **Text Book:**

- Advance computer architecture by Hwang & Briggs, 1993, TMH.

### **Reference Books:**

- Pipelined and Parallel processor design by Michael J. Flynn – 1995, Narosa.

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

**Unit-1: Introduction to Software Project Management (SPM):** Definition of a Software Project (SP), SP Vs. other types of projects activities covered by SPM, categorizing SPs, project as a system, management control, requirement specification, information and control in organization.

**Unit-2: Stepwise Project planning:** Introduction, selecting a project, identifying project scope and objectives, identifying project infrastructure, analyzing project characteristics, identifying project products and activities, estimate efforts each activity, identifying activity risk, allocate resources, review/ publicize plan.

**Unit-3: Project Evaluation & Estimation:** Cost benefit analysis, cash flow forecasting, cost benefit evaluation techniques, risk evaluation. Selection of an appropriate project report; Choosing technologies, choice of process model, structured methods, rapid application development, water fall-, V-process-, spiral- models. Prototyping, delivery. Albrecht function point analysis.

**Unit-4: Activity planning & Risk Management:** Objectives of activity planning, project schedule, projects and activities, sequencing and scheduling activities, network planning model, representation of lagged activities, adding the time dimension, backward and forward pass, identifying critical path, activity throat, shortening project , precedence networks.

**Risk Management:** Introduction, the nature of risk, managing risk, risk identification, risk analysis, reducing the risks, evaluating risks to the schedule, calculating the z values..

**Unit-5: Resource allocation & Monitoring the control:** Introduction, the nature of resources, identifying resource requirements, scheduling resources creating critical paths, counting the cost, being specific, publishing the resource schedule, cost schedules, the scheduling sequence.

**Monitoring the control:** Introduction, creating the frame work, collecting the data, visualizing progress, cost monitoring, earned value, prioritizing monitoring, getting the project back to target, change control.

**Unit-6: Managing contracts and people:** Introduction, types of contract, stages in contract, placement, typical terms of a contract, contract management, acceptance, Managing people and organizing terms: Introduction, understanding behavior, organizational behavior: a back ground, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures, conclusion, further exercises..

**Unit-7: Software quality:** Introduction, the place of software quality in project planning, the importance of software quality, defining software quality, ISO 9126, Practical software quality measures, product versus process quality management, external standards, techniques to help enhance software quality.

**Unit-8: Study of Any Software Project Management software:** viz Project 2000 or equivalent

**Text Book:**

- Software Project Management (2<sup>nd</sup> Edition), by Bob Hughes and Mike Cotterell, 1999, TMH

**Reference Books:**

- Software Engineering – A Practitioner’s approach, Roger S. Pressman (5<sup>th</sup> edi), 2001, MGH
- Software Project Management, Walker Royce, 1998, Addison Wesley.
- Project Management 2/c. Maylor
- Managing Global software Projects, Ramesh, 2001, TMH.

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

L	T	P
3	1	-

Class Work:	50
Exam:	100
Total:	150
Duration of Exam:	3 Hrs.

**Unit-1: Introduction To Compilers:** Compilers and translators, need of translators, structure of compiler :its different phases, Compiler construction tools.

**Unit-2: Lexical Analysis:** Role of lexical analyzer, design of lexical analyzer, regular expressions , Specification and recognition of tokens, input buffering, A language specifying lexical analyzer. Finite automata, conversion from regular expression to finite automata, and vice versa, minimizing number of states of DFA, Implementation of lexical analyzer.

**Unit-3: Syntax Analysis:** Role of parsers, context free grammars, definition of parsing.

**Unit-4: Parsing Technique:** Shift- reduce parsing, operator precedence parsing, top down parsing, predictive parsing.

**Unit-5: LR parsers, SLR, LALR and Canonical LR parser.**

**Unit-6: Syntax Directed Translations:** Syntax directed definition, construction of syntax trees, syntax directed translation scheme, implementation of syntax directed translation, three address code, quadruples and triples.

**Unit-7: Symbol Table & Error Detection And Recovery:** Symbol tables, its contents and data structure for symbol tables; trees, arrays, linked lists, hash tables. Errors, lexical phase error, syntactic phase error, semantic error.

**Unit-8: Code Optimization & Code Generation:** Code generation, forms of objects code, machine dependent code, optimization, register allocation for temporary and user defined variables.

**Text Books:**

- Compilers Principle, Techniques & Tools - Alfreed V. AHO, Ravi Sethi & J.D. Ullman; - 1998Addison Wesley.
- Compiler Design by O.G. Kakde, 1995, Laxmi Publ.

**Reference Books:**

- Theory and practice of compiler writing, Tremblay & Sorenson, 1985, Mc. Graw Hill.
- System software by Dhamdae, 1986, MGH.
- Principles of compiler Design, Narosa Publication

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

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Class Work:        25  
Exam:                50  
Total:                75  
Duration of Exam: 3Hrs.

1. Practice of LEX/YACC of compiler writing.
2. Write a program to check whether a string belong to the grammar or not.
3. Write a program to generate a parse tree.
4. Write a program to find leading terminals.
5. Write a program to find trailing terminals.
6. Write a program to compute FIRST of non-terminal.
7. Write a program to compute FOLLOW of non-terminal.
8. Write a program to check whether a grammar is left Recursion and remove left Recursion.
9. Write a program to remove left factoring.
10. Write a program to check whether a grammar is operator precedent.
11. To show all the operations of a stack.
12. To show various operations i.e. read, write and modify in a text file.

Note : At least 10 programs are required to be developed in the semester.

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Class Work:        25  
Exam:                50  
Total:                75  
Duration of Exam: 3 Hrs.

Study of Visual Basic 6.0.NET and Visual C++ 6.0.NET.

- 1) Study Windows API's. Find out their relationship with MFC classes. Appreciate how they are helpful in finding complexities of windows programming.
- 2) Get familiar with essential classes in a typical (Document- view architecture) VC++ Program and their relationship with each other.
- 3) Create an SDI application in VC++ that adds a popup menu to your application which uses File drop down menu attached with the menu bar as the pop-up menu. The pop-up menu should be displayed on the right click of the mouse.
- 4) Create an SDI application in VC++ using which the user can draw atmost 20 rectangles in the client area. All the rectangles that are drawn should remain visible on the screen even if the window is refreshed. Rectangle should be drawn on the second click of the left mouse button out of the two consecutive clicks. If the user tries to draw more than 20 rectangles, a message should get displayed in the client area that “ No more rectangles can be drawn”
- 5) Create an application in VC++ that shows how menu items can be grayed, disabled and appended at run time.
- 6) Write a program in VC++ to implement serialization of inbuilt and user defined objects.
- 7) Write a program in VC++ to create archive class object from CFile class that reads and stores a simple structure (record).
- 8) Make an Active X control in VC++ derived from a standard control.
- 9) Write a program in VB to implement a simple calculator.
- 10) Create a simple database in MS Access Database /Oracle and a simple database application in VB that shows database connectivity through DAO and ADO.
- 11) Write a simple program that displays an appropriate message when the illegal operation is performed using error handling technique in VB.
- 12) Write a program in VB to create a notepad.
- 13) Create a DLL in VB.

**Bright students may do the following exercises:**

- 14) Write a program in VC++ to implement a simple calculator.
- 15) Write a program in VC++ to create a static link library and a dynamic link library.
- 16) Create a simple database in MS Access Database and a simple database application in VC++ that shows database connectivity through ADO model.
- 17) Make an Active X control of your own using VB.
- 18) With the help of VB, create an object of excel application and implement any action on it.

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Class Work:	50
Exam:	100
Total:	150
Duration of Exam:	3 Hrs.

**Unit-1: Overview of biological neurons:** Structure of biological neurons relevant to ANNs.

**Unit-2: Fundamental concepts of Artificial Neural Networks:** Models of ANNs; Feedforward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner-take all learning rule, etc.

**Unit-3: Single layer Perception Classifier:** Classification model, Features & Decision regions; training & classification using discrete perceptron, algorithm, single layer continuous perceptron networks for linearly separable classifications.

**Unit-4: Multi-layer Feed forward Networks:** linearly non-separable pattern classification, Delta learning rule for multi-perceptron layer, Generalized delta learning rule, Error back-propagation training, learning factors, Examples.

**Unit-5: Single layer feed back Networks:** Basic Concepts, Hopfield networks, Training & Examples.

**Unit-6: Associative memories:** Linear Association, Basic Concepts of recurrent Auto associative memory: retrieval algorithm, storage algorithm; Bidirectional associative memory, Architecture, Association encoding & decoding, Stability.

**Unit-7: Self organizing networks:** Unsupervised learning of clusters, winner-take-all learning, recall mode, Initialization of weights, separability limitations

**Text Books:**

- Introduction to artificial Neural systems by Jacek M. Zurada, 1994, Jaico Publ. House.

**Reference Books:**

- "Neural Networks :A Comprehensive formulation", Simon Haykin, 1998, AW
- "Neural Networks", Kosko, 1992, PHI.
- "Neural Network Fundamentals" – N.K. Bose , P. Liang, 2002, T.M.H

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

# Semester-8

**CSE-402 E**

## **Distributed Operating System**

L	T	P
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Class Work: 50  
Exam: 100  
Total: 150  
Duration of Exam: 3 Hrs.

**Unit-1: Introduction:** Introduction to Distributed System, Goals of Distributed system, Hardware and Software concepts, Design issues. Communication in distributed system: Layered protocols, ATM networks, Client – Server model ,Remote Procedure Calls and Group Communication. Middleware and Distributed Operating Systems.

**Unit-2: Synchronization in Distributed System:** Clock synchronization, Mutual Exclusion, Election algorithm, the Bully algorithm, a Ring algorithm, Atomic Transactions, Deadlock in Distributed Systems, Distributed Deadlock Prevention, Distributed Deadlock Detection .

**Unit-3: Processes and Processors in distributed systems:** Threads, System models, Processors Allocation, Scheduling in Distributed System, Real Time Distributed Systems.

**Unit-4: Distributed file systems:** Distributed file system Design, Distributed file system Implementation, Trends in Distributed file systems.

**Distributed Shared Memory:** What is shared memory, Consistency models, Page based distributed shared memory, shared variables distributed shared memory.

**Unit-5: Case study MACH:** Introduction to MACH, process management in MACH, communication in MACH, UNIX emulation in MACH.

### **Text Book:**

- Distributed Operating System – Andrew S. Tanenbaum, PHI.

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

## ADVANCED JAVA

**CSE-404-E**

L T P

3 1 0

Class Work : 50

Exam. : 100

Total : 150

Duration of Exam. : 3 hrs.

### **UNIT 1: CORE JAVA**

Introduction to Java, Data types, variables, operators, Arrays, Control Statements, Classes & Methods, Inheritance, Exception Handling, Multithreading, Collections, I/O streams, AVVT & Aplet Programming.

### **UNIT 2: NETWORKING**

Connecting to a Server, Implementing Servers, Sending E-Mail, Making URL Connections, Advanced Socket Programming

### **UNIT 3: DATABASE NETWORKING**

The Design of JDBC. The Structured Query Language, JDBC Installation, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable Result Sets, Matadata, Row Sets, Transactions, Advanced Connection Management, Introduction of LDAP

### **UNIT 4: DISTRIBUTED OBJECTS**

The Roles of Client and Server, Remote Method Invocations, Setup for Remote Method Invocation, Parameter Passing in Remote Methods Server Object Activation, Java IDL and CCRA, Remote Method Calls with SOAP

### **UNIT 5: SWING**

Lists, Trees, Tables, Styled Text Components, Progress Indicators, Component Organizers

### **UNIT 6: AWT**

The Rendering Pipeline, Shapes, Areas, Strokes, Paint, Coordinate Transformations, Clipping, Transparency and Composition, Rendering Hints, Readers and Writers for Images, Image Manipulation, Printing. The Clipboard, Drag and Drop

### **UNIT 7: JAVABEANS COMPONENTS**

Beans, The Bean-Writing Process, Using Beans to Build an Application, Naming Patterns for Bean Components and Events Bean Property Tubes Beaninfo Classes Property Editors Cuatomizes

### **UNIT 8: SECURITY**

Class Loaders, Bytecode Verification, Security Managers and Permissions, Digital Signatures, Code Signing, Encryption

**TEXT BOOK:**

Core Java™ 2, Volume II-Advanced Features, 7<sup>th</sup> Edition by Cay Horetmann, Gary Cornell  
Pearson Publisher, 2004

**REFERENCE BOOKS:**

1. Professional Java Programming by Brett Spell, WROX Publication
2. Advanced Java 2 Platform, How to Program, 2<sup>nd</sup> Edition, Harvey. M. Dietal, Prentice Hall

**Note: Eight questions are to be set – at least one from each unit Students have to attempt any five.**

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Class Work: 50  
Exam: 50  
Total: 100  
Duration of exam: 3 hrs.

**Development of programs relating to :**

- **JDBC**
- **Servlets**
- **Beans**
- **RMI**
- **JSP**

**DEPT. ELECTIVES-I**

**IT- 464 E**                **Network Security & Management**  
**CSE-432 E**                **Digital Image Processing**  
**CSE-434 E**                **Advanced Database Management Systems**

**DEPT. ELECTIVES-II**

**CSE-442 E**                **Human Computer Interaction**  
**CSE-444 E**                **Fuzzy Logic**  
**CSE-446 E**                **Natural Language Processing**  
**CSE- 448 E**                **Object Oriented Software Engineering**

## IT-464 E                      Network Security & Management

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Class Work: 50  
Exam: 100  
Total: 150  
Duration of Exam: 3 Hrs.

**Unit-1: Introduction:** Codes and Ciphers – Some Classical systems – Statistical theory of cipher systems–Complexity theory of crypto systems – Stream ciphers, Block ciphers.

**Unit-2: Stream Ciphers:** Rotor based system – shift register based systems – Design considerations for stream ciphers – Cryptanalysis of stream ciphers – Combined encryption and encoding. Block Ciphers – DES and variant, modes of use of DES. Public key systems – Knacksack systems – RSK – Diffie Hellman Exchange – Authentication and Digital signatures, Elliptic curve based systems.

**Unit-3: System Identification and clustering:** Cryptology of speech signals – narrow band and wide band systems – Analogue & Digital Systems of speech encryption.

**Unit-4: Security: Hash function – Authentication:** Protocols – Digital Signature standards. Electronics Mail Security – PGP (Pretty Good Privacy) MIME, data Compression technique. IP Security: Architecture, Authentication Leader, Encapsulating security Payload – Key Management. Web security: Secure Socket Layer & Transport Layer security, Secure electronics transactions. Firewalls Design principle, established systems.

**Unit-5:** Telecommunication Network Architecture, TMN management layers, Management information Model, Management servicing and functions, Structure of management information and TMN information model, SNMP v1, SNMP2 & SNMP3, RMON1 & 2, Broadband Network Management (ATM, HFC, DSL), ASN

### Text Books:

- Cryptography and Network Security: Principal & Practices, 2<sup>nd</sup> Edition by Upper Saddle River, PHI
- Network Management Principles & Practices by Subramanian, Mani (AWL)
- SNMP, Stalling, Willian (AWL)

### Reference Books:

- SNMP: A Guide to Network Management (MGH)
- Telecom Network Management by H.H. Wang (MGH)
- Network Management by U. Dlack (MGH)

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

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Class Work: 50  
Exam: 100  
Total: 150  
Duration of Exam: 3 Hrs.

**Unit-1: Introduction and Fundamental to Digital Image Processing:** What is Digital Image Processing, Origin of Digital Image Processing, Examples that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Digital Image Processing System, Image sensing and acquisition, Image sampling, quantization and representation, Basic relationship between pixels.

**Unit-2: Image Enhancement in the Spatial Domain & Frequency domain:** Background, Basic gray level transformation, Histogram processing, Basics of spatial filtering, Smoothing and Sharpening Spatial filters, Introduction to Fourier Transform and the Frequency Domain, Discrete Fourier Transform. Smoothing and Sharpening Frequency-Domain filters.

**Unit-3: Image Restoration:** Image Degradation/Restoration Process, Noise models, Restoration in presence of noise, Inverse Filtering, Minimum Mean Square Filtering, Geometric mean filter, Geometric transformations.

**Unit-4: Color Image Processing:** Color Fundamentals, Color models, Basis of full color image processing, Color transformations.

**Unit-5: Image Compression:** Fundamentals, Image compression models, Error free compression, Lossy compression.

**Unit-6: Image Segmentation:** Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region oriented segmentation.

**Unit-7: Representation, Description and Recognition:** Representation-chain codes, polygonal approximation and skeletons, Boundary descriptors-simple descriptors, shape numbers, Regional descriptors- simple, topological descriptors, Pattern and Pattern classes-Recognition based on matching techniques.

**Unit-8: Recognition:** Pattern and pattern Classes, Decision-Theoretic Methods.

**Text Book:**

- Digital Image Processing by Rafael C.Gonzalez & Richard E. Woods –2002, Pearson Education

**Reference Book:**

- Digital Image Processing by A.K. Jain, 1995,-PHI

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Class Work:	50
Exam:	100
Total:	150
Duration of Exam:	3 Hrs.

**Unit-1: Data Models:** EER model and relationship to the OO model, Object Oriented data model and ODMG standard, Other data models - NIAM, GOOD, ORM.

**Query Optimisation:** Query Execution Algorithms, Heuristics in Query Execution, Cost Estimation in Query Execution, Semantic Query Optimisation.

Database Transactions and Recovery Procedures: Transaction Processing Concepts, Transaction and System Concepts, Desirable Properties of a Transaction, Schedules and Recoverability, Serializability of Schedules, Transaction Support in SQL, Recovery Techniques, Database Backup, Concurrency control, Locking techniques for Concurrency Control, Concurrency Control Techniques, Granularity of Data Items.

**Unit-2: Client Server Computing:** Client Server Concepts, 2-Tier and 3-Tier Client Server Systems, Client/Server Architecture and the Internet, Client /Database Server Models, Technology Components of Client Server Systems, Application Development in Client Server Systems.

**Distributed Databases:** Reliability and Commit protocols, Fragmentation and Distribution, View Integration, Distributed database design, Distributed algorithms for data management, Heterogeneous and Federated Database Systems.

**Unit-3: Deductive Databases:** Recursive Queries, Prolog/Datalog Notation, Basic inference Mechanism for Logic Programs, Deductive Database Systems, Deductive Object Oriented Database Systems.

**Commercial and Research Prototypes:** Parallel database, Multimedia database, Mobile database, Digital libraries, Temporal database.

**Text Book:**

- Fundamentals of Database Systems (3 edition), Elmasri R. and Navathe S.B., 2000, Addison Wesley, Low Priced Edition.

**Reference Book:**

- Database System Concepts by A. Silbershatz, H.F. Korth and S. Sudarshan, 3rd edition, 1997, McGraw-Hill, International Edition.

**Note:** Eight questions will be set in all by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all.

CSE 442-E

## Human Computer Interaction

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Class Work: 50  
Exam: 100  
Total: 150  
Duration of Exam: 3 Hrs.

Unit 1: Introductions & overview of HCI:

§ History of computer user interfaces, HCI - history and intellectual root

### **Human information processing limitations, human decision making.**

1. Human cognitive and sensory limits
2. Human memory
3. Human problem solving
4. Skill acquisition
5. Users' conceptual models (mental models)
6. Decision making

Unit 2: Computer systems and user interfaces, human-system interaction:

§ Input and output devices, Mechanics of particular devices, Speech input, sound and speech output, Computer architecture, Performance characteristics of humans and systems, Color issues, Computer graphics, Color representation, color maps, color range of devices

Unit 3: Interaction models and metaphors:

§ Use of abstract metaphors for describing interface behavior, Use of metaphors to support user understanding, Dialog input and output techniques and purposes, Screen layout issues, Dialog interaction: types and techniques, navigation and orientation, multimedia and non-graphical dialogues, Dialog issues: response time, control, standards, look and feel, Layers model of architecture of design and windowing systems, Windows manager models, e.g., X, Macintosh, MS Windows, Hypermedia and WWW

Unit 4: Principles guiding well-designed human-system interaction:

§ Paradigms for interaction, Principles to support usability, Accounting for users with disabilities

Unit 5: The design process – overview:

§ The typical software development lifecycle (idealized vs. actual), User-centered design overview, “Three pillars of design”, Usability engineering overview, Reconciling UCD and usability testing

Unit 6: The design process - task and user needs analysis:

§ Task analysis definition, Techniques for task analysis, Sources of information

Unit 7: The design process – making use of task and user data for system design.

§ Use cases, scenarios, Structuring the information, Information architecture, User and process flows, Wireframes, Mockups, comps, Other methods of conveying structure and function

Unit 8: Designing for universal access:

§ What is accessibility? What is accessible software, Examples of accessibility adaptations, What's driving software accessibility, Implications for software organizations

Unit 9: Speech user interfaces:

§ Attributes of speech user interfaces, Evaluating speech user interface quality

Unit 10: HCI in mission-critical and high-risk environments:

§ Safety implications of human-computer interaction, Effects of automation, Addressing the effects

**Text books:**

§ Hackos, J.T. & Redish, J.C. (1998). User and task analysis for interface design. John New York: Wiley & Sons.

§ Norman, D. (1988). The design of everyday things. New York: Basic Books.

**Reference Books:**

- Designing the User Interface: Strategy for Effective Human Computer Interaction, 3<sup>rd</sup> edition, Bel Shneiderman, Perason Edu. Publ. 2000
- Human Computer Interaction Dix, A et al. Prentice Hall 1993
- Graphical User Interface Design and Evaluation Redmond-Pyle, D. & Moore, A. Prentice Hall 1995
- The Art of Human-Computer Interface Design Laurel, B Addison-Wesley 1990

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

## CSE 444 E

## Fuzzy Logic

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Class Work: 50  
Exam: 100  
Total: 150  
Duration of Exam: 3 Hrs.

Unit - 1     Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function,  $\alpha$ -cuts, Properties of  $\alpha$ -cuts, Decomposition, Theorems, Extension Principle,

Unit - 2     Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations

Unit - 3     Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Unit - 4     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 – 5     Possibility Theory: Fuzzy Measures, Evidence & Possibility Theory, Possibility versus Probability Theory.

Unit – 6     Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

Unit – 7     Uncertainty based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp sets, Fuzziness of Fuzzy Sets.

Unit – 8     Applications of Fuzzy Logic in soft computing.

### Text / Reference books :

- Fuzzy Sets, Uncertainty & Information by G.J.Klir & T.A. Folyger, PHI, 1988.
- Fuzzy sets & Fuzzy logic by G.J.Klir & B.Yuan, PHI, 1995.

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

**CSE-446 E**

**Natural Language Processing**

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Class Work: 50  
Exam: 100  
Total: 150  
Duration of Exam: 3 Hrs.

**Unit-1:** Components of natural language processing: lexicography, syntax, semantics, pragmatics: word level representation of natural languages prosody & natural languages.

**Unit-2:** Formal languages and grammars: chomsky hierarchy, Left-Associative grammars, ambiguous grammars, resolution of ambiguities.

**Unit-3:** Computation linguistics: recognition and parsing of natural language structures: ATN & RTN, General techniques of parsing: CKY, Earley & Tomita algorithm.

**Unit-4:** Semantics-knowledge representation semantic networks logic and inference pragmatics, graph models and optimization, prolog for natural language semantic.

**Unit-5:** Application of NLP: intelligent work processors: Machine translation, user interfaces, Man-Machine interfaces, natural language querying, tutoring and authoring systems, speech recognition, commercial use of NLP.

**Text Book:**

- “Natural Language Understanding” James Allen ,Benjamin-1995, cummings Pub. Comp. Ltd.,

**Reference Books:**

- “Language as a cognitive process”, Terry Winograd 1983, AW
- “Natural Language processing in prolog” G. Gazder, 1989, Addison Wesley.
- “ Introduction of Formal Language Theory, Mdlj Arbib & Kfaury, 1988, Springer Verlag

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

L     T     P  
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Class Work: 50  
Exam: 100  
Total: 150  
Duration of Exam: 3 Hrs.

**Unit-1: Introduction:** Review of the Traditional Methodologies, Advantages of Object Oriented Methodologies over Traditional Methodologies, Classes, Objects, Encapsulation, Association, Aggregation, Inheritance, Polymorphism, States and Transitions.

**Visual Modelling using Unified Modelling Language (UML):** What is Visual Modelling? ObjectOriented Modelling, Introduction to Unified Modelling Language (UML): History of UML, Overview of UML – Capabilities, Usage of UML.

Introduction to Rational Rose CASE tool: Introduction – Importance of Rational Rose, Capabilities of Rational Rose Case Tool.

**Unit-2: Introduction to Objectory Software Development Process:** Introduction, Benefits, Phases and Iterations, Elaboration Stage, Construction Stage, Transition Stage.

**Creating Use Case Diagrams:** Actors and Use Cases, Use Case Relationships, Types of Relationships, Use Case Diagrams: Creating Main Use Case -, Relationships - , Additional Use Case - Diagrams in Rational Rose, Activity Diagrams Activities, Transitions, Decision Points, Swimlanes

**Unit-3: Identifying Classes ,Packages and drawing a Class Diagram:** State, Behaviour, Identity of Objects, Stereotypes and Classes, Creating and Documenting Classes in rational Rose, Packages, Drawing a Class Diagram Specifying Relationships : The Need of Defining Relationships, Association and Aggregation Relationships, Naming Relationships, Role Names, Multiplicity Indicators, Reflexive Relationships, Package Relationships, Inheritance, Finding Relationships, Creating Relationships in Rational Rose

**Unit-4: Discovering Object Interactions:** Documenting Scenarios using Interaction Diagrams, Types of Interaction Diagrams, Adding Behaviour and Structure: Representing Behaviour and Structure, Creating Attributes & operations and documenting them, Displaying attributes and operations, Association Classes, Analysing Object Behaviour: Modelling Dynamic Behaviour, States

**Unit-5: Checking the Model:** Making the Model Homogeneous, Combining Classes, Splitting Classes, Eliminating Classes, Consistency Checking, Scenario Walk-through, Event Tracing, Documentation Review, Designing the System Architecture: The need for Architecture, The “4+1” view of Architecture, The Logical view, The Component View, The Process View, The Deployment View, The Use Case view.

**Unit-6: The Iteration Planning Process:** Benefits, Goals, Design the User Interface, Adding Design Classes, The Emergence of Patterns, Designing Relationships, Designing Attributes and Operations, Designing for Inheritance, Coding, Testing, and Documenting the Iteration.

**Text Books:**

- “UML User Guide”, Grady Booch, James Rumbaugh, Ivar Jacobson, 2000, Addison Wesley.
- Visual Modeling with Rational Rose 2000 and UMLBy Terry Quatrani Foreword by Grady Booch, 2000

**Reference Books:**

- “UML Reference Guide”, James Rumbaugh, Ivar Jacobson, Grady Booch, 2000, Addison Wesley.
- “The Objectory Software Development Process”, Ivar Jacobson, Grady Booch, James Rumbaugh, 1999, Addison Wesley.
- UML Distiled by Maxtin Fowler with Kendall Scott,2000 ,Second Edition
- Sams Teach Yourself “UML” In 24 Hours By Joseph Schmuller ,2000

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

