

CSHE-08-01-F

Distributed Operating System

L T P	Class Work	:	50 Marks
4 1 -	Exam	:	100 Marks
	Total	:	150 Marks
	Duration of Exam	:	3 Hrs

Note:For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which have to attempt 5 questions out of 9 questions.

SECTION-A:

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.

SECTION-B:

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 .

SECTION-C:

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

SECTION-D:

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.

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.

CSHE-08-02-F

Advanced JAVA

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

Note:For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which have to attempt 5 questions out of 9 questions.

SECTION A:

CORE JAVA

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

NETWORKING

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

SECTION B:

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

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

SECTION C:

SWING

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

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

SECTION D:

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

SECURITY

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

TEXT BOOK:

Core Java™ 2, Volume II-Advanced Features, 7th Edition by Cay Horetmann, Gary Cornelll Pearson Publisher, 2004

REFERENCE BOOKS:

1. Professional Java Programming by Brett Spell, WROX Publication
2. Advanced Java 2 Platform, How to Program, 2nd Edition, Harvey. M. Diatal, Prentice Hall

CSHE-08-05-F

Advanced Java Lab.

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

Development of programs relating to :

- JDBC
- Servlets
- Beans
- RMI
- JSP

Network Security & Management

L T P

4 - -

Class Work	:	50 Marks
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Section A

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

Stream Ciphers: Rotor based system – shift register based systems – Design considerations for stream ciphers – Cryptanalysis of stream ciphers – Combined eneryption and encoding. Block Ciphers – DES and variant, modes of use of DES.

Public key systems – Knacksack systems – RSK – Diffe Hellman Exchange – Authentication and Digital signatures, Elliptic curve based systems.

Section B

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

Section C

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.

Section D

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: Principles & Practices, 2nd Edition by Upper Saddle River, PHI
- Network Management Principles & Practices by Subramanian, Mani (AWL)
- SNMP, Stalling, William (AWL)

Reference Books:

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

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4 - -

Digital Image Processing

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

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Section A

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.

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.

Section B

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

Color Image Processing: Color Fundamentals, Color models, Basis of full color image processing, Color transformations.

Section C

Image Compression: Fundamentals, Image compression models, Error free compression, Lossy compression.

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

Section D

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.

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

Advanced Database Management Systems

L	T	P	Class Work	:	50 Marks
4	-	-	Exam	:	100 Marks
			Total	:	150 Marks
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Section A

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.

Section B

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.

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.

Section C

Distributed Databases: Reliability and Commit protocols, Fragmentation and Distribution, View Integration,

Distributed database design, Distributed algorithms for data management, Heterogeneous and Federated Database

Systems.

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

Section D

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.

CSHE-08-04-1-F

Human Computer Interaction

L T P

4 - -

Class Work : 50 Marks

EXAM :

DURATION

Note:For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which have to attempt 5 questions out of 9 questions.

Section A

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

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

Section B

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

Principles guiding well-designed human-system interaction:

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

Section C

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

The design process - task and user needs analysis:

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

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

Section D

Designing for universal access:

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

Speech user interfaces:

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

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, 3rd 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

CSHE-08-04-2-F

Fuzzy Logic

L T P
4 - -

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

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Section A

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

Section B

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.

Section C

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

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

Section D

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

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.

CSE-08-04-3-F

Natural Language Processing

L T P
4 - -

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

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Section A

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

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

Section B

Computation linguistics: recognition and parsing of natural language structures: ATN & RTN,General techniques of parsing: CKY, Earley & Tomitas algorithm.

Section C

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

Section D

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 Verlog

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Section A

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? Object Oriented 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.

Section B

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
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

Section C

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
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.

Section D

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 UML By 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 Distilled by Maxtin Fowler with Kendall Scott, 2000 ,Second Edition
- Sams Teach Yourself “UML” In 24 Hours By Joseph Schmuller ,2000