

## Object Oriented Software Engineering

### CSE-472 (Departmental Elective – V)

**L T P**

**Theory: 75**

**3 1 -**

**Sessional: 50**

#### **Unit - I**

Design Objects, Class hierarchy, inheritance, polymorphism, object relationships and associations., aggregations and object containment, object persistence, meta-classes, object oriented systems development life cycle. Software development process Object Oriented systems development: a use-case driven approach.

#### **Unit - II**

Object modeling technique as software engineering methodology, Rumbaugh methodology Jacobson methodology, Booch methodology, Patterns, Frameworks, the unified approach, unified modeling language(UML)

#### **Unit - III**

Analysis Process Use Case Driven Object Oriented Analysis, Use Case Model, Object Classification, Theory, Different Approaches for identifying classes, classes, Responsibilities and collaborators, identifying Object Relationships, Attributes and Methods, Super sub class relationships, A Part of Relationships-Aggregation, class responsibilities, Object Responsibilities.

#### **Unit - IV**

Object Oriented Design process, corollaries, design axioms, design patterns. Object oriented design philosophy .UML Object Constraint Language, Designing Classes: The Process. Class Visibility ,Refining Attributes, Designing Methods and Protocols, Packages and Managing classes, Designing Interface objects. View layer interface design. Macro and Micro level interface design process .

**Note** :- Two questions will be set from each unit.

#### **Books**

1. Ali Bahrami Object Oriented Systems Development; McGraw Hill, 1999.
2. Rumbaugh et.al. Object Oriented Modeling and Design, PHI, 1997.
3. Forouzan, Coombs and Fegan : Introduction to data Communications and Networks TMH, 1999.
4. William Stallings : Data and Computer Communications 5/e, PHI.

## Expert Systems

### CSE-446 (Departmental Elective – IV)

L T P

Theory : 75

3 1 -

Sessional : 50

#### UNIT- I

Features of expert system, representation and organization of knowledge, Basic characteristics, type of problems handled by expert systems case study of PROSPECTOR.

#### UNIT- II

Techniques of knowledge representation in expert systems, knowledge engineering system-building aids, support facilities, stages in the development of expert system.

#### UNIT-III

Expert System development, selection of tool, acquiring knowledge, building process.

#### UNIT-IV

Difficulties, common pitfalls in planning, dealing with domain expert, Difficulties during development.

Note :- At least one question will be set from each unit.

#### Books

1. Waterman D.A. : A guide to expert systems, Addison Wesley Longman.
2. Hayes Roth Lenat and Waterman : Building Expert Systems, Addison Wesley.
3. Weiss S.M. and Kulikowski C.A. : A Practical Guide to Designing Expert Systems Roman & Allanheld, New Jersey.

## Neural Networks & Fuzzy Logic

### CSE-402

**L T P**

**Theory: 100**

**4 1 -**

**Sessional: 50**

#### **UNIT – I**

**Introduction** : Concepts of neural networks, characteristics of Neural Networks, Historical Perspective, and Applications of Neural Networks.

**Fundamentals of Neural Networks** : The biological prototype, Neuron concept, Single layer Neural Networks, Multi-Layer Neural Networks, Training of Artificial Neural Networks. Representation of perception and issues, perception learning and training, Classification, linear Reparability.

#### **Unit – II**

**Hopfield nets** : Structure, training, and applications, Stability.

Back propagation : Concept, Applications, and Back Propagation Training Algorithms.

**Counter Propagation Networks** : Kohonan Network, Grossberg Layer & Training, applications of counter propagation, Image classification.

#### **UNIT-III**

**Bi-directional Associative memories**: Structure retrieving a stored association, encoding associations, memory capacity.

**ART** : ART architecture, ART classification operation, ART implementation, and characteristics of ART.

Image Compression Using ART

#### **UNIT-IV**

**Optical neural networks** : Vector Matrix Multipliers, Hop field net using Electro Optical matrix multipliers, Holographic correlator, Optical Hopfield net using Volume Holograms.

The Cognitions and Neocognitrons : Their structure and training

**Genetic Algorithms** : Elements, a simple genetic algorithm, working of genetic algorithms evolving neural networks.

**Note :** There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

**Books :**

1. LiMin Fu, "Neural Networks in Computer Intelligence", McGraw-Hill, Inc.
2. Philip D. Wasserman, "Neural Computing Theory and Practice", ANZA Research Inc.
3. Melaine Mitchell, "An introduction to Genetic Algorithms", PHI.
4. M.H. Hassun, "Fundamentals of Artificial Neural Networks", PHI.

## Interactive Computer Graphics

**CSE-404**

**L T P**

**Theory: 100**

**4 1 -**

**Sessional: 25**

### Unit - I

**Display Devices** : Line and point plotting systems : Raster, Vector, pixel and point plotters, Continual refresh and storage displays, digital frame buffer, Plasma panel display, Very high resolution devices. High-speed drawing. Display processors. Character generators, Colour Display techniques (shadow mask and penetration CRT, colour look-up tables, analog false colours, hard copy colour printers).

### Unit – II

**Display Description** : Screen co-ordinates, user co-ordinates, Graphical data structures (compressed incremental list, vector list, use of homogeneous coordinates); Display code generation Graphical functions : the view algorithm. Two-dimensional transformation, Line drawing. Circle drawing algorithms.

### Unit – III

**Interactive graphics** : Pointing and positing devices (cursor, light pen, digitizing tablet, the mouse, track balls). Interactive graphical techniques. Positioning (Elastic or Rubber Bank lines, Linking, zooming, panning clipping, windowing, scissoring). Mouse programming.

### Unit – IV

**3-D Graphics** : Wire-frame, perspective display, Perspective depth, projective transformations. Hidden line and surface elimination. Transparent solids, shading, Two dimensional Transformations. 3-dimesional Transformations. Interactive Graphical Techniques GUI.

**Note** : There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

**Books** :

1. Giloi, W.K., Interactive Computer Graphics, Prentice Hall.
2. Newman, W., Sproul, R.F., Principles of Interactive Computer Graphics, McGraw Hill.
3. Harrington, S., Computer Graphics: A Programming Approach, Tat McGraw Hill.
4. Hearn, D. Basker, Computer Graphics, Prentice Hall.
5. Kelley Bootle, Mastering Turbo C.
6. Roggers, D.F., Procedural Elements for Computer Graphics, McGraw Hill.
7. Foley, J.D. Van Dam A, Fundamentals of Interactive Computer Graphics, Addison Wesley.
8. Tosijas. L.K. Computer Graphics, Springer Verilag.

**Neural Networks (Pr.)****CSE-406****L T P****Practical : 50****- - 3****Sessional: 50****Design and train**

1. NN for AND, OR gate using perception.
2. Perception to classify odd and even numbers.
3. NN for alphabet recognition using backpropagation.
4. Hopfield network for recognizing patterns such as '+' and '-'.
5. NN for EXOR classification using Back propagation.
6. CPN for image classification.
7. Name and Telephone number recognition system.

**Note :** Atleast 5 to 10 more exercises are to be given by the teacher concerned.