



Department of Computer Science
Gujarat Vidyapith, Ahmedabad – 14

MCA - SEMESTER – IV

MCA - 401: (Elective - I) COMPUTER GRAPHICS

(વૈકલ્પિક - I) કમ્પ્યુટર આલેખનશાસ્ત્ર

(Effective from JUNE - 2015)

Credits:	4+2
Objective:	To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them
Prerequisite:	Basic knowledge of Mathematics, Matrix, Linear Algebra and Trigonometry

UNIT - I

1 CREDIT

- **Introduction to Computer Graphics**
 - Introduction
 - About Geometry and Lines
 - Line Segment and Perpendicular Lines
 - Introduction to Pixel and Frame Buffer
 - About Vector and Vector Generation
 - Bresenham's Algorithm
 - Antialiasing of Lines
 - Thick Line Segment and Character Generation
- **Graphics Primitives**
 - Introduction to Primitive Operations and Different Display Devices
 - About Display File and it's Structure
 - Display File Interpreter
 - Normalized Device Coordinates
 - Display File Algorithms and Display Control
 - Text and Line Style Primitive

UNIT - II

1 CREDIT

- **Polygons**
 - Introduction to Polygons and it's Representation
 - An Inside Test
 - Polygon Interfacing Algorithms
 - Filling of Polygons
 - Filling Pattern
- **Transformations**
 - Introduction
 - Matrices
 - Types of Transformations and their Matrices
 - Homogeneous Coordinates and Translation
 - Coordinate Transformation

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UNIT - III

1 CREDIT

- **Segments**
 - Introduction
 - Segment Table
 - Creation, Closing, Deleting and Renaming of Segment
 - Visibility
 - Image Transformation
 - Other Display File Structures
- **Windowing and Clipping**
 - Introduction
 - Viewing Transformation and its Implementation
 - Clipping
 - Cohen-Sutherland Algorithm
 - Sutherland-Hodgeman Algorithm
 - Polygon Clipping
 - Generalized Clipping

UNIT - IV

1 CREDIT

- **Interaction**
 - Introduction
 - Input Devices
 - Event Handling
 - Interactive Techniques
- **Three Dimensions**
 - Introduction
 - 3D Geometry
 - 3D Primitives
 - 3D Transformations
 - Rotation About an Arbitrary Axis
 - Parallel Projection
 - Perspective Projection
 - Viewing Parameters
 - Special Projections
 - Clipping in Three Dimensions

PRACTICAL

2 CREDITS

LAB – COMPUTER GRAPHICS

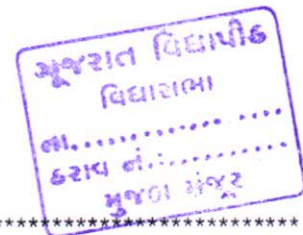
Books:-

- Computer Graphics By Steven Harrington

Reference Books:-

- Computer Graphics By Donald Hearn and Paulin Baker

***** END of MCA – 401 Elective – I) *****





Department of Computer Science
Gujarat Vidyapith, Ahmedabad – 14

MCA SEMESTER - IV

MCA- 401: (Elective – II) ARTIFICIAL INTELLIGENCE
(વૈકલ્પિક - II) આર્ટિફિશીયલ ઇન્ટેલીજન્સ

(Effective from JUNE - 2015)

Credits:	4+2
Objective:	Artificial Intelligence aims at developing computer applications, which encompasses perception, reasoning and learning and to provide an in-depth understanding of major techniques used to simulate intelligence.
Prerequisite:	Given are pre-requisites for the subject <ul style="list-style-type: none">• Knowledge of computer programming and basic algorithms• In-depth knowledge of discrete mathematics• Knowledge of Linear Algebra• Knowledge of data structure

UNIT - I

1 CREDIT

Introduction

- Intelligent Agents
- Agents and Environments
- Good Behavior
- The Nature of Environments
- Structure of Agents
- Problem Solving
- Problem Solving Agents
- Example Problems
- Searching For Solutions
- Uniformed Search Strategies
- Avoiding Repeated States
- Searching With Partial Information

UNIT - II

1 CREDIT

Searching techniques

- Informed Search and Exploration
- Informed Search Strategies
- Heuristic Function
- Local Search Algorithms and Optimistic Problems
- Local Search in Continuous Spaces
- Online Search Agents and Unknown Environments
- Constraint Satisfaction Problems (CSP)
- Backtracking Search and Local Search For CSP
- Structure of Problems

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- Adversarial Search
- Games
- Optimal Decisions in Games
- Alpha – Beta Pruning
- Imperfect Real-Time Decision
- Games That Include an Element Of Chance.

UNIT - III

1 CREDIT

Knowledge Representation

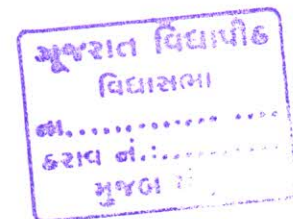
- First Order Logic
- Representation Revisited
- Syntax and Semantics for First Order Logic
- Using First Order Logic
- Knowledge Engineering in First Order Logic
- Inference in First Order Logic
- Propositional Versus First Order Logic
- Unification and Lifting
- Forward Chaining
- Backward Chaining
- Resolution
- Knowledge Representation
- Ontological Engineering
- Categories and Objects
- Actions
- Simulation and Events
- Mental Events and Mental Objects

UNIT - IV

1 CREDIT

Learning

- Learning from Observations
- Forms of Learning
- Inductive Learning
- Learning Decision Trees
- Ensemble Learning
- Knowledge in Learning
- Logical Formulation of Learning
- Explanation Based Learning
- Learning Using Relevant Information
- Inductive Logic Programming
- Statistical Learning Methods
- Learning with Complete Data
- Learning with Hidden Variable
- EM Algorithm
- Instance Based Learning



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