

M.C.A. (Masters in Computer Applications)

Revised MCA Course Structure-2007 (Modified)

SEMESTER-V

CS 7019 PRINCIPLES OF MANAGEMENT

Module I

Evolution of Management Thought: History of Management Theories, Classical School, Behavioral School, Integration and Contingency School of Management, Other Contemporary Theories of Management.

Module II

Nature and Scope of Management: Definition and Importance of Management Process, Planning, Organizing, Staffing, Leading and Motivating, Controlling Managerial Levels, Managerial Skills.

Module III

Planning: Concept, Definition and Importance, Types of Plans, Essential Features of Planning, Principles of Planning, Steps in Planning Process, Barriers in Planning.

Module IV

Organizing: Definition, Principles of Organization, Formal and Informal Organization, Line Structure, Line and Staff Structure, Functional Structure, Matrix Structure, Committees, Authority, Responsibility, Accountability, Delegation of Authority, Departmentation, and Decentralization.

Module V

Directing and Staffing: Overview of Staffing Functions, Leading, Motivating and Communication.

Module VI

Controlling: Definition, Importance of Controlling, Characteristics of Control, Control Process, Types of Control System, Essentials of Good Control Systems, and Techniques of Control, Budgetary and Non-Budgetary Control.

Module VII

Corporate Social Responsibility: Importance of CSR, Models of CSR.

Text Books:

1. Stoner and Freeman- Management
2. Koontz and Odonell- Essentials of Management
3. Robbins-Management
4. Gilbert-Management
5. Burton & Manab Thakur- Management Today-Principles & Practice

CS 7020 COMPUTER GRAPHICS

Module -I

Introduction: Image Processing as Picture Analysis, The Advantages of Interactive Graphics, Representative Uses of Computer Graphics, Classification of Applications, Development of Hardware and Software for Computer Graphics, Conceptual Framework for Interactive Graphics.

Basic Raster Graphics Algorithms for Drawing 2D Primitives: Overview, Scan Converting Lines, Scan Converting Circles, Scan Converting Ellipses, Filling Rectangles, Filling Polygons, Filling Ellipse Arcs, Pattern Filling, Thick Primitives, Line Style and Pen Style, Clipping in a Raster World, Clipping Lines, Clipping Circles and Ellipses, Clipping Polygons, Generating Characters, SRGP_copyPixel, Antialiasing.

Module- II & III

Graphics Hardware: Hardcopy Technologies, Display Technologies, Raster-Scan Display Systems, The Video Controller, Random-Scan Display Processor, Input Devices for Operator Interaction, Image Scanners.

Geometrical Transformations: 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Composition of 2D Transformations, The Window-to-Viewport Transformation, Efficiency, Matrix Representation of 3D Transformations, Composition of 3D Transformations, Transformations as a Change in Coordinate System.

Viewing in 3D: Projections, Specifying an Arbitrary 3D View, Examples of 3D Viewing, The Mathematics of Planar geometric Projections, Implementing Planar Geometric Projections, Coordinate Systems.

Module -IV

Input Devices, Interaction Techniques, and Interaction Tasks: Interaction Hardware, Basic Interaction Tasks, Composite Interaction Tasks.

Representating Curves and Surfaces : Polygon Meshes, Parametric Cubic Curves, Parametric Bicubic Surfaces, Quadric Surfaces.

Module-V

Achromatic and Colored Light: Achromatic Light, Chromatic Color, Color Models for Raster Graphics, Reproducing Color, Using Color in Computer Graphics.

The Quest for Visual Realism: Why Realism?, Fundamental Difficulties, Rendering Techniques for Line Drawings, Rendering Techniques for Shaded Images, Improved Object Models, Dynamics, Stereosis, Improved Displays, Interacting with Our Other Senses, Aliasing and Antialiasing.

Module -VI

Visible-Surface Determination: Functions of Two Variables, Techniques for Efficient Visible-Surface Algorithms, Algorithms for Visible-Line Determination, The z-Buffer Algorithms, List-Priority Algorithms, Area-Subdivision Algorithms, Algorithms for Octrees, Algorithms for Curved Surfaces, Visible-Surface Ray Tracing.

Illumination and Shading: Illumination Models, Shading Models for Polygons, Surface Detail, Shadows, Transparency, Interobject Reflections, Physically Based Illumination Models, Extended Light Sources, Spectral Sampling.

Module-VII

Advanced Raster Graphics Architecture: Simple Raster-Display System, Display-Processor Systems, Standard Graphics Pipeline, Introduction to Multiprocessing, Pipeline Front-End Architectures, Parallel Front-End Architectures, Multiprocessor Rasterization Architectures.

Advanced Geometric and Raster Algorithms: Clipping, Scan-Converting Primitives, Antialiasing, The Special Problems of Text, Filling Algorithms, Making copyPixel Fast, The Shape Data Structure and Shape Algebra.

Text Book:

1. Foley, Van Dam, Feiner, Hughes- Computer Graphics Principles & Practice, 11th edn., Pearson Education, New Delhi, 2004.

Reference Books:

1. D. Hearn & M.P.Baker- Computer Graphics, PHI, New Delhi , 2006

CS 7021 SYSTEM SIMULATION & MODELING

Module –I& II

Introduction to Discrete-Event System Simulation

Introduction to Simulation: When Simulation is the Appropriate Tool, When Simulation is not Appropriate, Advantages and Disadvantages of Simulation, Areas of Application, Systems and System Environment, Components of a System, Discrete and Continuous Systems, Model of a System, Types of Models, Discrete-Event System Simulation.

Simulation Examples: Simulation of Queueing Systems, Simulation of Inventory Systems, Other Examples of Simulation.

Module-III

General Principles: Concepts in Discrete-Event Simulation, List Processing.

Simulation Software: History of Simulation Software, Selection of Simulation Software, An Example of Simulation, Simulation in Java, Simulation in GPSS, Simulation in SSF, Simulation Software, Experimentation and Statistical-Analysis Tools.

Module-IV

Mathematical and Statistical Models

Statistical Models in Simulation: Review of Terminology and Concepts, Useful Statistical Models, Discrete Distributions, Continuous Distributions, Poisson Process, Empirical Distributions.

Module-V

Queueing Models: Characteristics of Queueing Systems, Queueing Notation, Long-Run Measures of Performance of Queueing Systems, Steady-State Behavior of Infinite-Population Markovian Models, Steady-State Behavior of Finite-Population Models (M/M/c/K/K), Networks of Queues.

Module-VI

Random-Number Generation: Properties of Random Numbers, Generation of Pseudo-Random Numbers, Techniques for Generating Random Numbers, Tests for Random Numbers.

Random-Variate Generation: Inverse-Transform Technique, Acceptance-Rejection Technique, Special Properties.

Module-VII

Analysis of Simulation Data

Input Modeling: Data Collection, Identifying the Distribution with Data, Parameter Estimation, Goodness-of-fit Tests, Fitting a Nonstationary Poisson Process, selecting Input Models without Data, Multivariate and Time-Series Input Models.

Verification and Validation of Simulation Models: Model Building , Verification, and Validation, Verification of Simulation Models, Calibration and Validation of Models.

Text Book:

1. J. Banks, J. S. Carson , B.L. Nelson, D.M. Nicol- Discrete-Event System Simulation, 4th Edn, Pearson Education, 2007.

Reference Book:

1. A.M. Law & W.D. Kelton – Simulation Modeling and Analysis, 3rd Edn. TMH, 2003

CS 7022 OPTIMIZATION THEORY

Module – I

Operation Research – An overview, Origin and Development of OR, Nature and Features of OR, Modeling in OR, General Solution Methods for OR models, Scientific method in OR, Methodology of OR, Application, Opportunities and Shortcomings of OR.

Module – II

Linear Programming Problem : Introduction, Mathematical Formulation of the Problem, Graphical Solution Method, Some Exceptional Cases, General LPP, Canonical and Standard forms of LPP, Simplex Method: Introduction, Fundamental properties of solutions, the Computational Procedure, Use of Artificial variables, Solution to simulation Linear Equations, Inverting a Matrix using Simplex Method.

Module – III

Duality in LPP: Introduction, General Primal – Dual pair, Formulating a Dual Problem, Primal Dual pair in Matrix form, Duality theorems, Dual simplex method, Post optimal Analysis, Introduction: Variation in cost vector, Requirement Vector, Coefficient Matrix, Structural Variation.

Module – IV

Integer Programming and Advance LPP techniques: Introduction, Gomory's Method, Construction of Gomory's constraints, Fractional Cut Method: All Integer & Mixed Integer, Revised Simplex Method, Bounded Variable, Parametric LPP, Karmarkar Algorithm.

Module – V

Dynamic Programming & Introduction: Characteristic of Dynamic Programming, Dynamic Programming Algorithm, Solution of LPP by Dynamic Programming.

Module – VI

NLPP: Introduction, Formulation of a NLPP, General NLPP, Constrained Optimization with Equality Constraints and Inequality constraints, Saddle Points.

Module – VII

NLPP Methods: Introduction, Graphical solution, Kuhn – Tucker Conditions with Non Negative Constraints, Quadratic Programming, Wolfe’s Modified Simplex Method, Separable Convex Programming & Algorithm.

Text Book:

1. Kanti Swarup, P.K. Gupta, Man Mohan – “Operations Research, Sultan Chand & Sons, New Delhi – 2001

Reference Books:

1. Ronald L. Rardin “Optimization in Operations Research”, Pearson Education, New Delhi – 2003
2. S.S. Rao, “Optimization Theory & Application”, Wiley Eastern Ltd, 1979.