

**CHAUDHARY CHARAN SINGH UNIVERSITY, MEERUT**  
**THREE YEARS BACHELOR OF COMPUTER APPLICATION PROGRAMME**

**COURSE CONTENT FOR SEMESTER – IV**

**BCA-401 Computer Graphics & Multimedia Application**

- Unit – I** Introduction: The Advantages of Interactive Graphics, Representative Uses of Computer Graphics, Classification of Application Development of Hardware and software for computer Graphics, Conceptual Framework for Interactive Graphics, Overview, Scan: Converting Lines, Scan Converting Circles, Scan Converting Ellipses.
- Unit – II** Hardcopy Technologies, Display Technologies, Raster-Scan Display System, Video Controller, Random-Scan Display processor, Input Devices for Operator Interaction, Image Scanners, Working exposure on graphics tools like Dream Weaver, 3D Effects etc, Clipping  
Southland- Cohen Algorithm, Cyrus-Beck Algorithm, Midpoint Subdivision Algorithm
- Unit– III Geometrical Transformation:** 2D Transformation, Homogeneous Coordinates and Matrix Representation of 2D Transformations, composition of 2D Transformations, the Window-to-Viewport Transformations, Introduction to 3D Transformations Matrix.
- Unit– IV Representing Curves & Surfaces:** Polygon meshes parametric, Cubic Curves, Quadric Surface.  
Solid Modeling: Representing Solids, Regularized Boolean Set Operation primitive Instancing Sweep Representations, Boundary Representations, Spatial Partitioning Representations, Constructive Solid Geometry Comparison of Representations.
- Unit – V** Introductory Concepts: Multimedia Definition, CD-ROM and the multimedia highway, Computer Animation (Design, types of animation, using different functions)
- Unit – VI** Uses of Multimedia, Introduction to making multimedia - The stage of Project, hardware & software requirements to make good multimedia skills and Training opportunities in Multimedia Motivation for Multimedia usage

**Referential Books:**

1. Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles & practice, 2000.
2. D.J. Gibbs & D.C. Tsichritz: Multimedia programming Object Environment & Frame work , 2000.
3. Ralf Skinmeiz and Klana Naharstedt, Multimedia: computing, Communication and Applications, pearson, 2001.
4. D.Haran & Baker. Computer Graphics Prentice Hall of India, 1986

## BCA-402      Operating System

- Unit – I** Introduction, What is an operating system, Simple Batch Systems, Multi-programmed Batch systems, Time- Sharing Systems, Personal - Computer Systems, Parallel systems, Distributed systems, Real- Time Systems. Memory Management: Background, Logical versus physical Address space, swapping, Contiguous allocation, Paging, Segmentation Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations
- Unit – II** **Processes:** Process Concept, Process Scheduling, Operation on Processes. **CPU Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple - Processor Scheduling. **Process Synchronization:** Background, The Critical - Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization
- Unit– III** **Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.
- Unit– IV** **Device Management:** Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering, Secondary Storage **Structure:** Disk Structure, Disk Scheduling, Disk Management, Swap- Space Management, Disk Reliability
- Unit – V** **Information Management:** Introduction, A Simple File system, General Model of a File System, Symbolic File System, Basic File System, Access Control Verification, Logical File System.
- Physical File system File - System Interface;** File Concept, Access Methods, Directory Structure, Protection, Consistency Semantics File - System Implementation: File- System Structure, Allocation Methods, Free-Space Management

### Referential Books:

1. Silberschatz and Galvin, “ Operating System Concepts”, Person, 5<sup>th</sup> Ed. 2001
2. Madnick E., Donovan J., “ Operating Systems:,Tata McGraw Hill,2001
3. Tannenbaum, “Operating Systems”, PHI, 4<sup>th</sup> Edition, 2000

## BCA-403      Software Engineering

- Unit – I    Software Engineering:** Definition and paradigms, A generic view of software are engineering.
- Unit – II    Requirements Analysis:** Statement of system scope, isolation of top level processes and entities and their allocation to physical elements, refinement and review. Analyzing a problem, creating a software specification document, review for correctness, consistency, and completeness.
- Unit– III    Designing Software Solutions:** Refining the software Specification; Application of fundamental design concept for data, architectural and procedural designs using software blue print methodology and object oriented design paradigm; Creating design document: Review of conformance to software requirements and quality.
- Unit– IV    Software Implementation:** Relationship between design and implementation, Implementation issues and programming support environment, Coding the procedural design, Good coding style and review of correctness and readability.
- Unit – V    Software Maintenance:** Maintenance as part of software evaluation, reasons for maintenance, types of maintenance (Perceptive, adoptive, corrective), designing for maintainability, techniques for maintenance.
- Unit – VI    Comprehensive examples using available software platforms/case tools, Configuration Management.**

### Referential Books:

1. K.K.Aggarwal & Yogesh Singh "Software engineering", 2<sup>nd</sup> Ed., New Age International 2005.
2. I.Sommerville, "Software Engineering", Addison Wesley, 2002.
3. James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach" John Wiley & Sons.

## **BCA-404      Optimization Techniques**

- Unit – I    Linear programming:** Central Problem of linear Programming various definitions included Statements of basic theorem and also their properties, simplex methods, primal and dual simplex method, transport problem, tic-tac problem, and its solution. Assignment problem and its solution. Graphical Method Formulation, Linear Programming Problem.
- Unit – II    Queuing Theory:** Characteristics of queuing system, Classification of Queuing Model Single Channel Queuing Theory, Generalization of steady state M/M/1 queuing models(Model-I, Model-II).
- Unit– III    Replacement Theory:** Replacement of item that deteriorates replacement of items that fail. Group replacement and individual replacement.
- Unit– IV    Inventory Theory:** Cost involved in inventory problem- single item deterministic model economics long size model without shortage and with shorter having production rate infinite and finite.
- UNIT-V    Job Sequencing:** Introduction, solution of sequencing problem Johnson s algorithm for n jobs through 2 machines.

### **Referential Books:**

1. Gillet B.E. "Introduction to Operation Research"
2. Taha,H.A. "Operation Research - an introduction"
3. Kanti Swarup "Operation Research"
4. S.D.Sharma "Operation Research"
5. Hira & Gupta "Operation Research"

## **BCA-406 Mathematics III**

**Unit – I COMPLEX VARIABLES:** Complex Number System, Algebra of Complex Numbers, Polar Form, Powers and Roots, Functions of Complex Variables, Elementary Functions, Inverse Trigonometric Function.

**Unit – II SEQUENCE, SERIES AND CONVERGENCE:** Sequence, Finite and Infinite Sequences, Monotonic Sequence, Bounded Sequence, Limit of a Sequence, Convergence of a Sequence, Series, Partial Sums, Convergent Series, Theorems on Convergence of Series (statement, alternating series, conditional convergent), Leibnitz Test, Limit Comparison Test, Ratio Test, Cauchy's Root Test, Convergence of Binomial and Logarithmic Series, Raabe's Test, Logarithmic Test, Cauchy's Integral Test (without proof)

**Unit– III VECTOR CALCULUS:** Differentiation of Vectors, Scalar and Vector Fields, Gradient, Directional Derivatives, Divergence and Curl and their Physical Meaning.

**Unit– IV FOURIER SERIES:** Periodic Functions, Fourier series, Fourier Series of Even and Odd Functions, Half Range Series.

**Unit – V ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER:** Variable- Separable Method, Homogeneous Differential Equations, Exact Differential Equations, Linear Differential Equations, Bernoulli's Differential Equations, Differential Equations of First Order and First Degree by Integrating Factor.

**Unit – VI ORDINARY DIFFERENTIAL EQUATIONS OF SECOND ORDER:** Homogenous Differential Equations with Constant Coefficients, Cases of Complex Roots and Repeated Roots, Differential Operator, Solutions by Methods of Direct Formulae for Particular Integrals, Solution by Undetermined Coefficients, Cauchy Differential Equations, (only Real and Distinct Roots) Operator Method for Finding Particular Integrals, (Direct Formulae).

### **Referential Books:**

1. A.B. Mathur and V.P. Jaggi, "Advanced Engineering Mathematics", Khanna Publishers, 1999.
2. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Co., 9th Revised Ed.

### **Course Code Course Name**

**BCA-405 Computer Laboratory and Practical Work of Computer Graphics & Multimedia Application**

Practical will be based on Paper Computer Graphics & Multimedia Application: Covers UNIT-II, UNIT-III, UNIT-V of Syllabus