Second Year –Second Semester
Core Java (BCA-221)
Discipline Core (DC); 4 Credits (3-0-2)

Unit	Contents	No. of Lectures
Unit 1	Java Fundamentals, Features of Java, OOPs concepts, Java virtual machine, Reflection byte codes, Byte code interpretation, Data types, variable, arrays, expressions, operators, and control structures, Objects and classes	8
Unit 2	Java Classes ,Abstract classes ,Static classes, Inner classes Packages, Wrapper classes Interfaces, This Super Access control	8
Unit 3	Database Connectivity, JDBC architecture, Establishing connectivity and working with connection interface Working with statements, Creating and executing SQL statements, Working with Result Set	9
Unit 4	Exception handling, Exception as objects Exception hierarchy, Try catch finall,y Throw, throws 4. IO package Input streams, Output streams, Object serialization Deserialization, Sample programs on IO files, Filter and pipe streams	10
Unit 5	Multi threading, Thread Life cycle, Multi threading advantages and issues, Simple thread program, Thread synchronization , GUI Introduction to AWT programming, Layout and component managers, Event handling, Applet class Applet life-cycle, Passing parameters embedding in HTML 3 Swing components – JApplet, JButton, JFrame, etc. Sample swing programs,	10
		45

Reference/ Text Book:
1. Programming with Java A Primer, E. Balaguruswamy Tata McGraw Hill Companies.
2. Java Programming John P. Flynt Thomson 2nd .

UNIX AND SHELL PROGRAMMING (BCA-222)

Discipline Core (DC); 4 Credits (3-0-2)

Objectives:

1. To learn commands on Linux operating system
2. To learn the scripting and application of the scripting in various field

Unit	Contents	No. of Lectures
Unit 1	The Unix Operating System, The UNIX architecture and Command Usage, The File System ,Basic File Attributes, the vi Editor.	**8**
Unit 2	The Shell, The Process, Customizing the , More file attributes, Simple filters	**10**
Unit 3	Filters using regular expressions, An Advanced Filter perl - The Master Manipulator	**10**
Unit 4	Essential Shell Programming, An Advanced Filter, perl - The Master Manipulator	**13**
		41

Reference/Text Books:
1. Sumitabha Das: UNIX – Concepts and Applications, 4 th Edition, Tata McGraw Hill, 2006.

2. Behrouz A. Forouzan and Richard F. Gilberg: UNIX and Shell Programming, Cengage Learning, 2005

Computer Graphics (BCA-223)
Discipline Core (DC); 4 Credits (3-0-2)

Objectives:

1. To get the Knowledge about the basics concepts of multimedia and its applications.
2. To get the knowledge of its relevance with internet and its future aspects

Unit	Contents	No. of Lectures
Unit 1	Line generation: Points lines, Planes, Pixels and Frame buffers, vector and character generation. Graphics Primitives: Display devices, Primitive devices, Display File Structure, Display control text.	12
Unit 2	Polygon: Polygon Representation, Entering polygons, Filling polygons. Segments: Segments table, creating deleting and renaming segments, visibility, image transformations.	10
Unit 3	Transformations: Matrices transformation, transformation routines, displays procedure. Windowing and Clipping: Viewing transformation and clipping, generalize clipping, multiple windowing.	10
Unit 4	Three Dimension: 3-D geometry primitives, transformations, projection clipping. Interaction: Hardware input devices handling algorithms, Event handling echoing, Interactive techniques.	8
Unit 5	Hidden Line and Surface: Back face removal algorithms, hidden line methods. Rendering and Illumination: Introduction to curve generation, Bezier, Hermite and B-spline algorithms and their comparisons	12
		42

References/Text Books:

1. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill
2. Asthana, Sinha, "Computer Graphics", Addison Wesley Newman and Sproul, "Principle of Interactive Computer Graphics", McGraw Hill
3. Steven Harrington, "Computer Graphics", A Programming Approach, 2nd Edition 4.

Rogar and Adams, "Mathematical Elements of Computer Graphics", McGraw Hill.

Numerical Methods (BCA-224)
Discipline Core (DC); 4 Credits (3-1-0)

Objectives:

At the end of the course, the students would be acquainted with the basic concepts in numerical methods and their uses are summarized as follows:

1. The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigenvalue problem of a matrix can be obtained numerically where analytical methods fail to give solution.
2. When huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values.
3. The numerical differentiation and integration find application when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information.

	Contents	
Unit 1	**Solution of Equations and Eigenvalue Problems:** Solution of equation – Fixed point iteration: x=g(x) method - Newton's method – Solution of linear system by Gaussian elimination and Gauss-Jordon method– Iterative method - Gauss-Seidel method Inverse of a matrix by Gauss Jordon method – Eigen value of a matrix by power method and by Jacobi method for symmetric matrix.	**10**
Unit 2	**Interpolation And Approximation:** Lagrangian Polynomials Divided differences – Interpolating with a cubic spline Newton's forward and backward difference formulas.	**6**
Unit 3	**Numerical Differentiation and Integration:** Differentiation using interpolation formulae –Numerical integration by trapezoidal and Simpson's 1/3 and 3/8 rules – Romberg's method – Two and Three point Gaussian quadrature formulae – Double integrals using trapezoidal and Simpsons's rules.	**8**
Unit 4	**Initial Value Problems for Ordinary Differential Equations:** Single step methods: Taylor series method – Euler method for first order equation – Fourth order Runge – Kutta method for solving first and second order equations – Multistep methods: Milne's and Adam's	**10**

	predictor and corrector methods.	
Unit 5	**Boundary Value Problems in Ordinary and Partial Differential Equations:** Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods One dimensional wave equation and two dimensional Laplace and Poisson equations.	**10**
		44

References/Text Books:

1. Veerarajan, T and Ramachandran, T. 'Numerical methods with programming in 'C' Second Editiion, Tata McGraw-Hill Publishing.Co.Ltd. (2007).
2. Sankara Rao K, 'Numerical Methods for Scientisits and Engineers' – 3rd editiion Printice Hall of India Private Ltd, New Delhi, (2007).
   Gerald, C. F. and Wheatley, P.O., "Applied Numerical Analysis", 6th Edition, Pearson Education Asia, New Delhi, 2006.