4TH SEMESTER BCA			
	SUB CODE		SUB NAME
MAJOR	CORE-I	PAPER-8	Computer Graphics
	CORE-I	PAPER-9	Web Development with PHP
	CORE-I	PAPER-10	Computer Network
MINOR	CORE-III		
	INTERNSHIP		

Core VIII

Computer Graphics

Course Objectives:
- To understand basic concepts of computer graphics.
- To learn techniques for creating basic graphical structures
- To learn different transformation techniques

Learning Outcomes:

Upon completion of this course, students will be able to:
- Know the use of different graphics systems
- Learn different algorithms to draw geometrical figures
- Learn various geometric transformation techniques
- Learn techniques for clipping

Unit I:

Computer Graphics: A Survey of Computer graphics, Overview of Graphics System: Video Display Devices, Raster-Scan Systems, Input Devices, Hard-Copy Devices, Graphics Software.

Unit II:

Graphics Output Primitives: Point and Lines, Algorithms for line, circle & ellipse generation, Filled-Area Primitives. Attributes of Graphics Primitives: Point, line, curve attributes, fill area attributes, Fill methods for areas with irregular boundaries.

Unit III:

Geometric Transformations (both 2-D & 3-D): Basic Geometric Transformations, Transformation Matrix, Types of transformation in 2-D and 3-D Graphics: Scaling, Reflection, shear transformation, rotation, translation. 2-D, 3-D transformation using homogeneous coordinates.

Unit IV:

Two-Dimensional Viewing: Introduction to viewing and clipping, viewing transformation in 2-D, viewing pipeline, Clipping Window, Clipping Algorithms: Point clipping, Line clipping and Polygon clipping.

Text Books:
- ✓ *Donald Hearn & M. Pauline Baker, "Computer Graphics with OpenGL", Pearson Education.*
- ✓ *Mathematical Elements for Computer Graphics, D. F. Rogers & J. A. Adams, MGH, 2/ed.*

Reference Books:
- ✓ *Computer Graphics principles & practice, Foley, Van Dam, Feiner, Hughes Pearson Education*
- ✓ *Computer Graphics by Zhigang Xiang, Roy A Plastic, McGraw-Hill*

BCA 4.3 Lab: Computer Graphics using OpenGL

1. Write a program to implement Bresenham's line drawing algorithm.
2. Write a program to implement mid-point circle drawing algorithm.
3. Write a program to clip a line using Cohen and Sutherland line clipping algorithm.
4. Write a program to clip a polygon using Sutherland Hodgeman algorithm.
5. Write a program to fill a polygon using Scan line fill algorithm.
6. Write a program to apply various 2D translation transformation.
7. Write a program to apply 2D object homogenous coordinates translation.
8. Write a program to apply various 2D rotation transformation.
9. Write a program to apply 2D object homogenous coordinates rotation.
10. Write a program to apply various 2D scaling transformation.
11. Write a program to apply 2D object homogenous coordinates scaling transformation.
12. Write a program to apply various 3D transformations on a 3D object and then apply parallel and perspective projection on it.

Core IX

Web Development with PHP

Course Objectives:
- To understand the essentials of Server-side programming
- To understand web development using PHP

Learning Outcomes:

On successful completion of this course, Students will be able to:
- Learn the basics of JSON, XML and AJAX
- Learn the programming concepts of PHP
- Learn the server-side programming using PHP
- Learn the mechanisms of connecting Database using PHP & use AJAX with PHP

Unit I:

Introduction to Server-Side Technologies, Web Servers, Understanding the concepts of JSON, AJAX: Introduction, Creating Internet Applications using AJAX. XML: Introduction, Features, Fundamentals, Document Type Definition, XML Schema.

Unit II:

PHP: Features, Programming fundamentals: Print/echo statement, Data Types, Variables, Constants, Strings, Arrays, Operators. Control Structures: Conditional, Looping & Jump Statements. Functions: String, Date-Time, Mathematical and User-defined functions. Embedding PHP in HTML, Reading Form Data of a Web Page.

Unit III:

Introduction to PHP with Database: Connecting to Database, selecting a Database, Adding Table and Altering a Table in a Database. Inserting Data, Modifying Data in a Table, Retrieving Data from a table and displaying in HTML.

Unit IV:

State Management in PHP: Introduction, Cookies, Session. Authentication in PHP: Creating a User, Adding authorized users, Displaying the User. Using AJAX: AJAX with PHP, AJAX with Database.

Text Book:

- ✓ *Web Technologies (Black Book), DreamTech Press*

Reference Books:

- ✓ *Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP 4th Edition by Ivan Bayross.*
- ✓ *PHP and MySQL Web Development by Luke Welling and Laura Thomson*. Addison - Wesley.

BCA 5.1 Lab: Web Development with PHP

1. Write PHP program (s) for the following.
   a. Find greatest among three numbers entered by the user
   b. Print the sum of numbers from M to N where their values are entered by the user.
   c. Find the factorial of a number entered by the user.
2. Write a PHP program that asks the name and date of birth of the user.
   a. Find the number of letters, words in the name
   b. Display the Name in reverse order
   c. Print the current date and time and age of the user.
3. Design a web page to create a form that collects the name, gender and mail of a person. Write a PHP program that collects the data entered by the user in the form and displays them in a new page.
4. Write a PHP program that creates a Table in a database. The number of columns of the table are determined by the fields in the form (created in question no. 3).
5. Write a PHP program to
   a. insert new records
   b. update a record
   c. delete a record based on a value of a field in the table.
6. Write a PHP program that asks the user to enter a name and display the details of the user retrieved from the database in the same page. [show the error message if no matching name is found in the database].
7. Write a PHP program to create a cookie and store your name and then read the cookie.
8. Write a PHP program that allows only authenticated users to retrieve the details of a table. [Use username and password of the user to validate the authenticity].
9. Write a PHP application to make use of AJAX.

Core X

Computer Network

Course Outcomes:
- To understand data communication and network concepts.
- To learn about different communication standards
- To understand different network protocols

Learning Outcomes:

Upon completion of this course, students will be able to:
- Understand concepts on data communication and the use of communication devices
- Learn about analog and digital signals and basic components of data communication
- Learn about errors during data communication & access control mechanisms
- Learn various network protocols and network security issues

Unit I:

Introduction to Data Communications and Network Models: Protocols and Standards, Layers in OSI Models, Analog and Digital Signals, Network Topology, Transmission Modes, Transmission Impairment, Data Rate Limits, Performance, Digital Transmission, Network Devices & Drivers: Router, Modem, Repeater, Hub, Switch, Bridge (fundamental concepts only).

Unit II:

Signal Conversion: Digital-to-Digital Conversion, Analog-to-Digital Conversion, Digital-to-analog Conversion, Analog-to-analog Conversion. Switching Techniques: Packet Switching, Circuit Switching, Datagram Networks, Virtual-Circuit Networks, and Structure of a Switch.

Unit III:

Error Detection and Correction: Parity Check, Checksum, CRC, Error correction technique (Hamming code), Data Link Control: Framing, Flow and Error Control, Noiseless Channels, Noisy channels, (Stop and Wait ARQ, Sliding Window Protocol, Go Back N, Selective Repeat) Point-to-Point Protocol. Access Control: TDM, CSMA/CD, and Channelization (FDMA, TDMA, and CDMA).

Unit IV:

Network Layer: Logical Addressing, IPv4 Addresses, IPv6 Addresses, Subnet, Subnet masking, Virtual-Circuit Networks: Frame Relay and ATM, Transport Layer: Process-Process Delivery: UDP, TCP. Application layers: DNS, SMTP, POP, FTP, HTTP, Basics of WiFi (Fundamental concepts only), and Network Security: Authentication, Basics of Public Key and Private Key Cryptography, Digital Signatures and Certificates (Fundamental concepts only).

Text Book:
- ✓ *Computer Networks, A. S. Tanenbaum, 4th edition, Pearson Education.*

Reference Book:

- Data Communications and Networking, Fourth Edition by Behrouza A. Forouzan, TMH.