:

FIFTH SEMESTER

Computer Networks
BCA-16-501

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: The objective of the course is to:

- Offer knowledge about computer network related hardware and software using a layered architecture.
- Provide good understanding of the concepts of network security, wireless and various emerging network technologies.

Note :

i. The Question Paper will consist of Four Sections.
ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
iv. All questions carry equal marks unless specified.

UNIT - I

Computer Network: Network Hardware and Software, Network Topologies, Uses of Computer Networks, OSI Reference Model, TCP/IP reference model, Comparison of OSI with TCP/IP model.

Physical Layer: Transmission media: Twisted pair, Coaxial cable, Fiber optics, Wireless Transmission (Radio, Microwave, and Infrared), Switching: Circuit Switching, Message Switching, Packet Switching & their comparisons. ISDN and its services, Multiplexing: Frequency Division, Time Division, Wave Length Division, MODEMS.

UNIT - II

Data Link Layer: Design Issue, Framing, Errors Detection and Correction Code: Check sum, CRC, Hamming code, Data Link Protocols for noisy and noiseless channels, Sliding Window Protocol: Stop and Wait ARQ, Go-back-N ARQ, Selective Repeat ARQ.

Medium Access Sub-Layer: Introduction to Static and Dynamic channel allocation, IEEE standards 802.3.

UNIT - III

Network Layer: Design Issues, network layer addressing, network layer datagram, IP addressed Classes. Sub netting-Sub network, Subnet mask, Routing Algorithm: Shortest Path Routing, Flooding, Broadcast and Multicast routing, Congestion control: Principles of Congestion Control, Congestion prevention policies, Leaky bucket and token bucket algorithms.

UNIT - IV

Application Layer: Domain Name system (DNS), DNS name space, DNS Servers, World Wide Web, HTTP, e-mail: Architecture and Services, Message Component, Multipurpose Internet Mail Extensions (MIME), Simple Mail Transfer Protocol (SMTP), Post Office Protocol (POP), Remote Login and File transfer protocol, Introduction to Network Security.

REFERENCES:

1. Andrew S. Tanenbaum, "Computer Networks", Pearson Publication.
2. Behrouz A. Forouzan, "Data Communication and Networking", Tata McGraw Hill.
3. Theodore S. Rappaport, "Wireless Communication: Principle and Practices", Pearson Publication.
4. Charlie Kaufman, Radio Perlman, Mike Speciner, "Network Security", PHI.
5. Mayank Dave," Computer Networks", Cengage Learning.

Discrete Mathematical Structure
BCA-16-502

L	T	P	Cr	External Marks: 65
6	1	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objectives : In this paper, Students will learn and be able to acquire the knowledge of Logic, Relations and Functions. Algebric Functions and Graph Theory will also be discussed in this paper.

Note :

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ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
iv. All questions carry equal marks unless specified.

UNIT – I

Set Theory : Relations and Functions : Set Notation and Description, subset, basic set operations, Venn Diagrams, laws of set theory, partitions of sets, min sets, duality principle, basic definitions of relations and functions, graphics of relations, properties of relations: injective, surjective and bijective functions, compositions.

UNIT - II

Recurrence : Recurrence Relations and Recursive Algorithms – Linear-Recurrence Relations with Constant Coefficients; Homogeneous Solutions : Particular Solution, Total Solution, Solution by the Method of Generating functions.

UNIT – III

Graph Theory : Graph and planar graphs – Basic Terminology, Multi-graphs, Weighted Graphs, Paths and Circuits, Shortest Paths, Eulerian Paths and Circuits. Travelling Salesman Problem, Planar Graphs.

UNIT – IV

Automata Theory : Finite State Machines–Equivalent Machines, Finite State Machines as language Recognizers; Analysis of Algorithms - Time Complexity, Complexity of Problems.

References :

1. Doerr,A.and Kenneth, L.,Applied Discrete Structures for Computer Science, 1989 Galgotia Publications Pvt. Ltd.
2. Liu, C. L., 1985, Elements of Discrete Mathematics, McGraw Hill.
3. Seymour Lipschutz and Lipson, :2000 Solved Problems in Discrete Mathematics, McGraw- Hill., 1992

Java Programming
BCA-16-503

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: This course aims at giving student knowledge about all the programming concepts of JAVA programming language.

Note :

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ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
iv. All questions carry equal marks unless specified.

UNIT I

Java and the Internet: The Java programming language and its characteristics; Java development kit, Java run- time environment; Java compiler

Fundamentals of Java: Java Vs. C++, Byte Code, Java Virtual Machine, constants, variables, data types, operators, expressions, control structures, defining class, creating objects, accessing class members, constructors, Garbage Collection, method overloading,

Inheritance: Different types of Inheritance, member access, using super keyword to call super class constructors, creating a multilevel hierarchy, method overriding, dynamic method dispatch, using abstract classes, using Final keyword.

UNIT II

I/O Basics: streams, the predefined streams; Reading console Input, Writing console Output.

Arrays and Strings: One-dimensional and two-dimensional Arrays, String Handling using String and StringBuffer class, String Functions.

Packages: Types of packages, defining a package, Importing packages, Access protection

Interfaces: Defining an Interface, Implementing Interfaces, Variables in Interfaces, Achieving multiple inheritance using interfaces, Interface and Abstract classes.

UNIT III

Exception Handling: Java Exception handling model, Types of exception, using Try and catch, Multiple Try and Catch clauses, Nested Try statements, finally block, user defined exceptions.

Multi-threaded Programming: The Java Thread model, the Thread class and Runnable interface, Creating a Thread using Runnable Interface and extending Thread, Creating Multiple Threads, Thread Priorities, Synchronizations: Methods, Statements, Inter Thread Communication, Deadlock, Suspending, Resuming and Stopping Threads.

Applet Programming: Introduction, Types of applet, Life Cycle, Incorporating an applet into web page using Applet Tag, running applets, using Graphics class and its methods to draw lines, rectangles, circles, ellipses, arcs and polygons.

UNIT IV

Using AWT controls: Introduction to AWT, Creating GUI Applications using AWT, AWT controls: Label, TextBox, TextArea, Check Boxes, Radio Buttons, Choice lists, Understanding Layout Managers: FlowLayout, BorderLayout, GridLayout; Introduction to Event handling using Delegation Event Model.

Introduction to Java Database Connectivity (JDBC): JDBC Architecture, JDBC Drivers, Java.SQL package, Connecting to the Database and performing basic database operation like Insert, Delete, Update and Select.

References:

1. Balaguruswamy, E. : Programming with Java, A Primer, TMH, New Delhi, Latest reprint.
2. Bayross, Ivan : Java 2 by BPB publication
3. Schildt , Herbert : The Complete Reference Java 2, TMH.
4. Arora, Indu : JAVA Programming

Web Application Development using PHP
BCA-16-504

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: This course enables students to do web programming using PHP and MySQL. It would enable them to develop websites and other web based applications.

Note :

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iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
iv. All questions carry equal marks unless specified.

UNIT - I

Introduction to web applications: Client Side Scripting Vs Server Side Scripting, Understanding Web Servers: Local Servers and Remote Servers, Installing WAMP and configuring PHP environment, Static website Vs Dynamic website development, Embedding PHP code in Web Pages

PHP Basics: Tokens, Variables, Variable Scope, Constants, Data Types, number handling in PHP, operands, operators, expressions, operator precedence, comments, echo and Print statement

Control structures: Branching statements: if-else, ternary operator, switch; looping statements: while, do-while, for; file inclusion Statements

UNIT - II

Functions: Function definition, Creating and invoking user-defined functions, Formal parameters versus actual parameters, Function and variable scope, Recursion, Library functions

String Handling: interpolation with curly braces, characters and string indexes, string operators, heredoc, string functions, Formatting Strings, Comparing and searching Strings and substrings

Arrays: PHP Arrays, Creating Arrays, Accessing Array elements, Multidimensional Arrays, Inspecting Arrays, Deleting from Arrays, Iterating with each() and foreach(), Iterative functions: current(), next(), prev(), reset(), end()

UNIT - III

Forms: Working with HTML Form controls and PHP, Super global variables, super global array, importing user input, Accessing user input

Integrating PHP and Database: Connecting to database, Making SQL queries, Executing queries, Fetching data sets, Integrating Forms and Databases**:** Basic form submission to a database, editing data with an HTML form

UNIT - IV

Maintaining User State: Introduction to Cookies, Setting time in a cookie with PHP, Deleting a cookie, creating session cookie, Introduction to sessions, Starting a session, Registering Session variables, working with session variables, Destroying session, passing session Ids , encoding and decoding session variables, increase session expire time, working of session without cookie.

Working with File System: Understanding PHP file permissions, Opening and closing a file, File reading and writing functions, File system and directory functions

References:

1. PHP6 and MySQL Bible, Steve Suehring, Wiley India edition, 2015 reprint
2. PHP: The Complete Reference, "Steven Holzner", Tata McGraw Hill
3. PHP6, Apache, MySQL Web development, Timothy Boronczyk, Wiley India edition
4. Programming PHP, Rasmus Lerdorf, Kevin Tetroi (O'Reilly, ISBN 1565926102).
5. PHP, MySQL, and JavaScript: A Step-By-Step Guide to Creating Dynamic Websites by Robin Nixon O'Reilly Media
6. Core PHP Programming. Leon Atkinson (Prentice Hall, ISBN 0130463469).

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SIXTH SEMESTER