Kumaun University, Nainital, Uttarakhand

BACHELOR OF COMPUTER APPLICATION

Session 2019-2020

BCA 511: Digital Communication and Network

UNIT I

Network definition; network topologies; network classifications; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite. back-bone networks- repeaters, hubs, switches, bridges, router and gateways;

UNIT II

Data Communication Fundamentals and Techniques: Analog and digital signal; data-rate limits; digital to digital line encoding schemes; pulse code modulation; digital to analog modulation-; multiplexing techniques- FDM, TDM; transmission media.

UNIT III

Error detection techniques; data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Multiple Access Protocol and Networks: CSMA/CD protocols; Ethernet LANS; connecting LAN.

UNIT IV

Networks Switching Techniques and Access mechanisms: Circuit switching; packet switching- connectionless datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer,

UNIT V

Networks Layer Functions and Protocols: Routing algorithms; Distance vector routing and link state routing, protocol of Internet- IP protocol (IP4, IP6) Transport Layer Functions and Protocols: TCP-Connection establishment and release- three-way handshake.

Recommended Books:

1. B. A. Forouzan: Data Communications and Networking, Fourth edition, THM ,2007
2. S. Tanenbaum: Computer Networks, Fourth edition, PHI, 2002
3. James F. Kurose, Keith W. Ross, “Computer Networking”, Pearson Education.
4. Michael A. Gallo, William M. Hancock, “Computer Communications and Networking Technologies”, CENGAGE Learning.

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BCA 512 (a): Java Programming

UNIT I

Features of java, JDK Environment & tools like (java, javac, appletviewer, javadoc, jdb), OOPs Concepts Class, Abstraction , Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA, Structure of java program, Data types ,Variables ,Operators , Keywords ,Naming Convention, Decision Making (if, switch), Looping(for, while), Type Casting, Array Creating an array Types of Array - One Dimensional arrays - Two Dimensional array, String - Arrays , Methods. – String Buffer class

UNIT II

Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance Simple, Multilevel, Interfaces, Abstract classes and methods, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes, Modifiers and Access Control, Packages Packages Concept Creating user defined packages, Java Built in packages: java.lang->math, java.util->Random, Date, Hashtable, Wrapper classes

UNIT III

Collection Framework, Interfaces - Collection - List - Set - SortedSet - Enumeration - Iterator – ListIterator, Classes - LinkedList - ArrayList - Vector - HashSet

UNIT IV

Exception: Exception types, Using try catch and multiple catch Nested try, throw, throws and finally, Creating user defined Exceptions

File Handling: Stream ByteStream Classes CharacterStream Classes, File IO basics, File operations Creating file Reading file (character, byte) Writing file (character, byte)

UNIT V

Applet: Introduction, Types applet, Applet Life cycle - Creating applet - Applet tag, Applet Classes - Color - Graphics - Font

AWT: Components and container used in AWT, Layout managers, Listeners and Adapter classes, Event Delegation model,

Swing: Introduction to Swing Component and Container Classes

Recommended Books:

1. Margaret Levine Young, “The Complete Reference Internet”, TMH
2. Balagurusamy E, “Programming in JAVA”, TMH
3. Naughton, Schildt, “The Complete Reference JAVA2”, TMH
4. Steven Holzner, “Java2 Black book”, dreamtech

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BCA 512 (b): C# with .NET Framework

UNIT I

The .NET Framework: Introduction, Common Language Runtime, Common Type System, Common Language specification, The Base Class Library, The .Net class library Intermediate language, Just-in time Compilation, Garbage Collection, Application Installation and Assemblies, Web services, Unified classes.

UNIT II

C# Basics: Introduction, Data Types, Identifiers, Variables and constants, C# statements, Object Oriented Concept, Object and Classes, Arrays and Strings, System collections, Delegates and Events, Indexes, Attributes, versioning.

UNIT III

C# Using Libraries: Namespace- System, Input Output, Multi-Threading, Networking and Sockets, Data Handling, Windows Forms, C# in web application, Error Handling.

UNIT IV

Advanced Features Using C#: Web services, Windows services, messaging, Reflection, COM and C#, Localization.

UNIT V

Advanced Features Using C#: Distributed Application in C#, XML and C#, Unsafe Mode, Graphical Device Interface with C#, CASE Study (Messenger Application)

Recommended Books:

1. Jeffrey Richter, “Applied Microsoft .NET Framework Programming”, (Microsoft)
2. Fergal Grimes, “Microsoft .Net for Programmers”, (SPD)
3. Balagurusamy, “Programming with C# “, TMH
4. Wiley,” Beginning Visual C# 2008”,Wrox

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BCA 513: Computer Graphics

UNIT I

Introduction, Basic elements of Computer graphics, Applications of Computer Graphics. Graphics Hardware, Video Display Devices, Architecture of Raster and Random scan display devices, Input devices, Hard-copy devices, Graphics software.

UNIT II

Fundamental Techniques in Graphics, Line Drawing Algorithms: DDA Algorithm, Bresenham's Line algorithm, Circle Generating Algorithms: Midpoint Circle Algorithm. Filled-Area Primitives: Scan-line polygon fill algorithm, Inside-Outside Tests, boundary Fill Algorithm, Flood- Fill algorithm.

UNIT III

Two- Dimensional Geometric Transformations: Basic Transformations- Translation, Rotation, Scaling. Matrix representations and Homogeneous Coordinates, Composite Transformations. Other Transformations: Reflection, Shearing.

UNIT IV

Two-Dimensional Viewing: The Viewing Pipeline, Clipping operations: Point clipping, Line Clipping: Cohen Sutherland line clipping, Liang- Barsky line clipping, Nicholl-lee-Nicholl line clipping, Polygon Clipping: Sutherland-Hedgeman Polygon Clipping, Weiler-Atherton Polygon Clipping, Curve Clipping, Text Clipping, Exterior Clipping.

UNIT V

Three-Dimensional Concepts: 3-D display methods: Parallel projection, Perspective projection, Depth cueing, Visible line and surface identification, Surface rendering.

Recommended Books:

1. J.D.Foley, A.Van Dan, Feiner, Hughes Computer Graphics Principles & Practice 2nd edition Publication Addison Wesley 1990.
2. D.Hearn, Baker: Computer Graphics, Prentice Hall of India 2008.
3. D.F.Rogers Procedural Elements for Computer Graphics, McGraw Hill 1997.
4. D.F.Rogers, Adams Mathematical Elements for Computer Graphics, McGraw Hill 2nd edition 1989.

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BCA 514: Software Engineering

UNIT I

Introduction**:** Software Engineering vs. Traditional Programming, System Development Life Cycle (Software Production Process, Conception, Initiation, Analysis Design, Construction, Testing, Implementation). Waterfall Model, Evolutionary Model. Factors affecting Software Development and Maintenance.

UNIT II

Software Project Management: Defining the Problem, developing a Solution Strategy, Planning the Development Process, Measurement of Software Productivity and Quality.

UNIT III

Software Engineering Principles &Tools: Tools of Design (Data Flow Diagrams, Data Dictionary, Decision Tree, Decision Tables), Modularization (Coupling)

UNIT IV

Testing: Testing fundamentals, Unit testing, Blackbox testing, Whitebox testing, Basic Path testing, Control Structure testing, Integration testing.

UNIT V

Software maintenance: Introduction to Software Maintenance, Enhancing Maintainability During Development (analysis Activities, Standards and Guidelines, Design activities, Implementation Activities, Supporting Documents) Managerial Aspects of Software Maintenance (Change Control Board, Change Request summaries, Quality Assurance Activities, Organizing Maintenance Programs).

Recommended Books:

1. R.F.Fairley,, “Software Engineering Concepts”, McGraw Hill.
2. R.S.Press Man , “Software Engineering A Practitioners Approach” McGraw Hill.
3. Rajib Mall, “Fundamentals of Software Engineering”. PHI.
4. Pankaj Jalote. “An Integrated Approach to Software Engineering”, Narosa