Third Year B.C.A.
(Effective from Session 2016-17)

BCA 301: Object Oriented Programming using C++

UNIT – I

Different paradigms for problem solving, need for OOP, differences between OOP and procedure oriented programming, abstraction, overview of OOP principles-encapsulation, inheritance and data binding polymorphism.abstraction.

C++ basics: structure of a C++ program, data types, declaration of variables, expressions, operators, type conversions, pointers and arrays, strings, structures, references, flow control statement, functions-scope of variables, parameter passing, recursive functions, default arguments, inline functions, dynamic memory allocation and deallocation operators.

UNIT – II

C++ classes and data abstraction: class definition, class structure, class objects, class scope, this pointer, static class members, constant member functions, constructors and destructors, dynamic creation and destruction of objects, friend function and class, static class member.
Overloading : function overloading, operator overloading – unary, binary operators.

UNIT - III

Inheritance: defining a class hierarchy, different forms of inheritance, defining the base and derived classes, access to the base class members, base and derived class construction, destructors, virtual base class.

Polymorphism: static and dynamic bindings, base and derived class virtual functions, dynamic binding through virtual functions, virtual function call mechanism, pure virtual functions, abstract classes, implications of polymorphic use of classes, virtual destructors.

UNIT - IV

Templates - function templates and class templates, overloading of function template, static class member in class template.

Exception handling: benefits of exception handling, throwing an exception, the try block, catching an exception, exception objects, exception specifications, rethrowing an exception, catching all exceptions.

UNIT-V

File handling : stream classes hierarchy, stream I/O, file streams, opening and closing data file, creating a data file, read and write functions, error handling during file operations, formatted I/O, sequential and random file processing.

Standard template library (STL): component of STL, containers, iterartors, algorithms, application of container classes.

Recommended books: Object Oriented Programming with C++ : E. Balagurusamy

BCA 302: Visual Programming

UNIT-I
WINDOWS PROGRAMMING
Windows environment – a simple windows program – windows and messages – creating the window – displaying the window – message loop – the window procedure – message processing – text output – painting and repainting – introduction to GDI – device context **4.**basic drawing – child windowcontrols

UNIT-II

VISUAL C++ PROGRAMMING – INTRODUCTION
Application Framework – MFC library – Visual C++ Components – Event Handling – Mapping modes – colors – fonts – modal and modeless dialog – windows common controls – bitmaps

UNIT-III
THE DOCUMENT AND VIEW ARCHITECTURE
Menus – Keyboard accelerators – rich edit control – toolbars – status bars – reusable frame window base class – separating document from its view – reading and writing SDI and MDI documents – splitter window and multiple views – creating DLLs – dialog based applications

UNIT-IV

ACTIVEX AND OBJECT LINKING AND EMBEDDING (OLE)
ActiveX controls Vs. Ordinary Windows Controls – Installing ActiveX controls – Calendar Control – ActiveX control container programming – create ActiveX control at runtime – Component Object Model (COM) – containment and aggregation Vs. inheritance – OLE drag and drop – OLE embedded component and containers – sample applications

UNIT-V

ADVANCED CONCEPTS

Database Management with Microsoft ODBC – Structured Query Language – MFC ODBC classes – sample database applications – filter and sort strings – DAO concepts – displaying database records in scrolling view – Threading – VC++ Networking issues – Winsock – WinInet – building a web client – Internet Information Server – ISAPI server extension – chat application – playing and multimedia (sound and video) files

TEXT BOOKS
9 Charles Petzold, "Windows Programming", Microsoft press, 1996 (UnitI)
10David J.Kruglinski, George Shepherd and Scot Wingo, "Programming Visual C++", Microsoft press, 1999 (Unit II –V)

REFERENCE
1. Steve Holtzner, "Visual C++ 6 Programming", Wiley Dreamtech India Pvt. Ltd., 2003.

BCA303: Information Security &Cryptography

UNIT-I

Overview of cryptography : Need of security, cryptographic goals, security approaches, basic terminology and concepts, symmetric key encryption - block cipher and stream cipher, substitution cipher and transposition ciphers, key space, public key cryptography, symmetric key v/s public key cryptography. Protocols and mechanisms, key management through symmetric key and public key techniques, attacks on encryption schemes, attacks on protocols, models for evaluating security, perspective for computational security.

UNIT-II

Pseudorandom bits and sequences : Random bit generation – hardware based generator and software based generator, tests for measuring randomness – frequency, serial, poker, runs and autocorrelation test. Blum-Blum-Shub pseudorandom bit generator.

Stream ciphers: Classification, one time pad, properties of synchronous and self-synchronizing stream cipher, linear and nonlinear feedback shift registers, stream ciphers based on LFSRs and its property, SEAL.

UNIT-III

Block ciphers : Modes of operation – ECB, CBC, CFB and OFB mode, exhaustive key search and multiple encryption, classical ciphers – transposition and substitution based ciphers, Vigenere ciphers, cryptanalysis of classical ciphers, Data Encryption Standard algorithm, double and triple DES, IDEA, Advance encryption standard, comparison of block ciphers, differential and linear cryptanalysis.

Public key encryption : Overview of symmetric key cryptography, RSA algorithm, EIGmal encryption, Knapsack encryption algorithm. public key cryptography standard (PKCS), PKI and security.

UNIT-IV

Message and Users authentication : One way hash functions, message digest, MD5 algorithm, secure hash algorithm (SHA1), comparison between different message digest algorithm, message authentication code.

Users authentication : authentication basics, password, authentication tokens, certificate based authentication, biometric authentication, Kerberos, Single sign on approach.

UNIT-V

Digital signature: digital envelope, classification of digital signature schemes – appendix and message recovery, attacks on signature.

Key management techniques: simple key establishment models, tradeoffs among key establishing protocols, techniques for distributing confidential key, techniques for distributing public keys, comparison of techniques for distributing public keys, key management involving multiple domains, key management life cycle.

Text/Reference Books
12.   Applied cryptography – Menezes, Oorschot andVanstone
13.   Network Security Essentials - WilliamStallings

BCA 304: System Analysis and Design

UNIT-I

Introduction: System Concept and the need for system approach, Definition of system and system analysis, Factoring into subsystems, Black box system, Introduction to the basic elements of the system, Different types and behaviour of the system.

UNIT-II

The System Development Life Cycle and System Analyst: Source and inspiration of a new system development, Recognition and need, Linear approach and prototype approach, Different phases in SDLC, Role of System Analyst.

UNIT-III

System Analysis: Importance of planning and control, Information Gathering: Various Methods, Tools of Structured Analysis: DFD, Decision Tree, Structured English, Decision Tables, Data Dictionary, Feasibility study. System Design: The Process of Design: Logical and Physical design, Methodologies: Structured, Form-Driven, IPO Charts etc., Input Output Form Design, File Organization: Sequential Indexed, inverted list, Database Design, Logical and Physical View of Data.

UNIT-IV

System Implementation: Need of Testing, Test Plan, Quality Assurance, Trends in Testing, Audit Trail, Post Implementation Review, Project Scheduling, Selection of Hardware and Software

UNIT-V

Security and Recovery in System Development: System Security: Definition, Threats to system security, Control measures, Disaster/ Recovery Planning, Ethics in System Development. Case Study.

Recommended books:
- **System Analysis and Design -E.M.Awad**
- **System Analysis and Design - DennisWixom**

BCA 305: Web Technology

UNIT I

INTRODUCTION

History of the Internet and World Wide Web – HTML 4 protocols – HTTP, SMTP, POP3, MIME, IMAP. Introduction to JAVA Scripts – Object Based Scripting for the web. Structures – Functions – Arrays –Objects.

UNIT II

DYNAMIC HTML

Introduction – Object refers, Collectors all and Children. Dynamic style, Dynamic position, frames, navigator, Event Model – On check – On load – Onenor – Mouse rel – Form process – Event Bubblers – Filters – Transport with the Filter – Creating Images – Adding shadows – Creating Gradients – Creating Motion with Blur – Data Binding – Simple Data Binding – Moving with a record set – Sorting table data – Binding of an Image and table.

UNIT- III

MULTIMEDIA

Audio and video speech synthesis and recognition - Electronic Commerce – E-Business Model – E- Marketing – Online Payments and Security – Web Servers – HTTP request types – System Architecture – Client Side Scripting and Server side Scripting – Accessing Web servers – IIS – Apache web server.

UNIT -IV

DATABASE- ASP – XML

Database, Relational Database model – Overview, SQL – ASP – Working of ASP – Objects – File System Objects – Session tracking and cookies – ADO – Access a Database from ASP – Server side Active-X Components – Web Resources – XML – Structure in Data – Name spaces – DTD – Vocabularies – DOM methods.

UNIT- V

SERVLETS AND JSP

Introduction – Servlet Overview Architecture – Handling HTTP Request – Get and post request – redirecting request – multi-tier applications – JSP – Overview – Objects – scripting – Standard Actions – Directives.
Brief survey of Web 2.0 technologies, introduction to Semantic web and other current technologies

Recommended Books:
1. Deitel & Deitel, Goldberg, "Internet and world wide web – How to Program", Pearson Education Asia

REFERENCES
1. Eric Ladd, Jim O' Donnel, "Using HTML 4, XML and JAVA", Prentice Hall of India
5.QUE 2. Aferganatel, "Web Programming: Desktop Management",PHI3. Rajkamal, "Web Technology", Tata McGraw-Hill,

BCA 306: Practical I: C++ Programming & Network security

Experiments based on the paper BCA 301 & BCA 303.

BCA 307: Practical II: Visual Programming & Web Designing Lab.

Experiments based on the paper BCA 302 and BCA 305.

BCA 308: PROJECT

In house project must be done by each student on simple applications using any computer language/ RDBMS/ Web design/visual programming etc.

The total work must be of minimum 180 hours per student. The internal guide must schedule the work & evaluate internally from time to time.

The project report must be prepared for the external examination. Monthly report of the students must be taken to monitor progress and must be placed for evaluation by external examiner. Projects submitted by the students shall be evaluated during external evaluation to ensure independent contribution and proficiency acquired by thestudents.

Note: Students must be allotted projects in the beginning of the session. Candidates submitting ready made projects/copied/ projects developed by professionals in the market etc shall be awarded zero marks.

Two copies of the project report and the software developed must be submitted to the external examiner. One copy of the project shall be returned to the student with the signature of external examiner.