B.C.A. SECOND YEAR

CODE No.	SUBJECT TITLE	TEACHING PERIODS / WEEK		MAXIMUM MARKS		TOTAL MARKS (A+B)	DURATION OF EXAM. Hours
		Theory	Practical	Theory / Practical (A)	Internal Test Marks (B)		
SEMESTER 3:							
BCA.S3.1.	Data Structures	4	---	80	20	100	3
BCA.S3.2	Fundamentals of Discrete Mathematics	4	---	80	20	100	3
BCA.S3.3	Web Page Designing	4	---	80	20	100	3
BCA.S3.4	Operating Systems	4	---	80	20	100	3
BCA.S3.PR1	Comp.lab.1 (Data Structure)	---	3	50	---	50	3
BCA.S3.PR2	Comp.lab.2 (HTML, DHTML)	---	3	50	---	50	3
TOTAL MARKS						**500**	
SEMESTER 4 :							
BCA.S4.5	Programming with Visual Basic.	4	---	80	20	100	3
BCA.S4.6	Programming with C++	4	---	80	20	100	3
BCA.S4.7	Software Engineering	4	---	80	20	100	3
BCA.S4.8	E-Commerce	4	---	80	20	100	3
BCA.S4.PR3	Comp.Lab.3 (Visual Basic)	---	3	50	---	50	3
BCA.S4.PR4	Comp.Lab.4 (C++)	---	3	50	---	50	3
TOTAL MARKS						500	
TOTAL MARKS (SEMESTER 3 + SEMESTER 4)						**1000**	

BCA.S3.1 – DATA STRUCTURES

(80 MARKS) (TOTAL LECTURES – 50)

1. Introductions and Overview:

1.1 Introduction
1.2 Basic technology, elementary data organization
1.3 Data structure
1.4 Data structure operation
1.5 Notation and Concept of algorithm

2. Array, Records And Pointers:

2.1 Introduction
2.2 Linear array
2.3 Representation of linear array in memory
2.4 Traversing linear array
2.5 Inserting and Deleting
2.6 Sorting methods
2.7 Searching methods (Binary and linear search)

3. Linked List:

3.1 Introduction
3.2 Linked list
3.3 Representation of Linked list in memory
3.4 Searching a linked list
3.5 Memory allocation, Garbage collection
3.6 Insertion and deletion in linked list

4. Stacks, Queues, Recursion:

4.1 Introduction
4.2 Stacks
4.3 Array representation of stacks
4.4 Arithmetic expression
4.5 Recursion
4.6 Queues

5. Tree:

5.1 Introduction
5.2 Terminology of Binary tree
5.3 Types of Binary tree

5.4 Traversing of binary tree
5.5 Header Nodes, Threads

6. Sorting:

6.1 General Tree Introduction
6.2 Selection, bubble, insertion

Reference Books:

1. DATA STRUCTURE, BY SEYMOUR LIPSCHUTZ (SCHAUM'S OULINE SERIES IN COMPUTERS) – MCGRAW HILL
2. AN INTRODUCTION TO DATA STRUCTURE WITH APPLICATION BY JEANPAUL, TREMBLAY PAUL, G. SORENSON (TATA MCGRAW HIL

BCA.S3.2 - FUNDAMENTALS OF DISCRETE MATHEMEATICS

(80 Marks) **(50 Lectures)**

1) SET THEORY

i) Set notations and descriptions
ii) Sub Sets
iii) Venn Diagram
iv) Set Operations

2) RELATIONS & FUNCTIONS

i) Basic Definition
ii) Relations
iii) Cartesian Product
iv) Functions, Domain, Range.
v) Types of Functions: One-One, On-To, In-To, One to One.

3) FUNCTIONS OF TWO & THREE VARIABLES

i) Introduction to Limit, Continuity, Derivatives, chain rule (without proof)

4) LOGIC

i) Propositions, Logical connectives, truth tables, prepositional form.
ii) Logical equivalence. Tautology and contradiction.
iii) Predicates
iv) Valid arguments

5) GRAPHS

i) Definition and elementary results
ii) Types of graphs
iii) Isomorphism

6) CONNECTED GRAPHS

i) Definition of connected, disconnected graphs.
ii) Edge sequence, path, circuit, definitions, and elementary results
iii) Vertex and edge connectivity
iv) Introduction to directed Graphs
v) Degree sequence and Havel- Hakimi theorem (Without proof)

7) TREE

i) Definition and equivalent characterizations, elementary results
ii) Center of a tree.
iii) Spanning trees and fundamental circuits and cut sets
iv) Binary trees and elementary results.

RECOMMANDED BOOKS:

1. Elements of discrete Mathematics by C.L. Liu.
2. Discrete Mathematics by Olympia Nicodemi,
3. Discrete Mathematical Structures for Computer Science by Alon Doerr and K. Levasieur.
4. A first step in graph Theory by Raghunathan, Nimkar & Solapurkar.
5. Graph Theory with applications to Computer science & Engineering by Narsing Deo.

BCA.S3.3 – WEB PAGE DESIGNING

(80 MARKS) (Total Lectures – 50)

1. Introduction to Web Publishing:

Web browser, WWW, Web design process, Implementation, Maintenance Phases of Web site. Web Publishing

2. HTML Documents:

Overview, rules & guidelines, structure of HTML documents, document types.

3. The Markup Tags:

HTML, HEAD, TITLE, BODY, Paragraphs, Lists, Formatted & Unformatted text, Extended quotations, Address, Horizontal rules, Hyper link, Font (Size, Color), Table, Image (Add, Alignments), Cell Space / Cell padding, Frame Set, Options, Form.

4. Linking:

URL, Mailto anchors.

5. Link Image:

Image size attributes, aligning images, alternate text for images, Background graphics, and Background color, External Images, Sounds & Animations.

Image map, Server side image map, Client side image map, Inline image

6. Tables:

Table tags, General Table format. Row Span, Cols pan

7. Frame:

Overview of frame, Simple frame example, Frame targeting, Floating frame, Frame problems

8. Form :

Action attribute, Method attribute, Name attribute, Enc type attribute, Complete form syntax

Example

9. DHTML:

Dynamic HTML, Document object model, Rollover Buttons, Moving objects with DHTML, Ramification of DHTML.

10. VB Script:

- Adding script to document, Input box, working with global & local variables, numbers, date & time, operators, arrays, uppercase & lowercase letters.
- Functions, Control statements, if-then-else, Nested ifs, Select Case, Looping Statements for-Next, Do-while, Do-Until

11. Java Script Basics:

Introduction, Basics, Data Types & variables, Expressions & Operators

Reference Book:

1. HTML COMPLETE BPB PUBLICATION.
2. JAVA SCRIPT 1.1: BY – DANESH & TATTERS :SAMSNET PUBLICATIONS.
3. VB SCRIPT BY BPB PUBLICATIONS.

BCA.S3.4 - OPERATING SYSTEMS

(80 MARKS) (TOTAL LECTURES – 50)

1. Introduction to Operating System:

1.1 Definition of Operating System
1.2 Functions of Operating System
1.3 Multi-user, Multiprocessing
1.4 Multiprogramming:
Time Sharing Systems, Real Time Systems
1.5 Hierarchical of Operating System

2. Memory Management:

2.1 Single Contiguous
2.2 Partition Allocation
2.3 Relocatable Partitioned
2.4 Page Memory Management
2.5 Introduction to Demand Paged & segmented Memory Management

3. Process Management:

3.1 What is process
3.2 Context Switching
3.3 Process Control Block
3.4 Job Scheduling & process scheduling
3.5 Process Synchronization
3.6 Race Condition
3.7 Introduction to Deadlocks

4. Device Management:

4.1 Techniques of Device Management
4.2 Dedicated, Shared, Virtual Devices
4.3 Device Characteristics
4.4 Channels & Control Units
4.5 I/O traffic Controller.

5. File Systems

5.1 A Simple file systems
5.2 General Model of file system
5.3 Symbolic file system

6. Parallel Processing

6.1 Introduction, What is Parallel Processing
6.2 Difference between distributed & Parallel processing
6.4 Advantages of parallel processing

Reference Books:

1. OPERATING SYSTEM BY STUART .E. MADNICK & JOHN. J. DONOVON
2. OPERATING SYSTEM BY MILAN MILENKOVIC (IBM CORPORATION)
3. OPERATING SYSTEM BY ACHYUTS GODBOLE
4. OPERATING SYSTEM BY H.M. DEITEL

BCA.S3.PR1-Computer Laboratory 1

Practical based on Data Structure

(50 MARKS)

1. At least 15 programs using advance C-Lang.

BCA.S3.PR2 – Computer Laboratory 2

Practical based on HTML, DHTML

(50 MARKS)

At least 15 practical based on following points

1. Create a simple web page
2. Create a web page contains link of other page & other area
3. Create a web page which contains table, frames & image
4. Create a web page contains animated image & text.

BCA.S4.5 Programming With Visual Basic.

(80 MARKS) (50 Lectures)

1. Introduction of Windows:

What is windows, Elements of Windows (Popup, Menus, Main Window, child Window, Control panel) Study of important files of windows.

2. Introduction to IDE:

Menu bar, tool bar, Project Explorer, toolbox. Property window, Form layout window, Project types.

3. Working with Forms:

The anatomy of forms, Form Properties, Form Events & Form Methods, Working with MDI forms.

4. Getting acquainted with VB

Data Types, keywords, Identifiers, variables, constants operators, Operator precedence & associatively, I/O statements, Control statements, looping statements, Arrays, Type, Library Functions.

5. Using controls:

Command Button – Properties, Events, Methods
Text Box -Properties, Events, Methods
Label Control – Properties, Events, Methods
Option Button - Properties, Events, Methods
Check Box - Properties, Events, Methods
Frame - Properties, Events, Methods
List Box - Properties, Events, Methods
Combo Box - Properties, Events, Methods
Image Control - Properties, Events, Methods
Picture Box - Properties, Events, Methods
Scroll Box - Properties, Events, Methods
Drive List - Properties, Events, Methods
Directory List - Properties, Events, Methods
File List - Properties, Events, Methods

6. Using Databases With VB

Introduction to Jet Engine ODBC and ISAM
Loading Access Database, FoxPro Database, Oracle Database.

7. Object Programming with VB

Characteristics of objects, creating objects
Using the object Browser
Working with collection.

8. Visual Basic and the Web

Web Browsing objects, The Properties of web Browser, The methods of web browser, the Events of web browser, Using Hyperlinks, Scripting, Document object

The Reference Books:

1. MASTERING VISUAL BASIC BY – BPB PUBLICATION
2. PETER NORTONS GUIDE TO VISUAL BASIC

BCA.S4.6 Programming With C++

(80 MARKS) (50 Lectures)

1. **Introduction to OOPs:**
   Object Oriented Programming, Basic concepts of OOPS, Benefits of OOPs.

2. **Introduction to C ++:**
   Tokens, Keywords, Identifiers, Data types, Constant, Operators Operator precedence & associatively, I/O statements, Structure of C++ program, Control statements, Looping statements, Type casting, Arrays, Pointer, References, Structure and Unions, Function, Function Prototype, Call by value, Call by reference, Return by reference, Inline function, Default arguments, Function Overloading.

3. **Class & Object:**
   Define Class, Members, Object, Visibility modes, Static members, Friend functions Pointer to members & Pointer to objects, Constructors & Destructors.

4. **Operator Overloading & Type Conversions:**
   Concept of Operator Overloading, Unary & Binary operator overloading, Rules for Overloading. Type conversions – Basic to Class, Class to basic Class to Class.

5. **Inheritance & Polymorphism:**
   Concept of Inheritance, Types of Inheritance, Polymorphism, Virtual Classes, Pointer to Derived class, Virtual functions, Rules for Virtual function, Pure Virtual functions.

6. **C++ I/O System:**
   C++ Streams, Stream classes, formatted I/O, Overloading <<.

Reference Books:

1. OBJECT ORIENTED PROGRAMMING WITH C++: BY E. BALGURUSWAMI
2. OBJECT ORIENTED PROGRAMMING IN C++: BY- RICHARD JOHNSON BAUGH & MARTIN KALIN
3. C++ COMPLETE REFERENCE BY – H. SHEILD

BCA.S4.7 - Software Engineering.

(80 MARKS) **(Total Lectures – 50)**

1. **The Product:**
   - The Evolving Role Of Software
   - Software:
   - Software Characteristics
   - Software Applications
   - Software Crisis & Horizon
   - Software Myths

2. **Process Of Software**
   - Software Engineering
   - Software Process
   - Software Process Model
   - Linear Sequential Model
   - Prototyping Model
   - Evolutionary Process Model
   - Spiral Model

3. **Management Concepts**
   - Management Spectrum
   - The People:
   - The Product
   - The Process
   - The Project
   - People:
   - Layers
   - Leaders & Software Team

4. **Software Process & Project Metrics**
   - Measures, Metrics & Indication
   - Metrics In The Process & Project Domains
   - Software Measurement
   - Metrics For Software Quality

5. **Software Project Planning**
   - Observation Estimation
   - Project Planning Objectives
   - Software Scope
   - Resources
   - Software Project Estimation

6. **Risk Analysis & Management**
   - Software Risks
   - Risk Identification

Risk Projection

7. Quality Assurances

Quality Concepts
Software Quality Assurance
Formal Technical Reviews

8. Testing Techniques

Software Testing Fundamentals
White Box Testing
Black Box Testing

9. Software Testing Strategies

A Strategic Approach To Software Testing
Unit Testing
Integration Testing
Top-Down Integration
Bottom Up Integration

Reference Books:

1. SOFTWARE ENGINEERING (A PRACTITIONER'S APPROACH) BY ROGERS PRESSMAN (FIFTH EDITION)

2. SOFTWARE ENGINEERING (A PRACTITIONER'S APPROACH) BY ROGERS PRESSMAN (FOURTH EDITION)

BCA.S4.8 – E-COMMERSE

(80 MARKS) **(50 Lectures)**

1. **Electronic Commerce**
   - Electronic Commerce
   - Electronic Data Interchange
   - Benefits of EDI Value Added Networks
   - Electronic Commerce over the Internet.
2. **The Internet**
   - The Internet
     - The Internet Engineering Task Force IETF
     - The Internet Architecture Board
     - Internet communication Protocols
     - File Transfer Protocol (FTP)
     - Security.
3. **Intranets**
   - Intranet
     - Intranet Services
     - Intranet Implementation
4. **Electronic Data Interchange**
   - Electronic Data Interchange
     - Components of EDI Systems
     - EDI Software.
5. **Identification & Tracking Tools for E-Commerce**
   - The EAN System
     - EAN/COM
     - Article Numbering
     - Bar Coding
6. **Internet Bandwidth and Technology issue**
   - Bandwidth Issues
     - Technology Issue for the Internet
     - ATM Technology
     - ATM / Fiber-Optic Networks
     - High capacity Storage System
7. **Security Issues**
   - Security Concerns
     - Security Solutions
     - Electronic Cash over the Internet

Reference Books:

1. E-Commerce The Cutting Edge of Business – Kamlesh K. Bajaj, Debjani Nag. (TATA McGRAW HILL)

BCA.S4.PR3-Computer Laboratory 1

Practical based on VB

(50 MARKS)

2. At least 15 programs using VB

BCA.S4.PR4 – Computer Laboratory 2

Practical based on C++

(50 MARKS)

1. At least 15 practical based on C++