MANNAR THIRUMALAI NAICKER COLLEGE
PASUMALAI, MADURAI – 625 004

(An Autonomous Institution affiliated to Madurai Kamaraj University)
Re-accredited with 'A' Grade by NAAC

BCA
SYLLABUS AND REGULATIONS

UNDER
CHOICE BASED CREDIT SYSTEM (CBCS)
(For those who joined during 2016 – 2017 and after)

MANNAR THIRUMALAI NAICKER COLLEGE(Autonomous)
DEPARTMENT OF COMPUTER APPLICATION

(For those who joined from 2016 onwards)

Program Specific Outcomes

PSO1 Prepare globally competent graduates having strong fundamentals and domain knowledge to provide effective solutions for computational problems.

PSO2 Provide conceptual knowledge in the Computing domain;

PSO3 Develop team work experience of professional skills for IT Industry.

PSO4 Help them to develop their career oriented skills throughthe Elective Courses.

Objectives

The syllabus for B.C.A degree has been designed on the basis of the choice basic credit system (CBCS) which would focus on job oriented programmes and value added education

Eligibility for Admission

Candidates seeking admission to the B.C.A Degree course; must have passed in the Higher Secondary Examination (should have studied Computer Science or Mathematics in HSC) of the Government of Tamil Nadu or any other state or its equivalent qualification.

Duration of the course

The duration of the course shall be three academic years comprising six semesters with two semesters in each academic year.

Subject of Study

Part   I: Tamil
Part   II: English
Part   III:

    1. Core Subjects

    2. Allied Subjects

    3. Electives

Part   IV   :

    1. Non Major Electives

    2. Skill Based Subjects

    3. Environmental Studies

    4. Value Education

Part   V :

Extension activities

The scheme of Examination

The components for continuous internal assessment are:

Two tests and their average	--15 marks
Seminar /Group discussion	--5 marks
Assignment	--5 marks
Total	--25 marks

Pattern of the question paper (External Examination)

(For Part I, Part II, Part III , NME & Skilled Paper in Part IV)

The question paper may have 3 parts.

Duration of the external examination is 3 hours

Part –A

Five questions (answer all)   5 x 02   = 10 Marks

(One question from each Unit)

Part –B

Five questions ('either …. or ' type)   5 x 07   = 35 Marks

(One question from each Unit)

Part –C

Three questions out of five   3 x 10   =30 Marks

(One question from each Unit)

Total   75 Marks

Question paper pattern

(for part IV – Environmental Studies and Value Education only)

Part –A

Five questions (either or type)   5 x 06   =30 marks

Part –B

Three questions out of Five   3 x 15 = 45 marks

Total   75 marks

Note: No unit shall be omitted ;not more than two question from each unit

Pattern of the Question paper (Internal)
Part –A
Five questions (answer all)   5 x02=10 Marks
Part –B
Two questions ('either …. or ' type)   2 x 05=10 Marks
Part –C
One questions out of two   1 x 10 =10 Marks

                                Total   30 Marks

Pattern of the Question paper for Environmental Studies & Value Education only) (Internal)
Part –A
Four questions ('either …. or ' type)   4 x05=20 Marks
Part –B
One question ('either …. or ' type)   1 x 10=10 Marks

                                Total   30 Marks


Minimum Marks for a Pass
1. 40% of the aggregate (Internal +External Examinations).
2. No separate pass minimum for the Internal Examinations.
3. 27 marks out of 75 is the pass minimum for the External Examinations.

COURSE PATTERN

Study Component	I Sem.	II Sem.	III Sem.	IV Sem.	V Sem.	VI Sem.	Total Hrs/week	Total Credit	No.of Papers	Total Marks
Part - I Tamil	6(3)	6(3)	6(3)	6(3)	-	-	24	12	4	400
Part - II English	6(3)	6(3)	6(3)	6(3)	-	-	24	12	4	400
Part – III										
Core Subjects/	6(4) 4(4)	5(4) 5(4)	5(4) 5(4)	5(4) 5(4)	6(5) 6(5) 5(4) 6(5)	5(4) 5(4) 5(4) 4(4) 4(4)	86	71	17	1700
Elective					5(4) (Any one from the list)	5(4) (Any one from the list)	10	8	2	200
Allied Subject	4(4)	4(4)	4(4)	4(4)			16	16	4	400
Part - IV										
Skill Based Subjects/	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	12	12	6	600
EVS/VE/	2(2)	2(2)					4	4	2	200
NME			2(2)	2(2)			4	4	2	200
Part – V										
Extension Activities				0(1)			0	1	1	100
Total	30	30	30	30	30	30	180	140	42	4200

	(22)	(22)	(22)	(23)	(25)	(26)				
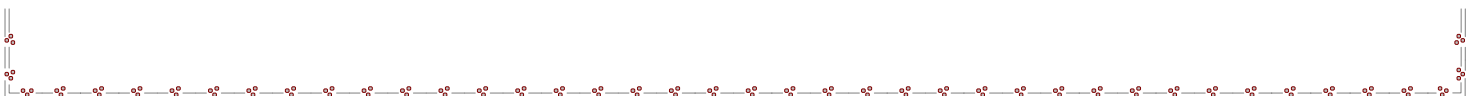
COMPUTER ORGANIZATION

Class	**: BCA**	**Part III**	**: Core**
Semester	**: I**	**Hours**	**: 06**
Sub code	**: 16UCAC11**	**Credits**	**: 04**

Course Outcomes

CO1   To understand the basic structure and operation of digital computer.

CO2   To expose the students with different ways of communicating with I/O devices and standard I/O interfaces.

CO3   To familiarize the students with hierarchical memory system including cache memories and virtual memory.

Unit – I:

Digital Logic Circuit: Digital Computers - Logic Gates-Boolean Algebra - **Data representation: Data Types -** Number systems - octal and Hexa-decimal representation - Decimal Representation - Alphanumeric Representation – Other Binary Codes.

Unit – II:

Basic computer organization and design: Instruction codes – Computer register – Computer instructions – Timing and control – Instruction cycle – Memory Reference Instruction – Input-Output and Interrupt.

Unit – III:

Central Processing Unit: Introduction – General Register Organization – Stack Organization – Instruction formats – Addressing Modes – Data Transfer and Manipulation – Program Control.

Unit - IV:

Input Output Organization: Peripheral devices – Input Output interface – Asynchronous Data Transfer – Modes of Data Transfer – Priority Interrupt – Direct Memory Access.

Unit - IV:

Memory Organization: Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory – Memory Management Hardware.

Text Book(s):

1. M. Morris Mano, **Computer System Architecture**, Pearson Education, New Delhi, Third edition, 2007.

Unit I: Chapter 1 – Section: 1.1 to 1.3, Chapter 3 – Section: 3.1, 3.5

Unit II: Chapter 5 – Section: 5.1 to 5.7

Unit III: Chapter 8 – Section: 8.1 to 8.7

Unit IV: Chapter 11 – Section: 11.1 to 11.6

Unit V: Chapter 12(Full)

Reference Book(s):

1 V.Raja Raman, T.Radhakrishnan, **Computer Organization and Architecture**, PHI, New Delhi, 2011.

2 Carl Hamacher,Zvonko Vranesic, Safwat Zaky, **Computer Organization,** TMH, Fifth Edition, 2011.

WEB PROGRAMMING – LAB

Class	**: BCA**	**Part III**	**: Core**
Semester	**: I**	**Hours**	**: 04**
Sub code	**: 16UCACP1**	**Credits**	**: 04**

Course Outcomes

    CO1   Define the basics in web design

    CO2   Visualize the basic concept of HTML.

    CO3   Introduce basics concept of CSS.

1. Create simple web page using various text formats.

2. Create Mark sheet using HTML.

3. Working with List and Tables.

4. Add a simple script using Click event.

5. Image map.

6. Change the colour of the old image to new image.

7. Filter effects.

8. Creating a banner – Typography.

9. Animation – text and image.

10. Adding sounds.

11. Working with layers and frames.

12. Create MTN COLLEGE website using HTML tags.

DISCRETE MATHEMATICS

Class	: BCA	**Part III**	: Allied
Semester	: I	**Hours**	: 04
Sub code	: 16UCAA11	**Credits**	: 04

Course Outcomes

CO1 To understand set theory, relations and functions and to read, understand and construct mathematical arguments.

CO2 To understand recurrence relation, generating functions and algebraic systems and their applications.

CO3 To understand Matrix algebra, Eigen values Eigen vectors and to apply graph theory to solve real-world problems.

Unit - I:

Set theory & Relations –Introduction – Sets – Venn - Euler diagrams – Operations on Sets – Properties of Set Operations – Verification of basic laws of algebra – Principle of Duality, Relations – Operation on relations – Equivalence relation – Closure and Wars hall's Algorithm.

Unit - II:

Functions & Mathematical induction- Functions and operators – One to One functions – Special type of functions – Invertible functions – Composition of functions, Mathematical induction. -Techniques of proofs.

Unit - III:

Logic – Introduction – Connectives – Truth table – Tautology implication and equivalence of formulae.

Unit - IV:

Matrix Algebra – Introduction – Operations – Inverse of a square matrix – Elementary operations and Rank of matrix – Solution of Simultaneous linear equations – Eigen values & Eigen vectors.

Unit -V:

Graph Theory – Introduction – Definitions and examples – Degrees – Subgraphs- Trees: Introduction – Characterisation of Trees – Centre of a Tree – Some Applications: Introduction – Connector problem – Shortest path problem.

Text Book(s):

1. M.Venkatraman, N.Sridharan and N.Chandrasekaran, **Discrete Mathematics,** The National Publishing Company, Chennai, Reprint, 2006.

2. S.Arumugam, S.Ramachandran, **Invitation to Graph Theory**, Scitech Publications India Pvt. Ltd, Chennai, Reprint 2006.

 Unit I : Book 1: Chapter 1 – Sections : 1,2.

 Unit II : Book 1: Chapter 3 – Sections : 3,4.

 Unit III : Book 1: Chapter 9 – Sections : 9.1,9.2,9.3,9.6,9.7,9.8.

 Unit IV : Book 1: Chapter 6 (Except 6.4).

 Unit V : Book 2: Chapter 2– Sections 2.0 to 2.3.

        Book 2: Chapter 6– Sections 6.0 to 6.2.

        Book 2: Chapter 11– Sections 11.0 to 11.2.

Reference Book(s) :

1. Seymour Lipchutz, **Discrete Mathematics,** Marc Lipson (Schaum's Outline Series), Tata McGraw Hill Education Private Limited, New Delhi, Second Edition, 2003.

2. Dr S Arumugam and Issac, **Modern Algebra,** SciTech Publishers, Hyderabad, 2003 (for Units 1,2,4).

3. T.Veerarajan, **Discrete Mathematics with Graph Theory and Combinations,** Tata McGraw Hill Publishing Company Ltd, New Delhi, 2007.

PC SOFTWARE – LAB

Class	**: BCA**	**Part IV**	**: Skilled**
Semester	**: I**	**Hours**	**: 02**
Sub code	**: 16UCASP1**	**Credits**	**: 02**

Course Outcomes

CO1	To perform documentation and handle databases
CO2	To perform accounting operations
CO3	To develop presentation skills

WINDOWS

1. Creating folder and managing file and folder (operations like rename, cut, copy, paste and

delete).

2. Arranging icons and setting display properties.

3. Adding and removing software and hardware.

4. Setting date and time, screen saver and appearance.

5. Using windows accessories.

6. Settings of control panel items (Date and Time).

7. Searching file.

Microsoft Word

1. Formatting text – Character formatting, Paragraph formatting.

2. Working with Objects – Images, Picture, Clip art, Shapes and Header and footer.

3. Working with Tables – Insert, Delete, Select, Auto format and Functions.

4. Working with page layout – Page Setup, Page background and Alignment.

5. Mail merge.

6. References: Adding footnotes, Citations and bibliography, Captions and index.

7. Create document using Template/Wizard.

Microsoft Excel

1. Creating & Editing Worksheet, Auto Fill.

2. Working with Functions.

3. Working with charts.

4. Working with Data tools: Sorts and filters and Pivot table.

Microsoft Access

1. Creating simple tables and working with queries.

2. Creating simple table and working with Forms.

3. Creating simple table and generating reports.

Microsoft PowerPoint

1. Creating, Manipulating & Enhancing Slides.

2. Inserting Organizational Charts, Excel Charts.

3. Working with design: Page setup, Themes, Design Template and Back ground.

4. Working with animations: Custom animation and Slide transition with Sound.

PROGRAMMING AND PROBLEM SOLVING THROUGH C

Class	: **BCA**	**Part IV**	: **Mandatory**
Semester	: **I**	**Hours**	: **05**
Sub code	: **16UCAC21**	**Credits**	: **04**

Course Outcomes

CO1 To learn to think logically and to write pseudo code or draw flow charts for problems.

CO2 To be exposed to the syntax of C and to be familiar with programming in C.

CO3 To learn to use arrays, strings, functions, pointers, structures, file handling and unions in C.

Unit – I:

Why programming language – Machine language –Assembly language –High level language – Algorithm – Flowchart – Logic Development & Problem Solving using computer. Overview of C: History of C- Basic structure of C program. Constant-Variables and Data types: Character Set - C Tokens - Keywords- Identifiers-Constants- Variables- Data types- Variables-Declaration of Variables- Types of Operators and expressions- Input and output functions in C.

Unit – II:

Decision Making Statement: IF-ELSE statement- break- continue- goto- switch case and nested IF statement. Looping Statements: For loop- While loop- Do while loop and nested loops. Arrays: Definition- Initialization- characteristics- One- Two- Three and Multi-dimensional Arrays. Strings & String handling Functions.

Unit – III:

Function: Introduction- Need for User-defined Functions- Definition of Functions-Return Values and their Types- Function Calls- Function Declaration- Category of Functions- Functions that Return Multiple Values- Nesting of Functions- Recursion.

Unit – IV:

Structures and Union**:** Introduction- Defining a Structure- Declaring Structure Variables- Accessing Structure Members- Structure Initialization- Copying and Comparing Structure Variables- Operations on Individual Members- Unions- Bit Fields. Pointers – Introduction- Understanding Pointers- Accessing the Address of a Variable- Declaring Pointer Variables- Initialization of Pointer Variables- Accessing a Variable through its Pointer

Unit – V:

Files: Introduction- Defining and Opening a File- Closing a File- Input/Output Operations on Files- Error Handling during I/O Operations- Random Access to Files- Command Line Arguments.

Text Book(s):

1. V. Rajaraman, **Fundamentals of Computers**, PHI, New Delhi, 5th Edition, 2013.

   Unit I : Chapter 1 - Section: 1.1 to 1.4, chapter 9 - Section: 9.1 – 9.3

2. E. Balaguruswamy, **Programming in ANSI C**, TMH, New Delhi, 6th Edition, 2011.

   Unit I : Chapter 1– Section: 1.1, 1.2, 1.8

              Chapter 2 – Section: 2.1 to 2.08

              Chapter 3 – Section: (3.1 – 3.11, 3.14), Chapter 4 (Full)

   Unit II : Chapter 5 (Full), Chapter 6 (Full)

              Chapter 7 (Full)

              Chapter 8 – Section: 8.1 to 8.4, 8.8.

   Unit III: Chapter 9 – Section: (9.1 -9.16)

   Unit IV: Chapter 10 (Full)

              Chapter 11– Section: 11.1 – 11.6.

   Unit V : Chapter 12 (Full)

Reference Books:

1. Kannetkar Yashavant, **Let us C**, BPB, New Delhi, 6th Edition, 2005.

2. Byron Gottfried, **Programming with C,** Schaum's Outlines, TMH, New Delhi, 2nd Edition, 2006.

PROGRAMMING IN C – LAB

Class	**: BCA**	**Part III**	**: Core**
Semester	**: II**	**Hours**	**: 05**
Sub code	**: 16UCACP2**	**Credits**	**: 04**

Course Outcomes

CO1 To introduce to students to the field of programming using C language.

CO2 To enhance their analyzing and problem solving skills and use the same for writing programs in C

CO3 To understand the concepts of C Language and motivate them to develop the Coding.

MS-DOS EDITOR COMMANDS

Creating file using commands – Directory related commands (MD, CD, RD)

Implement the following concept using C Programming Language:

1. Formatted and Unformatted Statements

2. Operators and expressions

3. Control Statements

4. Arrays

5. Strings

6. Functions

7. Structure

8. Union

9. Pointer

10 File Handling

11. Bitwise operators and Command line arguments

At least two programs should be given on each concept.

NUMERICAL APTITUDE

Class	: BCA	**Part III**	: Allied
Semester	: II	**Hours**	: 04
Sub code	: 16UCAA21	**Credits**	: 04

Course Outcomes

CO1 To learn numbers, fractions and surd and to be familiar with arithmetic ability.

CO2 To be exposed to logarithms and linear equations.

CO3 To learn more on modern Mathematics and reasoning

Unit - I :

NUMBERS: Numbers- HCF- LCM of Numbers- Decimal Fractions- Square root and Qube root-Average- Problem on numbers- Surds.

Unit -II:

ARITHMETIC: Percentages- Profit & Loss- Simple Interest and Compound Interest.

Unit -III:

ARITHMETIC: Time and Distance- Time and Work-Clocks- Calendars.

Unit -IV:

ALGEBRA: Logarithms- Problems on age.

Unit -V:

MODERN MATHEMATICS: Permutations- Combinations.

Text Book:

1. R.S.Agarwal, **Quantitative Aptitude for Competitive Examinations,** S.Chand Limited,
   New Delhi, 2011.

   Unit I   :   Chapter 1, 2, 3, 5, 6, 7, 9.

   Unit II   :   Chapter 10, 11, 21, 22.

   Unit III :   Chapter 15, 17, 27, 28.

   Unit IV   :   Chapter 8, 23.

   Unit V   :   Chapter 30.

Reference Books:

1. AbhijitGuha, **Quantitative Aptitude for Competitive Examinations,** TMH, New Delhi,

   4th Edition, 2011.

2. Arun Sharma, **How to prepare for Quantitative Aptitude for the CAT,** TMH, New
Delhi,

   2011.

MULTIMEDIA – LAB

Class	**: BCA**	**Part III**	**: Skilled**
Semester	**: II**	**Hours**	**: 02**
Sub code	**: 16UCASP2**	**Credits**	**: 02**

Course Outcomes

CO1 To familiarize with Photoshop tools.

CO2 To understand the animation techniques using Adobe Flash.

CO3 To understand the concept of mixing audio and video with text.

PHOTOSHOP

1. Changing Color Modes.
2. Pattern Setting.
3. Mirror Image.
4. Changing Black /White Image to Color and vice versa.
5. Stroking Effect.
6. Merge Text and Image.
7. Shadow of an image.
8. 3D & Lighting Effects.
9. Morphing.
10. Composite of two Images.

FLASH

1. Create an animation with the following features:
   WELCOME

   i) Letters should appear one by one.
   ii) The fill color of the text should change to a different color after the display of the Full word.
2. Simulate movement of a Cloud.
3. Create an animation to indicate a ball bouncing on steps.
4. Create an animation to represent the growing moon.
5. Animate a Globe.
6. Converting Text into Shapes.
7. Animate using motion- shape- Tweening and actions.

PROGRAMMING IN C++

Class	**: BCA**	**Part III**	**: Core**
Semester	**: III**	**Hours**	**: 05**
Sub code	**: 16UCAC31**	**Credits**	**: 04**

Course Outcomes

CO1 To learn the basic knowledge of object oriented programming concepts and techniques.

CO2 To develop skills in writing object oriented C++ programs.

CO3 To understand the idea of C++ streams, templates and error handling concepts of C++ programming.

UNIT - I

Principles of OOP: Procedure oriented programming - OOP paradigm - Basic concepts of OOP - Benefits of OOP - Object oriented language - Applications of OOP. **Beginning with C++:** Structure of C++ program. **Tokens, Expressions and Control Structures:** Token - Keywords- Identifiers and constants – Basic Data Types- Variables - Operators – Manipulators - Expressions - Control Structures.

UNIT - II

Functions in C++: Main function - Function prototype - Inline functions - Default argument - Function overloading. **Classes and Objects:** Specifying a class - Defining Member functions - Memory allocation for objects - Static data members – Static member functions – Object as function arguments – Friendly function.

UNIT - III

Constructors and Destructors: Constructors-Parameterized constructor-Constructor with default arguments-Copy constructor- Destructor. **Operator overloading:** Defining Operator overloading - Overloading Unary operators - Overloading Binary operators - Rules for operator overloading.

UNIT - IV

Inheritance: Single inheritance - Multilevel inheritance - Multiple inheritance - Hierarchical inheritance – Hybrid Inheritance. **Polymorphism, Virtual function:** Introduction - Pure virtual function

UNIT - V

Managing console I/O operations: C++ stream classes - Unformatted   I/O
Operations - Formatted console I/O Operations. **Working with files:** Classes for file
stream operations - Opening and closing a file – EOF - File modes - Sequential I/O
Operations.

Text Book:

1. E. Balagurusamy, **Object-Oriented Programming with C++**, 5th edition, TMH
publication, New Delhi, 2011.

      Unit 1: Chapter 1 Section 1.3 – 1.8

          Chapter 2 Section 2.6

          Chapter 3 Section 3.2-3.5, 3.11-3.14, 3.18-3.20, 3.24

      Unit 2: Chapter 4 Section 4.1-4.3, 4.6, 4.7, 4.10

          Chapter 5 Section 5.1-5.4, 5.10-5.15

      Unit 3: Chapter 6 Section 6.1-6.3, 6.6, 6.7

          Chapter 7 Section 7.1-7.4, 7.8

      Unit 4: Chapter 8 Section: 8.1 – 8.8

          Chapter 9 Section: 9.6, 9.7

      Unit 5: Chapter 10 Section: 10.1-10.5

          Chapter 11Section: 11.1 - 11.4, 11.7

Reference Books:

1. R. Rajaram, **Object-Oriented Programming and C++**, 4th edition, A New Age
   Publication, New Delhi, 2011.

2. D. Ravichandran, **Programming with C++**, 2nd Edition, TMH, New Delhi, 2005.

PROGRAMMING IN C++ - LAB

Class   **: BCA**   **Part III**   **: Core**
Semester   **: III**   **Hours**   **: 05**
Sub code   **: 16UCACP3**   **Credits**   **: 04**

Course Outcomes

CO1   To gain knowledge about various Object oriented concepts like classes and objects

CO2   To develop an application applying the object oriented concepts

CO3   To develop a practical knowledge about constructor, inheritance ,file operation.

Implement the following concepts using C++ Programming Language:

1. Classes and Objects

2. Arrays of Objects

3. Constructors and Destructors

4. Functions: Inline function, Static Function, Friend Function

5. Control statements

6. String Manipulation

7. Static Polymorphism: Operator overloading

8. Function Overloading

9. Dynamic Polymorphism: Virtual function

10. Inheritance: Single, Multiple, Multilevel, Hierarchical Inheritance.

11. Formatted I/O and File operation

12. Templates and Exception Handling.

At least two programs should be given as lab exercise in each topic.

COMPUTER BASED FINANCIAL ACCOUNTING

Class	**: BCA**	**Part III**	**: Allied**
Semester	**: III**	**Hours**	**: 04**
Sub code	**: 16UCAA31**	**Credits**	**: 04**

Course Outcomes

CO1 To get the Knowledge about the important concepts and characteristics of accounting.

CO2 To study the application of accounting in the general business environment.

CO3 To make the student familiar with generally accepted accounting principles of financial accounting and their applications in business organizations excluding corporate entitles.

UNIT–I

Introduction – Book Keeping – Accounting Principles – Concepts - Conventions – Classification of Accounts – Double Entry System.

UNIT–II

Journal – Ledger – Subsidiary books – Trial balance.

UNIT–III

Final accounts of Sole trading concern with adjustments. (Simple Problems only)

UNIT-IV

Introduction to Tally – Features of Tally – Gateway of Tally Screen.

UNIT-V

Creating a Company – Accounts group – Voucher – Accounts reports.

Text Books:

1. R.L.Gupta, Radha Swamy, **Advanced Accountancy**, Sultan Chand & Sons (P) Ltd., New Delhi, Reprint 2011.

   Unit 1: Chapter 2 (1.2.1-1.2.16)

      Chapter 3 (1.3.1-1.3.6)

   Unit 2: Chapter 5 (1.5.1-1.5.25)

      Chapter 6 (1.6.1-1.6.34)

   Unit 3: Chapter 7 (1.7.1-1.7.39)

      Chapter 8 (1.8.1-1.8.40)

2. S. Palanivel, **Tally Accounting Software**, Margham Publications, Chennai, 2007.

   Unit 4: Page No. 21-30, 85-98.

   Unit 5: Page No. 99-167.

Reference Books:

1. S.P.Jain, L.Narang, **Advanced Accountancy**, Kalyani Publishers, New Delhi, 2004.

2. Vikas Gupta, **Comdex Business Accounting with MS Excel 2010 and Tally. ERP 9 Course Kit**, Dream Tech Press, New Delhi, 2010.

TALLY – LAB

Class	**: BCA**	**Part IV**	**: Skilled**
Semester	**: III**	**Hours**	**: 02**
Sub code	**: 16UCASP3**	**Credits**	**: 02**

Course Outcomes

CO1 To impart knowledge regarding concepts of Financial Accounting Tally is an accounting package which is used for learning to maintain accounts

CO2 To impart practical training on this software so that the students could apply its various aspect in their day to day business / professional activities.

CO3 To help future entrepreneur in managing their financial accounting along with business operation through practical session.

1. Company Creation

2. Ledger Creation

3. Voucher Creation

    a) Receipt voucher

    b) Payment voucher

    c) Contra voucher

    d) Journal voucher

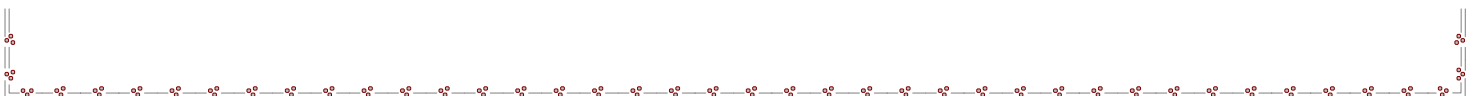   e) Sales voucher

    f) Purchase voucher

4. View Reports

    a) Purchase Register

    b) Sales Register

    c) Journal Register

    d) Outstanding Receivable

    e) Outstanding Payable

    f) Final accounts

    g) Day Book

5. Printing the Reports

    a) Multi-Accounts printing

    b) Final Accounts Printing

c) Cheque printing

JAVA PROGRAMMING

Class	: BCA	**Part III**	: Core
Semester	: IV	**Hours**	: 05
Sub code	: **16UCAC41**	**Credits**	: 04

Course Outcomes

CO1 To learn the basic functions, principles and concepts of Java Programming.

CO2 To understand the basics of Java Programming.

CO3 To learn Multithreading, String Manipulation, Applet and Graphics.

UNIT-I

Java Evolution: Java Features – How Java Differ from C and C++ - Java and Internet – Java and World Wide Web Browser – Simple Java Programs – Java Program Structure – Java Tokens- Data types – Java Statement – Java Virtual Machine – Comment Line Argument – Constants Variables – Giving Values to Variable – Scope of Variables – Symbolic Constants – Type Casting.

UNIT -II

Operators and Expressions: Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Bitwise Operators – Special Operators – Arithmetic Expressions Evolution of Expression – Precedence of Arithmetic Operators – Operator Precedence and Associativity - Mathematical Function. **Decision Making and Branching:** Decision Making with If Statement – Simple If Statement – If-Else Statement – Nesting If-Else Statement – Else If Ladder Statement – Switch Statement - Conditional Operators. **Looping Statement:** The While Statement – Do While Statement – For Statement – Jump in Loops. **Class Object and Methods:** Defining a Class-adding the variables and methods – Field Declaration – Method Declaration – Creating Declaration – Accessing Member – Constructor Method Overloading – Static Member – Nesting of Methods – Inheritance – Overwriting Method – Final variable, Classes, Method – Finalizer - Abstract Methods and Classes – Visibility Controls.

UNIT -III

Arrays, Strings and Vectors: One Dimensional Array – Creating Arrays - Two Dimensional Array – Strings – Vectors – Wrapper Class – Enumeration Types. **Interface:** Define Interfaces Extending Interfaces Implementing Interfaces – Accessing Interface Variables. **Packages:** Java API Packages, Using System Package – Naming Conventions – Creating Package – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes.

UNIT-IV

Multithreaded Programming: Creating Thread – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of Thread – Using Thread Method – Thread Exception – Thread Priority – Synchronization – Implementing the Runnable Interface. **Managing Errors and Exception:** Types of Errors – Exception – Syntax of Exception Handling – Multi Cache - Using Final Statement – Throwing Our Own Exception – Using Exception for Debugging**. Applet Programming:** How Applet Differ from Application – Preparing to write Applet – Building Applet – Applet Life Cycle – Creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to Html – Running the Applet.

UNIT-V

Graphics Programming: Graphics Class – Lines and Rectangle – Circle and Ellipse Drawing Arc – Using Control Oops in Applet – Drawing Bar Chat – **Managing Input and Output in Java** – Concept of Stream – Other Stream Class – Byte Stream Class – Character Stream Class – Using Stream – Other useful Input Output Class – Using the File Class – Input and Output Exception – Creation of File Reading, Writing Characters - Reading Class Writing Bytes – Linked Data Type and Buffering Files Random Access File – Interactive Input and Output.

Text Book:

1. E. Balagurusamy, **Object Oriented Programming with Java**, Tata McGraw Hill Private

   Limited, New Delhi, 4th Edition, 2010.

   Unit I: Chapter 2(Full), 3.2, 3.5, 3.6, 3.7, 3.10-3.11, 4.2, 4.3, 4.6-4.9

   Unit II: Chapter 5.2-5.12,5.14, 5.15, 6.2-6.8, 7.2- 7.5, 8.2-8.16, 8.18

   Unit III: Chapter 9(9.2 to 9.8), 10(Full), 11(11.2 to 11.9)

   Unit IV: Chapter 12(12.2 to 12.10), 13(Full), 14(14.2 to 14.10)

   Unit V: Chapter 15(15.2 to 15.5, 15.8, 15.9), 16(16.2 to 16.6)

Reference Books:

1. P.Radha Krishna, **Object Oriented Programming with Java**, University Press India Private Limited,

    Hyderabad, 3rd Edition, 2008.
2. Debasish Jana, **Java Object Oriented Programming Paradigm**, Prentice Hall of India Private

    Limited, New Delhi, 3rd Edition, 2008.
3. C.Xavier, **Programming with Java**, Scitech Publication India Private Limited, Chennai, 3rd Edition,

    2004.
4. Herbert Schildt, **Java 2 - The Complete Reference**, TMH, New Delhi, 5th Edition, 2005.

JAVA PROGRAMMING - LAB

Class	**: BCA**	**Part III**	**: Core**
Semester	**: IV**	**Hours**	**: 05**
Sub code	**: 16UCACP4**	**Credits**	**: 04**

Course Outcomes

CO1 Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc

CO2 Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.

CO3 Be aware of the important topics and principles of software development.

Create Java Programming in the following concept:

1. Class
2. Inheritance
3. Polymorphism
4. Packages
5. Interfaces
6. Exception Handling
7. Threading and Multithreading
8. Streams and String Classes
9. Applet
10. AWT Components
11. Swing components.

COST ACCOUNTING

Class	: BCA	**Part III**	: Allied
Semester	: IV	**Hours**	: 04
Sub code	: 16UCAA41	**Credits**	: 04

OBJECTIVES

CO1 To acquaint the students with basic concepts used in cost accounting and various methods involved in cost ascertainment systems.

CO2 To train the students in finding the cost of products using different methods of costing.

CO3 To provide the student knowledge about use of costing data for planning, controls and decision making.

UNIT–I

Introduction**:** Definition of Costing – Important use of costing – Objects & advantages of costing – Difference between Cost & Financial accounts – Installation of costing system – Analysis and classification of costs – Preparation of cost sheet.

UNIT–II

Materials**:** Maintenance of stores & records, Different levels of stock of materials – E.O.Q – Perpetual Inventory System – ABC Analysis – Stores Ledger – Pricing of material issues (FIFO, LIFO and Average Methods)

UNIT-III

Labour**:** Labour Turn over – Methods of Remunerating Labour – Incentive Schemes.

UNIT-IV

Overheads**:** Meaning – Classification of overhead – Allocation – Apportionment & Absorption of overheads.

UNIT-V

Budget and Budgetary Control: Meaning – Objectives – Advantages – Limitations – Classification of Budgets – Preparation of Functional budgets – Cash, Flexible and Master budget.

Text Book:

1. S.N. Maheswari, **Cost Accounting**, Sultan Chand & Sons (P) Ltd., New Delhi, Reprinted 2011.

Unit I – Chapters 1(Full), 2(Full)

Unit II – Chapters 3(Full), 4(Full)

Unit III – Chapters 6(Full), 7(Full)

Unit IV– Chapters 9(Full), 10(Full)

Unit V - Section C (C.1-C.52)

Reference Books:

1. S.P. Jain & K.L.Narang, **Cost Accounting**, Kalyani Publishers, New Delhi, Reprinted 2011.

2. R.S.N. Pillai & S. Bhagavathy, **Cost Accounting**, S.Chand Company Ltd, New Delhi, Reprint with corrections 2011.

Note:

The Questions should be asked in the ratio of 60% as problems and 40% as theory.

LINUX AND SHELL PROGRAMMING LAB

Class   : BCA   **Part III   : Skilled**
Semester : IV   **Hours   : 02**
Sub code : 16UCASP4   **Credits   : 02**

Course Outcomes

CO1   To write shell scripts to solve problems

CO2   To implement some standard Linux utilities such as ls,cp,etc using system calls.

CO3   To learn to control remote systems through Linux command

1. Execution of various file/directory handling commands.

2. Execution of various administrative commands.

3. Execution of various utility commands.

4. Execution of shell script using control statements.

5. Execution of shell script using string functions.

6. Write a shell script to display list of users currently logged in.

7. Write a shell script to count no. of lines, words and characters in a file.

8. Write a shell program using command line arguments

9. Write a shell program using filter and grep commands.

10. Write simple awk programs.

VB. NET PROGRAMMING

Class	: BCA	Part III	: Core
Semester	: V	Hours	05
Subject Code : 16UCAC51		Credits	04

Course Objects

    CO1   To know basic concepts in VB.NET.
    CO2   To learn windows forms.
    CO3   To gain knowledge of object oriented concepts in VB.NET.

Unit I

    Features in VS.NET: Introduction – Start Page – The IDE main window- Class view window-Object browser – Code window – Intellisense- Compiling the code – Code Debugging - Developing a simple VB.NET console application through visual studio IDE – Developing a simple VB.NET project through visual studio IDE.

Unit II

    Variables Constants and Expressions: Introduction-Value types and Reference types- Variable Declaration and initialization – Value Data Types- Reference Data types – Boxing and unboxing- Arithmetic operators-Text box control – Label control-Button control

    Control Statements: Introduction -IF statement – Radio button control - Check box, control - Group Box, Control - List Box Control- Checked list box Control - Combo box Control– Select.. Case statement – While statement -Do statement- for statement.

Unit III

    Methods and Arrays: Introduction-Type of methods- Arrays- One dimensional array -multidimensional Arrays- Jagged Arrays - **Classes Properties and Indexers**: Introduction-Definition and usage of a class- Constructor overloading – Copy constructor – Instance and shared Class members – Shared constructors – Properties – Indexers- **Inheritance and Polymorphism:** Introduction- Virtual Methods- Abstract Classes and Abstract Methods- Sealed classes .

Unit IV

Interfaces and Namespaces and components: Introduction- Definition and usage of interfaces-multiple implementation of an interface-Interface inheritance- Namespaces – **Delegates , Events and Attributes**

Introduction-Delegates-Events. **Exception handling**:Introduction- Default Exception Handling Mechanism – User Defined exception handling mechanism – Back tracking – The Throw statement – Custom exception – **Multi threading**: Introduction-Usage of threads – "Thread" class – Start(),Abort(), Join(), and Sleep(),- Suspend() and resume () methods

Unit V

I/O Streams: Introduction- Streams-Binary data files – Text files – Data files – File info and Directory Info classes – **Database Connectivity:** Introduction-Advantages of ADO.NET – Managed Data providers – Developing a simple ADO.NET based application – Creation of a Data table – Retrieving Data from Tables – Table updating – Disconnected Data Access through Dataset Object.

Text Book:

Muthu C **Visual Basic.NET**, 2nd Ed., Vijay Nicole Imprints Pvt.Ltd., Chennai, 2008.
Unit I : Chapter 2.1-2.11
Unit II: Chapter 3, 4
Unit III: Chapter 5, 6, 7
Unit IV: Chapter 8.1-8.5, 9.1-9.3, 10, 11.1-11.5
Unit V: Chapter 12, 15

Reference Books:

1. Jeffrey R.Shapiro, **The Complete Reference Visual Basic.Net**, TMH Education, New
   Delhi, 2002.

2. Steven Holzner, **Visual Basic .NET Black Book**, The Coriolis Group, New Delhi,

   2002.

DATABASE MANAGEMENT SYSTEM

Class	: BCA	**Part III**	: Core
Semester	: V	**Hours**	: 05
Sub code	: 16UCAC52	**Credits**	: 04

Course Outcomes

CO1 To study about the underlying concepts and functions of relational databases.

CO2 To know about Codd's relational model theory—including relational structures, integrity constraints, data manipulation.

CO3 To understand the relational algebra, and normalization.

UNIT-I

Data, Information and Information Processing: Introduction – Definition of information, Quality of information. **Files, File organization and file structures:** Introduction – Operations on files – File storage organization – Storage media. **Introduction to Database Management System (DBMS):** Introduction – Why a database – Characteristics of data – Data Base Management System – Why DBMS – Types of DBMS.

UNIT-II

Introduction to Relational Database Management systems (RDBMS): Introduction – RDBMS terminology – Relational data structure – Relational data manipulation – Codd's rules. **Entity – Relationship (ER) modelling:** ER model – Components of an ER model – ER modelling symbols.

UNIT-III

Data Normalization: Introduction – First Normal Form – Second Normal Form – Third Normal Form – Boyce – Codd Normal Form – Fourth Normal Form – Fifth Normal Form – De-normalization. **Relational Algebra and Relational calculus:** Relational algebra – Relational calculus. **Introduction to Structured Query Language:** Introduction – Characteristics and Advantages of SQL – SQL data types and Literals – Types of SQL commands – SQL operators – Arithmetic, Comparison, Logical operators - Set operators – Operator precedence.

UNIT-IV

Tables: Tables. **Aggregate functions:** General rules – count and count (*) – sum() –

avg() – max() – min(). **Insert, Update and Delete operations:** Insert statement – Bulkinsertsofdata-Updatestatement–Deletestatement.

UNIT-V

Cursors: Introduction – Cursor operations – Cursor positions – Cursor coding guidelines. Joins **and Unions:** Joins – Unions. **Triggers:** What is a Trigger – Types of triggers – Trigger syntax – Combining Trigger types – Setting inserted values – Enabling / Disabling, Replacing and Dropping Triggers – Advantages and disadvantages of triggers.

Text Book:

1. Alexis Leon and Mathews Leon, **Database Management Systems**, LeonVikas publishing, New Delhi, 1999.

   Unit I - Chapter 1, 3, 5
   Unit II – Chapter 7, 9
   Unit III - Chapter 11, 12, 14
   Unit IV - Chapter 15, 18, 19
   Unit V- Chapter 20, 21, 25

Reference Books:

1. Abraham Silberschtz, Henry F. Korth, S.Sudershan, **Data Base System Concepts**, 4th Edition, McGraw Hill International Editions, New Delhi, 2002.

2. Date C.J., **An Introduction to Database Systems Vol.1**, Narosha Publishing House, New Delhi, 1995.

OPERATING SYSTEM

Class	**: BCA**	**Part III**	**: Core**
Semester	**: V**	**Hours**	**05**
Subject Code: 16UCAC53		**Credits**	**04**

Course Outcomes

CO1 To gain knowledge about Operating System, Memory Management and Scheduling Concepts.

CO2 To study about the basics of OS,.

CO3 To understand the concept of Process Management, Synchronization, Memory Management and File Management.

UNIT-I

Operating System Overview: Operating System Objectives and Functions – The Evolution of Operating Systems – Major Achievements – Developments Leading to Modern Operating Systems –Microsoft Windows Overview – Traditional UNIX Systems – Modern UNIX Systems – Linux.

UNIT-II

Operating System – Functions and Structure: Different Services of the Operating System – Operating System Structure – Booting. **Information Management:** The File System - Device Driver (DD).

UNIT-III

Process Management: What Is A Process? – Evolution of Multiprogramming – Context Switching – Process States – Process State Transitions – Operations on a Process.

UNIT-IV

Memory Management: Introduction – Single Contiguous Memory Management – Fixed Partitioned Memory Management – Variable Partitions – Non-contiguous Allocation – General concepts - Paging – Segmentation – Combined Systems – Virtual Memory Management Systems.

UNIT-V

Distributed Processing, Client/Server and Clusters: Client/Server Computing – Distributed Message Passing- Remote Procedure Calls – Clusters –Windows Cluster server – Sun Cluster – Beowulf And Linux Clusters.

Text Books:

1. William Stallings, **Operating Systems Internals and Design Principles**, 5th Edition, PHI, New Delhi,2005.

Unit-I   : Chapter 2.1 - 2.8.

Unit-V   : Chapter 14.1 - 14.7.

2. AchyutGodbole, **Operating Systems,** 2nd Edition, TMH,New Delhi,2008.

Unit-II   : Chapter 3.2, 3.7, 3.9, 4.2, 4.3.

Unit-III   : Chapter 5.2-5.6, 5.9.

Unit-IV   : Chapter 8.1-8.9.

Reference Books:

1. Milan Milankovic, **Operating Systems Concepts and Design**, 2nd Edition, TMH,New Delhi,2005.

2. Andrew S. Tanenbaum, **Modern Operating Systems**, 2nd Edition, PHI,New Delhi,2007.

3. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, **Operating System Principles**,7th Edition, Wiley India, 2006.

VB .NET PROGRAMMING AND RDBMS – LAB

Class	: BCA	**Part III**	: Core
Semester	V	**Hours**	: 06
Subject Code : 16UCACP5		**Credits**	: 05

Course Outcomes

CO1 To learn knowledge about the windows based applications using standard controls

CO2 To gain knowledge about the methodologies behind VB.Net and ASP.Net and helps the students to develop Dot Net based application using ADO.NET and SQL Managed Provider-OLEDB Managed Provider.

CO3 To create a database and query it using Pl/SQL, design forms and generate reports. Understand the significance of integrity constraints, referential integrity constraints, triggers, assertions.

Develop programs based on the following concepts

Console Application

1. Check the case of the character
2. Check the vowels

Windows Application
1. String operation
2. Menu editor
3. Calculator
4. Calendar control
5. Timer based quiz
6. File and directory controls
7. ADO control
8. DAO control
9. Display records using data grid views
10. Add, edit and modify data grid

PL/SQL

1. DDL, DML, TCL commands and aggregate functions
2. Function and procedures
3. Package
4. Triggers
5. Cursors

OPERATING SYSTEM – LAB

Class   : BCA   **Part III**   : Core
Semester   : V   **Hours**   02
Subject Code : 16UCASP5   **Credits**   02

Course Outcomes

CO1   To gain knowledge about the methodologies behind CPU scheduling and algorithms like FCFS,SJF.

CO2   To provide necessary skills for developing and debugging programs in page replacement algorithms like FIFO,LRU

CO3   To learn knowledge about the memory management

1. Simulate the following CPU Scheduling Algorithms

     a) FCFS

     b) SJF

     c) Priority

     d) Round Robin

2. Simulate MVT and MFT

3. Simulate all Page Replacement Algorithms

     a) FIFO

     b) LRU

4. Simulate Paging Technique of Memory Management

DATA MINING AND WAREHOUSING

Class	**: BCA**	**Part III**	**: Elective**
Semester	**: V**	**Hours**	**05**
Subject Code: 16UCAE51		**Credits**	**04**

Course Outcomes

CO1 To understand Data warehousing architecture, OLAP operations and Schema.

CO2 To learn Basic concepts and introduction to techniques in Data Mining and Knowledge Discovery.

CO3 To study both basic and advanced techniques for finding interesting data patterns hidden in large data sets.

UNIT - I

Data Warehousing: Introduction –Datawarehouse architecture – Dimensional modelling – Categorisation of hierarchies – Aggregate function – Summarisability– OLAP operations.

UNIT - II

Data mining: What is data mining? – Data mining Definitions – KDD vs Data mining – DBMS vs DM – Other related areas – DM techniques – Other mining problems – Issues and challenges in DM – DM application areas – DM applications – Case studies.

UNIT – III

Association Rules: What is an association rule – Methods to discover association rules - Apriori algorithm – Partition algorithm – Rapid Association Rule Mining (RARM).

UNIT - IV

Clustering techniques: Clustering Paradigms – Partitioning algorithms – K-Medoid Algorithms - CLARA – CLARANS – Hierarchical clustering DBscan – Categorical clustering algorithm – STIRR. **Decision trees:** What is a decision tree?-Tree construction principle – Best split –Splitting indices – Splitting Criteria – Decision tree construction algorithms – CART – ID3–C4.5.

UNIT - V

Web mining: Introduction – Web mining – Web content mining – Web structure mining – Web usage mining – Unstructured text.

Text Book:

Arun K. Pujari, **Data mining techniques**, Universities Press, Third edition,
Hyderabad, 2013.

Unit 1 : Chapter 2 Section 2.1-2.6, 2.8

Unit 2 : Chapter 3 Section 3.2-3.11

Unit 3 : Chapter 4 Section 4.2-4.5,4.10

Unit 4 : Chapter 5 Section 5.2-5.8,5.11,5.12

Chapter 6 Section 6.2-6.10

Unit 5 : Chapter 10 Section 10.1-10.5, 10.7

Reference Books:

1. M. H. Dunham, **Data Mining: Introductory and Advanced
Topics**, Pearson Education,New Delhi, 2001.

2. D. Hand, H. Mannila and P. Smyth, **Principles of Data Mining**, Prentice-Hall,New
Delhi, 2001

MOBILE COMPUTING

Class	: BCA	**Part III**	: Elective
Semester	: V	**Hours**	05
Subject Code	: 16UCAE52	**Credits**	04

Course Outcomes

CO1 To understand the architecture, application and services of mobile computing.

CO2 To learn the architecture of Global System for Mobile communication.

CO3 To study the 802.11 standards, WAP architecture.

UNIT - I

Introduction: Mobility of Bits & Bytes – Wireless – The Beginning – Mobile Computing – Dialogue Control – Networks – Middleware and Gateways – Application and Services – Developing mobile computing applications – Security in mobile computing: **Mobile computing architecture:** Internet – The ubiquitous network – Architecture for mobile computing – Three-tier architecture – Design considerations for mobile computing – Mobile computing through internet.

UNIT - II

Mobile computing through telephony: Evolution – Multiple access procedures – Satellite communication systems – Mobile computing through telephone – developing an IVR application – Voice XML – TAPI – Computer supported telecommunication application. **Emerging Technologies:** Introduction – Bluetooth – RFID – Wireless broadband – IPV6 – Java card.

UNIT - III

Global System for mobile communications(GSM): GSM – Architecture – Entities – Call routing – PLMN interfaces – GSM addresses & identifiers – Network aspects – Mobility management – GSM frequency allocation – Personal communication service – Authentication & security . **General Packet Radio Service (GPRS):** Introduction – GPRS & Packet data network – Network architecture – Network operations – Data Services – Applications – Limitations – Billing & Charging – EDGE.

UNIT - IV

Wireless Application Protocol (WAP): Introduction – WAP – MMS – GPRS – Applications. **CDMA – and 3G:** Spread Spectrum Technology – IS-95 – CDMA versus GSM – Wireless data – Third generation networks - Applications on 3G.

UNIT - V

Wireless LAN: Advantages – IEEE 802.11 standards – Architecture – Mobility – Deploying – Mobile Ad hoc networks and Sensor networks – Security – Wireless access in Vehicular environment - Wireless local loop – Hiper LAN – WIFI versus 3G. **Security Issues in mobile computing:** Information Security – Security techniques and algorithms – Protocols – Public key infrastructure – Trust – Security models – Frameworks for mobile environment.

Text Book:

Asoke k Talukder, Hasan Ahmed, Rooopa R Yavagal, **Mobile Computing - Technology, Applications and Service Creation**, Second Edition, Tata McGraw Hill, 2012

Unit I – Chapters 1, 2

Unit II – Chapters 3, 4

Unit III – Chapters 5, 7

Unit IV – Chapters 8, 9

Unit V – Chapters 10, 20

Reference Books:

1. Jochen Schiller, **Mobile Communications**, 2nd Edition, Pearson Education, Delhi, 2003.

2. William Stallings, **Wireless Communications and Networks**, 2nd Edition, Pearson

Education, Delhi, 2004.

DIGITAL IMAGE PROCESSING

Class	**: BCA**	**Part III**	**: Elective**
Semester	**: V**	**Hours**	**05**
Subject Code: 16UCAE53		**Credits**	**04**

Course Outcomes

CO1 Develop an overview of the field of image processing.
CO2 Prepare to read the current image processing research literature.
CO3 Gain experience in applying image processing algorithms to real problems.

UNIT I

Digital Image Fundamentals: Elements of visual perception - Image sensing and acquisition - Image sampling and Quantization - Some basic relationships between pixels.

UNIT II

Intensity Transformation and Spatial Filtering: Background – Some basic intensity transformation functions – Histogram processing – Fundamentals of spatial filtering – Smoothing spatial filters – Sharpening spatial filters.

UNIT III

Image Restoration and Reconstruction: A model of the image degradation/ restoration process – Noise models – Restoration of the presence of noise only – Spatial filtering – Periodic noise reduction by frequency domain filtering – Inverse filtering - Geometric mean filter.

UNIT IV

Image Compression: Fundamentals – Some basic compression methods – Digital image watermarking.

UNIT V

Image Segmentation: Fundamentals – Point, line and edge detection – Thresholding – Region based segmentation – Segmentation using morphological watersheds.

Text book:

Rafael C. Gonzalez, Richard E. Woods, **Digital Image Processing**, Pearson,

Third Edition, New Delhi, 2009.

Unit 1: Chapter 2 –Section : 2.1 ,2.3- 2.5

Unit 2: Chapter 3 –Section : 3.1 - 3.6

Unit 3: Chapter 5 –Section : 5.1 - 5.4, 5.7, 5.10

Unit 4: Chapter 8 –Section: 8.1 - 8.3

Unit 5: Chapter 10 –Section: 10.1 – 10.5.

Reference books:

1. Anil K. Jain, **Fundamentals of Digital Image Processing,** Pearson,New Delhi, 2002.

2. Kenneth R. Castleman, **Digital Image Processing,** Pearson,New Delhi, 2006.

3. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, **Digital Image Processing using**

   MATLAB, Pearson Education, Inc., 2004.

DATA STRUCTURES

Class	: BCA	**Part III**	: Core
Semester	: VI	**Hours**	05
Subject Code	: 16UCAC61	**Credits**	04

OBJECTIVES

CO1   To learn the Principles and its Concepts.

CO2   To learn the Data Structure Fundamentals.

CO3   To understand the various Data Structure Algorithms for Sorting and Searching.

UNIT - I

Introduction to Data Structures: Introduction –Data and information– overview of data structure –Types of data structure– primitive, non-primitive data structure and operations.: Introduction-characteristic of array-one-dimensional array-operation with arrays-Two-dimensional arrays-strings-Array of structure.

UNIT - II

Stacks and Queues: Introduction-Stack related terms-Stack implementation-operation on stack-pointers and stack-Representation of arithmetic expressions-infix, prefix and postfix notations- Conversion of expression from infix to postfix. **Queues:** Introduction-various positions of queues-queue implementation-operation on queues –insertion and deletion operation-types of queues.

UNIT – III

Static List and Linked List: Introduction –Implementation of list-Traversal of list-searching and retrieving and element-predecessor and successor-Insertion, Deletion-Sorting-Linked List-important terms-memory allocation and de-allocation-operation on linked list-singly linked list-linked list with header and without header-insertion in the linked list-circular linked list-Doubly linked list.

UNIT – IV

Sorting and Searching: Introduction-sorting-insertion sort-selection sort-bubble sort-quick sort- Heap sort - Radix sort. **Searching:** Introduction-Linear search- Binary search.

UNIT - V

Trees: Introduction-basic terms-binary tree-complete binary tree-Binary tree representation-operation on binary tree-traversal of a binary tree-conversion of expression into postfix. **Graph:** Introduction-Graph-terminology of graph-graph representation-traversal in graph-spanning trees.

Text book:

Ashok N. Kamthane, **Introduction to Data Structure in C,** Pearson Education, New Delhi, 2004.

Unit I	:	Chapter 1	Section: 1.1-1.5
		Chapter 2	Section:2.1-2.8
Unit II	:	Chapter 4	Section:4.1-4.7,4.9
		Chapter 5	Section:5.1-5.8
Unit III	:	Chapter 6	Section:6.1-6.17,6.24,6.26
Unit IV	:	Chapter 10	Section:10.1-10.6,10.9,10.10
		Chapter 11	Section:11,1-11.4
Unit V	:	Chapter 8	Section:8.1-8.4,8.6-8.11,8.14
		Chapter 9	Section:9.1-9.5

Reference Books:

1. Jean Paul Trembly& Paul G.Sorenson, **Introduction to Data structures with applications**, Second Edition, TMH. New Delhi, 1984.
2. Langsam, Augenstein and Tenenbaum, **Data structures using C and C++,** PHI, New Delhi,2002.

SOFTWARE ENGINEERING

Class	**: BCA**	**Part III**	**: Core**
Semester	**VI**	**Hours**	**: 05**
Subject Code : 16UCAC62		**Credits**	**: 04**

Course Outcomes

CO1 To understand the concept of software development process.

CO2 To learn Software Cost estimation techniques and Software Design concept.

CO3 To realize the Quality assurance and Software Maintenance.

UNIT I

Introduction to Software Engineering: Some Definitions – Some Size Factors - Quality and Productivity Factors - Managerial Issues . **Planning a software project:** Defining the problem - Developing a Solution Strategy - Planning the Development Process - Planning an Organizational structure - Other Planning Activities.

UNIT II

Software Cost Estimation: Software cost factors - Software Cost Estimation Techniques - Staffing-level Estimation - Estimating Software Maintenance Costs. **The Software Requirements Specification:** The Software Requirements Specification - Formal Specification Techniques - Languages and Processors for Requirements Specification.

UNIT III

Software design: Fundamental Design Concepts - Modules and Modularization Criteria - Design Notations - Design Techniques - Detailed Design Considerations - Real-Time and Distributed System Design - Test Plans - Milestones, walkthroughs, and Inspections.

UNIT IV

Implementation issues: Structured Coding Techniques - Coding Style - Standards and Guidelines - documentation guidelines -Type Checking - Scoping Rules - Concurrency Mechanisms.

UNIT V

Verification and Validation Techniques: Quality Assurance - Walkthroughs and Inspections - Static Analysis - Symbolic Execution - Unit Testing and Debugging - System Testing - Formal Verification Enhancing Maintainability during Development - Managerial Aspects of Software Maintenance - Source Code Metrics - Other Maintenance Tools and Techniques.

Text Book:

R.Fairley, **Software Engineering Concepts,** Tata McGraw-Hill, reprint 2014.

Unit I	–	Chapters 1, 2
Unit II	–	Chapters 3, 4
Unit III	–	Chapters 5
Unit IV	–	Chapters 6, 7.1, 7.5, 7.7
Unit V	–	Chapters 8, 9.1,9.2,9.4,9.5

Reference Books:

1.R.S.Pressman, **Software Engineering,** Fourth Ed., McGraw Hill, 1997.

2. Ian Sommerville, **Software Engineering,** Ninth Edition, Addison Wesley, 2010.

DATA COMMUNICATIONS AND COMPUTER NETWORKS

Class   : BCA   **Part III   : Core**
Semester   VI   **Hours   : 05**
Subject Code : 16UCAC63   **Credits   : 04**

Course Outcomes

CO1	To understand the concepts of data communications and be familiar with the Transmission media and Tools.
CO2	To study the functions of OSI layers and know IEEE standards in computer networking.
CO3	To get familiarized with different protocols and network components.

UNIT I

Introduction: Why study Data communications – Networks – Protocols and standards – Standards organizations. **Basic concepts:** Line configuration – Topology – Transmission mode – categories of networks – Internetworks – Key terms and concepts. **The OSI model:** The model – Functions of the layers – TCP/IP protocol suite.

UNIT II

Transmission media: Guided Media Unguided media – Transmission impairment – Performance – Wavelength – Shannon capacity – Media comparison. **Error detection and correction:** Types of Errors – Detection – Vertical Redundancy Check (VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) – Checksum – Error correction.

UNIT III

Data Link control: Line discipline – Flow control – Error control. **Data Link Protocols:** Asynchronous Protocols − Synchronous Protocols −Character oriented Protocols −Bit oriented Protocols. **Local Area Networks:** Project 802 Ethernet – Other Ethernet networks – Token Bus – Token Ring.

UNIT IV

Switching: Circuit switching – Packet switching – Message Switching. **Networking and Internetworking devices:** Repeaters - Bridges – Routers - Gateways – Other devices – Routing Algorithms – Distance Vector Routing – Link State Routing.

UNIT V

TCP/IP Protocol Suite: Overview of TCP/IP – Network Layer – Addressing – Sub netting – Other Protocols in the Network Layer– Transport Layer. **Application Layer:** Client/Server Model – Bootstrap protocol (BOOTP) and Dynamic Host Configuration Protocol (DHCP) – Domain Name System (DNS) – Telnet – File Transfer Protocol (FTP) – Trivial File Transfer Protocol (TFTP) – Simple Mail Transfer Protocol (SMTP) – Simple Network Management Protocol (SNMP) – Hyper Text Transfer Protocol (HTTP) World Wide Web (WWW) .

Text Book:

Behrouz A.Forouzan, **Data Communications and Networking,** Tata McGraw Hill Publishing Company Limited, New Delhi, Second Edition Reprint 2006.

Unit I: Chapter 1, 2, 3

Unit II: Chapter 7.1 to 7.7, 9.1 to 9.7

Unit III: Chapter 10, 11.1 to 11.4, 12.1 to 12.5

Unit IV: Chapter 14, 21

Unit V: Chapter 24, 25

Reference Books:

1. Andrew S.Tanenbaum, **Computer Networks**, Prentice Hall of India Pvt Ltd., New Delhi, Fourth
   Edition,2004.

2. Brijendra Singh, **Data Communications and Computer Networks**, PHI Pvt Ltd., New Delhi, Third Edition, 2011.

PHP - LAB

Class	**: BCA**	**Part III**	**: Core**
Semester	**: VI**	**Hours**	**04**
Subject Code	**: 16UCACP9**	**Credits**	**04**

Course Outcomes

CO1 To know the features and syntax of programming language PHP

CO2 To develop applications in PHP using various concepts like arrays, Sessions, Cookies.

CO3 To make the students to understand and to establish the connectivity between PHP and MySQL and develop programs to add records, retrieve records and delete records from a table.

Develop Application Using PHP

1. Creating simple webpage using PHP

2. Use of conditional statements in PHP

3. Use of looping statements in PHP

4. Creating different types of arrays

5. Creating user defined functions

6. File manipulation using PHP

7. Creation of sessions

8. Creation of cookies

9. Creating simple applications using PHP

10. Database connectivity in PHP with MySQL

11. Validating Input

12. Formatting the Output.

PROJECT WORK AND VIVA – VOCE

Class   **: BCA**   **Part III**   **: Core**
Semester   **VI**   **Hours**   **: 04**
Subject Code : 16UCAPR1   **Credits**   **: 04**

Course Outcomes

CO1 The Project Lab is one that involves practical work for understanding   and solving problems in the field of computing.

CO2 Students will select individually Commercial or Technical Project based   on Application Development Technologies.

CO3 With the known technologies they can develop the software.

NETWORKING – LAB

Class	**: BCA**	**Part III**	**: Core**
Semester	**VI**	**Hours**	**: 02**
Subject Code : 16UCASP6		**Credits**	**: 02**

Course Outcomes

CO1   To gain knowledge about the different types of network cables and devices
CO2   To learn knowledge to connect the computers in local area network
CO3   To know about Network IP address, protocols, topologies

1. Study of different types of Network cables and Practically implement the cross-wired cable and straight through cable using clamping tool.

2. Study of Network Devices in Detail.

3. Study of network IP.

4. Connect the computers in Local Area Network.

5. Study of basic network command and Network configuration commands.

6. Configure a Network topology using packet tracer software.

7. Configure a Network topology using packet tracer software.

8. Configure a Network using Distance Vector Routing protocol.

9. Configure Network using Link State Vector Routing protocol.

SECURITY IN COMPUTING

Class	**: BCA**	**Part III**	**: Elective**
Semester	**: VI**	**Hours**	**05**
Subject Code	**: 16UCAE61**	**Credits**	**04**

Course Outcomes

CO1   To illustrate the students how to control the access to information by unauthorized parties.

CO2   To indicate risks involved in security in computing

CO3   To know about program security and database security.

UNIT I

Is there a security problem in Computing: What does "secure" mean – Attacks – The meaning of Computer Security- Computer Criminals – Methods of Defence.

UNIT II

Program Security: Secure Programs - Non-malicious Programs Errors – Viruses and Other Malicious Code – Targeted Malicious Code

UNIT III

Protection in General-Purpose Operating Systems: Protected Objects and Methods of Protection – Memory and Address Protection – Control of Access to General Objects – File Protection Mechanisms – User Authentication. Designing Trusted Operating Systems: What is Trusted System – Models of Security –Trusted Operating System Design.

UNIT IV

Database Security: Security Requirements – Reliability and Integrity - Sensitive Data – Inference – Multilevel Databases – Proposals for Multilevel Security.

UNIT V

Security in Networks: Network Concepts – Threats in Network –Firewalls – Intrusion Detection Systems- Secure E-mail. Legal and ethical issue in computer security: Protecting program and data -Information and the law - Computer crime.

Text Book:

Charles P.Pfleeger, Shari Lawrence Pfleeger and Deven Shah, **Security in Computing,** Forth

Edition, Dorling Kindersley Pvt. Ltd., New Delhi, 2009.

Unit I : Chapter 1.1 to 1.5

Unit II : Chapter 3.1 to 3.4

Unit III: Chapter 4.1 to 4.5, 5.1, 5.3, 5.4

Unit IV: Chapter 6.2 to 6.7

Unit V : Chapter 7.1, 7.2, 7.4 to 7.6

Chapter 11.1,11.2,11.5

Reference Books:

1. Bruce Schneier, **Applied Cryptography,** John Wiley & Sons Inc, 2001.

2. Michael E. Whitma, **Principles of Information Security**, Fifth Edition, Cengage Learning, 2014.

MOBILE COMMERCE

Class	: BCA	Part III	: Elective
Semester	: VI	Hours	05
Subject Code	: 16UCAE62	Credits	04

Course Outcomes

CO1   To study the scope of Mobile Commerce and the difference between E-commerce and M-Commerce.

CO2   To understand the Mobile access technology and Mobile Devices.

CO3   To learn the applications of Mobile commerce.

UNIT I

Introduction to Mobile Commerce – Mobile Commerce – Scope of Mobile Commerce – Content Management – Technology Infrastructure – Application Development – Business Service Infrastructure – Mobile commerce Business Models – M-Commerce Applications – Mobile Payments – E-Commerce vs M-Commerce – Impact of M-Commerce. Mobile Commerce Services: M-Commerce services – Types of Services – Mobile Portal – Google/Yahoo/AOL/MSN Mobile – Relevance of M-Commerce in Modern Society.

UNIT II

Mobile Commerce Application: In Industry – Financial Sector – Retail Sector – Telecommunication Sector – Entertainment sector – Mobile Application development – Software Platforms – Software Tools. Wireless and mobile Communication: Communication Systems – Analog Communication Systems – Digital Communication Systems – Wireless Communication – Wireless Services – Spectrum Allocation – Wireless Systems – Satellite Communication – Categories – Global satellite – Mobile Communication Systems – Broadband Technology – Wireless broadband Internet – Wireless Application Protocol(WAP)>

UNIT III

Mobile Access Technology: Standards – Evolution – GSM – GPRS – EDGE – CDMA – GSM vs CDMA – 3G Systems – IMT-2000 Standards. Mobile Devices: Types of Mobile Devices – Mobile Computers – Laptops – Wearable Computers –

Carputers – Ultra Mobile PC – Mobile Internet Device – PDA – Portable media player – Pager – Tablet – Mobile phone – RIM.

UNIT IV

Mobile Banking: M-Banking Business Models – M-Banking Technologies – M-Banking Services – Advantages – Challenges – M-Banking Applications. Tickets on Mobile: Mobile ticketing – Mobile ticketing process – Applications of Mobile tickets – Travel ticketing – Event ticketing – Advantages – Value-Addes Services – Privacy and Security Issues – Mobile Ticketing Apps – Mobile Ticket Providers.

UNIT V

Mobile Payment: Characteristics – Payment Models – Types of Payments – Mobile Wallets – Security issues – Mobile payment service providers – Future of M-Commerce: Mobile payment applications – Mobile shopping – Mobile social networking – Mobile Fraud detection – Future Issues. Case Studies: Mobile Shopping – Mobile Business Intelligence – Mobile Education.

Text Book:

Karabi Bandyopadhyay, **Mobile Commerce ,** PHI, 2013.

Unit I   - Chapter 1, 2.

Unit II - Chapter 3, 4.

Unit III- Chapter 6, 8.

Unit IV- Chapter 10, 11.

Unit V - Chapter 12, 16, 17.

Reference Books:

1. June Wei, **Mobile Electronic Commerce**, CRC Press, 2014.

2. Paul May, **Mobile Commerce**, Cambridge University Press, 2001.

SOFTWARE TESTING

Class	**: BCA**	**Part III**	**: Elective**
Semester	**: VI**	**Hours**	**05**
Subject Code	**: 16UCAE63**	**Credits**	**04**

Course Outcomes

CO1 To learn the principles of testing

CO2 To understand various types of testing.

CO3 To understand the software test metrics and Automation..

UNIT-I

Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing – Structural Testing –Challenges in White-Box Testing.

UNIT-II

Black-Box Testing: What is Black-Box Testing? - Why Black-Box Testing? – When to do Black-Box Testing? – How to do Black-Box Testing? – Challenges in White Box Testing - Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase f Testing – Scenario Testing – Defect Bash.

UNIT-III

System and Acceptance Testing: system Testing Overview – Why System testing is done? – Functional versus Non-functional Testing - Functional testing - Nonfunctional Testing – Acceptance Testing – Summary of Testing Phases.

UNIT-IV

Performance Testing: Factors governing Performance Testing – Methodology of Performance Testing – tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing: What is Regression Testing? – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

UNIT-V

Test Planning, Management, Execution and Reporting: Test Planning – Test Management – Test Process – Test Reporting –Best Practices. Test Metrics and Measurements: Project Metrics – Progress Metrics – Productivity Metrics – Release Metrics.

Text Book:

Srinivasan Desikan & Gopalswamy Ramesh, **Software Testing Principles and Practices,** Pearson Education, 2006.

Unit-I   : 2.1-2.5, 3.1-3.4.

Unit-II   : 4.1-4.4, 5.1-5.5.

Unit-III   : 6 .1-6.7.

Unit-IV   : 7.1-7.6, 8.1-8.5.

Unit-V   : 15.1-15.6, 17.4-17.7.

Reference Books:

1. William E.Perry, **Effective Methods Of Software Testing**, 3rd Edition, Wiley India.

2. Renu Rajani, Pradeep Oak, **Software Testing**, TMH, 2007.