

**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 2015 – 2016 and after)**

## **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)

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Total 75 Marks  
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### 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

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**Total** 75 marks  
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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 x 02=10 Marks
<b>Part –B</b>	
Two questions (‘either .... or ‘ type)	2 x 05=10 Marks
<b>Part –C</b>	
One questions out of two	1 x 10 =10 Marks
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Total	30 Marks
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**Pattern of the Question paper for Environmental Studies & Value Education only) (Internal)**

<b>Part –A</b>	
Four questions (‘either .... or ‘ type)	4 x 05=20 Marks
<b>Part –B</b>	
One question (‘either .... or ‘ type)	1 x 10=10 Marks
	-----
Total	30 Marks
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**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.

**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**Madurai - 4**

**BACHELOR OF COMPUTER APPLICATIONS (BCA)**

**Table 1: COURSE PATTERN**

(Those Who Joined in 2015 – 2016 and after)

<b>Study Component</b>	<b>I Sem.</b>	<b>II Sem.</b>	<b>III Sem.</b>	<b>IV Sem.</b>	<b>V Sem.</b>	<b>VI Sem.</b>	<b>Total Hrs/week</b>	<b>Total Credit</b>	<b>No. of Papers</b>	<b>Total Marks</b>
<b>Part - I Tamil</b>	6(3)	6(3)	-	-	-	-	12	6	2	200
<b>Part - II English</b>	6(3)	6(3)	-	-	-	-	12	6	2	200
<b>Part - III</b>										
<b>Core Subjects/ Elective</b>	5(4) 5(4)	5(4) 5(4)	5(4) 5(4) 5(4)	6(4) 6(4) 5(4) 5(4)	5(4) 5(4) 5(4) 5(4) 5(4)	5(4) 5(4) 5(4) 5(4)	122	96	24	2400
<b>Allied Subject</b>	4(4)	4(4)	4(3)	4(3)			16	14	4	400
<b>Part - IV</b>										
<b>Skill Based Subjects/EVS/ VE/NME</b>	2(2) 2(2)	2(2) 2(2)	2(2) 2(1) 2(2)	2(2) 2(2)			18	17	9	900
<b>Part - V</b>										
<b>Extension Activities</b>						0(1)	0	1	1	100
<b>Total</b>	30 (22)	30 (22)	30 (24)	30 (23)	30 (24)	30 (25)	180	140	42	4200

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**

**MADURAI – 4.**

**(Re-Accredited with ‘A’ Grade by NAAC)**

**CHOICE BASED CREDIT SYSTEM**

**BACHELOR OF COMPUTER APPLICATIONS**

**COURSE STRUCTURE**

**(W.e.f 2015 – 2016 batch onwards)**

<b>SEMESTER - I</b>							
<b>Subject Code</b>	<b>Subjects</b>	<b>No.of Papers</b>	<b>Hours/ Week</b>	<b>Credits</b>	<b>Maximum Marks</b>		
					<b>Int.</b>	<b>Ext.</b>	<b>Total</b>
15UTAG11	Tamil I: IkkalaKavithaiyumSirukathaiyum	1	6	3	25	75	100
15UENG11	English I:Language Through Literature –I	1	6	3	25	75	100
15UCAC11	Digital Principles and Computer Organization	1	5	4	25	75	100
15UCACP1	Digital Electronics – Lab	1	5	4	40	60	100
15UCAA11	Discrete Mathematics	1	4	4	25	75	100
15UCASP1	PC Software – Lab	1	2	2	40	60	100
15UEVG11	EVS	1	2	2	25	75	100
	<b>Total</b>	<b>7</b>	<b>30</b>	<b>22</b>			<b>700</b>

**SEMESTER - II**

Subject Code	Subject	No.of Papers	Hours/ Week	Credits	Maximum Marks		
					Int.	Ext.	Tot.
15UTAG21	Tamil II: IdaikkalaIlakkiyamumPuthin amum	1	6	3	25	75	100
15UENG21	English II: Language Through Literature – II	1	6	3	25	75	100
15UCAC21	Programming and Problem Solving through C	1	5	4	25	75	100
15UCACP2	Programming in C – Lab	1	5	4	40	60	100
15UCAA21	Numerical Aptitude	1	4	4	25	75	100
15UCASP2	Multimedia – Lab	1	2	2	40	60	100
15UVLG21	Value Education	1	2	2	25	75	100
	<b>Total</b>	<b>7</b>	<b>30</b>	<b>22</b>			<b>700</b>

<b>SEMESTER - III</b>							
<b>Subject Code</b>	<b>Subject</b>	<b>No.of Papers</b>	<b>Hours/ Week</b>	<b>Credits</b>	<b>Maximum Marks</b>		
					<b>Int.</b>	<b>Ext.</b>	<b>Tot.</b>
15UCAC31	Programming in C++	1	5	4	25	75	100
15UCAC32	Database Management System	1	5	4	25	75	100
15UCACP3	Programming in C++ - Lab	1	5	4	40	60	100
15UCACP4	Database Management System - Lab	1	5	4	40	60	100
15UCAAA31	Computer based Financial Accounting	1	4	3	25	75	100
15UCAS31	Cryptography	1	2	2	25	75	100
15UCAS32	Soft Skills	1	2	2	25	75	100
15UCAN31	Computer Fundamentals	1	2	2	25	75	100
	<b>Total</b>	<b>8</b>	<b>30</b>	<b>25</b>			<b>800</b>



**SEMESTER - IV**

Subject Code	Subject	No.of Papers	Hours/ Week	Credits	Maximum Marks		
					Int.	Ext.	Tot.
15UCAC41	Visual Basic Programming	1	5	4	25	75	100
15UCAC42	Java Programming	1	5	4	25	75	100
15UCACP5	Visual Basic Programming - Lab	1	5	4	40	60	100
15UCACP6	Java Programming - Lab	1	5	4	40	60	100
15UCAAA1	Cost Accounting	1	4	3	25	75	100
15UCAS41	Biometrics	1	2	2	25	75	100
15UCAS42	PC Maintenance and Troubleshooting	1	2	2	25	75	100
15UCAN41	Computer Applications	1	2	2	25	75	100
15UETN41	NCC	1		1	100	-	100
15UETN42	NSS						
15UETN43	Physical Education						
15UETN44	Red Ribbon Club						
15UETN45	Youth Red Cross Club						
	<b>Total</b>	<b>8</b>	<b>30</b>	<b>25</b>			<b>800</b>

**SEMESTER – V**

Subject Code	Subject	No.of Papers	Hours/ Week	Credits	Maximum Marks		
					Int.	Ext.	Tot.
15UCAC51	Dot net Programming	1	5	4	25	75	100
15UCAC52	Operating System	1	5	4	25	75	100
15UCAC53	Data Structures	1	5	3	25	75	100
15UCACP7	Dot net Programming Lab	1	5	4	40	60	100
15UCACP8	Linux and Shell Programming Lab	1	5	4	40	60	100
15UCAE51	Elective – I Data Mining and Warehousing	1	5	3	25	75	100
15UCAE52	Mobile Computing						
15UCAE53	Digital Image Processing						
	<b>Total</b>	<b>6</b>	<b>30</b>	<b>22</b>	<b>180</b>	<b>420</b>	<b>600</b>

**SEMESTER – VI**

<b>Subject Code</b>	<b>Subject</b>	<b>No.of Papers</b>	<b>Hours/ Week</b>	<b>Credits</b>	<b>Maximum Marks</b>		
					<b>Int.</b>	<b>Ext.</b>	<b>Tot.</b>
15UCAC61	Web Technology	1	5	4	25	75	100
15UCAC62	Software Engineering	1	5	4	25	75	100
15UCAC63	Data Communications and Computer Networks	1	5	4	25	75	100
15UCACP9	Web Design Lab	1	5	4	40	60	100
15UCAPR1	Project Work and Viva – Voce	1	5	4	40	60	100
15UCAE61	Elective – II Security in Computing	1	5	3	25	75	100
15UCAE62	Mobile Commerce						
15UCAE63	Software Testing						
	<b>Total</b>	<b>6</b>	<b>30</b>	<b>23</b>	<b>180</b>	<b>420</b>	<b>600</b>

**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**

**DEPARTMENT OF COMPUTER APPLICATIONS**

**Course Structure – Semester wise CBCS ( w.e.f. 2015 – 2016)**

**Class : BCA**

**Semester : I**

**Sub code : 15UCAC11**



**Part III : Core**

**Hours : 05**

**Credits : 04**

**DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION**

**Objectives**

- To identify various Number systems and Logic gates.
- To analyze various types of flip flops used for designing registers and counters.
- To understand the basic structure and operation of digital computer.
- To expose the students with different ways of communicating with I/O devices and standard I/O interfaces.
- To familiarize the students with hierarchical memory system including cache memories and virtual memory.
- To expose the students to the concept of pipelining.

**Unit – I:**

Digital Logic: Basic Gates – Universal Gates. Combinational Logic circuits: Boolean Laws and Theorems – Associative law – Distributive Law – De margons theorem. Number Systems and Codes: Binary Number system – Binary-to-Decimal Conversion – Decimal to Binary Conversion – Octal Numbers – Octal to Binary Conversion - Hexadecimal Numbers – Hexadecimal to Binary Conversion - ASCII code – Excess-3 codes – Gray codes.

## **Unit – II:**

Arithmetic circuits: Adder – Subtractor. Flip Flops: RS Flip Flop, D Flip Flop, JK Flip Flop, Master Slave Flip Flops. Shift registers: Types of shift registers - Asynchronous and Synchronous counters.

## **Unit – III:**

Basic structure of Computer: Computer types - Functional Units - Historical perspective. Input/Output organization: Accessing I/O devices – Interrupts – DMA – Buses - Interface Circuits - Standard I/O interface.

## **Unit – IV:**

Memory Subsystem: Basic concepts - Semiconductor RAM Memories - Read only memories - Cache memory - Virtual memory - Memory management requirements - Secondary storage.

## **Unit – V:**

Basic Processing Unit: Some fundamental concepts -Execution of a computer instruction - Multiple bus organization - Hardwired control unit - Micro programmed control unit. Pipelining: Basic concept - Data hazards - Instruction hazards - Super scalar operations.

## **Text Books:**

1. A.P. Malvino & D.P Leech, **Digital Principles and Applications**, TMH, New Delhi, 7<sup>th</sup> Edition, 2011.

Unit I : Chapter 2 – Section: 2.1 to 2.5

Chapter 3 – Section: 3.1

Chapter 5– Section: 5.1 to 5.8

Unit II : Chapter 6 – Section : 6.1, 6.2, 6.8

Chapter 8 – Section : 8.1, 8.4, 8.5, 8.7

Chapter 9 – Section: 9.1 to 9.5

Chapter 10 – Section : 10.1 to 10.3

2. C. Hamacher, Z. Vranesic, S. Zaky, **Computer Organization**, McGrawHill, New Delhi, 2002.

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

Chapter 4 – Section: 4.1, 4.2, 4.4 to 4.7

Unit IV: Chapter 5– Section: 5.1 to 5.3, 5.5, 5.7 to 5.9

Unit V : Chapter7 – Section: 7.1 to 7.5

Chapter 8 – Section: 8.1 to 8.3, 8.6

**Reference Books:**

- 1 V.Raja Raman, T.Radhakrishnan, **Computer Organization and Architecture**, PHI, New Delhi,2011.
- 2 M .Morris Mano, **Computer System Architecture**, Pearson Education, New Delhi, 3<sup>rd</sup> Edition, 2013.

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**DEPARTMENT OF COMPUTER APPLICATIONS**  
**Course Structure – Semester wise CBCS ( w.e.f. 2015 – 2016)**

**Class : BCA**  
**Semester : I**  
**Sub code : 15UCACP1**



**Part III : Core**  
**Hours : 05**  
**Credits : 04**

**DIGITAL ELECTRONICS – LAB**

- 1.a) Construct Basic Logic Gates.
- b) Construct Universal Gates.
2. Realization of NOT, OR, AND, XOR, XNOR gates using NAND gates.
3. Realization of NOT, OR, AND, XOR, XNOR gates using NOR gates.
4. Verification of Boolean Law.
5. Verification of De Morgan's theorem.
6. Design Gray to Binary conversion & vice-versa.
7. Construct Adder circuits using IC or logic gates.
8. Construct Subtractor circuits using IC or logic gates.
9. Realization of RS flip flop using Universal logic gates.
10. Realization of JK flip flop using Universal logic gates.
11. Realization of D flip flop using Universal logic gates.
12. Realization of Asynchronous up/down counter.
13. Design 4 bit Registers.
14. Design Digital to Analog converter.

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**DEPARTMENT OF COMPUTER APPLICATIONS**

**Course Structure – Semester wise CBCS ( w.e.f. 2015 – 2016)**

**Class : BCA**

**Semester : I**

**Sub code : 15UCAA11**



**Part III : Allied**

**Hours : 04**

**Credits : 04**

### **DISCRETE MATHEMATICS**

#### **Objectives**

- To understand set theory, relations and functions and to read, understand and construct mathematical arguments.
- To understand recurrence relation, generating functions and algebraic systems and their applications.
- To understand Matrix algebra and Eigen values and Eigen vectors.
- To understand 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 Books:**

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 Books :**

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.

**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**

**DEPARTMENT OF COMPUTER APPLICATIONS**

**Course Structure – Semester wise CBCS ( w.e.f. 2015 – 2016)**

**Class : BCA**

**Semester : I**

**Sub code : 15UCASP1**



**Part IV : Skilled**

**Hours : 02**

**Credits : 02**

**PC SOFTWARE -- LAB**

**WINDOWS**

1. Creating folder and managing file and folder (operations like cut, copy, paste and delete) in windows.
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.
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

## **Microsoft Excel**

1. Creating & Editing Worksheet, Fill Handle.
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 and labels.

## **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.

**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**

**DEPARTMENT OF COMPUTER APPLICATIONS**

**Course Structure – Semester wise CBCS ( w.e.f. 2015 – 2016)**

**Class : BCA**

**Semester : II**

**Sub code : 15UCAC21**



**Part III : Core**

**Hours : 05**

**Credits : 04**

**PROGRAMMING AND PROBLEM SOLVING THROUGH C**

**Objectives**

- To learn to think logically and to write pseudo code or draw flow charts for problems.
- To be exposed to the syntax of C.
- To be familiar with programming in C.
- To learn to use arrays, strings, functions, pointers, structures and unions in C.
- To be familiar with file handling 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: C declarations, Keywords, identifiers, constants, variables, Data types, type conversion, 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, Types of Storage Classes.

## **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 Books:**

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

Unit I : Chapter 1 - Section: 1.1 to 1.4

2. E. Balaguruswamy, **Programming in ANSI C**, TMH, New Delhi, 5<sup>th</sup> Edition, 2011.

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

Chapter 2 – Section: 2.1 to 2.11

Chapter 3 (Full)

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 (Full)

Unit IV: Chapter 10 (Full)

Chapter 11– Section: 1.1 – 11.6.

Unit V : Chapter 12 (Full)

**Reference Books:**

1. Kannelkar Yashavant, **Let us C**, BPB, New Delhi, 6<sup>th</sup> Edition, 2005.
2. Byron Gottfried, **Programming with C**, Schaum's Outlines, TMH, New Delhi, 2<sup>nd</sup> Edition, 2006.

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**DEPARTMENT OF COMPUTER APPLICATIONS**  
**Course Structure – Semester wise CBCS ( w.e.f. 2015 – 2016)**

**Class : BCA**

**Semester : II**

**Sub code : 15UCACP2**



**Part III : Core**

**Hours : 05**

**Credits : 04**

**PROGRAMMING IN C - LAB**

1. To find square root of nos. without using built in function
2. To reverse digits of a number
3. To reverse the given string
4. To check if a number is Prime or not.
5. To exchange the values of two variables using function
6. Solution of a Quadratic Equation.
7. Sum of Series (sine, cosine).
8. Ascending and descending order of numbers using Arrays (Use it to find Largest and Smallest Number).
9. Sorting of names in Alphabetical order.
10. Matrix operations (Addition, Subtraction, Multiplication using functions).
11. To find transpose of matrix
12. Finding factorials, generating Fibonacci Numbers using recursive functions.
13. String manipulations without using string functions (string length, string comparison, string copy, palindrome checking, counting words and lines in strings).
14. Prepare an address book using Structure.
15. To add two numbers using pointer
16. To illustrate the use of bitwise operators
17. To demonstrate the use of command line arguments
18. To read character from one text file; convert into upper case and write in other file.
19. Write a mark sheet program using file
20. Write a payroll program using file

**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**

**DEPARTMENT OF COMPUTER APPLICATIONS**

**Course Structure – Semester wise CBCS ( w.e.f. 2015 – 2016)**

**Class : BCA**

**Semester : II**

**Sub code : 15UCAA21**



**Part III : Allied**

**Hours : 04**

**Credits : 04**

### **NUMERICAL APTITUDE**

#### **Objectives**

- To learn numbers, fractions and surd.
- To be familiar with arithmetic ability.
- To be exposed to logarithms and linear equations.
- 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, 31.

**Reference Books:**

1. AbhijitGuha, **Quantitative Aptitude for Competitive Examinations**,TMH, New Delhi, 4<sup>th</sup> Edition, 2011.

2. Arun Sharma, **How to prepare for Quantitative Aptitude for the CAT**, TMH, New Delhi, 2011.

**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**Course Structure – Semester wise CBCS ( w.e.f. 2015 – 2016)**

**Class : BCA**  
**Semester : II**  
**Sub code : 15UCASP2**



**Part IV : Skilled**  
**Hours : 02**  
**Credits : 02**

**MULTIMEDIA – LAB**

**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.



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Class	: BCA	Part III	: Core
Semester	: III	Hours	: 05
Sub code	: 15UCAC31	Credits	: 04

### PROGRAMMING IN C++

#### Objectives

- To learn the basic knowledge of object oriented programming concepts and techniques.
- To develop skills in writing object oriented C++ programs.
- 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++**, 5<sup>th</sup> 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 11 Section: 11.1 - 11.4, 11.7

### Reference Books:

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

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



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Semester : III Hours : 05  
Sub code : 15UCAC32 Credits : 04

**DATABASE MANAGEMENT SYSTEM**

**Objectives**

- To study about the underlying concepts and functions of relational databases.
- To know about Codd's relational model theory—including relational structures, integrity constraints, data manipulation, 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 – Bulk inserts of data – Update statement – Delete statement.

## **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**, Leon Vikas 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**, 4<sup>th</sup> 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.



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<b>Semester</b>	<b>: III</b>	<b>Hours</b>	<b>: 05</b>
<b>Sub code</b>	<b>: 15UCACP3</b>	<b>Credits</b>	<b>: 04</b>

**PROGRAMMING IN C++ - LAB**

1. Finding the factorial of a given number.
2. Finding the sum of digits of a given number.
3. To check whether the given number is Armstrong or Not.
4. Calculating area of shapes using inline function
5. Displaying the employee details using class
6. Calculating the electricity bill for the user.
7. Calculating simple and compound interest using default arguments.
8. Calculating perimeter of shapes using function overloading.
9. Swapping two class objects using friend function.
10. Finding the smallest of two class object using friend function.
11. Member functions for overloading operator using unary increment operator.
12. Member functions for overloading operator using unary minus operator.
13. Overloading binary operator using friend function.
14. Finding the biggest value of two class objects.
15. Implementing single inheritance.
16. Implementing multiple inheritance.
17. Implementing hierarchical inheritance.
18. Illustrating pointer to an item.
19. Calculating the student mark statement using file.
20. To handle with multiple files.



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<b>Semester</b>	<b>: III</b>			<b>Hours</b>	<b>: 05</b>
<b>Sub code</b>	<b>: 15UCACP4</b>			<b>Credits</b>	<b>: 04</b>

**DATABASE MANAGEMENT SYSTEM - LAB**

1. Create a table for student and find total, average and rank for it using SQL commands.
2. Create a table for employee and find gross pay and net pay using SQL commands.
3. Create a table and apply all the aggregate functions using SQL commands.
4. Create a table and perform arithmetic and comparison operations using SQL commands.
5. Create a PL/ SQL program for Control Statements.
6. Create a PL/ SQL program for implicit cursor.
7. Create a PL/ SQL program for explicit cursor.
8. Create a PL/ SQL program for trigger.
9. Create a PL/ SQL program for system defined exception.
10. Create a PL/ SQL program for user defined exception.
11. Create a PL/ SQL program for function concept.
12. Create a PL/ SQL program for procedure concept.
13. Create a PL/ SQL program for package concept.





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<b>Class</b> : BCA	<b>Part III</b> : Allied
<b>Semester</b> : III	<b>Hours</b> : 04
<b>Sub code</b> : 15UCAA31	<b>Credits</b> : 03

**COMPUTER BASED FINANCIAL ACCOUNTING**

**Objectives**

- To get the Knowledge about the important concepts and characteristics of accounting.
- To study the application of accounting in the general business environment.
- To make the student familiar with generally accepted accounting principles of financial accounting and their applications in business organizations excluding corporate entities.

**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, RadhaSwamy, **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.



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Class : BCA

Part IV : Skill based

Semester : III

Hours : 02

Sub code : 15UCAS31

Credits : 02

### CRYPTOGRAPHY

#### Objectives

- To understand the concepts of cryptography.
- To survey the currently available cryptography algorithms.
- To learn and implement some of the cryptography security.

#### Unit- I

**Introduction to the concepts of Security:** Introduction - The need for security - Security approaches - Principles of Security - Types of Attacks.

#### Unit-II

**Cryptography techniques:** Introduction - Plain text and Cipher text - Substitution techniques-Transposition technique - Encryption and Decryption - Symmetric and Asymmetric key cryptography-Steganography - Possible types of attacks.

#### Unit- III

**Computer based Symmetric key cryptographic algorithms:** Introduction - Algorithm types and modes - An overview of Symmetric key cryptography - Data Encryption Standard (DES).

#### Unit -IV

**Computer based Symmetric key cryptographic algorithms:** RC5 – Blowfish - Advance encryption standard (AES) - **Computer based Asymmetric key cryptographic algorithms:** Introduction - Brief history - Overview of asymmetric key cryptography.

#### Unit -V

**Computer based Asymmetric key cryptographic algorithms:** RSA algorithm- Digital signatures Knapsack Algorithm - Attacks on Digital signatures.

**Text Book:**

1. AtulKahate, **Cryptography and Network Security**, 3<sup>rd</sup> edition, McGraw Hill Education Private Limited, New Delhi, 2013.

Unit 1: Chapter 1(Full)

Unit 2: Chapter 2 Section 2.1-2.7, 2.9

Unit 3: Chapter 3 Section : 3.1 - 3.4

Unit 4: Chapter 3 Section: 3.7 - 3.9,

Chapter 4 Section: 4.1 - 4.3

Unit 5: Chapter 4.Section: 4.4, 4.7, 4.8,4 .10

**Reference Books:**

1. Behrouz A. Frouzan, DebdeepMukhopadhyah, **Cryptography and Network Security**, TMH, New Delhi, 2012.
2. William Stallings, **Cryptography and Network Security: Principals and Practice**, 4<sup>th</sup> Edition, Pearson Education, New Delhi, 2006.



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**Class : BCA** **Part IV : Skill based**  
**Semester : III** **Hours : 02**  
**Sub code : 15UCAS32** **Credits : 02**

**SOFT SKILLS**

**Objectives**

- To develop inter personal skills and be an effective goal oriented team player.
- To develop communication and problem solving skills.
- To re-engineer attitude and understand its influence on behaviour.
- To develop effective presentation and discussion skills.

**Unit- I**

**Soft Skill Development:** Need for soft skill development – What is soft skill development? – Comparison of hard and soft skills – process – importance – Develop and improve your soft skill.

**Unit -II**

**Self-Discovery and Goal setting:** Self-discovery – Difference between wishes, dreams and goals – Why set goals? – Positive affirmation – Test your knowledge.

**Unit -III**

**Communication:** Types – Models – Tools – Team communication – Barriers – Developing Communication

**Unit -IV**

**Public Speaking:** Effective communication – Effective presentation – Strategies for an effective presentation.

**Unit- V**

**Group discussion:** Importance of group discussion – Group – Body language – Skills accessed – Discussion as an argument – Disagreeing with others – techniques – Summarizing – Understanding your objective – Concluding thoughts.

**Text Book:**

1. B.N. Ghosh, **Managing Soft Skills for Personality Development**, TMH, New Delhi, 2012.

- Unit I – Chapter 1(Full)
- Unit II – Chapter 2(Full)
- Unit III – Chapter 6(Full)
- Unit IV – Chapter 7(Full)
- Unit V – Chapter 8(Full)

**Reference Books:**

1. G. Ravindran, S.P. Benjamin Elango and L. Arockiam, **Success through Soft Skills**, ICT, 2007.

2. Robert M Sherfield and et al, **Developing Soft Skills** 4th edition, Pearson Education, New Delhi, 2009.

**Web Sources:**

<http://www.slideshare.net/rohitjsh/presentation-on-group-discussion>

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<b>Class</b> : BCA	<b>Part IV</b> : NME
<b>Semester</b> : III	<b>Hours</b> : 02
<b>Sub code</b> : 15UCAN31	<b>Credits</b> : 02

## **COMPUTER FUNDAMENTALS**

### **Objectives**

- To understand the basics of computer like History, Generation, Characteristics and Applications.
- To learn the basic structure of Computer system.
- To realize peripherals of Computer System.
- To know about the number system.

### **Unit-I**

**Basics of Computer:** Introduction – Digital and Analog computers – Characteristics of Computers – History of Computer – Generation of computers – Classification of Computers – The Computer System – Applications of Computers.

### **Unit-II**

**The Computer System Hardware:** Introduction – Central Processing Unit – Memory Unit – Microprocessor - Interconnecting the Units of a Computer – Performance of a Computer – Inside a Computer cabinet.

### **Unit-III**

**Computer Memory:** Introduction – Memory Representation – Hierarchy – CPU Registers – cache memory - Primary memory – Secondary memory – Magnetic tape – Magnetic Disk – Optical Disk – Magnetic – Optical disk.

### **Unit-IV**

**Input and Output devices:** Introduction – Input-Output Unit – Input devices – Human Data Entry Devices – Source Data Entry Devices – Output Devices – Hard copy devices – Soft copy devices.

## **Unit-V**

**Data Representation:** Introduction – Number System – Conversion – Binary Coding Schemes – Logic gates.

### **Text Book:**

1. Anita Goel, **Computer Fundamentals**, Pearson Education, New Delhi, 2010.

Unit I - Chapter 1(Full)

Unit II - Chapter 2 Section: 2.1 – 2.3, 2.7- 2.10

Unit III- Chapter 3

Unit IV- Chapter 4

Unit V - Chapter 5 Section: 5.1 – 5.6, 5.10, 5.11

### **Reference Books:**

1. G. Manjunath, **Computer Basics**, Vasan Publications, Chennai, 2010.
2. Sanjay Saxena, **A First Course in Computers**, Vikas Publishing House Pvt Ltd., New Delhi, 2003.





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**Class : BCA Part III : Core**  
**Semester : IV Hours : 05**  
**Sub code : 15UCAC41 Credits : 04**

**VISUAL BASIC PROGRAMMING**

**Objectives**

- To improve the extensive programming knowledge required to develop complex applications.
- To inculcate knowledge on Programming and Project Development using Visual Basic.
- To have the capability of creating Windows applications and ActiveX controls.

**Unit -I**

Visual Basic Overview – Creating a project in Visual Basic – Parts of a Visual Basic Project – Project Scope. Visual Basic Development Environment: Overview of IDE – Selecting colors, fonts and font sizes – Aligning and Sizing multiple controls – Using Predefined Forms, Menus and Projects – Adding ActiveX Controls and Insert able objects to projects - Customizing Menus and Toolbars – Setting forms initial positions – Displaying or hiding IDE Windows – Adding and removing Forms.

**Unit -II**

Visual Basic Language – Declaring Constants/Variables – Setting variable scope – Declaring arrays and dynamic arrays – Declaring Subroutines/Functions – Preserving variables values between calls to their Procedures – Strings – Operators – If else – Select case – Looping – Math/Date & Time Functions-Financial Data – Managing Forms – Adding toolbars to forms – Adding status bar to forms – Working with Multiple forms – Creating Dialog Boxes – Message box and Input box

**Unit -III**

Controls in Visual Basic - Text box – Rich Textbox – Label – Command Button – Option Button – Check Box – List Box – Combo Box – Image Objects – Picture Box.

**Unit- IV**

Visual Basic Menus – Menus – Adding a menu to a form – Modifying and deleting menu items – Adding Menu separator – Adding Access Characters – Adding Shortcut keys – Creating Sub menus – Disabling menu items. File Handling and File Controls – Creating/Opening a file – Reading and Writing Sequential file/Random Access File/Binary Files – Saving files from Rich textbox - Drive list – Directory List – File list Box.

## **Unit- V**

Databases: Using DAO, RDO, ADO – What are data bases? – Creating a table with Visual Data Manager – Adding a Data control to a program – Opening a database with Data control – Opening a data base with a Remote data control – Opening a data base with an ADO control.

### **Text Book:**

1. Steven Holzner, **Visual Basic 6 Black Book**, The Coriolis Group, Dream Tech Press, New Delhi, 2000.

Unit I - Chapter 1, 2

Unit II - Chapter 3, 4

Unit III- Chapter 6, 7, 8, 10

Unit IV- Chapter 5, 17

Unit V - Chapter 24.

### **Reference Books:**

1. Gray Cornell, **Visual Basic 6 from the Ground UP**, TMH, New Delhi, 1999.

2. Noel Jerke, **Visual Basic 6, The Complete Reference**, TMH, New Delhi, 1999.



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**Semester : IV** **Hours : 05**  
**Sub code : 15UCAC42** **Credits : 04**

**JAVA PROGRAMMING**

**Objectives**

- To learn the basic functions, principles and concepts of Java Programming.
- To understand the basics of Java Programming.
- 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 – Method Overloading – Static Member – Nesting Of Methods – Inheritance – Overwriting Method – Final Classes Method – Abstract Methods and Classes – Visibility Controls.

**Unit -III**

**Arrays, Strings And Vectors:** One Dimensional Array – Creating Arrays - One 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 – Implementory 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 Right 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 – and 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, 4<sup>th</sup> Edition, 2010.

Unit I: Chapter 1(Full), 2(Full), 3.6-3.7, 3.10-3.11, 4.2, 4.6-4.9

Unit II: Chapter 52-5.12, 6.2-6.8, 7.2- 7.5, 8.2-8.16, 8.18

Unit III: Chapter 9(Full), 10(Full), 11(Full)

Unit IV: Chapter 12(Full), 13(Full), 14(Full)

Unit V: Chapter 15(Full), 16(Full)

### **Reference Books:**

1. P.Radha Krishna, **Object Oriented Programming with Java**, University Press India Private Limited, Hyderabad, 3<sup>rd</sup> Edition, 2008.
2. Debasish Jana, **Java Object Oriented Programming Paradigm**, Prentice Hall of India Private Limited, New Delhi, 3<sup>rd</sup> Edition, 2008.
3. C.Xavier, **Programming with Java**, Scitech Publication India Private Limited, Chennai, 3<sup>rd</sup> Edition, 2004.
4. Herbert Schildt, **Java 2 - The Complete Reference**, TMH, New Delhi, 5<sup>th</sup> Edition, 2005.



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**Class : BCA** **Part III : Core**  
**Semester : IV** **Hours : 05**  
**Sub code : 15UCACP5** **Credits : 04**

**VISUAL BASIC PROGRAMMING - LAB**

1. Write a simple VB program to accept a number as input and convert them into
  - a. Binary
  - b. Octal
  - c. Hexa-decimal
2. Write a simple VB program to add the items to list box with user input and move the selected item to combo box one by one.
3. Write a simple VB program to develop a calculator with basic operation.
4. Design a form such that it accepts a text. Display the number of alphabetic characters, numeric characters and special characters.
5. Create a VB application to make the text bold, italic, underlined and also to color the text (using checkbox, option button, textbox controls)
6. Create a note pad using VB.
7. Design an form using common dialog control to display the font, save and open dialog box without using the action control property.
8. Write a simple program to prepare a Questionnaire.
9. Using a scroll bar display the numbers from 1 to 100 in the textbox depending on the position of the scroll box. The numbers should be continuously as and when the scroll box is moved.
10. Create a VB application that allows the user to change the shape by selecting a particular shape from a list of options from a list box, as well as change its color through a common dialog box.

11. Create a VB application with the following operations: a) To add the text typed in the text box as an entry in the listbox. b) To remove entries from the listbox by pressing the "remove" button.

12. Create a VB application that creates the illusion of moving the jet plane in four directions, North, South, East, and West. And also let the user magnify and diminish the jet plane by changing the height and width properties of the object.

13. Create a VB application using picture box which can do the following operations

- a. To draw a line
- b. To change the color of the line
- c. To change the thickness of the line

14. Create a VB application with Simple login form for a Windows application that checks the entered username and password against a list of usernames and passwords in a database table.

15. Write a VB Program to develop a menu driven program

Add a MDI window in the form and arrange them in the cascading/horizontal style using menus (Create a menu to add form, arrange) (Menu Item 1).

Also change the form color using the menu in another menu item (Menu Item 2).

16. Create a simple application using DAO and ADO Controls,



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**Class : BCA**

**Semester : IV**

**Sub code : 15UCACP6**

**Part III : Core**

**Hours : 05**

**Credits : 04**

**JAVA PROGRAMMING - LAB**

1. Arithmetic operations using switch case
2. Sum of Digits and Reverse of a number
3. Sorting list of numbers.
4. Finding Maximum and Minimum Number
5. Searching the number in the list
6. Perform Armstrong, Perfect number checking
7. Fibonacci series
8. Transpose Matrix using function
9. Sorting the Strings.
10. String Manipulations
11. Calculate Area of circle, rectangle, triangle, square using function overloading.
12. Calculate Area of circle, rectangle using method overloading
13. EB bill calculation using Single Inheritance
14. Student mark list using Multi-level Inheritance.
15. Salary calculation using Interface.
16. String Comparison using Exception Handling.
17. Perform Bank Operation using Package.
18. Perform arithmetic operation using Package
19. Draw basic Symbols using an Applet
20. Drawing a face picture using an Applet.





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**Class : BCA**

**Part III : Allied**

**Semester : IV**

**Hours : 04**

**Sub code : 15UCAA41**

**Credits : 03**

**COST ACCOUNTING**

**Objectives**

- To acquaint the students with basic concepts used in cost accounting and various methods involved in cost ascertainment systems.
- To train the students in finding the cost of products using different methods of costing.
- 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 and 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 and K.L. Narang, **Cost Accounting**, Kalyani Publishers, New Delhi, Reprinted 2011.

2. R.S.N. Pillainand 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.



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)  
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Class : BCA

Semester : IV

Sub code : 15UCAS41

Part IV : Skilled

Hours : 02

Credits : 02

**BIOMETRICS**

**Objectives**

- To understand the state-of-the-art in biometric technologies.
- To survey the currently available biometric system.
- To learn and implement some of the biometrics authentication.

**Unit- I**

**How authentication technology works:** What you Know - What you have - What you are - Multifactor authentication - Subverting the system - Deploying authentication system - Economics of authentication - **How biometrics work:** Why use Biometrics? - Key elements of Biometrics.

**Unit - II**

**Finger print and Hand Geometry:** History of fingerprints. **Hand geometry:** History of Hand geometry. **Facial and Voice Recognition Facial Recognition:** Application – Technologies. **Voice verification:** History- Applications - Other related software resources and technologies.

**Unit - III**

**Eye biometrics:** Iris scanning – Iris Recognition Technology - Applications – Retina scanning –Applications - Signature recognition – Applications - Key stroke dynamics – History - Applications.

**Unit - IV**

**Esoteric biometrics:** Vein pattern – DNA - Facial Thermography - Sweat pores - Hand grip - Fingernail bed - Body odour – Gait – Ear - Skin Luminescence - Brain wave pattern - Footprint and foot dynamics.

**Unit - V**

**Biometrics liveness testing:**Liveness testing – Difficulties. **Biometrics in large scale system:** Documenting the procurement process - Specifying the systems. **Biometrics testing and evaluation:**Best practices for Biometric testing - Types of testing.

**Text Book:**

1. John D. Woodward, Jr. Nicholas M. Orlans, Peter T. Higgins, **Biometrics - The Ultimate Reference**, DreamTech.Publishers, New Delhi, 2003.

Unit 1 : Chapter 1(Full), 2(Full)

Unit 2 : Chapter 3(Full), 4(Full)

Unit 3 : Chapter 5(Full), 6(Full)

Unit 4 :Chapter 7(Full)

Unit 5 :Chapter 8(Full), 9(Full), 11(Full)

**Reference Books:**

1. Paul Reid, **Biometric for Network Security**, Prentice Hall Professional, New Jersey, 2004.

2. Ratha, N.K. Govindaraju, **Advances in Biometrics**, TMH, New Delhi, 2008.



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**Course Structure – Semester wise CBCS (w.e.f. 2015 – 2016)**

<b>Class</b> : BCA	<b>Part IV</b> : Skill based
<b>Semester</b> : IV	<b>Hours</b> : 02
<b>Sub code</b> : 15UCAS42	<b>Credits</b> : 02

**PC MAINTENANCE AND TROUBLESHOOTING**

**Objectives**

To give the knowledge and competency to diagnose the faults

To trouble shoot for systematic repair and maintenance of computers and computer peripherals.

**Unit- I**

**Computer Systems and Peripherals:** The Microcomputer System: Introduction – System configuration – Inside the IBM PC System Unit – Tech tips and Troubleshooting.

**Unit - II**

**Memory Peripherals:** Introduction – Cleaning and Preventive Maintenance – The Winchester Disk Subsystem - Tech tips and Troubleshooting. **Peripheral Devices:** Introduction – Keyboards – Video Displays – Printers - Tech tips and Troubleshooting.

**Unit - III**

**Installation and Servicing:** Introduction – Configurations – Switch settings – Cables and Connectors – Operation – Power-On-Self-Test (POST) – Preventive Maintenance – Customer relations - Tech tips and Troubleshooting.

**Unit - IV**

**Diagnostics and Troubleshooting:** Introduction – Starting the advanced Diagnostics – The Home menu – Diagnostic Test Submenu – Error codes – The Dead Machine – Getting in deep - Tech tips and Troubleshooting.

**Unit - V**

**Test Equipment:** Introduction – Logic Probes and Pulsers – Meters – Oscilloscopes – Logic Analyzer – PROM burners – Power line monitors – The Universal Microcomputer Tester Project – Automatic Test Equipment - Tech tips and Troubleshooting.

**Text Book:**

1. Stuart M. Asser, Vincent J. Stigliano, Richard F. Bahrenburg, **Microcomputer Servicing, Practical Systems and Troubleshooting**, All India Traveler Book Seller, Publishers and Distributors, New Delhi, 1993.

Unit 1 : Chapter6 Section 6.0 - 6.2, 6.10.

Unit 2 : Chapter7 Section 7.0, 7.5 - 7.7,

Chapter 8 Section 8.0 - 8.2, 8.8, 8.11.

Unit 3 : Chapter9 (Full).

Unit 4 :Chapter10 (Full).

Unit 5 :Chapter12 (Full).

**Reference Books:**

1. GovindaRajalu, **IBM PC and Clones: Hardware, Troubleshooting and Maintenance**, 2<sup>nd</sup> Edition, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2008.
2. Mark Minersi, **The Complete PC Upgrade and Maintenance**, 16<sup>th</sup> Edition, Wiley, Dreamtech India Pvt Ltd., New Delhi, 2004.



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**DEPARTMENT OF COMPUTER APPLICATIONS**  
**Course Structure – Semester wise CBCS (w.e.f. 2015 – 2016)**

**Class : BCA**

**Part IV : NME**

**Semester : IV**

**Hours : 02**

**Sub code : 15UCAN41**

**Credits : 02**

**COMPUTER APPLICATIONS**

**Objectives**

- To learn the concept of Internet and services of Internet.
- To study the basics of Multimedia.
- To understand Word and Power point.

**Unit-I**

**Internet and Internet Services:** Introduction – History of the Internet – Internetworking protocol – The Internet Architecture – Managing the Internet – Connecting to Internet – Internet Connections – Internet Address – Internet Services – Uses of Internet.

**Unit-II**

**Multimedia:** Introduction – Definition – Characteristics of Multimedia system – Elements of Multimedia – Multimedia system – Multimedia Applications.

**Unit-III**

**Computer Security:** Introduction – Security threat and Attack - Malicious Software – Hacking – Security Services – Users identification and authentication – Security awareness.

**Unit-IV**

**MS-Word 2007:** Introduction – Starting Word – Screen and its Components – The Office Button - The Ribbon – Examples.

**Unit-V**

**MS-PowerPoint 2007:** Introduction – Basics of PowerPoint – Start MS-PowerPoint – Screen and its components – Office Button – The Ribbon – Examples.

**Text Book:**

1. Anita Goel, **Computer Fundamentals**, Pearson Education, New Delhi, 2010.

Unit I - Chapter 10(Full)

Unit II - Chapter 13(Full)

Unit III- Chapter 14 Section : 14.1 – 14.5, 14.10, 14.12.

Unit IV- Chapter 16(Full)

Unit V - Chapter 18(Full)

**Refernce Books:**

1. Vikas Gupta, **Comdex Computer Course Kit Windows 2007 with Office 2010**, Dream Tech Press, New Delhi, 2011.
2. Vikas Gupta, **Comdex Multimedia and Web Design Course Kit Windows 2007 with Office 2010**, Dream Tech Press, New Delhi, 2012.





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**Class : BCA**  
**Semester : V**  
**Subject Code: 15UCAC51**

**Part III : Core**  
**Hours : 05**  
**Credits : 04**

**DOT NET PROGRAMMING**

**OBJECTIVES**

- To know basic concepts in VB.NET.
- To learn windows forms.
- 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**, 2<sup>nd</sup> 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**, TheCoriolis Group, New Delhi, 2002.



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**Semester : V**  
**Subject Code: 15UCAC52**

**Part III : Core**  
**Hours : 05**  
**Credits : 04**

## OPERATING SYSTEM

### OBJECTIVES

- To gain knowledge about Operating System, Memory Management and Scheduling Concepts.
- To study about the basics of OS, 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**, 5<sup>th</sup> Edition, PHI, New Delhi,2005.

Unit-I : Chapter 2.1 - 2.8.

Unit-V : Chapter 14.1 - 14.7.

2. AchyutGodbole, **Operating Systems**, 2<sup>nd</sup> 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**, 2<sup>nd</sup> Edition, TMH,New Delhi,2005.

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

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



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**Class : BCA**  
**Semester : V**  
**Subject Code: 15UCAC53**

**Part III : Core**  
**Hours : 05**  
**Credits : 03**

## **DATA STRUCTURES**

### **OBJECTIVES**

- To learn the Data Structure Fundamentals, Principles and its Concepts.
- 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 structures–primitive, non-primitive data structures and operations. **Data Structures Arrays:** Introduction-characteristics of arrays-one-dimensional arrays-operation with arrays-Two-dimensional arrays-Three- or multi dimensional arrays-Strings-Array of structures.

### **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-operations on queues -types of queues.

### **UNIT – III**

**Static List and Linked List:** Introduction –Implementation of list-Traversal of list-searching and retrieving an element-predecessor and successor-Insertion, Deletion-Sorting-Merging list-Linked List-important terms-memory allocation and de-allocation-operations 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- searchingLinear search- Binary search.

## UNIT - V

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

### Text book:

Ashok N.Kamthane, **Introduction to Data Structure in C**, Pearson Education, NewDelhi, 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:5.1-5.4, 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:8.1-8.4,8.7-8.10
	Chapter 9	Section:9.1-9.6

### 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.



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**DEPARTMENT OF COMPUTER APPLICATIONS**  
**Course Structure – Semester wise CBCS (w.e.f.2017-2018)**

**Class : BCA**  
**Semester : V**  
**Subject Code: 15UCACP7**

**Part III : Core**  
**Hours : 05**  
**Credits : 04**

**DOT NET PROGRAMMING LAB**

**VB.NET**

1. String operations
2. List box operations
3. Array list operations
4. Constructor overloading
5. Number checking(Adam,Armstrong,Palindrome)
6. Calculator
7. Quiz Application
8. Exception Handling
9. Inheritance
10. Data Grid View
11. ADO control
12. DAO control

**ASP.NET**

1. Login form
2. Date and time function
3. Resume Validation
4. Ad-rotator control





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**Class : BCA**  
**Semester : V**  
**Subject Code: 15UCACP8**

**Part III : Core**  
**Hours : 05**  
**Credits : 04**

**LINUX AND SHELL PROGRAMMING LAB**

1. Execution of various file handling commands.
2. Execution of various directory handling commands.
3. Execution of various basic utility commands.
4. Develop Linux shell script for the following:
  - Implementing control structures.
  - String handling functions like find length, find position of given character, concatenation, comparison, reverse, substring etc.
  - grep commands.
  - awk commands.
  - Count occurrence of a given word in a file.
  - List of users currently logged in.
  - Count no. of lines, words and characters in a file.
5. Develop a shell program to convert all the contents into the uppercase in a particular file
6. Develop a shell program to find the average of the numbers entered in command line.



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**DEPARTMENT OF COMPUTER APPLICATIONS**  
**Course Structure – Semester wise CBCS (w.e.f.2017-2018)**

**Class : BCA** **Part III : Elective**  
**Semester : V Hours : 05**  
**Subject Code: 15UCAE51** **Credits : 03**

**DATA MINING AND WAREHOUSING**

**OBJECTIVES**

- To understand Data warehousing architecture, OLAP operations and Schema.
- To learn Basic concepts and introduction to techniques in Data Mining and Knowledge Discovery.
- 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



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**Course Structure – Semester wise CBCS (w.e.f.2017-2018)**

<b>Class</b>	<b>: BCA</b>	<b>Part III</b>	<b>: Elective</b>
<b>Semester</b>	<b>: V</b>	<b>Hours</b>	<b>: 05</b>
<b>Subject Code:</b>	<b>15UCAE52</b>	<b>Credits</b>	<b>: 03</b>

### **MOBILE COMPUTING**

#### **OBJECTIVES**

- To understand the architecture, application and services of mobile computing.
- To learn the architecture of Global System for Mobile communication.
- 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-Mobile IP – IPV6 – Java card.

### UNIT - III

**Global System for mobile communications(GSM):** GSM – GSM Architecture – GSM Entities – Call routing in GSM – PLMN interfaces – GSM addresses & identifiers – Network aspects in GSM – 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 – Wireless LAN Architecture – Mobility – Deploying – Mobile Ad hoc networks and Sensor networks – Wireless LAN - Security – Wireless access in Vehicular environment - Wireless local loop – HiperLAN – WIFI versus 3G. **Security Issues in mobile computing:** Information Security – Security techniques and algorithms – Security Protocols – Public key infrastructure – Trust – Security models – Security Frameworks for mobile environment.

### Text Book:

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

Unit I – Chapters 1.1 to 1.9, 2.3,2.4,2.5,2.6,2.7

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**, 2<sup>nd</sup> Edition, Pearson Education, Delhi, 2003.
2. William Stallings, **Wireless Communications and Networks**, 2<sup>nd</sup> Edition, Pearson Education, Delhi, 2004.



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**DEPARTMENT OF COMPUTER APPLICATIONS**  
**Course Structure – Semester wise CBCS (w.e.f.2017-2018)**

**Class : BCA** **Part III : Elective**  
**Semester : V Hours : 05**  
**Subject Code: 15UCAE53** **Credits : 03**

**DIGITAL IMAGE PROCESSING**

**OBJECTIVES**

- Develop an overview of the field of image processing.
- Understand the fundamental algorithms and how to implement them.
- Prepare to read the current image processing research literature.
- 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.





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**Course Structure – Semester wise CBCS (w.e.f.2017-2018)**

**Class : BCA**  
**Semester : VI**  
**Subject Code: 15UCAC61**

**Part III : Core**  
**Hours : 05**  
**Credits : 04**

## **WEB TECHNOLOGY**

### **OBJECTIVES**

- To understand the Internet basics and Protocols.
- To learn HTML, CSS and XML.
- To study JSP and scripting language.

### **UNIT-I**

**Introduction:** What is the Internet - Internet Services and Accessibility - Uses of the Internet - Protocols - Web Concepts - Internet Standards. **Internet Protocols:** Introduction –Internet Protocols –Host Names - Internet Applications and Application Protocols.

### **UNIT-II**

**HTML:** Introduction – SGML – Outline of an HTML Document – Head Section – Body Section – HTML Forms. **Javascript:** Introduction – Language Elements – Objects of JavaScript – Other Objects – Arrays. **VBscript:** Introduction – Embedding VBScript Code in an HTML Document – Comments – Variables – Operator – Procedures – Conditional Statements – Looping Constructs – Objects and VBScript – Cookies.

### **UNIT-III**

**Dynamic HTML(DHTML):** Introduction – Cascading Style Sheets (CSS) - DHTML Document Object Model and Collections – Event Handling – Filters and Transitions – Data Binding.

## UNIT-IV

**Extensible Mark-Up Language (XML):** Introduction - HTML vs XML – Syntax of the XML Document – XML Attributes – XML Validation – XML DTD – The Building Blocks of XML Documents – DTD Elements – DTD Attributes - DTD Entities – DTD Validation – XML Namespaces – XML Schema.

## UNIT-V

**Java Server Pages(JSP):** Introduction – Advantages of JSP – Developing first JSP – Components of JSP – Reading Request Information – Retrieving the Data Posted from a HTML File to a JSP File – JSP Sessions – Cookies – Disabling Sessions.

### Text Book:

Gopalan and J. Akilandeswari, **WEB TECHNOLOGY - A Developer's Perspective**, Second Edition, PHI, New Delhi, 2011.

Unit-1 – Chapter 1 Section: 1.1, 1.3 - 1.7, Chapter 2 Section: 2.1 - 2.4.

Unit-2 – Chapter 4 Section: 4.1- 4.6, Chapter 5 Section: 5.1-5.6 and

Chapter 6 Section: 6.1-6.10.

Unit-3 – Chapter 7 Section: 7.1 – 7.6.

Unit-4 – Chapter 8 Section: 8.1 - 8.15.

Unit-5 – Chapter 11 Section: 11.1 -11.9.

### Reference Books

2. Jeffrey C.Jackson, **Web Technologies--A Computer Science Perspective**, Pearson Education, New Delhi,2007.
3. Ivan Bayross, **Web Enabled Commercial Applications Development Using... HTML, JavaScript, DHTML and PHP**, 4th Revised Edition, BPB, New Delhi,2010.



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**Class : BCA**  
**Semester : VI**  
**Subject Code: 15UCAC62**

**Part III : Core**  
**Hours : 05**  
**Credits : 04**

**SOFTWARE ENGINEERING**

**OBJECTIVES**

- To understand the concept of software development process.
- To learn Software Cost estimation techniques and Software Design concept.
- 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.  
**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-Design Guidelines.

**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, New Delhi, 1997 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, New Delhi, reprint 2014.
2. Ian Sommerville,**Software Engineering**, Ninth Edition, Addison Wesley, New Delhi, 2010.



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<b>Semester</b>	<b>: VI</b>	<b>Hours</b>	<b>: 05</b>
<b>Subject Code:</b>	<b>15UCAC63</b>	<b>Credits</b>	<b>: 04</b>

**DATA COMMUNICATIONS AND COMPUTER NETWORKS**

**OBJECTIVES**

- To understand the concepts of data communications.
- To be familiar with the Transmission media and Tools.
- To study the functions of OSI layers.
- To learn about IEEE standards in computer networking.
- 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:

BehrouzA.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.



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**Semester : VI**  
**Subject Code: 15UCACP9**

**Part III : Core**  
**Hours : 05**  
**Credits : 04**

**WEB DESIGN LAB**

1. Create simple web page using various text formats.
2. Create online Application using HTML.
3. Working with List and Tables.
4. Add a simple script using Click event.
5. Image map.
6. Change the color 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.
13. Create a login page with validation
14. Implement a JAVASCRIPT to file with regular expression
15. Demonstrate the following using CSS
  - i. Color and background
  - ii. Font
  - iii. Text
  - iv. Border
  - v. Margin and List



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**Semester : VI**  
**Subject Code: 15UCAPR1**

**Part III : Core**  
**Hours : 05**  
**Credits : 04**

**PROJECT WORK AND VIVA – VOCE**

- The Project Lab is one that involves practical work for understanding and solving problems in the field of computing.
- Students will select individually Commercial or Technical Project based on Application Development Technologies.
- With the known technologies they can develop the software.





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**Semester : VI**  
**Subject Code: 15UCAE61**

**Part III : Elective**  
**Hours : 05**  
**Credits : 03**

**SECURITY IN COMPUTING**

**OBJECTIVES**

- To illustrate the students how to control the access to information by unauthorized parties.
- To indicate risks involved in security in computing.
- To know about program security and database security.
- To learn to design trusted operating system.

**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 a Trusted System – Models of Security – Trusted Operating System Design.

**UNIT IV**

**Database and Data Mining 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:**

1. Charles P.Pfleeger, Shari Lawrence Pfleeger and Deven Shah, **Security in Computing**, Fourth 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, New York, USA, 2001.

2. Michael E. Whitma, **Principles of Information Security**, Fifth Edition, Cengage Learning, BostonUSA, 2015.



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**Semester : VI**  
**Subject Code: 15UCAE62**

**Part III : Elective**  
**Hours : 05**  
**Credits : 03**

**MOBILE COMMERCE**

**OBJECTIVES**

- To study the scope of Mobile Commerce and the difference between E-commerce and M-Commerce.
- To understand the Mobile access technology and Mobile Devices.
- 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:

KarabiBandyopadhyay,**MobileCommerce**, PHI, New Delhi, 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**, Taylor & Francis group, CRC Press, USA,2014.
2. Paul May, **Mobile Commerce**, Cambridge University Press, 2001.



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**Part III : Elective**  
**Hours : 05**  
**Credits : 03**

## **SOFTWARE TESTING**

### **OBJECTIVES**

- To learn the principles of testing and various types of testing.
- 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 of 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 system testing – Non-functional 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:

SrinivasanDesikan&Gopalswamy Ramesh, **Software Testing Principles and Practices**, Pearson Education, New Delhi, 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**, 3<sup>rd</sup> Edition, Wiley India, U.S.A,2006.
2. RenuRajani, Pradeep Oak, **Software Testing**, TMH, New Delhi, 2007.