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 2018-2019 and after)

Eligibility for Admission

Candidates should have passed the Higher Secondary Examination with 10 +2 pattern conducted by the Board of Higher Secondary Education, Govt. of Tamil Nadu or any other Examinations accepted by the Syndicate as equivalent there to and the candidate should have studied +2 level Mathematics with Physics/ Commerce/ Economics as subject of study in the 10 +2 pattern

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 questions paper for the continuous Internal Assessment

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

The components for continuous internal assessment are:

Part –A

Six multiple choice questions (answer all) 6 x01= 06 Marks

Part –B

Two questions (‘either …. or ‘type) 2 x 07=14 Marks

Part –C

One question out of two 1 x 10 =10 Marks

Total 30 Marks

Pattern of the question paper for the Summative Examinations:

Note: Duration- 3 hours

Part –A

Ten multiple choice questions 10 x 01 = 10 Marks

(No Unit shall be omitted; not more than two questions from each unit.)

Part –B

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

(One question from each Unit)

Part –C

Three Essay questions out of five 3 x 10 =30 Marks

(One question from each Unit)

Total 75 Marks

The Scheme of Examination (Environmental Studies and Value Education)

Two tests and their average	--15 marks
Project Report	--10 marks*
Total	--25 marks

** The students as Individual or Group must visit a local area to document environmental assets – river / forest / grassland / hill / mountain – visit a local polluted site – urban / rural / industrial / agricultural – study of common plants, insects, birds – study of simple ecosystem – pond, river, hill slopes, etc.

Question Paper Pattern

Pattern of the Question Paper for Environmental Studies & Value Education only) (Internal)

Part –A

(Answer is not less than 150 words)

Four questions (‘either …. or ‘type) 4 x 05=20 Marks

Part –B

(Answer is not less than 400 words)

One question (‘either …. or ‘type) 1 x 10=10 Marks

Total 30 Marks

Pattern of the Question Paper for Environmental Studies & Value Education only) (External)

Part –A

(Answer is not less than 150 words)

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

(One question from each Unit)

Part –B

(Answer is not less than 400 words)

Three questions out of Five each unit (One question from each Unit) 3 x 15 = 45 Marks

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Total 75 Marks

Minimum Marks for a Pass

40% of the aggregate (Internal +Summative Examinations).

No separate pass minimum for the Internal Examinations.

27 marks out of 75 is the pass minimum for the Summative Examinations.

PROGRAMME EDUCATIONAL OUTCOME (PEOS):

PEO1 Inculcate graduates to pursue variety of careers in IT industries by providing expected domain knowledge

PEO2 Prepare to employ their skill with a strong base for higher Education and research activities in order to cater to the needs of industry and society

PEO3 Excel as socially committed individual by providing technical and soft skills with ethical standards, nurture to be an effective team member, infuse leadership qualities and protect the environment.

PEO4 To be able to adapt to the evolving technical challenges and changing career opportunities.

PROGRAMME OUTCOMES (POs):

PO1 Able to design and develop reliable software applications for social needs and excel in IT enabled services.

PO2 Ability to design, develop algorithms and provide software solutions to cater the industrial needs.

PO3 Ability to use knowledge gained for solving complex problems using Computational sciences.

PO4 Students to communicate effectively and to improve their competency skills to solve real time problems

PO5 Instill ethical responsibilities, human and professional values and make their contribution to the society.

PO6 Ability to function effectively in teams and individually to accomplish a common goal.

PO7 Understand and commit to professional ethics and cyber regulations, responsibilities and norms of professional computing practice.

PROGRAMME SPECIFIC OUTCOMES

PSO1: To understand, analyze and develop software in the areas related to system software, multimedia, web design, big data analytics, networking and algorithms for efficient design of computer-based systems of varying complexities.

PSO2: To apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

PSO3: To employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, with zest for research.

PSO4: To analyze and apply latest technologies to solve problems in the areas of computer applications.

BACHELOR OF COMPUTER APPLICATIONS
(For those who joined in 2018-2019 and after)

COURSE PATTERN

Study Component	I Sem.	II Sem.	III Sem.	IV Sem.	V Sem.	VI Sem.	Total Hrs/week	Total Credit	No. of Papers	Total Marks
Part – I Tamil	6(3)	6(3)	6(3)	6(3)	-	-	24	12	4	400
Part - II English	6(3)	6(3)	6(3)	6(3)	-	-	24	12	4	400
Part – III										
Core Subjects	6(4) 4(4)	5(4) 5(4)	5(4) 5(4)	5(4) 5(4)	6(5) 6(5) 6(5)	5(4) 5(4) 4(4) 4(4)	76	63	15	1500
Elective	-	-	-	-	5(4) 5(4)	5(4) 5(4)	20	16	4	400
Allied Subject	4(4)	4(4)	4(4)	4(4)	-	-	16	16	4	400
Part – IV										
Skill Based Subjects/	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	12	12	6	600
EVS/VE/	2(2)	2(2)	-	-	-	-	4	4	2	200
NME	-	-	2(2)	2(2)	-	-	4	4	2	200
Part – V										
Extension Activities	-	-	-	0(1)	-	-	0	1	1	100
Total	**30 (22)**	**30 (22)**	**30 (22)**	**30 (23)**	**30 (25)**	**30 (26)**	**180**	**140**	**42**	**4200**

SEMESTER – I							
Subject Code	**Subjects**	**No.of Papers**	**Hours/ Week**	**Credits**	**Maximum Marks**		
					Int.	**Ext.**	**Total**
18UTAG11	**பகுதி-Iதமிழ்** **தற்கால கவிதையும் உரைநடையும்**	1	6	3	25	75	100
18UENG11	English-I: Exploring Language Through Literature-1	1	6	3	25	75	100
18UCAC11	**Part III :Core Subject** Digital Computer Fundamentals	1	6	4	25	75	100
18UCACP1	Multimedia – Lab	1	4	4	40	60	100
18UCAA11	**Part III :Allied Subject** Discrete Mathematics	1	4	4	25	75	100
18UCASP1	**Part IV :Skill Subject** PC Software – Lab	1	2	2	40	60	100
18UEVG11	**Part IV : Mandatory** Environmental Studies	1	2	2	25	75	100
	Total	**7**	**30**	**22**	**205**	**495**	**700**

SEMESTER - II

Subject Code	Subject	No.of Papers	Hours/ Week	Credits	Maximum Marks		
					Int.	Ext.	Tot.
18UTAG21	பகுதி-I தமிழ் பக்தி இலக்கியமும் நாடகமும்	1	6	3	25	75	100
18UENG21	English-II: Exploring Language Through Literature-II	1	6	3	25	75	100
18UCAC21	**Part III :Core Subject** Programming in C	1	5	4	25	75	100
18UCACP2	Programming in C – Lab	1	5	4	40	60	100
18UCAA21	**Part III :Allied Subject** Statistical and Numerical Methods	1	4	4	25	75	100
18UCASP2	**Part IV :Skill Subject** Web Programming – Lab	1	2	2	40	60	100
18UVLG21	**Part IV : Mandatory** Value Education	1	2	2	25	75	100
	Total	**7**	**30**	**22**	**205**	**495**	**700**

SEMESTER – III

Subject Code	Subject	No. of Papers	Hours/ Week	Credits	Maximum Marks		
					Int.	Ext.	Tot.
18UTAG31	**Part I: Tamil** காப்பிய இலக்கியமும் சிறுகதையும்	1	6	3	25	75	100
18UENG31	**Part II: English** Exploring Language Through Literature-III	1	6	3	25	75	100
18UCAC31 18UCACP3	**Part III: Core Subject** Data Structures and C++ Data Structures and C++ - Lab	1 1	5 5	4 4	25 40	75 60	100 100
18UCAA31	**Part III: Allied Subject** Computer based Financial Accounting	1	4	4	25	75	100
18UCASP3	**Part IV: Skill Subject** Tally – Lab	1	2	2	40	60	100
18UCAN31	**Part IV: Non-Major Elective** Multimedia - Lab	1	2	2	40	60	100
	Total	**7**	30	22	220	480	700

SEMESTER – IV

Subject Code	Subject	No. of Papers	Hours/ Week	Credits	Maximum Marks		
					Int.	Ext.	Tot.
18UTAG41	**Part I: Tamil** பழந்தமிழ் இலக்கியமும் புதினமும்	1	6	3	25	75	100
18UENG41	**Part II: English** Exploring Language Through Literature-IV	1	6	3	25	75	100
	Part III: Core Subject						
18UCAC41	Java Programming	1	5	4	25	75	100
18UCACP4	Java Programming – Lab	1	5	4	40	60	100
18UCAA41	**Part III: Allied Subject** Cost Accounting	1	4	4	25	75	100
18UCASP4	**Part IV: Skill Subject** Android Application Development – Lab	1	2	2	40	60	100
18UCAN41	**Part IV: Non-Major Elective** Animation Lab	1	2	2	40	60	100
18UEAG40-18UEAG49	Extension Activities	1	0	1	-	100	100
	Total	**8**	**30**	**23**	**320**	**480**	**800**

SEMESTER V

Subject Code	Subject	No. of Papers	Hours / Week	Credits	Maximum Marks		
					Int.	Ext	Tot
18UCAC51	Operating System	1	6	5	25	75	100
18UCAC52	Relational Database Management System	1	6	5	25	75	100
18UCACP5	VB.Net Programming and RDBMS Lab	1	6	5	40	60	100
18UCAS51	Computer Networks	1	2	2	40	60	100
	Elective I						
18UCAE51	Data Mining and Warehousing						
18UCAE52	Web Technology	1	5	4	25	75	100
18UCAE53	Computer Graphics						
	Elective II						
18UCAE54	Internet of Things	1	5	4	25	75	100
18UCAE55	Digital Image Processing						
18UCAE56	Information Security						
	Total	6	30	25	180	420	600

SEMESTER VI

Subject Code	Subject	No. of Papers	Hours / Week	Credits	Maximum Marks		
					Int.	Ext	Tot
18UCAC61	Python Programming	1	5	4	25	75	100
18UCAC62	Software Project Management	1	5	4	25	75	100
18UCACP6	Python Programming Lab	1	4	4	40	60	100
18UCAPR1	Project Work and Viva Voce	1	4	4	40	60	100
18UCASP6	Web Technology Lab	1	2	2	40	60	100
	Elective I						
18UCAE61	Big Data Analytics						
18UCAE62	Cloud Infrastructure and Services	1	5	4	25	75	100
18UCAE63	Machine Learning Algorithm						
	Elective II						
18UCAE64	Cryptography	1	5	4	25	75	100
18UCAE65	Software Testing						
18UCAE66	Mobile Computing						
	Total	7	30	26	220	480	700

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme	**: BCA**	**Part III**	**: CORE**
Semester	**: V**	**Hours**	**: 06**
Subject Code	**: 18UCAC51**	**Credits**	**: 05**

OPERATING SYSTEMS

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Define Operating System, its components and Goals, basic concepts, structure and functions of operating systems

CO2 Explain the mutual exclusion primitives, semaphores and concurrent programming.

CO3 Implement processor scheduling, deadlock prevention and avoidance for a given scenario

CO4 Compare contiguous vs Noncontiguous memory allocation and Fixed and Variable Partition Multiprogramming.

CO5 Analyze the necessity of Disk Scheduling and various file systems.

UNIT I

Introduction to Operating System: Introduction - What Is An Operating Systems - Operating System Components And Goals - Operating System Architecture. Process Concepts: Introduction - Process States - Process Management- Interrupts - Interprocess Communication

UNIT II

Asynchronous Concurrent Execution: Introduction - Mutual Exclusion - Implementing Mutual Exclusion Primitives - Software Solutions To The Mutual Exclusion Problem - Hardware Solution To The Mutual Exclusion Problem - Semaphores.Concurrent Programming: Introduction - Monitors

UNIT III

Deadlock And Indefinite Postponement: Introduction - Examples of Deadlock - Related Problem Indefinite Postponement, Resource Concepts - Four Necessary Conditions For Deadlock - Deadlock Solution - Deadlock Prevention - Deadlock Avoidance With Dijkstra'sBanker'sAlgorithm - Deadlock Detection - Deadlock Recovery.Processor Scheduling: Introduction - Scheduling Levels - Preemptive Vs Non-Preemptive Scheduling Priorities - Scheduling Objective - Scheduling Criteria - Scheduling Algorithm

UNIT IV

Real Memory Organization And Management: Introduction - Memory Organization - Memory Management - Memory Hierarchy - Memory Management Strategies - Contiguous Vs Non ContiguousMemory Allocation - Fixed Partition Multiprogramming - Variable Partition Multiprogramming Virtual Memory Management: Introduction - Page Replacement - Page Replacement Strategies - Page Font Frequency - Page Size.

UNIT V

Disk Performance Optimization: Introduction - Why Disk Scheduling Necessary - Disk Scheduling Strategies - Rotational Optimization File and Database System: Introduction - Data Hierarchy - File System - File Organization - File Allocation - Free Space Management - File Access Control

Text Book:

1. Operating Systems by H.M.Deitel, P.J.Deitel, D.R.Choffnes - Pearson Education, Third Edition, 2008.

Unit I	Chapter1: 1.1,1.2,1.12,1.13,
	Chapter3: 3.1,3.2,3.3,3.4,3.5
Unit II	Chapter 5: 5.1,5.2,5.3,5.4(up to 5.42),5.5,5.6
	Chapter 6: 6.1,6.2
Unit III	Chapter7: 7.1,7.2,7.3,7.4,7.5,7.6,7.7, 7.8,7.9,7.10
	Chapter8: 8.1,8.2,8.3,8.4,8.5,8.6,8.7
Unit IV	Chapter9: 9.1,9.2,9.3,9.4,9.5,9.6,9.8,9.9
	Chapter11: 11.1,11.5,11.6,11.8,11.9,11.10
Unit V	Chapter12: 12.1,12.4,12.5,12.6
	Chapter13: 13.1,13.2,13.3,13.4,13.5,13.6,13.7,13.8,

Reference Books

1. An Introduction to Operating Systems Concepts and Practice By Pramod Chandra P.Bhatt, PHI 2nd Edition, 2008.
2. Silberschatz A, Galvin P.B., Gange G, Operating System Concepts, John Wiley& Sons, INC,New Delhi, Sixth Edition, 2002.
3. Milan Milenkovic, Operating System Concepts and Design, Tata McGraw Hill, New Delhi, Third Edition, 1997.

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme : BCA **Part III: Core**
Semester : V **Hours : 06**
Subject code : 18UCAC52 **Credits: 05**

RELATIONAL DATABASE MANAGEMENT SYSTEM

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Enumerate the underlying concepts of the management of database systems.

CO2 Explain the structure and model of the relational database System

CO3 Design a database based on a data model considering thenormalization to a specified level

CO4 Write a SQL queries for user specification.

CO5 Design multiple tables using group functions, sub queries and Implement cursor and trigger concept for a given scenario

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.- RDBMS: Introduction – RDBMS terminology

UNIT II

Relational data structure – Relational data manipulation – Codd's rules. Entity Relationship (ER) modelling: ER model – Components of an ER model – ER modelling symbols -Data Normalization: Introduction – First Normal Form – Second Normal Form – Third Normal Form – Boyce – Codd Normal Form – Fourth Normal Form – Fifth Normal Form – De-normalization

UNITIII

Relational algebra –Relational calculus. 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- Views - Indexes – Nulls - Aggregate functions -. Insert, Update and Delete operations: Insert statement – Bulk inserts of data – Update statement – Delete statement.

UNITV

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

Text Book:

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

   Unit I - Chapter 1, 3, 5

   Unit II – Chapter 7, 9

   Unit III - Chapter 11, 12, 14

   Unit IV - Chapter 15, 18, 19

   Unit V - Chapter 20, 21, 25

Reference Books:

1. Abraham Silberschtz, Henry F. Korth, S.Sudershan, Data Base System Concepts, 4th Edition, McGraw Hill International Editions, New Delhi, 2002.
2. Date C.J., An Introduction to Database Systems Vol.1, Narosha Publishing House, New Delhi, 1995.
3. Rob, Coronel, “Database Systems”,Seventh Edition, Cengage Learning.
4. Elmasri, R. and S. B. Navathe: Fundamentals of Database Systems (5th Ed.), Addison Wesley, 2007.
5. Jeffrey A. Hoffer, Mary B. Prescott, and Fred R. McFadden. Modern Database Management (8th Ed.). Prentice-Hall, 2007.

MANNAR THIRUMAAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme : BCA **Part III: Core**
Semester : V **Hours : 06**
Subject Code : 18UCACP5 **Credits: 05**

VB .NET PROGRAMMING AND RDBMS – LAB

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Compute Console Application using VB.NET

CO2 Use Standard controls for creating windows based applications

CO3 Use the database from a front end application

CO4 Write SQL queries to user specifications

CO5 Develop cursors, triggers, procedures, user defined functions and designaccurate and PLSQL programs in Oracle

Develop programs based on the following concepts

Console Application

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

Windows Application

1. Menu editor
2. Design form to create Calculator Application.
3. Design a logon form and validate it.
4. Design a form to create digital clock.
5. Design form to select image from list and display it in the picture box.
6. Timer based quiz
7. Design a form to open and save files using menus.
8. ADO control
9. Display records using data grid views
10. Add, edit and modify data grid

SQL

1. DDL, DML and TCL Commands
2. Implementation of queries for student Database.
3. Implementation of queries for employee Database.

PL/SQL

1. Factorial of a Number
2. Check whether a number is prime or not.
3. Fibonacci Series.
4. Odd or even number
5. Manipulation of Student Database using Cursor
6. Triggering the employee table
7. Manipulation of Library Database using procedure and function..
8. Package Creation.

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme : BCA **Part III : Skill**
Semester : V **Hours : 02**
Subject Code :18UCAS51 **Credits : 02**

COMPUTER NETWORKS

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Explain about building blocks of Computer Networks, components and transmission media.

CO2 Demonstrate the functionalities and protocols in the layers of ISO/OSI network model

CO3 Make use of data link layer protocols in Error detection and correction

CO4 Examine the Forwarding and multicast routing protocols

CO5 Justify how digital signatures are used to provide authentication

UNIT I

Introduction: Data communication– Networks – Protocols and Standards – Network Models: Layered Tasks–The OSI Model – Layers in the OSI Model –TCP/IP protocol suite.

UNIT II

Transmission Media: Guided media – Unguided media (Wireless) – Radio waves, Microwaves, Infrared –Wireless WANs: Cellular Telephone and Satellite Networks: Cellular Telephony – Satellite Networks.

UNIT III

Error Detection and Correction: Introduction – Block Coding – Linear Block Codes – Cyclic Codes – Checksum –Data Link Control: Framing – Flow control and Error control – Protocols – Noiseless Channels–Noisy Channels.

UNIT IV

Network Layer: Delivery, Forwarding and Routing: Delivery– Forwarding – Multicast Routing Protocols.

UNIT V

Network Security: Security services – Message confidentiality – Message Integrity – Message Authentication – Digital Signature – Entity Authentication

Text Book:

1. Behrouz A. Forouzan, Data Communications and Networking, TataMcGraw Hill Education Private Limited, New Delhi, Fourth Edition, 2007.

Unit I	:	Chapter1 – Section: 1.1, 1.2, 1.4.
		Chapter2 – Section: 2.1- 2.4
Unit II	:	Chapter 7 – Section: 7.1,7.2
		Chapter 16 – Section:16.1,16.2
Unit III	:	Chapter 10 – Section: 10.1 - 10.5
		Chapter 11 – Section:11.1-11.5
Unit IV	:	Chapter22 – Section: 22.1, 22.2, 22.4.
Unit V	:	Chapter 31 – Section: 31.1-31.6

Reference Books:

1. Andrew S.Tanenbaum, Computer Network, Prentice Hall of India, New Delhi, Fifth Edition, 2014.
2. PrakeshC.Gupta, Data Communications & Computer Networks, Prentice Hall of India, New Delhi, Third Edition, 2006.
3. William Stallings, Data and Computer Communications, Prentice Hall of India, New Delhi, Seventh Edition, 2004.

Websites:

1. https://www.studytonight.com/computer-networks/
2. https://www.computernetworkingnotes.com/networking-tutorials/
3. https://nptel.ac.in/downloads/106105080/

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme : BCA **Part III : Elective**
Semester : V **Hours : 05**
Subject Code : 18UCAE51 **Credits : 04**

DATA MINING AND WAREHOUSING

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Understand Data Warehouse fundamentals, Data Mining Principles

CO2 Design data warehouse with dimensional modelling and apply OLAP operations

CO3 Identify appropriate data mining algorithms to solve real world problems

CO4 Compare and evaluate different data mining techniques like classification, prediction, Clustering and Association Rule Mining.

CO5 Describe complex data types with respect to spatial and web mining

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 – KMedoid 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:

1. 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

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme : BCA | **Part III : Elective**
Semester : V | **Hours : 05**
Subject Code : 18UCAE52 | **Credits : 04**

WEB TECHNOLOGY

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Describe the development of the World Wide Web and understand the basic concepts of internet, internet standards and protocols.

CO2 Develop a webpage using various html tags.

CO3 Analyze, identify and define the technology required to build and implement a website

CO4 Justify various development tool using to design a webpage and web application

CO5 Design a dynamic webpage.

UNIT I

Introduction to the Internet: Computers in Business – Networking –Internet – Electronic Mail – Resource Sharing – Gopher – World Wide Web – Usenet – Telnet. Internet Technologies: Modem – Internet Addressing – Physical Connections – Telephone Lines. Internet Browsers: Internet Explorer – Netscape Navigator.

UNIT II

Introduction to HTML: Designing a Home Page – History of HTML – HTML Generations – HTML Documents – Anchor Tag – Hyper Links. Head and Body Sections: Header Section – Title – Prologue – Links –Colorful Web Page – Comment Lines. Designing the Body Section: Heading Printing – Aligning the Headings – Horizontal Rule – Paragraph – Tab Settings – Images and Pictures. Ordered and Unordered Lists: Lists – Unordered Lists – Heading in a List – Ordered Lists –Nested Lists.

UNIT III

Table Handling: Tables – Tables Creation in HTML –Width of the Table and Cells – Cells Spanning Multiple Rows/Columns – Coloring Cells – Column Specification. Frames: Frameset Definition – Frame Definition – Nested Framesets. Forms: Action Attribute – Method Attribute – Enctype attribute – Drop Down List.

UNIT IV

JAVASCRIPT: Introduction – Language Elements – Objects of JavaScript – Other Objects – Arrays – Worked Examples.

UNIT V

VBSCRIPT: Introduction – Embedding VBScript Code in an HTML Document – Comments – Variables – Operators – Procedures – Conditional Statements – Looping Constructs – Objects and VBScript – Cookies – XML – CSS.

Text Books:

1. C.Xavier, **World Wide Web Design with HTML**, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2000.
2. N.P. Gopalan and J. Akilandeswari, **Web Technology**: A Developer's Perspective, PHI Learning Private Limited, Delhi, Second Edition,2014.

Text Book1:

Unit I Chapters – 1.1 To 1.9, 2.1 To 2.4, 3.1 To 3.2

Unit II Chapters – 4.1 To 4.6, 5.1 To 5.6, 6.1 To 6.6, 7.1 To 7.5

Unit III Chapters – 8.1 To 8.6, 10.1 To 10.3, 12.1 To 12.4

Text Book2:

Unit IV Chapters – 5

Unit V Chapters – 6

Reference Books:

1. Steven Holzner, HTML Black Book, Dream Tech Press, Tata McGraw Hill, New Delhi, 2001.
2. Ivan Bayross, HTML, JavaScript, DHTML and PHP, BPB Publications, New Delhi, 4th Revised Edition, 2005.

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme : BCA **Part III : Elective**
Semester : V **Hours : 05**
SubjectCode:18UCAE53 **Credits : 04**

COMPUTER GRAPHICS

Course Outcomes

On successful completion of the course, the students will be able to

CO1 List the basic concepts used in computer graphics.

CO2 Implement various algorithms to scan, convert the basic geometrical primitives, transformations, Line filling, clipping.

CO3 Describe the importance of viewing and projections.

CO4 Define the fundamentals of animation, virtual reality and its related technologies.

CO5 Design an application with the principles of virtual reality

UNIT I

Overview of Graphics Systems**:** Video display devices- Raster scan Systems -Random Scan Systems - Interactive input devices - Hard copy devices - Graphics software.

UNIT II

Output Primitives: Line-Drawing Algorithms- Line Function – Circle-Generating Algorithms– Filled-Area Functions-Character Generation.

UNIT III

Attributes of Output Primitives:Line Attributes - Color and Grayscale Levels – Area - Fill Attributes - Character Attributes -Bundled Attributes.

Two-Dimensional Transformations**:** Basic Transformations- Matrix Representation-Composite Transformations.

UNIT IV

Two-Dimensional Viewing**:** The Viewing Pipeline-Viewing Coordinate Reference Frame-Window-to-Viewport Coordinate Transformation-Clipping Operations-Point Clipping-Line Clipping-Polygon Clipping-Curve Clipping- Text Clipping.

UNIT V

Three Dimensional Concepts:Display Methods-Graphics Packages.Three Dimensional Geometric and Modeling Transformations:Translation – Rotation –Scaling-Other Transformations-Three-Dimensional Transformation Functions.Three Dimensional Viewing:Viewing Pipeline-Viewing Coordinates-Projections.

Text Book:

1. Donald D. Hearn and Pauline Baker M.,Computer Graphics, C Version",Pearson Education, Second Edition, New Delhi,2011.

Unit-I	: Chapter 2 - 2.1-2.3,2.5-2.7
Unit-II	: Chapter 3 – 3.2-3.5,3.11,3.14
Unit-III	: Chapter 4 – 4.1, 4.3-4.6
	Chapter 5 – 5.1, 5.2, 5.4
Unit – IV	: Chapter 6 – 6.1 – 6.10
Unit – V	: Chapter 9 – 9.1,9.2
	Chapter 11 – 11.1 - 11.4,11.6
	Chapter 12 – 12.1-12.3

Reference Books:

1. Roy A Plostock, Zhigang Xiang., Schaum's outline of Computer Graphics, Tata McGraw Hill, New Delhi,2001.
2. Steve Marschner, Peter Shirley Fundamentals of Computer Graphics, CSR Press, Fourth Edition, 2016.

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme : BCA **Part III: Elective**
Semester : V **Hours : 05**
Subject Code : 18UCAE54 **Credits: 04**

INTERNET OF THINGS

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Describe and explain about IoT, Physical and Logical design of IoT, IoT levels, domain SpecificIoTs.
CO2 Determine physical and logical design of IoT.
CO3 Compare Physical and Logical IoT, different levels and domain specific IoTs.
CO4 Conclude the importance of IoT, Physical and Logical IoT, IoTlevel,s domain specificIoTs.
CO5 Design and develop Physical and Logical IoT, IoT deployment templates

UNIT I

Introduction to Internet of things: Introduction to Internet of things– Definition & Characteristics of IoT - Physical Design of IoT – Things in IoT - IoT protocols. Logical Design of IoT:IoT Functional blocks- IoT communication Models- IoT communication APIs. IoT Enabling Technologies– Wireless Sensor Networks- Cloud Computing- Big data Analysis – Communication Protocols – Embedded systems.

UNIT II

IoT Levels & Deployment Templates: IoT Level-1 IoT Level-2 IoT Level -3 IoT Level-4 IoT Level-5 IoT Level -6. IoT physical devices and endpoints- What is an IoT device – Basic building blocks of an IoT Device.

UNIT III

Domain Specific IoTs: Introduction – Home Automation- Smart Lighting- Smart Appliances- Intrusion Detection-Smoke/ Gas Detectors. Cities– Smart Parking – SmartLighting- Smart roads– Structural Health Monitoring – Surveillance – Emergency Response.Environment – Weather Monitoring- Air Pollution Monitoring - Noise Pollution Monitoring - Forest Fire Detection – River Floods Detection Energy – Re- Logistics-Agriculture.

UNIT IV

IoT and M2M: Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Networking – Network Function Virtualization – IoT System Management with NETCONF – YANG – Need for IoT Systems Management – Simple Network Management Protocol (SNMP) – Limitations of SNMP – Network Operator Requirements – NETCONF – YANG –IoT Systems Management with NETCONF – YANG.

UNIT V

IoT Platforms Design Methodology: Introduction - IoT Design Methodology – Introduction – IoT Design Methodology – Purpose and Requirements Specification – Process Specification – Domain Model Specification – Information Model Specification – Service Specifications – IoT Level Specification – Functional View Specifications – Operational View Specifications – Device & Component Integration – Application Development

Text Book:

1. Arshdeep Bahga , Vijay Madisetti, “Internet of Things - A Hands on Approach”, University Press (India)Private Limited, New Delhi,2014

Unit I : Chapter 1: 1.1-1.2, 1.3-1.4.

Unit II : Chapter 1 & 7: 1.5,7.1

Unit III: Chapter 2 : 2.1 – 2.10

Unit IV: Chapter 3 &4: 3.1-3.4, 4.1-4.6.

Unit V : Chapter 5: 5.1 – 5.3

Reference Books:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014.
2. Francis da Costa, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1 st Edition, A Press Publications, 2013.

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DEPARTMENT OF COMPUTER APPLICATIONS

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Programme : BCA **Part III : Elective**
Semester : V **Hours : 05**
Subject Code : 18UCAE55 **Credits : 04**

DIGITAL IMAGE PROCESSING

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Knowthe basic concepts of Digital image fundamentals, Intensity Transformation and spatial filtering, image restoration, image compression, image segmentation.

CO2 Classify spatial filtering technique.

CO3 Analyze Image restoration and Reconstruction technique.

CO4 Implement image compression technique.

CO5 Propose a image segmentation work

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 – Lossy and Lossless Compression methods –Digital image watermarking.

UNIT V

Image Segmentation: Fundamentals – Point, line and edge detection –Thresholding – Region based segmentation

Text book:

1. 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.

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme: BCA **Part III : Elective**
Semester : V **Hours : 05**
Subject Code :18UCAE56 **Credits : 04**

INFORMATION SECURITY

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Discuss the basics of information security.

CO2 Illustratethe legal, ethical and professional issues in information security.

CO3 Understand the concepts of cyber law

CO4 To understand the concepts of authentication and authorization.

CO5 To demonstrate the aspects of protocolmanagement.

UNIT I

Introduction-How to Speak Crypto-Classic Crypto-Modern Crypto History-A Taxonomy of Cryptography-A Taxonomy of Cryptanalysis.

UNIT II

Stream Ciphers-Block Ciphers: Feistel Ciphers, DES – RSA-Elliptic Curve Cryptography-Public Key Notation –Public Key Infrastructure.

UNIT III

Introduction-Linear and Differential Cryptanalysis-Side Channel Attack on RSA-Lattice Reduction and the Knapsack-Hellman's Time-Memory Trade-off.

UNIT IV

Authentication: Introduction-Authentication Methods – Passwords – Biometrics-Authorization: Access Control Matrix-Multilevel Security Models-Multilateral Security.

UNIT V

Introduction-Simple Security Protocols-Authentication Protocols - Authentication and TCP-Secure Socket Layers – Kerberos-GSM.

Text Book:

1. "Information Security Principles And Practice", Mark Stamp. A John Wiley& Sons, Inc., Publication.

Unit I Chapters - 2.1 to2.6

Unit II Chapters –3.2,3.3,4.3,4.5,4.6,4.8

Unit III Chapters - 6.1 to 6.5

Unit IV Chapters –7.2, 7.3, 7.4, 8.2, 8.3, 8.4

Unit V Chapters -9.1, 9.2, 9.3, 9.4, 10.2, 10.4, 10.5

Reference Books:

1. Michael E Whitman and Herbert J, Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2003.
2. Rodney D. Ryder, " Guide to Cyber Laws", Second Edition, Wadhwa and Company, New Delhi, 2012.
3. Micki Krause, Harold,F. Tipton, "Handbook of Information Security Management", Vol 1-3 CRC Press LLC, 2004.
4. Stuart McClure, Joel Scrambray, "Hacking Exposed" - George Kurtz, Tata, McGraw-Hill, 2003.
5. Justice Yatindra Singh, "Cyber Laws", Universal Law Publishing, New Delhi, 2013.

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme	**: BCA**	**Part III**	**: Core**
Semester	**: VI**	**Hours**	**: 05**
Sub Code	**: 18UCAC61**	**Credits**	**: 04**

PYTHON PROGRAMMING

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Recall the basics of OOP and translate the variables in Python.

CO2 Manipulate the variables and statements using Loops, Function, Strings.

CO3 Simplify the code by utilize the control statement and Modules.

CO4 Choose the method to reduce source code metrics with exception.

CO5 Create a program using OOP and additional features of Python.

UNIT I

Introduction to Python:Introduction – Python Overview – Getting started with Python- Comments- Python Identifiers – Reserved Keywords- Variables – Standard Data Types – Operators- Statement and Expressions – String Operations – Boolean Expressions – Control Statements – Iteration – *While* Statement – Input From Keyboard.

UNIT II

Functions: Introduction – Built- in Functions – Composition of Functions – User Defined Functions – Parameters and arguments – Function Calls – The return statement- Python Recursive Function – The Anonymous Functions – Writing Python Scripts.

UNIT III

Strings and Lists: Strings – Lists- Tuples and Dictionaries: Tuples - Dictionaries. Files and Exceptions: Text Files – Directories – Exceptions- Exception with argument – User – Defined Exceptions.

UNIT IV

Regular Expressions: Concept of regular expression, various types of regular expressions, using match function.Classes and Objects: Overview of OOP – Class Definition- Creating Objects- Objects as Arguments- Objects as Return Values – Built – in class Attributes – Inheritance – Method Overriding – Data Encapsulation – Data Hiding.

UNIT V

Multithreaded Programming: Thread Module, creating a thread, synchronizing threads, multithreaded priority queue. Modules: Importing module, Creating and exploring modules, Math module, Random module, Time module

Text Book:

1. E.Balagurusamy, "Problem Solving and Python Programming", McGraw Hill Education Private Limited, India, First Edition, 2018.

Unit I	:	Chapter 3: 3.1 – 3.15
Unit II	:	Chapter 4: 4.1 - 4.10
Unit III	:	Chapter 5: 5.1, 5.2
		Chapter 6: 6.1, 6.2
Unit IV	:	Chapter 7: 7.1- 7.5
Unit V	:	Chapter 8: 8.1 – 8.10

Reference Books:

1. Allen B.Downey, "Think Python", O'Reilly Media Inc, 5th reprint, Aug 2018.
2. Wes Mckinney, "Python for Data Analysis", O'Reilly Media Inc, Second Edition, 2017.
3. Zed Shaw, "Learn PYTHON the HARD WAY", Pearson Education, Third Edition, 2013.

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme : BCA **Part III: Core**
Semester : VI **Hours : 05**
Subject Code : 18UCAC62 **Credits: 04**

SOFTWARE PROJECT MANAGEMENT

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Define the methods used to evaluate and select projects for investment of funds.

CO2 Elaborate knowledge on the principles and techniques of software project management.

CO3 Prepare organization behavior and general management techniques used for project

CO4 Organize test case design and types of testing.

CO5 Evaluate the levels of testing.

UNIT I

Software Projects And Project Models: Introduction: Software projects Vs Other types of projects – SPM Activities – Plans, methods, Methodologies – Categorizing software projects - Stepwise project planning - Project evaluation: Technical assessment – Cost-benefit analysis – Cost-benefit evaluation techniques – Risk evaluation – Selection of an appropriate project approach: Choice of process models .

UNIT II

Software Project Handling : Software Effort Estimation: The basis for software estimating - Effort estimation techniques Activity planning: Sequencing and Scheduling activities – Network planning models –Precedence networks – Activity on arrow networks - Critical path - Resource Allocation: Resource requirements – Scheduling - Cost schedules - Monitoring and Control: Visualizing progress - Cost monitoring – Earned value analysis - Prioritizing monitoring – change control. Software Quality - SQA plan, Techniques, Conventions and Metrics.

UNIT III

Testing Fundamentals: Introduction to Testing as an Engineering activity: Testing as a Process-TMM – Testing fundamentals: Basic Definitions, Software Testing Principles, The Tester's Role – Defects, Hypotheses and Tests: Origins of Defects, Defect Classes, The Defect Repository and Test Design, Defect Examples.

UNIT IV

Testing Approaches : Test case design (Black box): Test Case Design Strategies, Random Testing, Equivalence Class Partitioning, Boundary Value Analysis - Test case design (White box): Test Adequacy Criteria, Coverage and Control Flow Graphs, Covering Code Logic, Paths: Evaluating Test Adequacy Criteria.

UNIT V

Testing Methods : Levels of Testing: Unit, Integration Test, System Test, Regression, Alpha, Beta and Acceptance test - Test goals, policies, plans and documentation - Test Planning – Testing Tools: Overview of Software testing tools – Case study using an Open source Testing tool .

Text book:

1. Bob Hughes and Mike Cotterell, Software Project Management, 5th edition, McGraw-Hill Higher Education, 2009.

Unit I	CHAPTER 1,2	1.1-1.24,2.1-2.40
Unit II	CHAPTER 3,4	3.1-3.13,4.1-4.2
Unit III	CHAPTER 5	5.1-5.33
Unit IV	CHAPTER 9	9.1-9.49
Unit V	CHAPTER 11	11.1-11.81

References:

1. Ilene Burnstein, “Practical Software Testing”, Springer International Edition, Seventh Indian reprint 2010.
2. RenuRajani and Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, New Delhi, 2005.
3. Paul C. Jorgensen “Software Testing, A Craftsman’s Approach”, 2nd Edition, 2007, CRC Press.

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER APPLICATIONS
(For those who joined in 2018-2019 and after)

Programme : BCA **Part III : Core**
Semester : VI **Hours : 04**
Subject Code : 18UCACP6 **Credits : 04**

PYTHON PROGRAMMING LAB

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Recall and understand the variable, datatypes and tokens.

CO2 Identify the error and apply the exception techniques.

CO3 Analyze the decision making statements like switch, for, while in the program

CO4 Justify the concept of various techniques to maximize the execution speed.

CO5 Create a file to manipulate the input and output values.

List of Experiments

1. Compound interest
2. Armstrong Number
3. Area of a circle
4. Sum of squares of first n natural numbers
5. Array rotation
6. Find largest element in an array
7. Swap two elements in a list
8. Count occurrences of an element in a list
9. Count Even and Odd numbers in a List
10. Remove multiple elements from a list in Python
11. Reverse words in a given String in Python
12. Check if a string contains any special character
13. Find the sum of all items in a dictionary
14. Create grade calculator in Python
15. Dictionary to find mirror characters in a string
16. Convert a list of Tuples into Dictionary
17. Create a list of tuples from given list having number and its cube in each tuple

18. Sort a list of tuples by second Item
19. Binary Search
20. Print the pattern ‘G’
21. Convert time from 12 hour to 24 hour format
22. Read the Contents of a File
23. Count the Number of Words in a Text File
24. Count the Number of Lines in a Text File

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER APPLICATIONS
(For those who joined in 2018-2019 and after)

Class : BCA **Part III : Core**
Semester : VI **Hours : 04**
Subject Code : 18UCAPR1 **Credits : 04**

PROJECT WORK AND VIVA – VOCE

Course Outcomes

On successful completion of the course, the students will be able to:

CO1 Demonstrate a sound technical knowledge of their selected project topic.

CO2 Undertake problem identification, formulation and solution.

CO3 Design solutions to complex problems utilising a systems approach.

CO4 Conduct a Real Time Project

CO5 Demonstrate an ability to present and defend their project work to a panel of experts.

Course Description

The Project is conducted by the following Course Pattern.

Internal

Presentation Submission	**40**

External

Project Report Viva Voce	**60**
Total	**- 100**

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER APPLICATIONS
(For those who joined in 2018-2019 and after)

Programme : BCA **Part III : Skill**
Semester : VI **Hours : 02**
Subject Code : 18UCASP6 **Credits : 02**

WEB TECHNOLOGY LAB

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
CO2 To have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
CO3 To familiar with Web page design using HTML / DHTML and style sheets.
CO4 To develop a Web site using text, images, links, lists, and tables for navigation and layout.
CO5 To create applications using controls.

LIST OF PROGRAMS:

1. Develop a HTML document, which displays your name as <h1> heading and displays any four of your friends. Each of your friend's names must appear as hot text. When you click your friend's name, it must open another HTML document, which tells about your friend.
2. Apply various colors to suitably distinguish key words. Also apply font styling like italics, underline and two other fonts to words you find appropriate. Also use header tags
3. Insert an image and create a link such that clicking on image takes user to other page.
4. Create links on the words e.g. "Wi-Fi" and "LAN" to link them to Wikipedia pages.
5. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links.
6. Write an HTML code to display your profile on a web page.
7. Write an html code to display your education details in a tabular format.
8. Create a webpage with html describing your department. Use paragraph and list tags.
9. Create a table to show your class time-table.
10. Create a simple form to submit user input like his name, age, address and favorite subject, movie and singer.

11. Create a HTML table with rows and columns and split them using Rowspan and Colspan.
12. Create a Web Page, showing an ordered list of the names of five of your friends
13. Add few form elements such as radio buttons, check boxes and password field. Add a submit button at last.
14. Create a web page with a text box and a button. On click of a button a message box is displayed with the text entered by the user in the textbox
15. Create a web page with some text in using some color. Change the color of the text on click of a button or on mouse over.
16. Client side scripts for validating web form controls Using DHTML
17. Calendar Creation: Display all month
18. Validation of registration form
19. Open a Window from the current window
20. Change color of background at each click of button or refresh of a page

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme : BCA **Part III : Elective**
Semester : V I **Hours : 05**
Subject code : 18UCAE61 **Credits : 04**

BIG DATA AND ANALYTICS

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Explain the basic concepts of Big data, Bigdata analytics, NoSQL, Hadoop and MongoDB.

CO2 Collect, manage, store, query and analyze various form of big data

CO3 Differentiate SQL with NoSQL,NewSQL, RDBMS and Hadoop.

CO4 Evaluate bigdata concept in extract knowledge using Hadoop and MongoDB.

CO5 Combine the benefits of bigdata techniques in businesses and organizations.

UNIT I

Types of Digital Data: Classification of Digital Data. Introduction to Big Data: Characteristics of Data – Evolution of Big Data – Definition of Big Data – Challenges in Big Data – Other characteristics of Data which are not Definitional Traits of Big Data – Changing in the Realms of Big Data - Big Data Analytics: Introduction- Classification of Analytics - Greatest challenges that prevent business from capitalizing on Big Data – Top challenges facing Big Data – Importance of Big Data Analytics – Terminologies used in Big Data Environment.

UNIT II

The Big Data Technology Landscape:NoSQL – Types of NoSQL Database – Need of NoSQL – Advantages of NoSQL – Use of NoSQL in Industry – SQL vsNoSQL – Comparison of SQL, NoSQL and NewSQL.

UNIT III

Hadoop: Introduction- RDBMS vsHadoop – Distributed computing challenges – History of Hadoop – Hadoop overview – Use case of Hadoop – Hadoop distributors - Hadoop: Features of

Hadoop – Advantages of Hadoop – versions of Hadoop-Overview of Hadoop – Hadoop distribution – Hadoopvs SQL – Integrated Hadoop System – Cloud- Based Hadoop Solutions.

UNIT IV

Introduction to MongoDB**:** What is MongoDB – Why MongoDB – Terms used in RDBMS and MongoDB – Data types in MongoDB - MongoDB query language

UNIT V

Map Reduce - Machine Learning Algorithms.

Text Book:

1. Seema Acharya, Subhashini Chellappan, "Big Data and Analytics**",** Wiley, New Delhi, 2015.

Unit I	Chapter 1(Full), Chapter 2.1-2.6, 2.13,Chapter 3.2, 3.5 - 3.8, 3.12.
Unit II	Chapter 4 (Full).
Unit III IV	Chapter 5.1 – 5.9.
Unit IV	Chapter 4 (Full).
Unit V	Chapter 6(Full).

Reference Books:

1. DT Editorial Services, "Big Data, Black book", Ninth Edition, Dreamtech, New Delhi, 2016.
2. Michael Minelli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics", Wiley, New Delhi,2016.

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER APPLICATIONS
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Programme : BCA **Part III: Elective**
Semester : VI **Hours: 05**
Subject Code : 18UCAE62 **Credits: 04**

CLOUD INFRASTRUCTURE AND SERVICES

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Describe the Key Technologies, Architecture, Services and Applications of Cloud Computing.
CO2 Apply suitable Technologies, Algorithms, and Applications in the Cloud Computing Driven Systems.
CO3 Classify the various Cloud Services Platform with Cloud Computing Technology and Services.
CO4 Explain the Importance of Cloud Based Technologies and evaluate various cloud Development tools.
CO5 Build the Skill about the Cloud Infrastructure and Supports for employability.

UNIT I

CloudIntroduction:Introduction-Cloud Computing definition – Characteristics – Cloud Models – Cloudservices – Cloud – based Services andApplications. Cloud Concepts andTechnologies: Virtualization – Load balancing – Scalability andElasticity – Deployment – Replication – Monitoring – Software Defined Networking – Network Function Virtualization –Map Reduce – Identity and Access Management – Service level agreement – Billing

UNIT II

CloudServicesandPlatforms: Computeservice – Storage services – Database Services – Application Services – Content Delivery Services – Analytics Services –Deployment andManagement Services – Identity &Access Management Services –Open Source Private Cloud Software.

UNIT III

CloudComputingTechnology: Hardware and Infrastructure:Clients – Security – Network – Services. Accessing The Cloud: Platforms –Web Applications – Web APIs – Web Browsers.

UNITI IV

Cloud Storage: Overview – Cloud Storage Providers – Standards – Application – Client – Infrastructure – Service.

UNIT V

Cloud Architecture Authentication – Authorization – DataSecurity – Keymanagement – Auditing.Cloud for Industry, Security: Introduction – CSA Cloud security Healthcare & Education: Cloud computing for Health care – Cloudc omputing for Transportation systems –Cloud computing for Manufacturing Industry – Cloud computing for Education.

TextBooks:

1. ArshdeepBahga,VijayMadisetti,"CloudComputing–AHands – On Approach", UniversityPress, Calcuta,2014.
   UnitI : Chapter1and 2 (Full)
   UnitII : Chapter 3 (Full)
   UnitV : Chapter 12 and 13 (Full)
2. T.AnthonyVelte,J.TobyVelte,RobertElsenpeter,"CloudComputing–APractical Approach", TMH, New Delhi, 2010.
   UnitIII : Chapter5(Full)
   UnitIV : Chapter 7 and 8 (Full)

ReferenceBooks:

1. BarrieSosinsky,"CloudComputingBible",Wiley Publishing,NewDelhi,2014.
2. RayRafaels,CloudComputing:FromBeginningtoEnd",CreateSpaceIndependentPublishingPlatform,NewDelhi,2015.
3. Michael Miller," Cloud Computing: Web Based Applications That Changethe Way" You Workand Collaborate Online,1st Edition,Que Publishing, United States,2008.

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DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Progrmme	**: BCA**	**Part III**	**: Elective**
Semester	**: VI**	**Hours**	**: 05**
Subject code	**: 18UCAE63**	**Credits**	**: 04**

MACHINE LEARNING ALGORITHM

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Select and implement machine learning techniques and computing environment that are suitable for the applications

CO2 Solve problems associated with batch learning and online learning.

CO3 Understand and apply scaling up machine learning techniques and associated computing techniques and technologies

CO4 Recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.

CO5 Design and implement machine learning solutions to classification, regression, and clustering problems; and be able to evaluate and interpret the results of the algorithms.

UNIT I

Introduction- overview of machine learning- Different forms of learning- Generative learning- Gaussian parameter estimation- maximum likelihood estimation- MAP estimation- Bayesian estimation- bias and variance of estimators- missing and noisy features- nonparametric density estimation- applications- software tools.

UNIT II

Classification Methods-Nearest neighbour- Decision trees- Linear Discriminant Analysis- Logistic regression-Perceptrons- large margin classification- Kernel methods- Support Vector Machines.Classification and Regression Trees.

UNIT III

Graphical and sequential models- Bayesian networks- conditional independence-Markov random fields- inference in graphical models- Belief propagation- Markov models- Hidden Markov models- decoding states from observations- learning HMM parameters.

UNIT IV

Clustering Methods-Partitioned based Clustering - K-means- K-medoids; Hierarchical Clustering - Agglomerative- Divisive- Distance measures; Density based Clustering - DBScan; Spectral clustering.

UNIT V

Neural networks- the perceptron algorithm- multilayer perceptron's- back propagation- nonlinear regression- multiclass discrimination- training procedures- localized network structure- dimensionality reduction interpretation.

Text book:

1. T. Hastie, R. Tibshirani and J. Friedman, "Elements of Statistical Learning", Springer, 2009.
2. E. Alpaydin, "Machine Learning", MIT Press, 2010.

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(For those who joined in 2018-2019 and after)

Progrmme	**: BCA**	**Part III**	**: Elective**
Semester	**: VI**	**Hours**	**: 05**
Subject code	**: 18UCAE64**	**Credits**	**: 04**

CRYPTOGRAPHY

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Understand the concept of Symmetric key and Asymmetric key cryptography

CO2 Apply the symmetric-key ciphers and asymmetric key ciphers to encrypt data

CO3 Analyze the different crypto systems in asymmetric key cryptography for data authentications

CO4 Evaluate the various digital signature schemes to check the user authentication

CO5 Compose secure data exchange between sender and receiver by using message integrity and message authentication

UNIT I

Introduction: Security Goals – Cryptographic Attacks – Services and Mechanism – Techniques Traditional symmetric-key ciphers: Introduction – Substitution Ciphers – Transposition Ciphers – Stream and Block Ciphers

UNIT II

Introduction to Modern Symmetric-key Ciphers: Modern Block Ciphers – Modern Stream Ciphers. Data Encryption Standard (DES): Introduction – DES Structure – DES Analysis – Security of DES – Multiple DES-Conventional Encryption Algorithms – Examples of Block Ciphers Influenced by DES

UNIT III

Advanced Encryption Standard (AES): Introduction – Transformations – Key Expansion – The AES Ciphers – Examples – Analysis of AES.Asymmetric-key Cryptography**:** Introduction – RSA Cryptosystem – Rabin cryptosystem – Elgamal Cryptosystem – Elliptic Curve Cryptosystems

UNIT IV

Message Integrity and Message Authentication: Message Integrity – Random Oracle Model – Message Authentication. Digital Signature: Comparison – Process – Services – Attacks and Digital Signature – Digital Signature Schemes – Variations and Applications

UNIT V

Key Management: Symmetric-key Distribution – Kerberos – Symmetric-key Agreement – Public-key Distribution –Hijacking.

Text Book:

1. Behrouz A.Forouzan, Debdeep Mukhopadhyay, **"**Cryptography and Network Security", 2nd Edition,TataMcgraw Hill Education Pvt Ltd, New Delhi, 2013.

   Unit – I: Chapter 1,3
   Unit – II: Chapter 5, 6
   Unit – III: Chapter 7,10
   Unit – IV: Chapter 11, 13
   Unit – V: Chapter 15

Reference Books:

1. Atul Kahate, "Cryptography and Network Security" Third Edition, Mcgraw Hill Education(India) Pvt.Ltd, New Delhi,2011.
2. S.Bose, P.Vijayakumar "Cryptography and Network Security", Pearson Edition, Chennai,2017

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF COMPUTER APPLICATIONS

(For those who joined in 2018-2019 and after)

Programme : BCA **Part III : Elective**
Semester : VI **Hours : 05**
Subject Code : 18UCAE65 **Credits : 04**

SOFTWARE TESTING

Course Outcomes

On successful completion of the course, the students will be able to

CO1 List a range of different software testing techniques and demonstrate the integration testingwhich aims to uncover interaction and compatibility problems as early as possible

CO2 Apply specific unit testing method to the projects.

CO3 Distinguish characteristics of structural testing methods.

CO4 Choosing a testing tool which should be addressed when selecting an application testing solution.

CO5 Propose methods and tools of testing and maintenance of software

UNIT I

Software Development Life cycle Modes – Phases of Software Project – Quality, Quality Assurance and Quality control-Testing, Verification and validation-Process Models to Represent Different Phases-Life Cycle Models

UNIT II

White Box Testing: What is White Box Testing? – Static Testing – Structural Testing – Challenges in White Box Testing, Black Box Testing – What is Black Box Testing

UNIT III

Integration Testing: What is Integration Testing – Integration Testing as a Type of Testing – Scenario Testing – Defect Bash

UNIT IV

System and Acceptance Testing – System Testing Overview – Why is System Testing Done? – FuctionalVersus Non-Functional Testing – Functional System Testing – Non Functional Testing – Acceptance Testing – Summary of Testing Phases.

UNIT V

Performance Testing – Factors Governing Performance Testing –Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing. Regression Testing – Definition – Types of Regression Testing- How to Do Regression Testing – Best practices in Regression Testing.

Text Book:

1. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing Principles and Practices", Pearson Edition, 2014.

   UNIT I : Chapter 2
   UNIT II : Chapter 3,4
   UNIT III : Chapter 5
   UNIT IV : Chapter 6
   UNIT V : Chapter 7,8

Reference Books:

1. William Perry, "Effective Methods for Software Testing", John Wiley &Sons
2. Richard E. Fairly, "Software Engineering Concepts", McGraw Hill Edition,

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DEPARTMENT OF COMPUTER APPLICATIONS

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Programme :BCA **Part III: Elective**
Semester : VI **Hours : 05**
Subject Code : 18UCAE66 **Credits: 04**

MOBILE COMPUTING

Course Outcomes

On successful completion of the course, the students will be able to

CO1 Describe the Architecture, Application and Services of Mobile Computing.

CO2 Build an Application Based on the User Requirements.

CO3 Select Appropriate Framework for Developing Applications based on the Problem Requirements.

CO4 Explains the importance of Emerging Technologies, GPRS, CDMA and 3G, Security Issues.

CO5 Design and Develop Mobile Applications for Societal and Environmental IT Problems.

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 computingthrough internet.

UNITII

Mobile computing through telephony: Evolution of Telephony – Multiple access procedures – Satellite communication systems – Mobile computing through telephone –developing an IVRapplication – Voice XML – TAPI – Computer supported telecommunication Applications, Emerging Technologies: Introduction – Bluetooth– RFID – Wireless broadband – MobileIP – IPV6 – Javacard.

UNIT III

Short Message Service (SMS): Mobile Computing Over SMS – Short Message Service (SMS) – Value Added Services through SMS – Accessing the SMS Bearer.General Packet Radio Service (GPRS): Introduction – GPRS & Packet data network – Network architecture – Network operations – Data Services in GPRS – Applications for GPRS – Limitations of GPRS – Billing and Charging in GPRS – EDGE.

UNIT IV

Wireless Application Protocol (WAP): Introduction – WAP – MMS GPRS – Applications, Wireless LAN: Advantages – IEEE802.11 standards – Wireless LAN Architecture – Mobility in wireless LAN – Deploying WLAN –Mobile Adhoc networks and Sensor networks –Wireless LAN.Security – Wireless access inVehicular environment – Wireless local loop – HiperLAN – WIFI versus 3G.

UNIT V

Wireless Devices with Symbian OS: Introduction to Symbian OS – Symbian OS Architecture – Applications for Symbian – Controls and Compound Controls – Active Objects – Localizations – Security on the Symbian OS – Latest in Symbian, 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:

1. Asokek Talukder, Hasan Ahmed, Roopa RYavagal, "Mobile Computing-Technology, Application sand Service Creation",Second Edition, Tata McGraw Hill, NewDelhi, 2012.
   UnitI: Chapters1.1to1.9,2.3,2.4,2.5,2.6,2.7
   UnitII : Chapters 3,4
   UnitII : Chapters 6,7
   UnitIV : Chapters 8,10
   UnitV : Chapters 14,2

ReferenceBooks:

1 . JochenSchiller,"MobileCommunications",2nd Edition,PearsonEducation,Delhi,2003.

2. William Stallings, "Wireless Communications and Networks", 2nd Edition, Pearson Education, Delhi, 2004.