MANONMANIAM SUNDARANAR UNIVERISTY,
TIRUNELVELI-12
SYLLABUS
UG - COURSES – AFFILIATED COLLEGES
Course Structure for BCA
(Choice Based Credit System)

(with effect from the academic year 2021-2022 onwards)

Semester-V				
Part	**Subject Status**	**Subject Title**	**Subject Code**	**Credit**
III	CORE	MACHINE LEARNING USING PYTHON	CMCA51	4
III	CORE	WEB TECHNOLOGY	CMCA52	4
III	CORE	RELATIONAL DATABASE MANAGEMENT SYSTEMS	CMCA53	4
III	Major Practical V	RDBMS LAB	CMCAP5	2
III	Major Elective I	E-COMMERCE/DESIGN AND ANALYSIS OF ALGORITHMS/CYBER SECURITY/MULTIMEDIA	CECA51	4
III	Project	MINI PROJECT	CMCA5P	4
IV	Skill Based Common	PERSONALITY DEVELOPMENT/EFFECTIVE COMMUNICATION	CCSB51/ CCSB52	2

Nesamony Memorial Christian College, Marthandam

Total Marks: 100   Internal Exam: 25 marks + External Exam: 75 marks

A. **Scheme for internal Assessment**:
Maximum marks for written test: **20 marks**
 3 internal tests, each of **I hour** duration shall be conducted every semester.
To the average of the **best two** written examinations must be added the marks scored in. The **assignment** for 5 marks.

The break up for internal assessment shall be:
Written test- 20 marks; Assignment -5 marks   Total - 25 marks

B. **Scheme of External Examination**
3 hrs. examination at the end of the semester
A – Part : 1 mark question two - from each unit
B – Part : 5 marks question one - from each unit
C – Part : 8 marks question one - from each unit

➢ **Conversion of Marks into Grade Points and Letter Grades**

S.No	Marks	Letter Grade	Grade point (GP)	Performance
1	90-100	O	10	Outstanding
2	80-89	A+	9	Excellent
3	70-79	A	8	Very Good
4	60-69	B+	7	Good
5	50-59	B	6	Above Average
6	40-49	C	5	Pass
7	0-39	RA	-	Reappear
8	0	AA	-	Absent

➢ **Cumulative Grade Point Average (CGPA)**

$$CGPA = \frac{\Sigma\,(GP \times C)}{\Sigma C}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

➢ **Classification**
a) First Class with Distinction   : CGPA ≥ 7.5*
b) First Class   : CGPA ≥ 6.0
c) Second Class   : CGPA ≥ 5.0 and < 6.0
d) Third Class   :   CGPA< 5.0

MACHINE LEARNING USING PYTHON

COURSE OBJECTIVE:
- To understand the Machine Learning Basics and steps in developing ML applications.
- To understand the concept of KNN, Decision tree , plotting concepts with Matplotlib.
- To learn about the classification concepts with Naive Bayes, Logistic Regression and various classifiers in ML.

Course Outcomes:

Upon completion of the course the student will be able to
- CO1: Describe the concepts of machine Learning
- CO2: Explain the fundamentals of Classification and probability theory
- CO3: Analyse the supervised learning techniques
- CO4: Analyse the un-supervised learning techniques
- CO5: Illustrate Big Data using machine learning
- CO6: Develop applications using Hadoop and Map Reduce

UNIT I

Classification - Machine learning basics - Key terminology - Key tasks of machine learning - How to choose the right algorithm - Steps in developing a machine learning application - Getting started with the NumPy library - Classifying with k-Nearest Neighbors - Classifying with distance measurements - Example: a handwriting recognition system - Splitting datasets one feature at a time: decision trees - Tree construction - Plotting trees in Python with Matplotlib annotations - Testing and storing the classifier.

UNIT II

Classifying with probability theory: naïve Bayes - Classifying with Bayesian decision theory - Classifying with conditional probabilities - Document classification with naïve Bayes - Classifying text with Python - Logistic regression - Classification with logistic regression - Using optimization to find the best regression - Support vector machines - Separating data with the maximum margin - Finding the maximum margin - Efficient optimization with the SMO algorithm - Speeding up optimization with the full Platt SMO - Using kernels for more complex data - Improving classification with the AdaBoost meta-algorithm - Classifiers using multiple samples of the dataset - Train: improving the classifier by focusing on errors - Creating a weak learner with a decision stump - Implementing the full AdaBoost algorithm - Test: classifying with AdaBoost.

UNIT III

Forecasting numeric values with regression - Finding best-fit lines with linear regression - Locally weighted linear regression - Shrinking coefficients to understand our data - The bias/variance tradeoff - Tree-based regression - Locally modeling complex data - Building trees with continuous and discrete features - Using CART for regression - Tree pruning - Model trees - Example: comparing tree methods to standard regression - Using Tkinter to create a GUI in Python.

UNIT IV

Unsupervised learning - Grouping unlabeled items using k-means clustering - The k-means clustering algorithm - Improving cluster performance with post processing - Bisecting k-means - Association analysis with the Apriori algorithm - Association analysis - The Apriori principle - Finding frequent itemsets with the Apriori algorithm – Mining association rules from frequent item sets - Efficiently finding frequent itemsets with FP-growth - FP-trees: an efficient way to encode a dataset - Build an FP-tree - Mining frequent items from an FP-tree.

UNIT V

Using principal component analysis to simplify data - Dimensionality reduction techniques - Principal component analysis - Simplifying data with the singular value decomposition - Applications of the SVD - Matrix factorization - SVD in Python - Collaborative filtering–based recommendation - Big data and MapReduce - MapReduce: a framework for distributed computing - Hadoop Streaming - Running Hadoop jobs on Amazon Web Services - Machine learning in MapReduce - Using mrjob to automate MapReduce in Python - Example: the Pegasos algorithm for distributed SVMs.

TEXT BOOK

1. Peter Harrington,‖ Machine Learning in Action‖, Manning Publications Co., 2012..

REFERENCE BOOKS

1. WilliRichert, Luis Pedro Coelho, ―Building Machine Learning Systems with Python‖, Packt Publishing, 2013.
2. Andreas C. Müller, Sarah Guido, ―Introduction to Machine Learning with Python: A Guide for Data Scientists‖, O'Reilly Media, 2016.

WEB TECHNOLOGY

COURSE OBJECTIVE:
- To provide the conceptual and technological developments in the field of Internet and web designing with the emphasis on comprehensive knowledge of Internet, Describe the basic concepts for network implementation.
- To learn the basic working scheme of the Internet and World Wide Web.
- Understand fundamental tools and technologies for web design.

COURSE OUTCOME (COs):
Upon Completion of the course, the students should be able to:
- CO1: Employ fundamental computer theory to basic programming techniques.
- CO2: Use fundamental skills to maintain web server services required to host a website.
- CO3: Select and apply markup languages for processing, identifying, and presenting of information in web pages.
- CO4: Use scripting languages and web services to transfer data and add interactive components to web pages.

UNIT - 1 INTRODUCTION TO THE WEB
Understanding the Internet and World Wide Web – History of the Web – Protocols Governing the Web – Creating Websites for Individuals and the Corporate World – Web Applications – Writing Web projects – Identification of Objects – Target Users – Web Team – Planning and Process Development – Web Architecture –Internet Standards – TCP/IP Protocol Suite – IP Address – MIME – Cyber Laws. Hyper Text Transfer Protocol (HTTP): Introduction – Web servers and clients – Resources – URL and its Anatomy – Message Format.

UNIT - 2 HYPER TEXT MARKUP LANGUAGE (HTML)
History of HTML and W3C – HTML and its Flavors – HTML Basics – Elements, Attributes, and Tags – Basic Tags – Advanced Tags – Frames.

UNIT - 3 JAVA SCRIPT
Introduction – Variables – Literals – Operators – Control Structure – Conditional statements – Arrays – Functions – Objects.

UNIT - 4 EXTENSIBLE MARKUP LANGUAGE (XML)
Common Usage – Role of XML – Prolog – Body – Elements – Attributes – Validation – Displaying XML – Namespace.XML DTD: XML Schema Languages– Validation – Introduction to DTD– Purpose of DTD – Using a DTD in an XML Document.

UNIT - 5 COMMON GATEWAY INTERFACE (CGI)

Internet Programming Paradigm – Server – side Programming – Languages for CGI – Applications – Server Environment – Environment Variables – CGI Building Blocks – CGI Scripting Using C, Shell Script – Writing CGI programs – CGI Security – Alternatives and Enhancements to CGI. Servlet: Server – Side Java – Advantages Over Applets - Servlet Alternatives – Servlet Strength – Servlet Architecture – Servlet Life Cycle.

TEXT BOOK:
1. Web Technologies - Uttam K. Roy, Oxford University Press 2010.

REFERENCE BOOKS:
1. Web Technology and Design - C. Xavier, New Age International Publishers, 2005.
2. Web Technologies TCP/IP Architecture and Java Programming -Achyut S. Godbole & AtulKahate, Tata McGraw Hill, Second Edition, 2008.

Relational Database Management Systems

COURSE OBJECTIVES:
- To understand relational database concepts and transaction management concepts in database system.
- To write PL/SQL programs that use: procedure, function, package, cursor and Exceptions.
- To Use current techniques and tools necessary for complex computing practices.

COURSE OUTCOMES:
- Master the basic concepts and appreciate the applications of database systems.
- Master the basics of SQL and construct queries using SQL.
- Be familiar with a commercial relational database system (Oracle) by writing SQL using the system.

UNIT – 1 AN OVERVIEW

Personal database - Client server databases – Oracle 9i An introduction – The SQL*Plus Environment – SQL – SQL*PLUS commands – Sample Databases. Oracle Tables; Naming rules and conventions – Data types – Constraints – Creating an Oracle table – Displaying table information's – Altering and exiting table – Dropping a table – Renaming a table – Truncating a table.

UNIT - 2 WORKING WITH TABLES

DML – Adding a new Rows/Records – Customized Prompts – Updating existing rows/records – Deleting existing rows/records – Retrieving data from a table - Arithmetic operations – Where clause – sorting.

UNIT - 3 MULTIPLE TABLES

Joins–Set operators. Subqueries: Subquery–Top–NAnalysis. Advanced features:Views–Subsequences - Synonyms–Index.

UNIT - 4 PL/SQL: FUNDAMENTALS

PL/SQL: fundamentals – Block structure – Comments – Data types –Variable declaration – Anchored declaration – Assignment operation – Bind variables – Substitution Variables – Arithmetic operators. Control Structures: Control structures – Nested blocks – SQL in PL/SQL DML in PL/SQL – Transaction Control Statements.

UNIT - 5 PL/SQL CURSORS &EXCEPTIONS

Cursors – Implicit cursors – Explicit cursor – Explicit cursor attributes – Implicit cursor attributes – cursor FOR loops – SELECT … FOR UPDATE- WHERE CURRENT of clause – cursor with parameters – Exceptions – Exception types – Records, Tables: PL/SQL Records – PL/SQL Tables – PL/SQL Varrays.

TEXT BOOK:
1. Database System Using Oracle - Nilesh Shah, 2nd Edition, Pearson, 2016.

REFERENCE BOOK:
1. Oracle 9i Complete Reference - Loney, Koch, Tata McGraw Hill, 2005.

RDBMS LAB

1. Create an employee database with tables department, employee details, address, pay details and project details. After the tables and add constraints relevant to the fields in the tables. Insert records into all the tables.
2. Create queries to retrieve relevant information from a table.
3. Create a table from the exiting tables. Create views from the tables.
4. Develop queries to retrieve information from more than one table. Develop summary queries to retrieve relevant information from the table
5. Create a partition table and query the records.
6. Create a PL / SQL Program to print multiplication table.
7. Create a PL / SQL Program to check whether a given string is palindrome or not.
8. Create a PL / SQL Program to print student details using report.
9. Create a PL/SQL Program to update using various triggers.
10. Create a PL/SQL Program to find factorial of numbers using function and procedure.

E – COMMERCE

COURSE OBJECTIVES
- To provide adequate basic understanding about Management Education among the students.
- To prepare students to exploit opportunities being newly created in the Management Profession.
- To train the students in communication skills effectively.

COURSE OUTCOMES:
- Design and implement an e-commerce application with a shopping cart.
- Integrate the waterfall model in the development of e-commerce applications.
- Integrate user-centered design guidelines in developing user-friendly websites.

UNIT – 1 INTRODUCTION

What is Electronic Commerce? – Types of Electronic Commerce Technology

UNIT – 2 MODELS AND TYPES

Types of E-Business Models and Markets - Types of E-Commerce Providers and Vendors E- Commerce website Creation.

UNIT - 3 E-COM WEB DEVELOPMENT

Managing E-Commerce website Development – Building Shopping Cart Applications – Mobile Electronic Commerce.

UNIT - 4 E-COM DATABASES

Enhancing a web server with E-Commerce Application Development – Strategies, Techniques and tools – Implementing Merchandising Strategies – Implementing E-Commerce Databases.

UNIT - 5 E-COMMERCE APPLICATIONS

Applying and Managing E-Business Intelligence Tools for Application Development – Types of Security Technologies – protocols for the Public Transport of Private Information.

TEXT BOOKS:
1. Electronic Commerce - Pete Loshin and John Vacca, Fourth edition, Firewall Media, New Delhi, 2006.
2. E-Business - ParagKulkarni, SunitaJahirabadkar, and PradipChande, Oxford
3. University Press, 2013.

REFERENCE BOOKS:
1. Electronic Commerce - Gary O.Schnelder James T.Perry, First edition, Thomson Learning 2000.
2. Electronic Commerce - Elias M.Awad, Prentice Hall of India 2002.

DESIGN AND ANALYSIS OF ALGORITHMS

COURESE OBJECTIVES:
- To know the basics of various sorting methods.
- To provide a thorough knowledge of the most common algorithms and
- data structures.
- To understand the design of algorithms

COURSE OUTCOMES:
- Argue the correctness of algorithms using inductive proofs and invariants.
- Analyse worst-case running times of algorithms using asymptotic analysis.
- Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm.

UNIT – 1 INTRODUCTION

What is performance? – Space Complexity: Components of space complexity. Time Complexity: Components of time complexity – Operation counts – Best, worst Average counts – Step counts. Asymptotic Notations: Introduction – Big Oh Notation – Omega and Theta Notations – Complexity analysis examples

UNIT – 2 DIVIDE & CONQUER APPROACHES

The Method – Applications [Merge Sort, Quick Sort, Defective chessboard] – Solving recurrence equations – Lower bound complexity.

UNIT -3 GREEDY METHOD

Optimization problems – The Greedy Method – Applications [Container Loading, Topological sorting, Single Source Shortest Paths]

UNIT – 4 BACKTRACKING

Method – Applications [Max Clique, Travelling Salesperson, Board Permutation]

UNIT – 5 DYNAMIC PROGRAMMING

The Method – Applications [Matrix Multiplication chains – All pairs shortest path – Single source shortest path with negative costs]

TEXT BOOK
1. Data Structures, algorithms and applications in Java – Sartaj Sahni, Second Edition, University Press 2005

REFERENCE BOOKS
1. Algorithms - Dasgupta, Papadimitrou and Vazirani, McGraw-Hill Education, 2006.
2. Computer Algorithms - Horowitz, Sahni, and Rajasekaran, Silicon Press, 2007.

CYBER SECURITY

COURSE OBJECTIVES
- To describe different classes of attacks.
- To describe new and emerging IT and IS technologies.
- To analyze threats and risks within context of the cyber security architecture.

COURSE OUTCOMES:
- Evaluate the computer network and information security needs of an organization.
- Assess cyber security risk management policies in order to adequately protect an organization's critical information and assets.
- Measure the performance of security systems within an enterprise-level information system.

UNIT – 1 INTRODUCTION TO INFORMATION SECURITY
Introduction–The History of Information Security –What is Security–Critical Characteristics of Information – NSTISSC Security Model – Components of an Information System – Securing Components – Balancing Information Security and Access – Approaches to Information Security Implementation–The Systems Development Life Cycle –The Security Systems development life cycle – Security Professional and the Organization – Communities of Interest - Information Security – Is it an Art or a Science. The Need for Security: Introduction – Business Needs First – Threats – Attacks – Secure Software Development.

UNIT – 2 RISK MANAGEMENT &PLANNING
Introduction – An overview of Risk Management – Risk Identification – Risk Assessment – Risk control Strategies – Selecting a Risk control Strategy – Quantitative versus qualitative risk control practices - Risk Management Discussion Points – Recommended Risk Control Practices. Planning for Security: Introduction – Information Security Policy, Standards and Practices – The Information Security Blueprint – Security Education, Training and Awareness Program – Continuity Strategies. Security Technology: Firewalls and VPNs: Introduction – Physical Design – Firewalls – Protecting Remote Connections.

UNIT – 3 SECURITY TECHNOLOGY
Introduction – Intrusion Detection and Prevention System (IDS and IPSs) – Honey Pots, Honey Nets and Padded Cell Systems – Scanning and Analysis Tools – Access Control Devices. Cryptography: Introduction – Foundations of Cryptology – Cipher Methods – Cryptographic Algorithms – Cryptographic Tools.

UNIT – 4 SECURITYIMPLEMENTATION

Physical Security: Introduction – Physical Access Controls – Fire Security and Safety – Failure of Supporting Utilities and Structural Collapse – Interception of Data – Mobile and Portable Systems – Special Considerations for Physical Security Threats. Implementing Information Security: Introduction – Information Security Project Management – Technical Topics of Implementation – Non technical Aspects of Implementation – Information Systems Security Certification and Accreditation.

UNIT – 5 SECURITY AND INFORMATION SECURITY

SecurityandPersonnel:Introduction–Positioning&StaffingtheSecurityFunction–
Credentials of Information Security Professionals – Employment Policies and Practices – Security Considerations for Nonemployees – Internal Control Strategies – Privacy and the Security of Personal Data. Information Security Maintenance: Introduction – Security Management Models – The Maintenance Model – Digital Forensics.

TEXT BOOK:

1. Principles and Practices of Information Security – Dr Michael E.Whitman, CISM, CISSP Herbert J.Mattord, CISM, CISSP – Cengage Learning India Private Limited, Indian fourth edition Reprint , 2010.

MULTIMEDIA

COURSE OBJECTIVES:
- To define the principles, characteristics and forms of Visual Design in Multimedia Development.
- To define the role of Visual Reading Elements.
- To learn how to use multimedia software.

COURSE OUTCOMES:
- Describe different realizations of multimedia tools and the way in which they are used.
- Analyse the structure of the tools in the light of low-level constraints imposed by the adoption of various QoS schemes (ie bottom up approach).
- Plan experiments to test user perception of multimedia tools.

UNIT - 1 MULTIMEDIA FUNDAMENTALS

Basic concepts - Multimedia applications Design consideration – Multimedia Application Goals & Objectives –Opportunities in multimedia production: Important

in Multimedia development Application Design and production.

UNIT - 2 MULTIMEDIA APPLICATION
Structure and organization: Considering Interface design – Planning the production of your Application – Creating multimedia building blocks.

UNIT - 3MULTIMEDIA PRESENTATION
Building blocks: Text - Graphics.

UNIT - 4 OTHER MULTIMEDIA TOOLS
Multimedia presentation building blocks: video capturing, Sound Capturing and Editing.

UNIT - 5 STRUCTURE AND FUNCTION OF AUTHORING SOFTWARE
Authoring software, selection of authoring program - Fundamentals of Macromedia Director 5.0

TEXT BOOK:
1. Multimedia An Introduction- John Villain – Casanova- Louis Molina Prentice –Hall/Macmillan Computer Publishing, Reprint.

REFERENCE BOOK:
1. Multimedia: Making it works – Tay Vaughan, 6th Edition, TataMcGraw-Hill.

PERSONALITY DEVELOPMENT

UNIT I: INTRODUCTION
Concept of personality - Dimensions of personality – Significance & Stages of personality development - Elements of Success

UNIT II POSITIVE ATTITUDE & SELF-MOTIVATION
Attitude - Concept - Significance - Factors affecting attitudes - Positive attitude – Advantages –Negative attitude- Disadvantages - Ways to develop positive attitude - Differences between personalities having positive and negative attitude. Concept of motivation - Significance – Internal and external motives - Importance of self-motivation-Factors leading to de-motivation

UNIT III SELF DEVELOPMENT SKILLS
Emotional Adjustment - Self-Awareness – Self-esteem - Self-Confidence - Stress CopingAbility – Time Management

UNIT IV SOCIAL SKILLS DEVELOPMENT

Assertiveness - Interpersonal Relationship – Problem Solving - Decision Making - ConflictResolution

UNIT V SERVICE ORIENTATION & EMPLOYABILITY QUOTIENT

Social Concern - Value System and Culture; Resume building- Developing Group DiscussionSkills – Facing the Mock Interview Sessions

Text Books:

1. Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill.
2. Bhatia, R. C. (2010). Personality Development, Ane Books Pvt. Ltd., Chennai.
3. Aurther, J. (2006). Personality Development. Lotus Press, New Delhi.

Reference Books:

1. Andrews, Sudhir. How to Succeed at Interviews. 21st (rep.) New Delhi.Tata McGraw-Hill 1988.
2. Stephen P. Robbins and Timothy A. Judge (2014), Organizational Behavior 16th Edition: Prentice Hall.
3. Hindle, Tim. Reducing Stress. Essential Manager series. Dk Publishing, 2003
4. Mile, D.J Power of positive thinking. Delhi. Rohan Book Company, (2004).
5. Pravesh Kumar. All about Self- Motivation. New Delhi. Goodwill Publishing House.2005.
6. Seven Habits Of Highly Effective People – Stephen Covey
7. You Can Win – Shiv Khera

EFFECTIVE COMMUNICATION

Objectives:
- To impart effective communication skills to enrich students' personality development and self confidence
- To enhance the students' employability skills
- The courses will help to bridge the gap between the skill requirements of the employer or industry and the competency of the students

Teaching Methodology:
Lectures, Practical classes, Video, Public speaking, Group Discussion and Case Studies

Unit – I Introduction
Introduction to Communication, Flow of Communication, Elements of Communication and their characteristics - Models of Communication - Barriers to Communication, How to overcome barriers of communication.

Unit – II Understanding Human Communication
Types of Communication transactions, Culture and communication- Signs, symbols and codes in communication, Tools of communication (Oral, written, one way, two way, verbal and nonverbal, vertical and horizontal and lateral) Business communication-Body language.

Unit – III Effective Communication
Concept, nature and relevance to communication process: - Empathy - Persuasion - Perception - Listening - Learning and Audio-Visual Aids- concept and classification

Unit – IV Language and Communication
Listening skills– Etiquette (Personal, social, telephone, email and global), Types of Listening, Barriers to Effective Listening & Traits of a Good Listener, Language for Communication: Language and Communication; General Principles of Writing; Improving Writing Skills, Essentials of good style, Expressions and words to be avoided

Unit – V Employment Communication
Soft Skills: Empathy - Intrapersonal skills - Interpersonal skills - Problem solving – Reflective thinking - Critical thinking - Negotiation skills, Employment Communication – Resume:Contents of Good Resume; Job Interview- Job Interview Techniques- Manners and etiquettes tobe maintained during an interview; and Presentation skills.

References:
- SOFT SKILLS, 2015, Career Development Centre, Green Pearl Publications.
- Barker, L. (1990). "Communication", New Jersey: Prentice Hall, Inc; 171.
- Devito, J. (1998) Human Communication. New York: Harper & Row.
- Patri and Patri (2002); Essentials of Communication. Greenspan Publications