

**VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (AUTONOMOUS)
VISAKHAPATNAM**

**PROGRAM STRUCTURE AND DETAILED SYLLABUS FOR
MCA
I YEAR - I SEMESTER**

(Applicable for the batches admitted from 2019-2020 onwards)

PROGRAM STRUCTURE MCA (VR-19)
Department: Master of Computer Applications (MCA)

MCA 1st Year (I-Semester)

S. No	Subject Code	Name of the Subject	Theory	Tutorial	Practical	Credits
1	4098191100	C Programming and Data Structures	3	1*	0	3
2	4098191101	Digital Computer Fundamentals	3	1*	0	3
3	4098191102	Discrete Mathematical Structures and Graph Theory	3	1*	0	3
4	4098191103	Accounting and Financial Management	3	1*	0	3
5	4098191104	Professional Communication	3	1*	0	3
6	4098191110	English Language Communication Skills Lab	0	0	4	2
7	4098191111	C Programming and Data Structures Lab	0	0	4	2
8	4098191112	IT Workshop Lab	0	0	4	2
Total Credits						21

Autonomous Course Structure (VR-19)

For the Academic Year 2019-20

(I MCA I Semester Syllabus)

Subject Code	C PROGRAMMING & DATA	L	T	P	Credits
4098191100	STRUCTURES	3	1	0	3

Course Overview and Objectives:

- Students will learn how to analyze the problem and writing a code for given algorithm
- Students will learn different operators, control structures and familiarize with the large number of built-in functions available in C language
- Students will learn the various data structure concepts like searching, sorting, stack, queue etc.

Course Outcomes:

	Course outcome	Cognitive Level as per Bloom's Taxonomy	PO number mapped
CO1	Analyze problems and develop solutions by writing algorithms.	Remember/ Understand	PO1,PO2
CO2	Design various dynamic allocation memory programs.	Understand & Apply	PO1,PO2,PO3
CO3	Develop simple real-time applications to get familiarity of the programming environment.	Apply	PO2, PO3,PO5
CO4	Solve problems using various data structures like linear list, stack, queue, tress and graphs	Create	PO2,PO3,PO4, PO5,PO12

UNIT-I:

C Basics And Control Structures

Computer Basics: Introduction to Computers, HW and SW Concepts, Problem Solving Techniques, Program Development Steps, **C BASICS:** Basic structure of C Program, History of C, identifiers, basic data types and sizes, constants, variables, different types of operators, type conversions, expressions, precedence and order of evaluation.

Control Structures: if statement- switch and go to statement, labels and looping statements.

Outcome:

Analyze problems and develop solutions by writing algorithms.

Activity:

Writing algorithms and programs for real-time problems.

UNIT-II:

Arrays, Strings And Functions:

Arrays: Basic concepts of arrays- declaration, definition, accessing elements, storing elements, 1-D arrays, 2-D arrays,

Strings: String concepts, String manipulations, character arrays, multi-dimensional arrays, and string handling functions.

Functions: Basic concepts on functions, types of functions, categories of functions, Function parameters, Parameter passing techniques, scope rules, block structure, Storage classes, Recursion concept, recursive functions.

Outcome:

Arrays, strings and functions are used to solve real time problems.

Activity:

Writing functions using modularity concepts.

UNIT-III:**Pointers, Structures And Unions**

Pointers: Definition, declaration and initialization of pointer variables, the & and * operators, void pointer, pointer-to-pointer, pointers and function arguments, passing by address, character pointer and functions, pointer and multidimensional arrays, dynamic memory management functions, array of pointer, command line arguments.

Structures And Unions: Definition, initialization, accessing structure elements, array of structures and array within the structure, nested structures, self-referential structure, Union's concept, differences between structures and unions, type-def, bit fields, enum data type.

Files: Concepts of a files, text and binary files, opening and closing a file, file I/O operations, formatted I/O operations.

Outcome:

Design various dynamic allocation memory programs.

Activity:

Allocation of memory for different data types using DMA

UNIT-IV:**Data Structures : Stacks And Queues****Data Structures:**

Introduction to Data Structures, Time complexity, Space complexity, Pattern matching, naïve method, Robin Karp Algorithm-Searching-Linear and Binary Search methods, Sorting- Bubble sort, selection sort, insertion sort, quick sort, merge sort.

Stacks And Queues:

Stack concept, applications of stack-infix to postfix conversion, postfix expression evaluation, implementation of stack using array- Queue concept, types of queues, applications of queues, queue implementation using array.

Outcome:

Solve problems using various data structures like linear list, stack, queue, tree and graphs

Activity:

Calculating time and space complexity for various Data structures concepts.

UNIT-V:

Linked lists, trees and graphs

Linked lists:

Singled linked lists, doubly linked lists, circular linked list, linked stack and linked queue.

Trees:

Basic concepts of trees, binary trees, terminology, representation, traversals,

Graphs:

Graphs- terminology, representation, graph traversals, (dfs & bfs)-Dijkstra-Kruskal-Prims Algorithms only.

Outcome:

Develop simple real-time applications to get familiarity of the programming environment.

Activity:

Real-time problems can be solved using Graphs.

Text Books:

1. C and Data Structures: A snapshot oriented treatise using live engineering examples, N B Venkateswarlu, E. V Prasad, S Chand & Co.
2. Computer science, A structured programming approach using C, B.A. Forouzan and R. F. Gilberg, Third edition, Thomson.

Reference Books:

1. Fundamentals of Data Structures in C , Horowitz, Sahni, Anderson- Freed, 2nd ed., universities Press, 2008.
2. The C Programming Language, B.W. Kernighan, Dennis M. Ritchie, PHI/ Pearson.
3. Data Structures Using C , A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/ Pearson
4. C Programming and Data Structures, E Balaguruswamy, TMH, 2008.

Subject Code**4098191101****DIGITAL COMPUTER
FUNDAMENTALS****L T P Credits****3 1 0 3****Course Overview:**

This course focuses on the fundamental theory and techniques of electronic data processing and includes binary arithmetic, Boolean algebra, and the design, analysis, and applications of combinational and sequential digital circuits.

Course Objectives:

The course aims to teach a student the fundamental components used in a Digital Computer and its functioning.

	Course outcome	Cognitive Level as per Bloom's Taxonomy	PO number mapped
CO1	Identify the logic gates and their functionality.	Remember/Understand	PO1,PO2
CO2	Perform number conversions from one system to another system.	Understand/Apply	PO1,PO2,PO3
CO3	Design basic electronic circuits (combinational circuits).	Apply	PO2, PO3,PO5
CO4	Perform a comparative analysis of the components of different memory units.	Create	PO2,PO3,PO4,PO5, PO12

UNIT – I:

Number System And Codes:

Decimal Numbers, Binary Numbers, Decimal to binary Conversions, Binary Arithmetic, 1's and 2's complements of Binary Numbers, Signed Numbers, Arithmetic Operations with Signed numbers, Hexadecimal Numbers, Octal Numbers, Digital Codes, Error Detection Codes.

Outcome:

Perform number conversions from one system to another system

UNIT – II:

Logic gates:

The Inverter, The AND gate, The OR gate, The NAND gate, NOR gate, The Exclusive-OR gate and Exclusive-NOR gate; Boolean Algebra and Logic Simplification - Boolean Operations and Expressions, Laws and Rules, DeMorgan's Theorems, Boolean Expressions and Truth tables, The Karnaugh Map, SOP minimizations.

Outcome:

Identify the logic gates and their functionality

UNIT – III:

Combinational Logic Analysis: Basic combinational Logic Circuits, Implementing Combinational Logic, The Universal Property of NAND and NOR Gates. Functions of Combinational Logic - Basic Adder, Parallel Binary Adders, Comparators, Decoders, Encoders, Code Converters, Multiplexers, Parity Generator/Checkers.

Outcome:

Design basic electronics circuits (combinational circuits)

UNIT – IV:

Latches And Flip-Flops:

Latches, Edge Triggered Flip-Flops, Flip-Flop Operating characteristics, Flip-Flop Applications, Shift Registers, Counters: Asynchronous Counters, Synchronous counters.

Outcome:

Learn how the basic types of latches and flip flops operate and how you can use them in your circuit.

UNIT – V:

Memory And Storage:

Memory Basics, The RAM, The ROM, Programmable ROMs, The Flash Memory, Memory Expansion, Special Types of Memories, Magnetic and Optical Storage, PLDs – PROM, PAL and PLA.

Outcome:

Perform a comparative analysis of the components of different memory units

Text Book:

Floyd, Thomas L, “Digital Computer Fundamentals”, 10th Edition, University Book Stall, 1997.

Reference Books:

1. Malvino, Paul Albert and Leach, Donald P, “Digital Principles and Applications”, 4th Edition, TMH, 2000.
2. Malvino, Paul Albert and Leach, Donald P, “Digital Computer Fundamentals”, 3rd Edition, TMH, 1995.
3. Bartee, Thomas C, “Digital Computer Fundamentals”, 6th Edition, TMH, 1995.

Subject Code	DISCRETE MATHEMATICAL STRUCTURE AND GRAPH THEORY	L	T	P	Credits
4098191102		3	1	0	3

Course Description and Objectives:

The purpose of this course is to provide the students with solid foundations in the basic concepts of counting techniques, mathematical logic, predicates, graph theory concepts, and algorithms. The main objective of the course is to teach the students how to implement the concept and how to design the given data and algorithms that are appropriate for problems that they might encounter. This course is also about showing the correctness of algorithms and studying their computational complexities. This course offers the students a mixture of theoretical knowledge and practical experience. The study of Mathematical foundation of computer science is carried out with Mathematical concepts like Mathematical methods, Engineering Mathematics etc.

Course Objectives:

- To describe the importance and limitations of predicate logic
- To perform the operations associated with sets, functions and relations.
- To introduce basics of counting techniques.
- Familiarise closed form solution of linear recurrence relations by various methods.
- To bring awareness of basic concepts of Graphs, Trees, spanning trees, minimal spanning trees and explaining related algorithms.

Course Outcomes:

At the end of the course, the student will be able to

	Course outcome	Bloom's taxonomy	Bloom's Taxonomy Level	PO
CO1	Analyze logical structure and able to Apply inference theory to verify the consistence of data.	Applying	L3	PO1, PO2
CO2	Construct Hasse diagram and Understand concept of recursive functions.	Understanding	L2	PO1, PO2
CO3	Understand different counting techniques.	Understanding	L2	PO1, PO2
CO4	Apply different methods to solve homogeneous and non-homogeneous recurrence relations.	Applying	L3	PO1, PO2
CO5	Apply graph theory concepts in core subjects such as data structures and network theory effectively.	Applying	L3	PO1,PO2, PO3

UNIT – 1:

Mathematical Logic:

Statements and notations, Connectives, Well formed formulas, Truth tables, tautology, equivalence implication, Normal forms, Theory of inference for the statement calculus, Rules of inference, Consistency of premises and indirect method of proof, Predicate calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus.

UNIT-II:

Relations: Introduction,

Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial ordering, Hasse diagram, Lattice and its Properties.

Functions: composition of functions, Inverse Function, Recursive Functions.

UNIT-III:

Elementary Combinatorics:

Basis of counting, Enumeration of Combinations & Permutations, Enumerating of Combinations & Permutations with repetitions and constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, principles of Inclusion –Exclusion

UNIT-IV:

Recurrence Relations:

Generating Function of Sequences, Calculating Coefficient of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, The method of Characteristic roots, Solution of Inhomogeneous Recurrence Relation.

UNIT-V:

Graph Theory:

Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees, Planar Graphs, Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs.

Textbooks:

1. Discrete Mathematical Structures with Applications to computer science J.P Trembley, R.Manohar, TMH
2. Discrete Mathematical for computer Scientists & Mathematicians “ J.L. Molt, A.Kandel,
3. T.P.Baker, PHI.

Reference textbooks:

1. Elements of Discrete Mathematics, C L Liu, D P Mohanpatra, TMH
2. Discrete Mathematics, Schaum's Outlines, Lipschutz, Lipson, TMH. Discrete Mathematical Structures, Kolman, Busby, Ross, 6th ed., PHI, 2009
3. Discrete Mathematics, Johnsonbaugh, 6th ed., Pearson, 2005
4. Discrete Mathematics, Malik, Sen, 6th ed., Cengage Learning, 2004
5. Discrete Mathematics for computer science, Bogart, Stein and Drysdale, Springer, 2005.

Subject Code	ACCOUNTING AND FINANCIAL MANAGEMENT	L	T	P	Credits
4098191103		3	1	0	3

Course Description:

Management accounting or managerial accounting is the process of identifying, analyzing, recording and presenting financial information that is used for internally by the management for planning, decision making and control. In contrast to financial accounting, managerial accounting is concerned with providing helpful information and reports to internal users such as managers and entrepreneurs etc. so that they can control and plan the business activities.

Financial management refers to the efficient and effective management of money (funds) in such a manner as to accomplish the objectives of the organization. It is the specialized function directly associated with the top management. The significance of this function is not seen in the 'Line' but also in the capacity of 'Staff' in overall of a company. It has been defined differently by different experts in the field. The term typically applies to an organization or company's financial strategy, while personal finance or financial life management refers to an individual's management strategy.

Course Objectives:

The objectives of the course are:

1. To learn the concept and the role of accounting.
2. To know the systems of accounting.
3. To understand and the Preparation of trail balance – Final accounts.
4. To understand the concept of financial management.
5. To learn the concept of cost of capital.
6. To understand the capital structure
7. To able to know the cost accounting.
8. To learn the total computerized accounting system.

Course Outcomes:

	Course outcome	Skill	PO
CO1	To identify the need and the role of accounting in present modern business.		
CO2	To have capabilities to preparation of trail balance – Final accounts.		
CO3	Financial management role and objectives of the business.		
CO4	To explain the Importance of the cost behavior		
CO5	Use of the standard costing and budgeting in present business level.		

UNIT-I:

Introduction of accounting:

Meaning of accounting-Book keeping Vs Accounting - – Objectives of accounting- Users of accounting information-Branches of accounting.

Definition of financial accounting – Principles of accounting (GAAP) - Classification of accounts-Accounting Cycle – Preparation of Book of Original entry, Ledger, Trial balance – Final.Accounts with Simple adjustments.

UNIT-II:

Financial Management:

Nature and Scope and Objectives of Financial Management. Firms Missions and Objectives-function of FM- Profit Maximization Vs Wealth maximization Vs EPS Maximization – Role of Financial Manager.

UNIT-III:

Cost accounting:

Meaning of cost - Elements of cost - Methods of Costing, Techniques of Costing - Role of Cost accounting - Financial accounting Vs Cost accounting Vs Management Accounting – Concept of BEP analysis – CVP Analysis.

UNIT-IV:

Standard costing and budgeting :

Meaning - Nature, scope of Standard Costing and the concept of variance analysis – materials variance, labor variance and sales variance – The concept of Budget - cash budget, sales - budget – flexible Budgets, master budgets.

UNIT-V:

Introduction to Computerized Accounting System:

Definition - Importance - Merits and Demerits of CAS – Importance coding logic and codes, master files, transaction files- Documents used for data collection, processing of different files and Outputs obtained.

Text books:

- 1 Accounting for Managers, P. Vijaya Kumar, and Himalaya Publications.
2. Accounting for Management. Vijaya Kumar.TMH.
3. Financial Accounting, S.N Maheswari and S.K. Maheswari, Vikas.
4. Financial Accounting, A. Mukherjee and M. Heneef, TMH.

Subject Code	PROFESSIONAL COMMUNICATION	L	T	P	Credits
4098191104		3	1	0	3

Course Overview:

In this course students will read, analyze, and interpret material from general and technical fields, and will practice reading, writing, listening and speaking skills on a variety of contemporary topics.

Course Objectives:

- To introduce students to the specific use of English for Technical Communication.
- To develop the overall English proficiency of students and enable them to function effectively in different professional contexts.
- To strengthen student skills in the areas of reading, writing, listening and speaking and enable them to function effectively in their professional sphere

Course outcomes:

	Course outcome	Cognitive Level as per Bloom's Taxonomy	PO number mapped
CO1	The students will be able to read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources, Social Awareness	Understanding and Applying	PO7,PO1,PO10,P O6,PO12
CO2	The students will be able to analyze the functions of language and grammar in spoken and written forms.	Applying and Analyzing	PO10,PO12,PO5
CO3	The students will be able to write effectively on various domains.	Applying and Creating	PO10,PO12
CO4	The students will be able to prepare and exhibit oral presentation skills by using ICT.(Individual/Team)	Applying and Creating	PO10,PO12,PO9, PO5

UNIT – I:

Reading Text: ENVIRONMENTAL CONSCIOUSNESS (Green Cover, Pollution)

Grammar: Articles, Prepositions

Vocabulary: Root, Prefixes and Suffixes

Writing: Letter writing (formal)

UNIT – II:

Text: GETTING JOB-READY (SWOT Analysis of Indian Software Industry, Arvind Mills)

Grammar: Tenses

Vocabulary: Words often confused

Writing: Paragraph writing (Descriptive and narrative)

UNIT – III:

Text: TRAVEL AND TOURISM (Ten Reasons why travel is a Waste of Time, Tourism in India: Role of Conflict and Peace)

Grammar: Subject-Verb agreement, Sentence construction

Vocabulary: Idioms and phrases

Writing: Report writing (Formal)

UNIT – IV:

Reading Text : LESSONS FROM THE PAST (Importance of History, Modern Corporatism)

Grammar: Sentence transformation (Degrees of Comparison, Voice)

Vocabulary: Phrasal verbs

Composition: Note-Making & Note Taking

UNIT – V:

Text: MEDIA MATTERS (The Evolution of Media, The Top Ten Developments in Journalism in the 2000s)

Grammar: Common errors

Vocabulary: One-word substitutes

Composition: E-mail Writing, Making advertisements

Text Book:

1. “Mindscapes - English for Technologists and Engineers”, Orient Black Swan, 2012.

Reference Books:

1. V. R. NarayanaSwamy, “Strengthen Your Writing”, 1st edition, Orient Longman, 2003.
2. Thomas Elliott Berry, “The Most Common Mistakes in English Usage”, 1st edition, Tata McGraw Hill, 2004.
3. T. Balasubramanian, “A Textbook of English Phonetics for Indian Students”, Macmillan Ltd., 2000.
4. Sasikumar.V and P.V. Dhamija,. “Spoken English: A Self-Learning Guide to Conversation Practice”, 34th Reprint, Tata McGraw Hill, New Delhi, 1993.
5. Margaret M Maison, “Examine Your English”, 1st edition, Orient Longman, 1999.
6. Ashraf Rizwi, “Effective Technical Communication”, Tata McGraw Hill, 2005.

Subject Code	ENGLISH LANGUAGE COMMUNICATION SKILLS LAB	L	T	P	Credits
4098191110		0	0	4	2

Course objectives:

- Apply the critical and creative thinking abilities necessary for effective communication in today's modern world;
- Organize and express ideas in writing and speaking to produce messages suitably tailored for the topic, objective, audience, communication medium and context;
- Demonstrate clarity, precision, conciseness and coherence in your use of language.

Course Outcomes:

- Use English language fluently, accurately and appropriately.
- Demonstrate skills in Reading, listening comprehension, GDs and Interview.
- Read and answer questions (orally and in writing) based on passages.
- Show effective writing skills in academic and professional contexts.

Experiments:

1. Just A Minute
2. Situational Dialogues
3. Introduction to Phonetics
4. Reading Comprehension-Practice
5. Listening comprehension –Practice
6. Debate
7. Writing Skills –Letter Writing
8. Writing Skills – Speech Writing.

Recommended Books:

1. Simon Sweeny, English for Business Communication, CUP, First South Asian Edition, 2010.
2. Dr A Ramakrishna Rao, Dr. G. Natanam & Prof SA Sankaranarayanan, English Language Communication: A Reader cum Lab Manual, Anuradha Publications, Chennai, 2006
3. Dr. Shalini Verma, Body Language- Your Success Mantra S. Chand, 2006.
4. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill Publishing Company Ltd. 2005

Subject Code	C PROGRAMMING & DATA STRUCTURES LAB	L	T	P	Credits
4098191111		0	0	4	2

Course Objectives:

- To learn/strengthen a programming language like C, To learn problem solving techniques
- To introduce the student to simple linear and non linear data structures such as lists, stacks, queues, etc.,

Recommended Systems / Software Requirements:

- Intel based desktop PC, ANSI C Compiler with Supporting Editors, IDE's such as Turbo C, Bloodshed C.

Course Outcomes:

- Able to write programs in C Language
- Develop logical and analytical thinking in C
- Knowledge in writing programs in various concepts like arrays, functions, pointer etc.
- How to read and write contents from or into a file

Exercise 1

- Write a C Program to find the sum of individual digits of a positive integer.
- A Fibonacci sequence is defined as follow: the first second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C Program to generate the first n terms of the sequence.
- Write a C Program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
- Write a C Program which checks a given integer is Fibonacci number or not.

Exercise 2

- Write a C Program to calculate the following sum:
$$\text{sum} = a - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- Write a C program to find the roots of a quadratic equation.
- Write a C Program to implement Newton Raphson method for a quadratic equation

Exercise 3**a) Write a C Program that use both recursive and non-recursive functions**

- (i) To find the factorial of a given number
- (ii) To find the GCD (greatest common divisor) of two given integers.
- (iii) To Solve Towers of Hanoi problem
- (iv) To generate Fibonacci sequence

Exercise 4**a) The total distance travelled by vehicle in 't' seconds is given by distance = $ut + \frac{1}{2}at^2$**

where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec²). Write a C Program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations values of 'u' and 'a'.

b) Write a C program, which takes two integer operands and one operator form the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)**Exercise 5****a) Write a C program to find both the largest and smallest number in a list of integers.****b) Write a C program that uses functions to perform the following:**

- i) Addition of Two Matrices.
- ii) Multiplication to Two Matrices.
- iii) Checking symmetry of a square matrix
- iv) Calculating transpose of a matrix in-plane manner.

Exercise 6**a) Write a C program to determine if the given string is a palindrome or not.****b) Write a C program to count the lines, words and characters in a given text.****c) Write a C program to swap two numbers using pointers****d) Write a C program to find the reverse of a given string using pointers.****Exercise 7**

Write a C program that uses functions to perform the following operations using Structure:

- i) Reading a complex number ii) Writing a complex number
- iii) Addition of two complex numbers iv) Multiplication of two complex numbers

Exercise 8

- a) Write a C program which copies one file to another.
- b) Write a C program to reverse the first n characters in a file using command line arguments

Exercise 9

- a) Write C program that use both recursive and non recursive functions to perform Linear search for a Key value in a given list.
- b) Write C program that use both recursive and non recursive functions to perform Binary search for a Key value in a given list.
- c) Write C program that use both recursive and non recursive functions to perform Fibonacci search for a Key value in a given list.

Exercise 10

- a) Write C program that implement Bubble sort, to sort a given list of integers in ascending order
- b) Write C program that implement Quick sort, to sort a given list of integers in ascending order
- c) Write C program that implement Insertion sort.

Exercise 11

- a) Write C program that implement stack (its operations) using arrays
- b) Write C program that implement stack (its operations) using Linked list

Exercise 12

- a) Write a C program that uses Stack operations to convert infix expression into postfix expression
- a) Write C program that implement Queue (its operations) using arrays.
- b) Write C program that implement Queue (its operations) using linked lists

Exercise 13

- a) Write a C program that uses functions to create a singly linked list
- b) Write a C program that uses functions to perform insertion operation on a singly linked list
- c) Write a C program that uses functions to perform deletion operation on a singly linked list

Exercise 14

- a) Adding two large integers which are represented in linked list fashion.
- b) Write a C program to reverse elements of a single linked list.
- c) Write a C program to store a polynomial expression in memory using linked list
- d) Write a C program to representation the given Sparse matrix using arrays.
- e) Write a C program to representation the given Sparse matrix using linked list

Exercise 15

- a) Write a C program to create a Binary Tree of integers
- b) Write a recursive C program for traversing a binary tree in preorder, inorder and postorder.
- c) Write a non recursive C program for traversing a binary tree in preorder, inorder and postorder.

Exercise 16

- a) Write a C program to create a BST
- b) Write a C program to insert a node into a BST.
- c) Write a C program to delete a node from a BST.

Subject Code	IT WORKSHOP LAB	L	T	P	Credits
4098191112		0	0	4	2

Course Description and Objectives:

This course aims at enabling a student to understand basic digital computer hardware and software office tools through practical exposure.

Course Outcomes:

The Student will be able to:

- Identify the basic peripherals, assembling a Personal Computer, Installation of system software like MS Windows, device drivers.
- Troubleshoot Hardware and software.
- Analyze different ways of hooking the PC on to the internet from home and workplace effectively, Usage of the internet, web browsers, email, newsgroups and discussion forums.
- Get awareness about “Cyber hygiene” (protecting the personal computer from getting infected with viruses), worms and other cyber-attacks.
- Crafting professional word documents, Excel spread sheets, Power point presentations and personal web sites using the Microsoft suite of office tools.

(**Note:** Student should be thoroughly exposed to a minimum of 12 Tasks)

PC Hardware**Task 1:**

Identification of the peripherals of a computer. To prepare a report containing the block diagram of the CPU along with the configuration of each peripheral and its functions. Description of various I/O Devices.

Task 2:

A practice on disassembling the components of a PC and assembling them to back to working condition.

Task 3:

Examples of Operating systems- DOS, MS Windows, Installation of MS windows on a PC.

Task 4:

Introduction to Memory and Storage Devices , I/O Port, Device Drivers, Assemblers, Compilers, Interpreters , Linkers, Loaders.

Task 5:

- Hardware Troubleshooting (Demonstration): Identification of a problem and fixing a defective PC(improper assembly or defective peripherals).
- Software Troubleshooting (Demonstration):. Identification of a problem and fixing the PC for any software issues. Internet & Networking Infrastructure

Task 6:

Demonstrating Importance of Networking, Transmission Media, Networking Devices- Gateway, Routers, Hub, Bridge, NIC ,Bluetooth Technology, Wireless Technology, Modem, DSL, Dialup Connection. Orientation & Connectivity Boot Camp and web browsing: Students are trained to configure the network settings to connect to the Internet. They are trained to demonstrate the same through web browsing (including all tool bar options) and email access.

Task 7:**Search Engines & Netiquette**

Students are enabled to use search engines for simple search, academic search and any other context based search (Bing, Google etc). Students are acquainted to the principles of micro-blogging, wiki, collaboration using social networks, participating in online technology forums.

Task 8:**Cyber Hygiene (Demonstration)**

Awareness of various threats on the internet. Importance of security patch updates and anti-virus solutions. Ethical Hacking, Firewalls, Multi-factor authentication techniques including Smartcard, Biometrics are also practiced.

Word**Task 9 :****MS Word Orientation**

Accessing, overview of toolbars, saving files, Using help and resources, rulers, formatting ,Drop Cap , Applying Text effects, Using Character Spacing, OLE in Word, using templates, Borders and Colors, Inserting Header and Footer, Using Date and Time option, security features in word, converting documents while saving.

Task 10:**Creating project**

Abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.

Excel**Task 11:**

Using spread sheet features of EXCEL including the macros, formulae, pivot tables, graphical representations. Creating a Scheduler – Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Lookup/Vlookup**Task 12:**

Performance Analysis – Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

Power Point**Task 13:**

Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting –Images, Clip Art, Tables and Charts in

Power Point.**Task 14:**

Focusing on the power and potential of Microsoft power point. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: – Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides, OLE in PPT.

Text Books:

1. Anita Goel, “Computer Fundamentals”, 1st Edition, Pearson, 2010
2. Scott. Mueller, “Upgrading and Repairing PCs”, 18th Edition, Pearson, 2008.

Reference Books:

Dr. N.B. Venkateswarlu, “Essential Computer and IT Fundamentals for Engineering and Science Students”, 1st Edition, S. Chand, 2010.

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (AUTONOMOUS)

VISAKHAPATNAM

ACADEMIC REGULATIONS for MCA (Regular)

Effective for the students admitted into first year from the Academic year 2019-20 and onwards

**PROGRAM STRUCTURE AND DETAILED SYLLABUS FOR
MCA I YEAR II SEM SYLLABUS**

MCA 1st Year (II-Semester)

S. No	Subject Code	Name of the Subject	Theory	Tutorial	Practical	Credits
1	4098191200	OOPS Through JAVA	3	1*	0	3
2	4098191201	Operating Systems	3	1*	0	3
3	4098191202	Software Engineering	3	1*	0	3
4	4098191203	Operations Research	3	1*	0	3
5	4098191204	Database Management Systems	3	1*	0	3
6	4098191210	OOPS Through JAVA Lab	0	0	4	2
7	4098191211	Database Management Systems Lab	0	0	4	2
8	4098191212	Operating System Lab	0	0	4	2
Total Credits						21

Autonomous Course Structure (VR-19)

For the Academic Year 2019-20

(I MCA II Semester Syllabus)

Subject Code	OOPS THROUGH JAVA	L	T	P	Credits
4098191200		3	1	0	3

Course Overview:

Java is the most popular platform, which is used to develop several applications for the systems as well as embedded devices like mobile, laptops, tablets and many more. It is an object oriented programming language. It provides a virtual machine, which is accumulated with byte-code and can run on any system. With time the importance and popularity of Java is on rise as it has the magic in its remarkable abilities to innovate and morph as the technology landscape changes. It is the language of choice for developing applications for the BlackBerry Smartphone. There is huge scope for this programming language.

Course Objectives:

This course aims at applying the concepts of Object-Oriented programming in Java, its importance in finding solutions for specific problems. The properties of Object-Oriented systems can be experienced by designing Object-Oriented applications.

Course outcomes:

	Course outcome	Skill	PO
CO1	Apply OOP concepts and basics of Java programming.	Remember/Understand	PO1,PO2
CO2	Use the concepts of Java programming in problem solving.	Remember/Understand	PO1,PO2,PO3
CO3	Extend the knowledge of Java programming in developing futuristic applications.	Apply	PO2, PO6,PO12

UNIT – I:

Java Concepts:

Creation of Java, Byte code, Java buzzwords, OOP Principles- Encapsulation, Inheritance and Polymorphism, Compiling and running of simple Java program, Data types, Variables, declaring variables, Dynamic initialization, Scope and life time of variables, Arrays, Operators, Control statements.

Outcome:

Student can able to install java software and write a basic program in java.

Activity:

Seminar

UNIT – II:

Classes and objects:

Class fundamentals, Declaring objects, Assigning object reference variables, Introducing methods, Constructors, the ‘this’ keyword, Garbage collection, ‘finalize’ method, Overloading methods and Constructors, Call by value, Recursion.

Outcome:

Student can able to learn and use methods, keywords in programming.

Activity:

Class test/seminar

UNIT – III:

Inheritance And Packages:

Access control, Usage of ‘static’ with data and methods, Usage of ‘final’ with data, exploring the String class, using command line arguments; Basic concepts of inheritance - Member access rules, Usage of super key word, Forms of inheritance, Method overriding, Abstract classes, Dynamic method dispatch, Using final with inheritance, the Object class; Defining, Creating and Accessing a Package, Understanding CLASSPATH, Importing packages.

Outcome:

Student can learnt about the inheritance and package concepts.

Activity: Class test/seminar

UNIT – IV:

Interfaces And Exception Handling:

Defining an interface, Implementing interfaces, Applying interfaces, Variables in Interfaces, Extending Interfaces; Exception handling concepts - Types of exceptions, Usage of try, Catch, Throw, Throws and Finally keywords, Built-in Exceptions, Creating own exception sub-classes.

Outcome:

Student can able to write programs by using interfaces and exception handling

Activity:

Class test/seminar.

UNIT – V:

Multithreading:

Thread Introduction, Thread class, Runnable Interface, Extending Thread, Creating Multiple Threads, Is Alive(),Join(), Thread priorities, Synchronization. Inter thread communication, Deadlock, Suspending, resuming and stopping Threads.

Outcome:

Students can learnt multi threading concept.

Activity:

Seminar/class test

Text Book:

1. Herbert Schildt, “The Complete Reference Java J2SE”, 7th ed., TMH Publishing Company Ltd, New Delhi, 2008.

Reference Books:

1. Cay Horstmann, “Big Java”, 2nd ed., John Wiley and Sons, 2006.
2. Joe Wiggles worth and Paula McMillan, “Java Programming Advanced Topics”, 3rd ed., TMH, 2009.

Subject Code	OPERATING SYSTEMS	L	T	P	Credits
4098191201		3	1	0	3

Course Overview:

This course aims at concepts and principles of Operating Systems, its overall responsibility in acting as an interface between the system's hardware components and the user. Further, it also helps students to understand the different scheduling policies, process synchronization mechanisms, deadlock handling mechanisms and memory management techniques.

Course Objectives:

To understand the basic fundamentals of operating system Physical and virtual structure with different principle. The basic concepts to be operating system and its resources will help for the improvement, proper utilization and effective utilization of system resources which is essential to satisfy the ever increasing demands of the users with efficient resource utilization.

Course Outcomes:

	Course outcome	Cognitive Level as per Bloom's Taxonomy	PO number mapped
CO1	Apply optimization techniques for the improvement of system performance.	Remember/Understand	PO1,PO2
CO2	Design and solve synchronization problems.	Understand/Apply	PO1,PO2, PO3
CO3	Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput by keeping CPU as busy as possible.	Understand/Apply	PO2, PO5
CO4	Change access controls to protect files.	Understand/Apply	PO2,PO3, PO4,PO5

UNIT-I :

Introduction to System:

Computer system organization, Computer- system Architecture, Operating system Structure, Operating-system Operations, Process Management, Memory Management, Storage management, Protection and Security, Distributed Systems, Special-purpose systems, Computing Environments, Operating-system Services, Operating-system Interface, System calls, Operating-system Design and Implementation, Operating-system structure, Virtual Machine.

UNIT-II :

Process Management:

Process Concept, Process Scheduling, IPC and examples of IPC Systems, Threads: Overview, Threading Issues, Multithreading Models, CPU Scheduling: Basic concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Thread Scheduling, Process Synchronization: The Critical- section problem, Petersons solution, Synchronization Hardware, Semaphores, Classic problems of Synchronization, Monitors, Atomic Transactions.

UNIT-III:

Memory management :

Main memory: Swapping, Contiguous memory Allocation, Paging, Structure of the Page table, Segmentation Virtual memory: Background, Demand paging, copy on-Write, Page Replacement, Allocation of frames, Thrashing, Memory-Mapped Files.

UNIT-IV:

Deadlocks and Security

System model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock avoidance Deadlock Detection and Recovery form Deadlock. Protection: Goals of Protection, Principles of protection, Access Matrix, Access Control, Revocation of Access Rights, Capability Based systems, Language-Based Protection.

The Security Problem, Program Threads, System and Network Threats, Cryptography as a security tool, User Authentication, Implementing security Defenses, Firewalling to protect systems and Networks.

UNIT-V:

File-system Implementation:

File-system Structure, Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery, Log-Structured File systems, NFS Mass –storage Structure: Overview, Disk Structure, Disk Attachment, Disk Scheduling, Disk and swap-space Management, RAID Structure, Stable- Storage Implementation, Tertiary-Storage Structure I/O systems.

Text Books:

1. Operating system concepts, 7/e, Abraham Silberschatz, Galvin, John Wiley & sons ,

Reference Books:

1. Operating systems, 6/E, William stallings, PHI/Pearson.
2. Operating systems 3/e, Dietal, Dietal, Pearson.
3. Operating systems, 2/e, Dhamdhere, TMH.
4. An introduction to Operating systems, Concepts and practice, Pramod Chandra P. Bhat, PHI

Subject Code	SOFTWARE ENGINEERING	L	T	P	Credits
4098191202		3	1	0	3

Course Overview and Objectives:

This course focuses on the concepts of software life cycle, role of process models and methods to prepare software requirement specification document. In addition to that, it also imparts knowledge of design, development and testing of software. The objective of this course is to enable the student to develop efficient, cost effective, feasible software as per client requirements.

Course Outcomes:

	Course outcome	Skill	PO
CO1	Prepare a Software Requirement Specification (SRS) document for any software project.	Remember/Understand	PO1,PO2
CO2	Identify the importance of system analysis and design in solving complex problems.	Understand	PO1,PO2,PO3
CO3	Distinguish between object-oriented approach and traditional approach in system analysis and design.	Understand	PO3,PO5
CO4	Analyze various metrics to measure software product size and complexity.	Understand/Apply	PO3,PO4,PO6,PO12

UNIT-I:

Introduction to Software Engineering

The evolving role of software, Changing Nature of Software, Software myths.
The software problem: Cost, schedule and quality, Scale and change.

UNIT-II:

Software Process

Process and project, component software process, Software development process models: Waterfall model, prototyping, iterative development, relational unified process, time boxing model, Extreme programming and agile process, using process models in a project. Project management process

UNIT-III:

Software requirement analysis and specification

Value of good SRS, requirement process, requirement specification, functional specifications with use-cases, other approaches for analysis, validation.

Planning a software project:

Effort estimation, project schedule and staffing, quality planning, risk management planning, project monitoring plan, detailed scheduling.

UNIT-IV:

Software Architecture

Role of software architecture, architecture views, components and connector view, architecture styles for C & C view, documenting architecture design, evaluating architectures.

Design:

Design concepts, function-oriented design, object oriented design, detailed design, verification, metrics

UNIT-V:

Coding and Unit testing

Programming principles and guidelines, incrementally developing code, managing evolving code, unit testing, code inspection and metrics.

Testing: Testing concepts, testing process, black-box testing, white-box testing, metrics.

Text Books:

1. A Concise introduction to software engineering (undergraduate topics in computer science), Pankaj Jalote, Springer International Edition.
2. Software Engineering, A Precise approach, Pankaj Jalote, Wiley
3. Software Engineering, 3/e ,& 7e Roger S.Pressman , TMH

Reference Books:

1. Software Engineering, 8/e, Sommerville, Pearson.
2. Software Engineering principles and practice, W S Jawadekar, TMH
3. Software Engineering concepts, R Fairley, TMH

Subject Code	OPERATIONS RESEARCH	L	T	P	Credits
4098191203		3	1	0	3

Course Objectives:

- To acquaint students with the fundamental concepts of Operations research, and understanding of certain mathematical formulation of linear programming.
- Realize the Importance of certain mathematical techniques in getting the minimum transportation cost.
- Introduce advanced topics such as Probabilistic models and Replacement techniques.
- To learn network flow problems, queueing models.

Course Outcomes:

At the end of the course, the student will be able to

	Course outcome	Bloom's taxonomy	Bloom's Taxonomy Level
CO1	Formulate a given simplified description of a suitable real world problem as a linear programming model	Creative	L6
CO2	Solve the transportation problem, and assignment problems to drive their optimal solution.	Applying	L3
CO3	Identify the best age of replacement and Use waiting line models to estimate system performance	Applying	L3
CO4	Describe the functions and costs of an inventory system and Determine the order quantity.	Evaluating	L5
CO5	Solve simple games using various techniques. Identify the resources required for a project and generate a plan and work schedule.	Applying	L3

UNIT -1:

Development:

Definition, Characteristics and Phrases, scientific method. Types of models, general methods for solving, operations research modes.

Allocation:

Introduction linear programming formulation, graphical solution, simplex methods, artificial variable technique, duality principle.

UNIT-II:

Transportation Problem:

Formulation, optimal solution, unbalanced transportation, assignment problem: formulation, optimal solution, variations problem, degeneracy i.e. non square $M \times N$ matrix, restrictions travelling salesman problem(i.e.) shortest acyclic route models.

UNIT-III:

Replacement:

Introduction, replacement of items that deteriorate when money value is not counted and counted, and replacement of items that fail completely (i.e.) group replacements.

Waiting lines: Introduction, single channel, Poisson arrivals, exponential service time infinite population and unrestricted queue.

UNIT-IV:

Inventory:

Introduction, single item, deterministic models, production is instantaneous or at a constant rate , shortages are allowed or not allowed and with draws from stock is continuous, purchase inventory model with one price break, shortages are not allowed.

UNIT-V:

Theory of Games:

Introduction, minmax (maximum), criterion and optimal strategy solution of games with saddle points, rectangular without saddle points.

Project Management:

PERT and **CPM** , difference between PERT and CPM, PERT/CPM network components and precedence relations, Time Estimates for activities.

Text Book:

1. Operations research by S.D.Sharma
2. Operations Research by J.K.Sharma

Reference Books:

1. Operation Research, P. K. Gupta, Man Mohan
2. Operation Research, 2/e, Panneerselvam.

Subject Code	DATABASE MANAGEMENT SYSTEMS	L	T	P	Credits
4098191204		3	1	0	3

Course Overview

The course, Database Management Systems, provides an introduction to the management of database systems. The course emphasizes the understanding of the fundamentals of relational systems including data models, database architectures, and database manipulations. The course also provides an understanding of new developments and trends such as Internet database environment and data warehousing. The course uses a problem-based approach to learning.

Course Objectives:

Provides students with theoretical knowledge and practical skills in the use of database and database management systems in information technology applications. The logical design, physical design and implementation of relational databases are covered.

Course Outcomes:

	Course outcome	Cognitive Level as per Bloom's Taxonomy	PO Number mapped
CO1	give a description of the Architecture of Database Management Systems	Remember/Understand	PO3
CO2	understand the applications of Databases and functions of DBA	Remember/Understand	PO1,PO2
CO3	compare relational model with the structured query language (SQL)	Anlaysiaing	PO2,PO6
CO4	know the rules guiding transaction ACID.	understanding	PO2

UNIT-I

Introduction to Database & ER Diagrams

Introduction to Database:

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, Other Models – Database Languages –DDL, DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, History of Data base Systems. Introduction to Data base design,

ER diagrams:

Introduction, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises, Logical Database Design.

Outcomes:

- Student can able to describe the Architecture of Database Management Systems
- Student can design different ER Models

Activity:

Seminar and Class Test

UNIT-II:

Relational Algebra and Calculus & Relational Model

Relational Algebra and Calculus:

Relational Algebra – Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus

Relational Model:

Introduction to the Relational Model – Integrity Constraints Over Relations, Enforcing Integrity constraints, Introduction to Views – Destroying /altering Tables and Views.

Outcome:

- Student can able to differentiate the knowledge in TRC & DRC
- Student can compare relational model with the structured query language (SQL)

Activity:

Seminar and Class Test.

UNIT-III

SQL & Schema Refinement

SQL:

Form of Basic SQL Query – Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators, Aggregate Operators, NULL values – Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers.

Introduction to Schema Refinement :

Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

Outcome:

Student can able to design the new database

Activity:

Seminar and Class Test

UNIT-IV

Transaction Management & Crash Recovery

Overview of Transaction Management:

The ACID Properties, Concurrent execution of Transactions. Concurrency Control Techniques: Scheduling, Serializability, Basic concepts on Locking Techniques, Lock Based Concurrency Control, Deadlocks – Performance of Locking, Concurrency Control without Locking.

Crash recovery:

Introduction to Crash recovery, Introduction to ARIES, the Log and Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery.

Outcome:

- Student can perform transactions for new concepts.

Activity:

Seminar and Class Test.

UNIT-V

Storage & Indexing

Overview of Storage and Indexing:

Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing. Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent disks. Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert and Delete. Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendible vs. Linear Hashing.

Outcome:

Student can differentiate different indexing techniques in real time

Activity:

Seminar and Class Test.

Text Books:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003
2. Data base System Concepts, A. Silberschatz, H.F. Korth,
3. S. Sudarshan, McGraw hill, VI edition, 2006.
4. Fundamentals of Database Systems 5th edition, Ramez Elmasri, Shamkant .Navathe, Pearson Education, 2008.

Reference Books:

1. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
2. Database Management System Oracle SQL and PL/SQL, P.K. Das Gupta, PHI.
3. Introduction to Database Management, M. L. Gillenson and others, Wiley Student Edition.
4. Introduction to Database Systems, C. J. Date, Pearson Education.

Subject Code
4098191210

OOPS THROUGH JAVA LAB

L	T	P	Credits
0	0	4	2

Course Description and Objectives:

- To learn/strengthen a programming language JAVA, to learn problem solving techniques.
- To introduce the student to java concepts such as Exception handling, applets, swings etc.

Course Outcomes:

	Course outcome	Skill
CO1	write simple programs in Java Language	Remember
CO2	Develop logical and analytical thinking in Java	Understand
CO3	Knowledge in writing programs in various concepts like Exception Handling, applets, swings etc.	Understand
CO4	Design to read and write contents from or into a file	Apply

Lab experiments:

1. The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1, 1. every subsequent value is the sum of the 2 values preceding it. Write A Java Program (WJJP) that uses both recursive and non recursive functions to print the nth value of the Fibonacci sequence.
2. WJJP to demonstrate wrapper classes and to fix the precision.
3. WJJP that prompts the user for an integer and then prints out all the prime numbers up to that Integer.
4. WJJP that checks whether a given string is a palindrome or not. Ex.
MALAYALAM is a palindrome.
5. WJJP for sorting a given list of names in ascending order.

6. WAJP to check the compatibility for multiplication, if compatible multiply two matrices and find its transpose.
7. WAJP that illustrates how runtime polymorphism is achieved.
8. WAJP to create and demonstrate packages.
9. WAJP, using String Tokenizer class, which reads a line of integers and then displays each integer and the sum of all integers.
10. WAJP that reads on file name form the user then displays information about whether the file exists, whether the file is readable/writable, the type of file and the length of the file in bytes and display the content of the using FileInputStream class.
11. WAJP that displays the number of characters, lines and words in a text/text file.
12. Write an Applet that displays the content of a file.
13. WAJP that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the $+ - * ? \%$ operations. Add a text field to display the result.
14. WAJP for handling mouse events.
15. WAJP demonstrating the life cycle of a thread.
16. WAJP that correctly implements Producer-Consumer problem using the concept of Inter Thread Communication.
17. WAJP that lets users create Pie charts. Design your own user interface(with Swings & AWT).
18. WAJP that allows user to draw lines, rectangles and ovals.
19. WAJP that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result and then sends the result back to the client. The client displays the result on the console. For ex: The data send form the client is the radius of a circle and the result produced by the server is the area of the circle.
20. WAJP to generate a set of random numbers between two numbers x_1 and x_2 , and $x_1 > 0$.
21. WAJP to create an abstract class named shape, that contains an empty method named number Of Sides(). Provide three classes named Trapezoid, Triangle and Hexagon, such that each one of the classes contains only the method number Of Sides(), that contains the number of sides in the given geometrical figure.

22. WAJP to implement a Queue, using user defined Exception Handling (also make use of throw, throws). WAJP that creates 3 threads by extending Thread class. First thread displays “Good Morning” every 1 sec, the second thread displays “Hello” every 2 seconds and the third displays “Welcome” every 3 seconds. (Repeat the same by implementing Runnable).
23. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviours, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.

Subject Code	DATABASE MANAGEMENT	L	T	P	Credits
4098191210	SYSTEMS LAB	0	0	4	2

Lab experiments:

1. Execute a single line and group functions for a table.
2. Execute DCL and TCL Commands.
3. Create and manipulate various DB objects for a table.
4. Create views, partitions and locks for a particular DB.
5. Write PL/SQL procedure for an application using exception handling.
6. Write PL/SQL procedure for an application using cursors.
7. Write a DBMS program to prepare reports for an application using functions.
8. Write a PL/SQL block for transaction operations of a typical application using triggers.
9. Write a PL/SQL block for transaction operations of a typical application using package.
10. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).
11. Create table for various relation
12. Implement the query in sql for a) insertion b) retrieval c) updation d) deletion
13. Creating Views
14. Writing Assertion
15. Writing Triggers
16. Implementing operation on relation using PL/SQL
17. Creating Forms
18. Generating Reports

Typical Applications – Banking, Electricity Billing, Library Operation, Pay roll, Insurance, Inventory etc.

Subject Code	OPERATING SYSTEMS LAB	L	T	P	Credits
4098191212		0	0	4	2

Course Description and Objectives:

- To make students able to implement CPU scheduling algorithms and Bankers algorithm used for deadlock avoidance and prevention.
- Students will also be able to implement page replacement and memory management algorithms.

Course Outcomes:

	Course outcome	Skill
CO1	Implement CPU scheduling algorithms and Bankers algorithm used for deadlock avoidance and prevention.	Understand/Apply
CO2	Implement CPU scheduling algorithms and Bankers algorithm used for deadlock avoidance and prevention.	Understand/Apply

Lab Experiments:

Total hours-07

The following need to be implemented:

1. Simulate the Following CPU Scheduling Algorithms A) Round Robin B) SJF C) FCFS D) Priority
2. Multiprogramming-Memory Management- Implementation Of Fork (), Wait (), Exec() and Exit ()
3. Simulate The Following
 - a. Multiprogramming with A Fixed Number Of Tasks (MFT)
 - b. Multiprogramming with A Variable Number Of Tasks (MVT)
1. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate Bankers Algorithm for Dead Lock Prevention.
6. Simulate The Following Page Replacement Algorithms.
 - a. FIFO B) LRU C) LFU
7. Simulate the Following File Allocation Strategies
Sequenced B) Indexed C) Linked

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)

Duvvada, Visakhapatnam-530049



P.G. Course

MASTER OF COMPUTER APPLICATIONS (MCA)

PROGRAM STRUCTURE & II, III MCA SYLLABUS

VR19

(Applicable for batches admitted from 2019-20)

MCA PROGRAM STRUCTURE (VR19)

MCA 1st Year (I-Semester)

S. NO.	Subject Code	Subject Name	Theory	Tutorial	Practical	Credits
1	4098191100	C Programming and Data Structures	3	0	0	3
2	4098191101	Digital Computer Fundamentals	3	0	0	3
3	4098191102	Discrete Mathematical Structures and Graph Theory	3	0	0	3
4	4098191103	Accounting and Financial Management	3	0	0	3
5	4098191104	Professional Communication	3	0	0	3
6	4098191110	English Language Communication Skills Lab	0	0	2	1
7	4098191111	C Programming and Data Structures Lab	0	0	3	1.5
8	4098191112	IT Workshop Lab	0	0	2	1
Total			15	0	7	18.5

MCA 1st Year (II-Semester)

S. NO.	Subject Code	Subject Name	Theory	Tutorial	Practical	Credits
1	4098191200	OOPS Through JAVA	3	0	0	3
2	4098191201	Operating Systems	3	0	0	3
3	4098191202	Software Engineering	3	0	0	3
4	4098191203	Operations Research	3	0	0	3
5	4098191204	Database Management Systems	3	0	0	3
6	4098191210	OOPS Through JAVA Lab	0	0	3	1.5
7	4098191211	Database Management Systems Lab	0	0	3	1.5
8	4098191212	Operating System Lab	0	0	3	1.5
Total			15	0	9	19.5

MCA 2nd Year (III-Semester)

S. NO.	Subject Code	Subject Name	Theory	Tutorial	Practical	Credits
1	4098192100	Advanced Java & Web Technologies	3	0	0	3
2	4098192101	Object Oriented Analysis and Design	3	0	0	3
3	4098192102	UNIX Programming	3	0	0	3
4	4098192103	Principles and Practices of Management	3	0	0	3
5	4098192104	Design and Analysis of Algorithms	3	0	0	3
6	4098192110	Advanced Java & Web Technologies Lab	0	0	3	1.5
7	4098192110	Object Oriented Analysis and Design Lab	0	0	3	1.5
8	4098192112	UNIX Programming Lab	0	0	3	1.5
Total			15	0	9	19.5

MCA 2nd Year (IV-Semester)

S. NO.	Subject Code	Subject Name	Theory	Tutorial	Practical	Credits
1	4098192200	Computer Networks	3	0	0	3
2	4098192201	Python Programming	3	0	0	3
3	4098192202	Data warehousing and Mining	3	0	0	3
4 (Elective-1)	4098192250	Statistical Programming with R	3	0	0	3
	4098192251	Network Programming	3	0	0	
	4098192252	Cloud Computing	3	0	0	
5 (Elective-2)	4098192253	Software Project Management	3	0	0	3
	4098192254	Artificial Intelligence	3	0	0	
	4098192255	Mobile Application Development	3	0	0	
6	4098192210	Python Programming Lab	0		3	1.5
7	4098192211	Data Warehousing and Mining Lab	0	0	3	1.5
8	4098192212	Soft Skills Lab	0	0	2	1

9	4098192270	Mini Project	0	0	0	2
10	4098192280	Online Certification Course form NPTEL or equivalent – (Audit Course)	0	0	0	0
Total			15	0	8	21

MCA 3rd Year (V-Semester)

S. NO.	Subject Code	Subject Name	Theory	Tutorial	Practical	Credits
1	4098193100	Big Data Analytics	3	0	0	3
2	4098193101	Internet of Things	3	0	0	3
3	4098193102	Cryptography and Network Security	3	0	0	3
4 (Elective-3)	4098193150	Cyber Security	3	0	0	3
	4098193151	Advanced Mobile Application Development	3	0	0	
	4098193152	E-Commerce	3	0	0	
5 (Elective-4)	4098193153	Web Scripting Through PHP & MYSQL	3	0	0	3
	4098193154	Multimedia Application Development	3	0	0	
	4098193155	Human Computer Interaction	3	0	0	
6	4098193110	Big Data Analytics Lab	0	0	3	1.5
7	4098193111	IOT Lab	0	0	3	1.5
8	4098193112	Cryptography & Network Security Lab	0	0	3	1.5
Total			15	0	9	19.5

MCA 3rd Year (VI-Semester)

S. No.	Subject Code	Subject Name	Theory	Practical	Credits
1	4010193232	Technical Seminar on latest technologies	0	0	2
2	4010193237	Internship /Major Project	0	0	10
	4010193238	Dissertation/Thesis Excellent/Good/Satisfactory/Not Satisfactory			
					Total Credits : 12
					Grand Total Credits: 110

Total credits = 18.5+19.5+19.5+21+19.5+12=110

MCA Syllabus (VR-19)

For the Academic Year 2020-21

(II MCA I Semester Syllabus)

Advanced Java & Web Technologies

Course Name : MCA II YEAR I SEM.

Course Code : **4098192100**

L	T	P	C
3	0	0	3

Course Description and Objectives:

1. To understand the concepts of Hypertext Markup Language and collections.
2. To learn java bean concepts for creating dynamic web pages.
3. To acquire knowledge on creation of software components using JAVA Beans.
4. To learn Server-Side Programming using Servlets and Java Server Pages.
5. To learn the creation of pure Dynamic Web Application using JDBC.

Course Outcomes:

	Course outcome	Skill	PO
CO1	Implement web based applications using features of HTML.	Understand	PO1,PO2
CO2	Develop reusable component for Graphical User Interface applications	Understand	PO1,PO2,PO3
CO3	Apply the concepts of server side technologies for dynamic web applications.	Analysis	PO3,PO8
CO4	Implement the web based applications using effective data base access with rich client interaction.	Understand/Apply	PO2,PO3,PO4,PO6,

Syllabus

UNIT - I:

Basic HTML Tags, Java Swing package - use of System class - Applet Context, object serialization - shallow and deep copying - Java collections - Iterators - Array Lists - sets - hash set - hash table, vector class.

UNIT - II:

Java Beans: Introduction to Java Beans, Advantages of Java Beans, JDK Introspection, Using Bean properties, Bean Info Interface, Constrained properties Persistence, Customizers, Java Beans API.

UNIT - III:

Introduction to Servlets: Lifecycle of a Servlet, Servlet API, The javax.servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servlet.http Package, Handling Http Request & Responses, Using Cookies-Session Tracking.

UNIT - IV:

Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC. Installing Tomcat Server & Testing Tomcat.

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging, Passing Control and Data between JSP Pages – Sharing Session and Application Data – Memory Usage Considerations.

UNIT - V:

Database Access: Role of JDBC, JDBC API ,Types of JDBC Drivers ,Database Programming using JDBC, Accessing MySQL database- Accessing MS Access database- Accessing a Database from a JSP Page Application ,Deploying JAVA Beans in a JSP Page. Introduction to struts frame work.

TEXT BOOKS:

1. Internet and World wide web- How to program , Dietel and Nieto , Pearson.
2. The Complete Reference, Java 2 , 3ed, Patrik Naughton, Herbert Schildt, TMH.
3. Java Server Pages , Hans Bergstan, Oreilly .

REFERENCE BOOKS:

1. Jakarta Struts cook book, Bill Siggelkow, SPD, Oreilly
2. Murach's, Beginning Java JDK5, Murach, SPD.
3. An introduction to Web Design and Programming, Wang Thomson
4. Web application technologies concepts, Knuckles, John Wiley.
5. Programming world wide web, Sebesta, Pearson
6. Building Web Applications, NIIT, PHI
7. Web Warrior Guide to Web Programing, Bai, Ekedaw, Thomas, Wiley
8. Beginning Web Programming, Jon Duckett ,Wrox, Wiley
9. Java server pages, Pekowsky, Pearson

Subject code	Object Oriented Analysis and Design	L	T	P	Credits
4098192101		3	0	0	3

Course Overview:

This course is intended to provide an in depth understanding of object oriented approaches to software development, in particular to the analysis and design phases of the software life cycle. Topics include notation, methods, competing methodologies, issues in object oriented development, and recent advancements which complement traditional object-oriented methodologies.

Course Objectives:

1. Essential and fundamental aspects of object-oriented analysis and design, in terms of “how to use” it for the purpose of specifying and developing software.
2. Explore and analyze different analysis and design models, such as OO Models, Structured Analysis and Design Models, etc
3. Understanding the insight and knowledge into analyzing and designing software using different object-oriented modeling techniques
4. Understanding the fundamental principles through advanced concepts of analysis and design using UML

Course Outcomes:

	Course outcome	Skill	PO
CO1	Possess an ability to practically apply knowledge software engineering methods, such as object-oriented analysis and design methods with a clear emphasis on UML	Understand	PO1(3),PO2(3),PO3(3), PO4(2),PO5(2),PO12(1)
CO2	Have a working ability and grasping attitude to design and conduct object-oriented analysis and design experiments using UML, as well as to analyze and evaluate their Models.	Understand	PO1(3),PO2(3),PO3(3), PO4(2),PO6(1),PO7(1), PO12(1)
CO3	Display an ability to identify, formulate and solve software development problems: software requirements, specification (problem space), Software design, and implementation (solution space).	Analysis	PO1(3),PO2(3),PO3(2), PO4(1)
CO4	Show an ability to use the graphical UML representation using tools, such as IBM's Rational Rose or Microsoft's Vision.	Understand/Apply	PO1(3),PO2(3),PO3(3), PO4(2)

1: Weakly correlated 2: Moderately correlated 3: Strongly correlated

Unit-I: Introduction to UML

The meaning of Object-Orientation, object identity, encapsulation, information hiding, polymorphism, generosity, importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture.

Unit-I Outcome:

1. Possess an ability to practically apply knowledge software engineering methods, such as object-oriented analysis and design methods with a clear emphasis on UML

Activity/Event on Unit-1:Seminar on Case Study and Class test

Unit-II: Basic structural Modeling & Class & object diagrams

Basic structural Modeling: Classes, relationships, common mechanisms, diagrams, Advanced structural modeling: advanced relationships, interfaces, types & roles, packages, instances.

Class & object diagrams: Terms, concepts, examples, modeling techniques, class & Object diagrams.

Unit-II Outcome:

1. Have a working ability and grasping attitude to design and conduct object-oriented analysis and design experiments using UML, as well as to analyze and evaluate their Models.

Activity/Event on Unit-II:Seminar on Case Study and Class test

Unit-III: Sequence diagrams & Collaboration diagrams

Sequence diagrams: Terms, concepts, differences between collaboration and sequence diagrams, depicting synchronous messages with/without priority call back mechanism broadcast message.

Collaboration diagrams: Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages.

Unit-III Outcome:

1. Have a capacity to analyze and design software systems, components to meet desired needs

Activity/Event on Unit-III:Seminar on Case Study and Class test

Unit-IV: Behavioral Modeling & Advanced Behavioral Modeling

Behavioral Modeling: Interactions, use cases, use case diagrams, activity diagrams.

Advanced Behavioral Modeling: Events and signals, state machines, processes & threads, time and space, state chart diagrams

Unit-IV Outcome:

1. Display an ability to identify, formulate and solve software development problems: software requirements, specification (problem space), Software design, and implementation (solution space).

Activity/Event on Unit-IV: Seminar on Case Study and Class test

Unit-V: Architectural Modeling

Terms, concepts, examples, modeling techniques for component diagrams and deployment diagrams.

Unit-V Outcome:

1. Show an ability to use the graphical UML representation using tools, such as IBM's Rational Rose or Microsoft's Vision

Activity/Event on Unit-V:Seminar on Case Study and Class test

Text Books:

1. The Unified Modeling Language User Guide, Grady Booch, Rumbaugh, Ivar Jacobson, PEA

2. Fundamentals of Object Oriented Design in UML, Meilir Page- Jones, Addison Wesley

Reference Books:

1. Head First Object Oriented Analysis & Design, Mclaughlin, SPD O'Reilly, 2006
2. Object oriented Analysis & Design Using UML, Mahesh , PHI
3. The Unified Modeling Language Reference Manual, 2/e, Rumbaugh, Grady Booch, etc., PEA
4. Object Oriented Analysis & Design, Satzinger, Jackson, Thomson
5. Object Oriented Analysis Design & implementation, Dathan., Ramnath, University Press
6. Object Oriented Analysis & Design, John Deacon, PEA
7. Fundamentals of Object Oriented Analysis and Design in UML, M Pages-Jones, PEA
8. Object-Oriented Design with UML, Barclay, Savage, Elsevier, 2008

UNIX PROGRAMMING

Course Name : MCA II YEAR I SEM.

Course Code : **4098192102**

L	T	P	C
3	0	0	3

Course Description and Objectives:

1. Describe the usage of UNIX inter process communications (IPC).
2. Discriminate the various commands to control the resources (files / memory)
3. Explain File systems and File structures in Unix.
4. Outlining the threading and multithreading applications in UNIX environment.
5. Discussing the concepts of network programming with socket system

Course Outcomes:

	Course outcome	Skill	PO
CO1	Understand Fundamental Network Design Principles	Understand	PO1,PO2
CO2	Understand All the Unix Utilities, and Implement Shell Scripting	Understand	PO1,PO2,PO3
CO3	Differentiate Connection Oriented and Connection less Network Communication	Analysis	PO3,PO5
CO4	Understands the Concept of Process Threads and File Structure	Understand/Apply	PO3,PO4,PO6,PO12
CO5	Design Various Client Server Applications Using TCP or UDP Protocols	Understand/Analysis	

Syllabus

UNIT -I

Review of Unix Utilities and Shell Programming: -File handling utilities, security by file permissions, process utilities, disk utilities, networking commands, backup utilities, text processing utilities, Working with the Bourne shell-, What is a shell, shell responsibilities, pipes and input redirection, output redirection, here documents, the shell as a programming language, shell meta characters, shell variables, shell commands, the environment, control structures, shell script examples.

UNIT- II

Unix Files: Unix file structure, directories, files and devices, System calls, library functions, low level file access, usage of open, creat, read, write, close, lseek, stat, fstat, ioctl, umask, dup, dup2. The standard I/O (fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets), formatted I/O, stream errors, streams and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd), Directory handling system calls (opendir, readdir, closedir, rewinddir, seekdir, telldir)

UNIT- III

Unix Process :Threads and Signals: What is process, process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, system call interface for process management, -fork, vfork, exit, wait, waitpid, exec, system, Threads, -Thread creation, waiting for a thread to terminate, thread synchronization, condition variables, cancelling a thread, threads vs. processes, Signals-, Signal functions, unreliable signals, interrupted system calls, kill and raise functions, alarm, pause functions, abort, sleep functions.

UNIT -IV

Data Management: Management Memory (simple memory allocation, freeing memory) file and record locking (creating lock files, locking regions, use of read/ write locking, competing locks, other commands, deadlocks). Interprocess Communication: Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes, FIFOs, streams and messages, namespaces, introduction to three types of IPC (system-V)- message queues, semaphores and shared memory. Message Queues-: IPC, permission issues, Access permission modes, message structure, working message queues, Unix system-V messages, Unix kernel support for messages, Unix APIs for messages, client/server example.

UNIT- V

Semaphores: -Unix system-V semaphores, Unix kernel support for semaphores, Unix APIs for semaphores, file locking with semaphores. **Shared Memory:** -Unix system-V shared memory, working with a shared memory segment, Unix kernel support for shared memory, Unix APIs for shared memory, semaphore and shared memory example. **Sockets:** Berkeley sockets, socket system calls for connection oriented protocol and connectionless protocol, example- client/server program, advanced socket system calls, socket options.

TEXT BOOKS:

1. Unix and shell Programming, N B Venkateswarlu, Reem
2. Unix Concepts and Applications, 3/e, Sumitabha Das, TMH

REFERENCE BOOKS:

1. Unix and shell Programming, Sumitabha Das, TMH
2. A Beginner's Guide to Unix, N.P.Gopalan, B.Sivaselva, PHI
3. Unix Shell Programming, Stephen G.Kochan, Patrick Wood, 3/e, Pearson
4. Unix Programming, Kumar Saurabh, Wiley,India
5. Unix Shell Programming, Lowell Jay Arthus& Ted Burns,3/e, GalGotia
6. Nix Concepts and Applications, Das, 4/e, TMH

L	T	P	C
3	0	0	3

Subject Code: 4098192103

PRINCIPLES AND PRACTICES OF MANAGEMENT

Course Description and Objectives:

The main objective of this course is to explain about concepts, principles and practices of management.

Course Outcomes:

The student will be able to:

- Understand what is management and evolution of management thought
- Importance of planning and decision making in organizations
- Process of organizing and delegation of authority
- Theories of motivation and leadership styles
- Coordination and control process in the organizations

Syllabus

UNIT – 1

12 Hours

MANAGEMENT: Definition, nature, purpose and scope of management - Functions and Roles of a manager - an overview of planning, organizing and controlling - Is managing a science or art? Ethics in managing and social responsibility of managers - Evolution of management thought. Various approaches to Management - Decision Theory approach. Systems Approach

UNIT – 2

12 Hours

PLANNING & DECISION MAKING: Types of plans, steps in planning, and process of planning. Nature of objectives, setting objectives. Concept and process of Managing by Objectives. Nature and purpose of strategies and policies. Strategic planning process. SWOT analysis, Portfolio matrix, premising and forecasting. Decision Making: Meaning, Importance and steps in Decision Making - Traditional approaches to decision-making - Decision making under certainty, programmed decisions

UNIT – 3

12 Hours

ORGANIZING: Concept of organization, process of organizing, bases of Departmentation, Authority & power - concept & distinction. Various types of organization structures - Delegation - concept of delegation; elements of delegation - authority, responsibility, accountability. Reasons for failure of delegation & how to make delegation effective. Decentralization - concept, reasons for decentralization and types (or methods) of decentralization. Span of Management - concept, early ideas on span of management.

UNIT – 4

12 Hours

DIRECTING: Motivation and Motivators: Concept, Theories of Motivation: Hierarchy of Needs, Motivation-Hygiene Expectancy, Equity, Reinforcement, McClelland's needs - Leadership: Meaning, Definition, – Trait Approaches of Leadership – Leadership Behavior and Styles – Contingency Approaches to Leadership – Communication: Meaning, Process, and Importance in Functions of Organization – Barriers in Communication – Effective Communication.

UNIT – 5

12 Hours

CO-ORDINATION AND CONTROL: Concept and importance of coordination; techniques or methods to ensure effective coordination. Control: Concept, planning-control relationship, process of control - setting objectives, establishing standards, measuring performance, correcting deviations. Dimensions or Types of Control: Feed forward control, Concurrent Control (Real Time Information & Control), Feedback Control - Techniques of Control: Brief review of Traditional and Modern Techniques of Control.

Text Books:

1. Stoner, Freeman and Gilbert, "Jr. Management", 6th Edition, Pearson Education, NewDelhi, 2006.
2. Heinz Weihrich, Harold Koontz, "Management A Global Perspective", 10th Edition, Tata McGraw Hill, 2007.

Reference Books:

1. Daft, "The New Era of Management", 7th Edition, Thomson New Delhi, 2007.
2. "Schermerhorn: Management", 8th, Wiley India, 2006.

DESIGN ANALYSIS OF ALGORITHMS

Course Name : MCA II YEAR I SEM.

Course Code : 4098192104

L	T	P	C
3	0	0	3

Course Description and Objectives:

This course introduces basic methods for the design and analysis of efficient algorithms emphasizing methods useful in practice. Different algorithms for a given computational task are presented and their relative merits evaluated based on performance measures. The following important computational problems will be discussed: sorting, searching, elements of dynamic programming and greedy algorithms, advanced data structures, graph algorithms (shortest path, spanning trees, tree traversals), string matching, NP completeness.

Course Outcomes:

	Course outcome	Skill	PO
CO1	Basic data structure and its working topological design.	Understand	PO1,PO2
CO2	Basic functionality of different type of algorithms and its usage	Understand	PO1,PO2,PO3
CO3	Analysis of different type of complexity and its applicable condition	Analysis	PO3,PO5
CO4	Able to design algorithm	Understand/Apply	PO3,PO4,PO6,PO12

Syllabus

UNIT-I: Introduction to Algorithm & Design

Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, probabilistic analysis, Amortized analysis. Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components.

UNIT-II: Divide and conquer:

General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication. Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

Unit-III: Dynamic Programming:

General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1

knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

Unit-IV: Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

Unit-V: Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution. NP-Hard and NP Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.

Text Books:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press.
2. Introduction to Algorithms, second edition, T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein, PHI Pvt. Ltd.

Reference Books:

1. Introduction to the Design and Analysis of Algorithms, Anany Levitin, PEA
2. Design and Analysis of Algorithms, Parag Himanshu Dave, Himansu Balachandra Dave, Pearson Education
3. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S. Tseng, R. C. Chang and T. Tsai, Mc GrawHill.

Advanced Java & Web Technologies Lab

Course Name : MCA II YEAR I SEM.

L	T	P	C
0	0	3	1.5

Course Code : 4098192110

Course Objectives:

1. HyperText Markup Language (HTML) and Cascading Style Sheets (CSS) for laying out (formatting) pages that contain text, images and graphics.
2. Extensible Markup Languages (XML is used to store and transport data among webpages), a mechanism for defining new tag sets and interchanging data among web applications.
3. Client-side Programming using JavaScript for validating the data.
4. Creation of software components (objects used for client and server communication) using Beans.
5. Server-Side Programming using servlets are to generate static content and Java Server Pages are used to generate dynamic content.
6. Creating a pure Dynamic Web Application which retrieves the data from Database according to the client request using JDBC.

Course Outcomes (COs): At the end of the course, student will be able to

- Implement sophisticated Java applications and well-organized, complex computer programs with both command line and graphical user interfaces.
- Learn to access database through Java programs, using Java Data Base Connectivity (JDBC).
- Create dynamic web pages, using Servlets and JSP & make a reusable software component, using Java Bean.
- Understand the multi-tier architecture of web-based enterprise applications.

List of Experiments

1. Write a program to prompt the user for a hostname and then looks up the IP address for the hostname and displays the results.

2. Design the following static web pages

1.Login page

2.Registration page

3. Write programs for TCP server and Client interaction as per given below.

A program to create TCP server to send a message to client.

4. Write a program in Java Beans to add a Button to the Bean and display the number of times the button has been clicked.

5. Write a program in java bean to calculate simple Interest.

6. Write a program to display a greeting message in the browser by using Http Servlet.

7. Write a program to receive two numbers from a HTML form and display their sum in the browser by using Http Servlet.

8. Write a program to store the user information into Cookies. Write another program to display the above stored information by retrieving from Cookies.

9. Program to demonstrate dynamic html using java Servlet.

10.Basic JSP program

11. Write a JSP program to print even and odd numbers.

12. Program to verify the particular user and redirect to welcome page if credentials are valid else print proper message.

13. Write a program by using JDBC to execute a SQL query for a database and display the results.

14. Write a program by using JDBC to execute an update query without using Prepared Statement and display the results.

15. Write a program by using JDBC to execute an update query by using Prepared Statement and display the results.

Subject Code	Object Oriented Analysis and Design Lab	L	T	P	Credits
4098192111		0	0	3	1.5
Course Overview: The analysis, design, coding, documentation, database design of mini project which will be carried out in 2 nd year can be done in object-oriented approach using UML and by using appropriate software which supports UML.					
Course Objectives: <ul style="list-style-type: none">• Construct UML diagrams for static view and dynamic view of the system.• Generate creational patterns by applicable patterns for given context.• Create refined model for given Scenario using structural patterns.• Construct behavioral patterns for given applications.					
Course Outcomes: <ul style="list-style-type: none">• Understand the Case studies and design the Model.• Understand how design patterns solve design problems.• Develop design solutions using creational patterns.• Construct design solutions by using structural and behavioral patterns.					
List of Experiments					
Week 1: Familiarization with Rational Rose For each case study: Must be Define Dynamically by the faculty based on current scenario And real time applications					
Week 2, 3 & 4: For each case study: a) Identify and analyze events b) Identify Use cases c) Develop event table d) Identify & analyze domain classes e) Represent use cases and a domain class diagram using Rational Rose f) Develop CRUD matrix to represent relationships between use cases and problem domain classes					
Week 5 & 6: For each case study: a) Develop Use case diagrams b) Develop elaborate Use case descriptions & scenarios c) Develop prototypes (without functionality) d) Develop system sequence diagrams					

Week 7, 8, 9 & 10:**For each case study:**

- a) Develop high-level sequence diagrams for each use case
- b) Identify MVC classes / objects for each use case
- c) Develop Detailed Sequence Diagrams / Communication diagrams for each use case showing interactions among all the three-layer objects
- d) Develop detailed design class model (use GRASP patterns for responsibility assignment)
- e) Develop three-layer package diagrams for each case study

Week 11 & 12:**For each case study:**

- a) Develop Use case Packages
- b) Develop component diagrams
- c) Identify relationships between use cases and represent them
- d) Refine domain class model by showing all the associations among classes

Week 13 onwards:**For each case study:**

- a) Develop sample diagrams for other UML diagrams - state chart diagrams, activity diagrams and deployment diagrams

Text Books:

1. Craig Larman, "Applying UML and Patterns: An Introduction to ObjectOriented Analysis and Design and the Unified Process", 2nd ed., Pearson Education Asia, 2002.

Reference Books:

1. Simon Sennet, Steve McRobb, and Ray Farmer, "Object Oriented Systems Analysis and Design using UML", 2nd ed., McGraw Hill, 2002.
2. Andrew Haigh, "Object-Oriented Analysis & Design," 1st ed., Tata McGraw-Hill, 2001.

Subject Code	UNIX Programming Lab	L	T	P	Credits
4098192112		0	0	3	1.5
Course Objectives: This course introduces basic understanding of UNIX OS, UNIX commands and File system and to Familiarize students with the Linux environment To make student learn fundamentals of shell Scripting and shell programming Emphases are on making student familiar with UNIX environment and issues related to it.					
Course Outcomes: <div><div>1. You will be able to run various UNIX commands on a standard UNIX/LINUX Operating System (We will be using Ubuntu flavor of the Linux operating system).</div><div>2. You will be able to run C / C++ programs on UNIX.</div><div>3. You will be able to do shell programming on UNIX OS.</div><div>4. You will be able to understand and handle UNIX system calls</div></div>					
List of Experiments					
<div><div>1. Program using basic network commands.</div><div>2. Program using system calls: create, open, read, write, close, stat, fstat, lseek .</div><div>3. Write a shell script for sorting, searching and insertion/deletion of elements in a list</div><div>4. Write a program to display the good morning, good afternoon, good evening and good night depending on the users log on time</div><div>5. Create two processes to run a for loop, which adds numbers 1 to n, say one process adds odd numbers and the other even all lines containing the word</div><div>6. Write a program to print prime numbers between x and y</div><div>7. Write a shell script which works similar to the wc command. This script can receive the option -l, -w, -c to indicate whether number of lines/ words/characters</div><div>8. Write a shell script that accepts any number of arguments and prints them in the reverse order.</div><div>9. Write a shell script that determines the period for which a specified user is working on the system</div><div>10. Program to implement inter process communication using pipes</div><div>11. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.</div><div>12. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.</div><div>13. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.</div><div>14. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.</div><div>15. Write a program which takes a set of filenames along with the command line and print them based on their size in bytes either ascending or descending order</div><div>16. Write a shell script which displays a list of all files in the current directory to which you have read, write and execute permissions</div></div>					

17. Write a shell script for renaming each file in the directory such that it will have the current shell's PID as an extension. The shell script should ensure that the directories do not get renamed
18. Write a shell script to list all of the directory files. in a directory
19. Write a shell script that copies multiple files to a directory.
20. Write a shell script that counts the number of lines and words present in a given file.
21. Write a program which reads a source file name and destination file name using command line arguments and then converts into specified format (i.e. either from lower case to upper case or upper case to lower case or inverse of each)
22. Write a program which takes directory name along the command line and displays names of the files which are having more than one link.
23. Write a program to demonstrate the use of exec family functions
24. Program using TCP sockets (Client and Server)
25. Program using UDP sockets (Client and Server)

MCA Syllabus (VR-19)

For the Academic Year 2020-21

(II MCA II Semester Syllabus)

Computer Networks

Course Name : MCA II YEAR II SEM.

Course Code : 4098192200

L	T	P	C
3	0	0	3

Course Description and Objectives:

This course introduces basic routing algorithms and related protocols for Network Management and define the functionality of different type of network layers and it efficient usage.

Course Outcomes:

	Course outcome	Skill	PO
CO1	Students will able to understand the network topology and its structure	Understand and Analyze	PO1,PO2
CO2	Students will able to understand different types of network standards and protocols	Understand	PO1,PO2,PO3
CO3	Students will able design new routing technique base on exiting study	Understand and Analyze	PO3,PO5
CO4	Students will able to understand the application of networks in MANETS, Adhoc Networks, Wireless Sensors network etc.	Understand/Apply	PO3,PO4,PO6,PO12

Syllabus

UNIT-I:-Network Hardware reference model: Transmission media, Narrowband ISDN, Broad band ISDN, ATM.

The data Link layer: Design Issues, Error detection and correction, Elementary Data Link Protocols, Sliding window and ATM. protocols : Data link layer in HDLC, Internet.

UNIT-II:-Channel allocation methods: TDM, FDM, ALOHA, Carrier sense Multiple access protocols, Collision Free protocols – IEEE standard 802 for LANs – Ethernet, Token Bus, Token ring, Bridges.

Network layer Routing Algorithms: Shortest path, Flooding, Flow based Distance vector, Link state, Hierarchical, Broadcast routing, Congestion Control algorithms-General principles of congestion control, Congestion prevention policies, Choke packets and Load shedding.

UNIT-III:-Internet Working: Tunneling, internetworking, Fragmentation, network layer in the internet – IP protocols, IP address, Subnets, Internet control protocols, OSPF, BGP, Internet multicasting, Mobile IP. Network layer in the ATM Networks – cell formats, connection setup, routing and switching, service categories, and quality of service, ATM LANs.

UNIT-IV:-The Transport Layer: Elements of transport protocols – addressing, establishing a connection, releasing connection, flow control and buffering and crash recovery, end to end protocols: UDP, reliable Byte Stream (TCP) end to end format, segment format, connection establishment and termination, sliding window revisited, adaptive retransmission, TCP extension, Remote Procedure Call – RPC, CHAN, SELECT, DCE.

UNIT-V: Application Layer: Network Security, Cryptographic Algorithms: DES, RSA. Security Mechanisms: Authentication Protocols, Firewalls. Name service (DNS) Domains Hierarchy, Name servers. Traditional Applications: SMTP, MIME, World Wide Web: HTTP, Network Management: SNMP.

Text Books: Computer Networks Andrew, Tanenbaum, 4/e, Pearson

Reference Books: Data communications and networking Forouzan, 4/e, TMH

Subject Code	Python Programming	L	T	P	Credits
4098192201		3	0	0	3

Course Overview:

- The course is designed to provide an introduction to the python programming language. The focus of the course is to provide students with an introduction to programming, I/O, functions, visualization using the Python programming language.

Course Objectives:

- Introduction to Scripting Languages
- Understanding the operators, functions, key concepts of OOP in Python.
- Exposure to various problems solving approaches of Computer Applications.

Course Outcomes: After completion of course students will be able to

CO1	Construct Software easily right out of the box
CO2	Experiment with an interpreted Language
CO3	Build software for real needs
CO4	Explain to testing Orielly

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	-	1	1	-	2	-	-	1	-	1
CO2	2	2	-	1	2	-	1	-	1	-	-	-
CO3	1	1	2	3	1	2	1	1	1	1	1	3
CO4	-	1	-	1	-	2	-	1	-	1	1	2

Unit-I: Introduction

No. of lecture hours: 9

History of Python, Need of Python Programming, Applications Basics of Python, Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

Unit-I Outcome:

- Explain need of python programming
- Explain basic principles of Python Programming language

Activity/Event on Unit-1: Seminar and Class test

Unit-II: Types, Operators and Expressions

No. of lecture hours: 9

Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while, break, continue, pass.

Unit-II Outcome:

- Explain the operators in Python
- Explain the control structures in Python

Activity/Event on Unit-2: Seminar and Class test

Unit-III: Data Structures

No. of lecture hours: 8

Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences, Comprehensions.

Unit-III Outcome:

- Explain the different data structures like list, tuple, dictionary and sequences etc.

Activity/Event on Unit-3: Seminar and Class test

Unit-IV: Functions

No. of lecture hours: 9

Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local variables.

Modules: Creating modules, import statement, from. Import statement, name spacing.

Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages.

Unit-IV Outcome:

- Gains the knowledge in functions and modules
- Implement packages

Activity/Event on Unit-4: Seminar and Class test

Unit-V:

No. of lecture hours: 10

Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor, Method, Inheritance, Overriding Methods, Data hiding.

Error and Exceptions: Difference between an error and Exception, Handling Exception, try, except block, Raising Exceptions, User Defined Exceptions

Brief Tour of the Standard Library - Operating System Interface - String Pattern Matching, Mathematics, Internet Access, Dates and Times, Data Compression, Multithreading, GUI Programming, Turtle Graphics.

Introduction to Relational databases: An introduction to relational databases, SQL statements for data manipulation, creating a GUI that handles an event, working with components, Illustrative programs.

Unit-V Outcome:

- Implement object oriented concepts
- Implement databases and GUI applications

Activity/Event on Unit-5: Seminar and Class test

Text Books:

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
2. Learning Python, Mark Lutz, Orielly

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W. Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage

Data warehousing and Data Mining

Course Name : MCA II YEAR II SEM.

L	T	P	C
3	0	0	3

Course Code : **4098192202**

Course Overview and Objectives:

This course introduces the basic concepts, principles, methods, implementation techniques, and applications of data mining, with a focus on three major data mining functions: (1) Association rule mining (2) Classification and (3) cluster Analysis. In the first part of the course student will learn why Association rule mining is important, what are the major methods are for computing association rules and analyzing their importance. In classification student will learn basic concepts of classification and methodologies for classification. This includes KNN, Naive Bayes, Decision tree and Neural Network based methods. In clustering students will learn different clustering methods. This includes K-Means, Hierarchical and Density based methods.

Upon completion of this course, students will be able to do the following:

- Apply proximity measures on various data types
- Discover Association rules among the Items
- Apply classification and clustering methods
- Compare the different classification methods performance

Course Outcomes:

	Course outcome	Cognitive Level as per Bloom's Taxonomy	PO number mapped
CO1	Ability to identify, understand and investigate various patterns that can be extracted from different types of data.	Remember/Understand	PO4(2)
CO2	Apply various pre-processing techniques and classification algorithms on different domains of data	Understand & Apply	PO4(2), PO5(3)
CO3	Build decision making systems using data mining algorithms for a given real time data set.	Understand & Apply	PO3(2), PO4(3), PO5(3)
CO4	Construct models using modern tools such as WEKA, R and python etc.	Apply	PO6(4)

1: Weakly correlated 2: Moderately correlated 3: Strongly correlated

SYLLABUS

UNIT-I	Introduction to Data warehouse	No. of lecture hours: 9
	Data warehouse: Basic concepts, definition of data warehouse, difference between operational database systems and data warehouses, comparison between OLTP and OLAP, data warehouse: A Multitiered Architecture, Data warehouse modules, ETL, Data cube, Overview of concepts like star schema, snowflakes and fact constellations schemas, typical OLAP operations and multi dimensional data analysis.	
	Outcome: Ability to identify, understand and investigate various patterns that can be extracted from different types of data. Activity: Seminar by toppers of the class	
UNIT-II	Introduction to Data Mining	No. of lecture hours: 8
	Introduction to Data mining, types of Data, Data Quality, Data Processing, Measures of Similarity and Dissimilarity, Exploring Data: Data Set, Summary Statistics, OLAP	
	Outcome: Apply various pre-processing techniques and classification algorithms on different domains of data. Activity: Seminar by toppers of the class	
UNIT-III	Classification	No. of lecture hours: 10
	Basic Concepts, Decision Trees and model evaluation: General approach for solving a classification problem, Decision Tree induction, Model over fitting: due to presence of noise, due to lack of representation samples, Evaluating the performance of classifier. Nearest Neighborhood classifier, Bayesian Classifier, Support vector Machines: Linear SVM, Separable and Non Separable case.	
	Outcome: Build decision making systems using data mining algorithms for a given real time data set. Activity: Group seminar for deep discussion	
UNIT-IV	Association Analysis & Clustering	No. of lecture hours: 9
	Association Analysis: Problem Definition, Frequent Item-set generation, rule generation, compact representation of frequent item sets, FP-Growth Algorithms. Handling Categorical, Continuous attributes, Concept hierarchy, Sequential, Sub graph patterns. Clustering: Over view, K-means, Agglomerative Hierarchical clustering, DBSCAN,	
	Outcome: Build decision making systems using data mining algorithms for a given real time data set.	

	Activity: Seminar and followed by test	
UNIT-V	Web data mining	No. of lecture hours: 9
	Introduction, Web terminology and characteristics, Web content mining, Web usage mining, web structure mining, Search Engines: Characteristics, Functionality, Architecture, Ranking of WebPages, Enterprise search	
	Outcome: Student will able to understand the basic structure of internet and how to do mining and search engine functionality. Activity: Seminar & test	
Text Books:		
1)	Data Mining concepts and Techniques By Jiawei Han, Micheline Kamber, Jian Pei, Third Edition.	
2)	Introduction to Data Mining: Pang-Ning tan, Michael Steinbach, Vipin kumar, Addison- Wesley.	
Reference Books:		
1)	Data Mining: Introductory and Advanced Topics, Margaret H Dunham, Pearson, 2008.	

STATISTICS WITH R PROGRAMMING

(Elective-1)

Course Name : MCA II YEAR II SEM.

Course Code : 4098192250

L	T	P	C
3	0	0	3

Course Description and Objectives:

- Developing programs in R Language
- Students will learn control structures, graphics functions in R
- Simplifying statistical concepts in R using graphs
- Solving statistical problems using probability concepts

Course Outcomes:

	Course outcome	Skill	PO
CO1	Understand the basics of R programming	Understand	PO1,PO2
CO2	Knowledge on R programming control statements	Understand	PO1,PO2,PO3
CO3	Knowledge on Graphics	Understand	PO3,PO5
CO4	Awareness on statistical concepts	Understand/Apply	PO3,PO4,PO6,PO12

Syllabus

UNIT-I: Introduction, How to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes.

UNIT-II: R Programming Structures, Control Statements, Loops, - Looping Over Nonvector Sets,- If-Else, Arithmetic and Boolean Operators and values, Default Values for Argument, Return Values, Deciding Whether to explicitly call return- Returning Complex Objects, Functions are Objective, No Pointers in R, Recursion, A Quick sort Implementation-Extended Example: A Binary Search Tree

UNIT-III: Doing Math and Simulation in R, Math Function, Extended Example Calculating Probability- Cumulative Sums and Products-Minima and Maxima- Calculus, Functions for Statistical Distribution, Sorting, Linear Algebra Operation on Vectors and Matrices, Extended Example: Vector cross Product- Extended Example: Finding Stationary Distribution of Markov Chains, Set Operation, Input /output, Accessing the Keyboard and Monitor, Reading and writer Files,

UNIT-IV: Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot () Function – Customizing Graphs, Saving Graphs to Files.

UNIT-V: Probability Distributions, Normal Distribution- Binomial Distribution- Poisson Distributions Other Distribution, Basic Statistics, Correlation and Covariance, T-Tests,- ANOVA. Linear Models, Simple Linear Regression, -Multiple Regression Generalized Linear Models, Logistic Regression, - Poisson Regression- other Generalized Linear Models-Survival Analysis, Nonlinear Models, Spines- Decision- Random Forests,

Text Books:

- 1) The Art of R Programming, Norman Matloff, Cengage Learning
- 2) R for Everyone, Lander, Pearson

Reference Books:

- 1) R Cookbook, Paul Teetor, Oreilly.
- 2) R in Action, Rob Kabacoff, Manni

Subject Code	Network Programming (Elective-1)	L	T	P	Credits
4098192251		3	0	0	3
Course Overview: The course presents the concepts necessary to understand the way works as well as the system's most commonly used commands. Data manipulation utilities and socket syntax for synthesizing command pipelines are emphasized. Comprehensive hands on exercises are integrated throughout to reinforce learning and develop real competency					
Course Objectives: <div><div></div><div>1. To understand the fundamental design of the Network programming</div><div>2. To become fluent with the systems calls provided in the Client server environment.</div><div>3. To be able to design and build an application/service over the socket programming.</div></div>					
Course Outcomes: <div><div></div><div>1. Ability to understand and reason out the working of network Systems.</div><div>2. To teach students the use of basic socket programming Utilities.</div><div>3. To teach students the principles of socket programming</div><div>4. To familiarize students with the concepts, design, and structure of the TCP/UDP programming.</div><div>5. To be able to build an application of UNIX programming in socket.</div></div>					
Unit-I Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.					
Unit-I Outcome: <div><div></div><div>1. Ability to understand and reason out the working of Unix base socket programming.</div></div>					
Activity/Event on Unit-1: Seminar and Class test					
Unit-II: TCP client server: Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.					
Unit-II Outcome: <div><div></div><div>1. To create practical concept of TCP socket, echo server and IPV6 protocol implementation.</div></div>					
Activity/Event on Unit-II: Seminar and Class test					
Unit-III: Sockets: Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and					

exec function, concurrent servers. Close function and related function. **I/O Multiplexing and socket options:** I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions.

Unit-III Outcome:

1. Student will able to implement socket base programming and design customize server.

Activity/Event on Unit-III: Seminar and Class test

Unit-IV: Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP. Elementary name and Address conversions: DNS, gethost by Name function, Resolver option, Function and IPV6

Unit-IV Outcome:

1. To familiarize students with the concepts, design, and structure of the UDP sockets and server with different type of implementation with DNS.

Activity/Event on Unit-IV: Seminar and Class test

Unit-V: IPC - Introduction, File and record locking, Pipes, FIFOs streams and messages, Name spaces, system IPC, Message queues, Semaphores. Remote Login: Terminal line disciplines, Pseudo Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC Transparency Issues.

Unit-V Outcome:

1. Student will able to understand the concept of files in network programming and also learn how to manage the synchronization between the terminals.

Activity/Event on Unit-V: Seminar and Class test

Text Books:

1. Unix and shell Programming, N B Venkateswarlu, Reem
2. Unix Concepts and Applications, 3/e, Sumitabha Das, TMH

Reference Books:

1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
3. Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education

Subject Code	Cloud Computing (Elective-1)	L	T	P	Credits
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4098192252		3	0	0	3
Course Overview: This course introduces basic functionality of different type of services provided by the cloud and cloud structure and it working topological design.					
Course Objectives: 1. Students will learn the basics clouds and its applications, 2. Students will learn the key concept IAAS, PAAS, SAAS, along with security issues related to cloud data					
Course Outcomes:					
	Course outcome	Skill	PO		
CO1	Understand the systems, protocols and mechanisms to support cloud computing.	Remember/ Understand	PO1,PO2,PO3		
CO2	Develop applications for cloud computing by using platforms and technologies.	Apply	PO1,PO2,PO3,		
CO3	Understand the hardware requirements for cloud computing.	Understand	PO1,PO2,PO3		
CO4	Understand the cloud security risks	Understand	PO2PO3,PO4, PO6,		
Unit-I: Introduction to Cloud &Parallel and Distributed Systems Network centric computing, Network centric content, peer-to –peer systems, cloud computing delivery models and services, Ethical issues, Vulnerabilities, Major challenges for cloud computing Parallel and Distributed Systems: introduction, architecture, distributed systems, communication protocols, logical clocks, message delivery rules, concurrency, model concurrency with Petri Nets					
Unit-I Outcome: Student will able to understand the basic architecture of Distributed system					
Activity/Event on Unit-1: seminar					
Unit-II: Cloud infrastructure Cloud Infrastructure: At Amazon, The Google Perspective, Microsoft Windows Azure, Open Source Software Platforms, Cloud storage diversity, Inter cloud, energy use and ecological impact, responsibility sharing, user experience, Software licensing Cloud Computing : Applications and Paradigms: Challenges for cloud, existing cloud applications and new opportunities, architectural styles, workflows, The Zookeeper, The Map Reduce Program model, HPC on cloud, biological research					
Unit-II Outcome: student will able to understand the parallel computing and its functionality					
Activity/Event on Unit-II: Seminar followed by test					

Unit-III: Cloud Resource virtualization:**Cloud Resource Management and Scheduling**

Virtualization, layering and virtualization, virtual machine monitors, virtual machines, virtualization- full and para, performance and security isolation, hardware support for virtualization, Case Study: Xen, vBlades

Cloud Resource Management and Scheduling: Policies and Mechanisms, Applications of control theory to task scheduling, Stability of a two-level resource allocation architecture, feedback control based on dynamic thresholds, coordination, resource bundling, scheduling algorithms, fair queuing, start time fair queuing, cloud scheduling subject to deadlines, Scheduling Map Reduce applications, Resource management and dynamic application scaling

Unit-III Outcome: student will able to know how the resource stored on the cloud and its usage

Activity/Event on Unit-III: Seminar by toppers

Unit-IV: Storage Systems & Cloud Security:

Storage Systems: Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system. Apache Hadoop, Big Table, Megastore (text book 1), Amazon Simple Storage Service(S3) (Text book 2)

Cloud Security: Cloud security risks, security – atop concern for cloud users, privacy and privacy impact assessment, trust, OS security, Virtual machine security, Security risks

Unit-IV Outcome: Student will able to know the different security mechanism to secure the data

Activity/Event on Unit-IV: Seminar on Cryptography

Unit-V: Cloud Application Development

Storage Systems: Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system. Apache Hadoop, Big Table, Megastore (text book 1), Amazon Simple Storage Service(S3) (Text book 2)

Cloud Security: Cloud security risks, security – atop concern for cloud users, privacy and privacy impact assessment, trust, OS security, Virtual machine security, Security risks

Unit-V Outcome: Student will understand the Cloud server development and allocation to its users

Activity/Event on Unit-V: Tutorial

Text Books:

1. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier

Reference Books:

1. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar, Buyya, Christen vecctiola, S Tammaraiselvi, TMH

SOFTWARE PROJECT MANAGEMENT

(Elective-2)

Course Name : MCA II YEAR IV SEM.

Course Code : 4098192253

L	T	P	C
3	0	0	3

Course Description and Objectives:

In this course students understand the fundamental principles of Software Project management & will also have a good knowledge of responsibilities of project manager and student will have good knowledge of the issues and challenges faced while doing the Software project Management and be familiar with the different methods and techniques used for project management .Student will be able to do the Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques

Course Outcomes:

	Course outcome	Skill	PO
CO1	Basic Knowledge on software Engineering	Remember/Understand	PO1,PO2
CO2	Basic knowledge on project goals	Understand	PO1,PO2,PO3
CO3	Basic Knowledge on Software Constraints	Understand/Apply	PO3,PO5

Syllabus

UNIT-I:

Conventional Software Management: The waterfall model, conventional software management performance.

Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

Improving Software Economics: Reducing Software product size, improving software Processes, improving team effectiveness, improving automation, achieving required quality, Peer inspections.

The old way and the new: The principles of conventional software Engineering, principles of Modern software management, transitioning to an iterative process.

UNIT-II:

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, Transition phases.

Artifacts of the process: The artifact sets, Management artifacts, engineering artifacts, Programmatic artifacts

UNIT-III: Model based software architectures: A Management perspective and technical perspective.

Work Flows of the process: Software process workflows, Iteration workflows.

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT-IV:

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation: Automation Building blocks, The Project Environment.

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics Automation.

UNIT-V:

Tailoring the Process: Process discriminates.

Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.

Text Books: Software Project Management, Walker Royce, PEA, 2005.

Reference Books:

1. Software Project Management, Bob Hughes,3/e, Mike Cotterell, TMH
2. Software Project Management, Joel Henry, PEA
3. Software Project Management in practice, Pankaj Jalote, PEA, 2005

Artificial Intelligence (Elective-2)

Course Name : MCA II YEAR II SEM.

L	T	P	C
3	0	0	3

Course Code : 4098192254

Course Overview: This is an introductory course on Artificial Intelligence. The topics may include: AI methodology and fundamentals; intelligent agents; search algorithms; game playing; supervised and unsupervised learning; decision tree learning; neural networks; nearest neighbour methods; dimensionality reduction; clustering; kernel machines; support vector machines; uncertainty and probability theory; probabilistic reasoning in AI; Bayesian networks; statistical learning; fuzzy logic

Course Objectives:

1. To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.
2. To have an understanding of the basic issues of knowledge representation and blind and heuristic search, as well as an understanding of other such as minimax, resolution etc. that play an important role in AI programs

To have a basic understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and robotics, expert systems, and planning.

Course Outcomes:

CO1: Describe the modern view of AI as the study of agents that receive percepts and perform Actions.

CO2: Apply AI search Models and Generic Search strategies

CO3: Inspect and analyze Logic for representing Knowledge and Reasoning of AI systems.

CO4: Evaluate the searching strategies for given situation to achieve the goal.

CO5: Design different learning algorithms for improving the performance of AI systems.

CO6: Conduct investigation and implement projects using different AI learning techniques.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2		2										
CO3			3									
CO4				3								
CO5			2							3		
CO6					3					3		

1: Weakly correlated 2: Moderately correlated

3: Strongly correlated

SYLLABUS

UNIT-I	Introduction to artificial intelligence
	What is AI, the Foundations for AI, The History of AI, The state of the Art. Intelligent Agents: Agents and Environments, The concept of Rationality, The Nature of Environments, The Structure of Agents.
UNIT-II	Problem reduction and game playing
	Solving Problems by searching: Problem Solving agents, searching for solutions, Uninformed search strategies: BFS, DFS, UCS, IDS, BS, Informed Search Strategies: BFS, Greedy Search, A*, AO* Algorithms, Hill Climbing, Adversarial search: Games, Optimal decisions in Games, Alpha Beta Pruning.
UNIT-III	Knowledge representation & Expert system and applications
	<p>Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames.</p> <p>advanced knowledge representation techniques: Introduction, conceptual dependency theory, script structure, cyc theory, case grammars, semantic web</p> <p>Expert system and applications:</p> <p>Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools</p>
UNIT-IV	Planning
	The Planning problem, Planning with state space search, Partial order planning, Planning Graphs, Planning with propositional logic, Analysis with planning approaches.
UNIT-V	Machine Learning & ANN
	<p>Machine learning paradigms:</p> <p>Introduction, machine learning systems, supervised and unsupervised learnings, inductive learning, deductive learning, clustering, support vector machines, case based reasoning and learning.</p> <p>Artificial neural networks:</p>

	Introduction, artificial networks, single layer feed forward networks, multi layered forward networks, design issues of artificial neural networks
Text Books:	
1)	Artificial Intelligence- Saroj Kaushik, CENGAGE Learning
2)	Artificial intelligence, A modern Approach , 2nd ed, Stuart Russel, Peter Norvig, PEA
3)	Artificial Intelligence- Rich, Kevin Knight, Shiv Shankar B Nair, 3rd ed, TMH
4)	Introduction to Artificial Intelligence, Patterson, PHI
Reference Books:	
1.	Artificial intelligence, structures and Strategies for Complex problem solving, -George F Luger, 5th ed, PEA
2.	Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier
3.	Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer

Subject code	Mobile Application Development (Elective-2)	L	T	P	Credits
4098192255		3	0	0	3
Course Overview: This course introduces basic Mobile Network structure and its working topological design. Routing algorithms and related protocols for MANETS					
Course Objectives: Data Mining: Introductory and Advanced Topics, Margaret H Dunham, Pearson, 2008.					
Course Outcomes:					
	Course outcome	Skill	PO		
CO1	Get familiarity with the Android operating system development environment.	Remember/ Understand	PO1,PO2,PO3		
CO2	Create user-friendly mobile user interfaces and views.	Understand/Apply	PO1,PO3,PO4		
CO3	Develop basic Android applications for mobiles.	Apply	PO3,PO5,PO6		
Unit-I: Mobile Communications					
An Overview- Mobile Communication-guided transmission, unguided transmission- signal propagation frequencies, antennae, modulation, modulation methods and standards for voice-oriented data communication standards, modulation methods and standards for data and voice communication, mobile computing- novel applications and limitations, mobile computing architecture, mobile system networks. Mobile devices and systems: Cellular networks and frequency reuse, Mobile smart phones, Smart mobiles and systems, handheld pocket computers, Handheld devices, Smart systems, Limitations of mobile devices					
Unit-I Outcome: To know about the cellular technology with GSM					
Activity/Event on Unit-1: To show the real time model with you tube and PPT					
Unit-II: GSM and other 2G Architectures					
GSM and other 2G Architectures: GSM-services and system architecture, Radio interfaces of GSM, Protocols of GSM, Localization, Call handling, GPRS system architecture. Wireless medium access control, CDMA, 3G, and 4G Communication: Modulation, Multiplexing, Controlling the medium access, Spread spectrum, Coding methods, 3G /4G/5G technology					
Unit-II Outcome: To know about the GSM Technology and cellular architecture					
Activity/Event on Unit-II: Discuss about the cellular architecture formation with you tube video					
Unit-III: Mobile IP Network layer:					
Mobile IP Network layer: IP and Mobile IP network layers: OSI layer functions, TCP/IP and Internet protocol, Mobile internet protocol; Packet delivery and Handover Management;					

Location Management: Agent Discovery; Mobile TCP Introduction to Mobile Adhoc network: fixed infrastructure architecture, MANET infrastructure architecture; MANET: properties, spectrum, applications; Security in Ad-hoc network; Wireless sensor network and its applications

Unit-III Outcome: Student will able to define the Internet Protocol and its implementation

Activity/Event on Unit-III: You tube demonstration

Unit-IV: Synchronization

Synchronization: Synchronization in mobile computing systems, Usage models for Synchronization in mobile application, Domain-dependant specific rules for data synchronization, Personal information manager, synchronization and conflict resolution strategies, synchronizer; Mobile agent: mobile agent design, aglets; Application Server

Unit-IV Outcome: To know about the synchronization and clock signaling with cells.

Activity/Event on Unit-IV: Showing the demo of cells handover and handshaking synchronization with you tube

Unit-V: Mobile Wireless

Mobile Wireless Short Range Networks and Mobile Internet: Wireless networking and wireless LAN, Wireless LAN (WLAN) architecture, IEEE 802.11 protocol layers, Wireless application protocol (WAP)-WAP1.1 architecture, wireless datagram protocol (WDP), Wireless Transport Layer Security (WTLS), wireless transaction and session layers, wireless application environment.

Unit-V Outcome: Student will learn the wireless architecture and layers

Activity/Event on Unit-V: YouTube Demonstration for the wireless and sensor technology

Text Books:

1. RAJ KAMAL, "Mobile Computing," second edition, Oxford.
2. Technology Applications and Service Creation" Second Edition, McGraw Hill.

Reference Books:

1. ASOKE K TALUKDER, HASANAHMED, ROOPA R YAVAGAL, "Mobile Computing,

Subject Code	PYTHON PROGRAMMING LAB	L	T	P	Credits
4098192210		0	0	3	1.5

List of Experiments

Week 1: Exercise 1 - Basics

- Running instructions in Interactive interpreter and a Python Script
- Write a program to purposefully raise Indentation Error and Correct it

Week 2: Exercise 2 - Operations

- Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)
- Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

Week 3: Exercise - 3 Control Flow

- Write a Program for checking whether the given number is a even number or not.
- Using a for loop, write a program that prints out the decimal equivalents of $1/2$, $1/3$, $1/4$, . . . , $1/10$
- Write a program using a for loop that loops over a sequence. What is sequence?
- Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

Week 4: Exercise 4 - Control Flow - Continued

- Find the sum of all the primes below two million.

Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:

1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

- By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

Week 5: Exercise - 5 - DS

- Write a program to count the numbers of characters in the string and store them in a dictionary data structure
- Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.

Week 6: Exercise - 6 DS - Continued

- Write a program combine_lists that combines these lists into a dictionary.
- Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?

Week 7: Exercise – 7 Files

- Write a program to print each line of a file in reverse order.
- Write a program to compute the number of characters, words and lines in a file.

Week 8: Exercise - 8 Functions

- Write a function ball_collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding. Hint: Represent a ball on a plan e as a tuple of (x, y, r), r being the radius

If (distance between two balls centers) \leq (sum of their radii) then (they are colliding) b) Find mean, median, mode for the given set of numbers in a list.

Week 9: Exercise - 9 Functions - Continued

- a) Write a function `nearly_equal` to test whether two strings are nearly equal. Two strings `a` and `b` are nearly equal when `a` can be generated by a single mutation on `b`.
- b) Write a function `dups` to find all duplicates in the list.
- c) Write a function `unique` to find all the unique elements of a list.

Week 10: Exercise - 10 - Functions - Problem Solving

- a) Write a function `cumulative product` to compute cumulative product of a list of numbers.
- b) Write a function `reverse` to reverse a list. Without using the `reverse` function.
- c) Write function to compute `gcd`, `lcm` of two numbers. Each function shouldn't exceed one line.

Week 11: Exercise 11 - Multi-D Lists

Write a program that defines a matrix and prints

- a) Write a program to perform addition of two square matrices
- b) Write a program to perform multiplication of two square matrices

Week 12: Exercise - 12 - Modules

- a) Install packages `requests`, `flask` and explore them. using (`pip`)
- b) Write a script that imports `requests` and fetch content from the page. Eg. (Wiki)
- c) Write a simple script that serves a simple HTTP Response and a simple HTML Page

Week 13: Exercise - 13 OOP

a) Class variables and instance variable and illustration of the self variable

- i) Robot
- ii) ATM Machine

Week 14: Exercise - 14 GUI, Graphics

1. Write a GUI for an Expression Calculator using `tk`
2. Write a program to implement the following figures using `turtle`

Week 15: Exercise - 15 - Testing

- a) Write a test-case to check the function `even_numbers` which return True on passing a list of all even numbers
- b) Write a test-case to check the function `reverse_string` which returns the reversed string

Week 16: Exercise - 16 - Advanced

- a) Build any one classical data structure.
- b) Write a program to solve knapsack problem.

Data warehousing and Data Mining Lab

Course Name : MCA II YEAR II SEM.

L	T	P	C
0	0	3	1.5

Course Code : 4098192211

List of Experiments

1. Data cleaning (handling missing values, removing noise), Normalization, Discretization using Weka.
2. Performing Correlation Analysis on various data sets (Using R Programming)
3. Performing Dimensionality reduction using PCA (R programming)
4. Feature selection (Attribute selection) Using information gain method (Weka)
5. Finding Association rules (weka)
6. Performing classification using J48 algorithm and tree visualization (Weka)
7. Classification using Naïve Bayes, SVM, method (Weka)
8. Applying clustering methods (Simple K-Means), K Medoid using Weka.
9. Applying Hierarchical clustering method using weka.

TEXT BOOKS:

1. Jiawei Han, MichelineKamber, Jian Pei, Data mining Concepts and Techniques, 3rd Edition, Morgan Kaufmann, 2012.

REFERENCE BOOKS:

1. Pang-Ning Tan, Michael Steinbach, Vipin Kumar Introduction to Data Mining, Pearson, 2014.

Soft Skills Laboratory

Course Name :	L	T	P	Credits
	0	0	3	1.5

II MCA II SEM.

Course Code : 4098192212

Course Overview:

In this course students will practice reading, writing, listening and speaking skills on a variety of contemporary topics

Course objectives

- understand the fundamental principles of effective communication;
- apply the critical and creative thinking abilities necessary for effective communication in today's modern world;
- organize and express ideas in writing and speaking to produce messages suitably tailored for the topic, objective, audience, communication medium and context; and
- Demonstrate clarity, precision, conciseness and coherence in your use of language.

Course Outcomes:

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

- Use English language fluently, accurately and appropriately.
- Discuss and discover barriers to effective communication.
- Demonstrate skills in listening comprehension, GDs and Interview.
- Read and answer questions (orally and in writing) based on passages.
- Show effective writing skills in academic and professional contexts

Experiments:

1. Writing Skills – Technical Report Writing/ Project Proposals.
2. **Cover letter and Resume writing**
3. Group Discussions
4. Mock Interviews
5. Listening Comprehension-Practice
6. Presentations-Group &Individual

Recommended Books:

- Simon Sweeny, English for Business Communication, CUP, First South Asian Edition, 2010.
- M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill Publishing Company Ltd. 2005
- Dr A Ramakrishna Rao, Dr. G. Natanam & Prof SA Sankaranarayanan, English Language Communication: A Reader cum Lab Manual, Anuradha Publications, Chennai, 2006
- Dr. Shalini Verma, Body Language- Your Success Mantra S. Chand, 2006.

MCA Syllabus (VR-19)
(III MCA I Semester Syllabus)
For the Academic Year 2021-22

Course Name: **MCA III YEAR I SEM**
Subject Code : **4098193100**

L	T	P	C
3	0	0	3

Big Data Analytics

Course Overview: This course provides practical foundation level training that enables immediate and effective participation in big data projects. The course provides grounding in basic and advanced methods to big data technology and tools, including MapReduce and Hadoop and its ecosystem

Objectives:

Optimize business decisions and create competitive advantage with Big Data analytics

- Introducing Java concepts required for developing map reduce programs
- Derive business benefit from unstructured data
- Imparting the architectural concepts of Hadoop and introducing map reduce paradigm

To introduce programming tools PIG & HIVE in Hadoop ecosystem

Course Outcomes:

	Course outcome	Skill	PO
CO1	Preparing for data summarization, query, and analysis.	Understanding	PO1,PO2
CO2	Applying data modeling techniques to large data sets	Applying	PO1,PO2, PO4
CO3	Creating applications for Big Data analytics	Applying	PO1,PO2, PO4
CO4	Building a complete business data analytic solution	Applying	PO1,PO2, PO4, PO5

Unit-I: Data structures in Java

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

Unit-II: Working with Big Data

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner

Unit-III: Writing Map Reduce Programs

Hadoop I/O: The Writable Interface, WritableComparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a RawComparator for speed, Custom comparators

Unit-IV: Hadoop I/O

Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

Unit-V: Pig

Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data.

Text Books:

1. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC.
2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly.
3. Hadoop in Action by Chuck Lam, MANNING Publ.
4. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk, Bruce Brown, Rafael Coss

Reference Books:

1. Hadoop in Practice by Alex Holmes, MANNING Publ.
2. Hadoop MapReduce Cookbook, Srinath Perera, Thilina Gunarathne

Course Name: MCA III YEAR I SEM
Subject Code : 4098193101

L	T	P	C
3	0	0	3

Internet of Things

Course Description and Objectives:

The course covers IOT basic devices, connectivity, design principles and focuses on how to build and deploy IOT solutions. Practical case studies are included to ensure that the candidate develops an ability to work through practical real-life scenarios.

Course Outcomes:

	Course outcome	Skill	PO
CO1	Understand the IOT connectivity principles and application areas.	Remember/Understanding	PO1,PO2
CO2	Conceptually identify revolution of IOT in cloud, wireless sensors including recent attacks involving the Internet of Things.	Analyzing	PO1,PO2,PO3
CO3	Build a real time IOT application.	Applying	PO2, PO6,PO12

Syllabus

UNIT-I:

Introduction to Internet of things, Devices of IOT, Sources of IOT, M2MCommunication, Examples of IOT, Technology Behind IOT Design Principles for Connected Devices, Communication Technologies Application Layer Protocols: HTTP, HTTPS, FTP, Telnet.

UNIT-II:

Business Models for Business Processes in the Internet of Things, IOT/M2M systems layers and designs standardizations, Modified OSI Stack for the IOT, ETSI M2M Domains, Data Enrichment and Consolidation, Security issues in IOT.

UNIT-III:

Design Principles for the Web Connectivity for connected-Devices, Web Communication Protocols for Connected Devices, Message Communication protocols for Connected Devices, Web Connectivity for connected-Devices.

UNIT-IV:

Data Acquiring, Organizing and Analytics in IOT/M2M, Applications/Services/Business Processes, IOT/M2M Data Acquiring and Storage, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.

UNIT-V:

Data Collection, Storage and Computing Using a Cloud Platform for IoT/M2M Applications/Services, Data Collection, Storage and Computing Using cloud platform Services, IOT cloud-based services using the Xively, Building an IOT application.

Text Books:

- Internet of Things: Architecture, Design Principles and Applications, Rajkamal, McGraw Hill Higher Education.
- Internet of Things, A. Bahgya and V. Madiseti, University Press, 2015

Reference Books:

- Designing the Internet of Things, Adrian McEwen and Hakim Cassimally, Wiley
- Getting Started with the Internet of Things CunoPfister , Oreilly.

Course Name: MCA III YEAR I SEM
Subject Code : 4098193102

L	T	P	C
3	0	0	3

Cryptography and Network Security

Course Overview: In today's cyber world, it is important for engineers to understand and appreciate computer/information security as it has become an essential aspect of our day life. This course provides students with concepts of computer security, cryptography, digital money, secure protocols, detection and other security techniques. Upon the completion of this course, students should be able to understand, appreciate, employ, design and implement appropriate security technologies and policies to protect computers and digital information.

Course Objectives:

- 1) Students will learn the basics of cryptographic algorithm and objective of security techniques from experiences.
- 2) 2) Students will learn different type of security standards, security framework and cryptography techniques.

	Course outcome	Skill	PO
CO1	Understand the concepts of need of security in real time applications	Understand and Analyze	PO1,PO2
CO2	To analyze the use of different security techniques in diverse applications	Understand	PO1,PO2,PO3
CO3	Students will get the knowledge of advance security algorithm with respect to applications security	Understand Analyze and Implement	PO3,PO5
CO4	Awareness of different types of security threats and virtual enemy with possible solutions	Understand/Apply	PO3,PO4,PO6, PO12

Syllabus

Unit-I: Introduction to Network Security

Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).

Unit-II: Block cipher and Key Cryptography -Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management – Diffie Hellman Key exchange

Unit-III: Security Function -Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 – SHA – HMAC , Digital signature and authentication protocols – DSS – El Gamal .

UNIT-IV: Authentication Protocol and Services – Kerberos, X.509 Authentication services – Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls – Firewall designs – SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

Unit-V: E-MAIL, IP & WEB SECURITY -

E-mail Security: Security Services for E-mail-attacks possible through E-mail – establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. IPSecurity: Overview of IPsec – IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). Web Security: SSL/TLS Basic Protocol-computing the keys- client authentication-PKI .

Text Books: 1. Network Security Essentials. By William Stallings

Course Name: MCA III YEAR I SEM
Subject Code : 4098193150

L	T	P	C
3	0	0	3

Cyber Security (Elective-3)

Course Overview: In today's cyber world, it is important for engineers to understand and appreciate computer/information security as it has become an essential aspect of our day life. This course provides students with concepts of computer security, cryptography, digital money, secure protocols, detection and other security techniques. Upon the completion of this course, students should be able to understand, appreciate, employ, design and implement appropriate security technologies and policies to protect computers and digital information.

Course Objectives:

- Cyber Security program will be able to 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.

	Course outcome	Skill	PO
CO1	Understand the basics Concepts of Cyber threats and security with forensics procedure	Understand and Analyze	PO1,PO2
CO2	Students will get the Knowledge of Cyber forensic standard procedures and policy	Understand and implementing procedure	PO1,PO2,PO3
CO3	To get the knowledge the cyber threats and cyber law	Understand	PO3,PO5
CO4	To understand the specific circumstances of cyber threats	Understand/Apply	PO3,PO4,PO5,PO6,PO12

Unit-I: Introduction to Cybercrime: Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? , Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.

Unit-I Outcome:

- Outline the origin of different type of threats and risk.
- An ability to analyze a problem, and to identify and define the computing requirements appropriate to its solution.

An ability to design, implement and evaluate a computer-based solution to meet a given set of computing requirements in the context of the discipline.

Unit-II: Cyber offenses: How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.

Unit-II Outcome:

1. An ability to communicate effectively with a range of audiences about technical information.

An ability to make informed judgments in computing practice based on legal and ethical principles

Unit-III: Cybercrime Mobile and Wireless Devices:

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

Unit-III Outcome:

1. An ability to function effectively on teams to establish goals, plan tasks, meet deadlines, manage risk and produce deliverables.
2. An ability to apply security principles and practices to the environment, hardware, software, and human aspects of a system

Unit-IV Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

Unit-IV Outcome:

- An ability to function effectively on teams to establish goals, plan tasks, meet deadlines, manage risk and produce deliverables.

- An ability to apply security principles and practices to the environment, hardware, software, and human aspects of a system.

Unit-V: Cybercrimes and Cyber Security: Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Security Blueprint, Security education, Training and awareness program, Continuing Strategies.

Unit-V Outcome:

- An ability to analyze and evaluate systems with respect to maintaining operations in the presence of risks and threats.

Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, SunitBelapure, Wiley.
2. Principles of Information Security, MichealE.Whitman and Herbert J.Mattord, Cengage Learning

Reference Books:

- . 1. Information Security, Mark Rhodes, Ousley, MGH.

Course Name: MCA III YEAR I SEM
Subject Code : 4098193151

L	T	P	C
3	0	0	3

Advanced Mobile Application Development (Elective-3)

Course Description and Objectives:

This course enables the student to explore advanced user interface components, persistent data storage, messaging techniques, client/server applications and mobile app development process. In addition, the student develops his/her ability to create two/three or n-tier mobile applications.

Course Outcomes:

The student will be able to:

- Get familiarity in mobile user interface components.
- Use data storage procedures and retrieval process.
- Apply several mobile communication techniques.
- Create interoperable mobile apps using version control and deployment.

Skills:

- Design and development of mobile commerce applications.
- Implement temporary and persistent mobile apps like contacts, messaging, and messengers etc...
- Prepare apk or other mobile app deployment format files.

Activities:

- Create Image Gallery for online Shopping in Grid view.
- Create menus for any one standard mobile application.
- Design and develop contacts mobile application using SQLite Database.
- Implement an Android program for HTTP Connection
- Design and develop simple charting mobile app using socket programming
- Create the APK file for all the above mobile experiments and create signature certificates.

Syllabus

UNIT – 1

12 Hours

DISPLAYING PICTURES AND MENUS WITH VIEWS: Image views to display pictures - Gallery and Image views, Image Switcher, Grid View; Menu Views – Creating the helper methods, Option menu, Content Menu.

UNIT – 2**12 Hours**

DATA PERSISTENCE: Creating and using data bases – Creating and DBAdapter helper class, Using Data base, Creating Database.

UNIT – 3**12 Hours**

MESSAGING: SMS Messaging – Sending SMS Messages, Sending SMS using Intent, Receiving SMS messages, Sending E-mail.

UNIT – 4**12 Hours**

NETWORKING: Consuming web services using HTTP, Consuming JSON Services, and Socket Programming.

UNIT – 5**12 Hours**

PUBLISHING ANDROID APPLICATION: Preparing for publishing – Versioning your application, digitally signing android applications; Deploying APK File using Deployment tools.

Test Book:

Wei-Meng Lee, “Beginning Android Application Development”, 1st Edition, John Wiley & Sons, Inc, 2012.

Reference Books:

1. RaimonRefolsMontane, Laurence Dawson, “Learning and Android Application Development”, 1st Edition, PACKT Publishing, 2016.
2. Reto Meier, “Professional Android 4 Application Development”, Wrox, 3rd Edition, 2012.
3. Adam Gerber and Clifton Craig, “Learn Android Studio”, 1st Edition, Apress, 2015.

Course Name: MCA III YEAR I SEM
Subject Code : 4098193152

L	T	P	C
3	0	0	3

E-Commerce (Elective-3)

Course Description and Objectives:

The student gains an overview of all aspects of E-Commerce. Topics include development of the Internet and E-Commerce, options available for doing business on the Internet, features of Web sites and the tools used to build an E-Commerce web site, marketing issues, payment options, security issues, and customer service. The objectives of the course are:

- To know and understand the critical success factors in implementing an ecommerce system.
- To know how to plan and how to manage e-commerce solutions.
- To apply processes of e-commerce.
- To analyze and understand the human, technological and business environment associated with e-commerce.
- To know how to use technologies to build e-commerce websites.

Course Outcomes

	Course outcome	Skill	PO
CO1	Demonstrate an understanding of the foundations and importance of E-commerce	Remembering	PO1
CO2	understanding of retailing in E-commerce by analyzing branding and pricing strategies	Understanding Analyzing	PO2
CO3	Internet trading relationships including Business to Consumer, Business-to-Business, Intra organizational.	Analyzing	PO10,PO8,PO12
CO4	Describing the key features of Internet, Intranets and Extranets and explain how they relate to each other	Applying	PO5,PO4

Syllabus

Unit-I:

Electronic Commerce, Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications, Consumer Oriented Electronic commerce, Mercantile Process models.

UNIT-II:

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

UNIT-III:

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT-IV:

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses.

Advertising and Marketing, Information based marketing, Advertising on Internet, on-line marketing process, market research.

UNIT-V:

Consumer Search and Resource Discovery, Information search and Retrieval, Commerce Catalogues, Information Filtering. Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing, Desktop video conferencing.

Text Books:

1. Frontiers of Electronic Commerce, Kalakata, Whinston, PEA,2006.

Reference Books:

1. E-Commerce Fundamentals and Applications Hendry Chan, Raymond Lee, Dillon, Chang, John Wiley.
2. E-Commerce, A Managerial Perspective, Turban E, Lee J , King, Chung H.M.,PEA,2001.
3. E-Commerce An Indian Perspective , 3/e, P.T. Joseph, PHI,2009.
4. E-Commerce, S. Jaiswal, Galgotia.
5. Electronic Commerce , Gary P. Schneider, Thomson.

Course Name: MCA III YEAR I SEM
Subject Code : 4098193153

L	T	P	C
3	0	0	3

Web Scripting Through PHP & MYSQL (Elective-4)

Course Description and Objectives:

This course offers the basic concepts used to develop static and dynamic web pages. It also provides the knowledge of a Web server, MYSQL, and form handling with PHP. The objective of this course is to build web applications with PHP and MYSQL database using XAMPP/WAMP tool.

Course Outcomes:

Student will be able to:

- Use different data types to design programs involving decisions, loops, and functions.
- Work with HTML forms and handling HTML forms using PHP.
- Familiar with MYSQL database and perform insert, update and delete operations on DBMS tables.
- Implement and debug programs in PHP and MYSQL for a specific application.

	Course outcome	Skill	PO
CO1	Use different data types to design programs involving decisions, loops, and functions	Remember/ Understand	PO1(2),PO2(3), PO3(2), PO4(2).
CO2	Work with HTML forms and handling HTML forms using PHP	Remember/ Understand	PO1(2),PO2(3), PO3(1),
CO3	Familiar with MYSQL database and perform insert, update and delete operations on DBMS tables.	Understand/Apply	PO1(1),PO2(2), PO3(2),PO4(3), PO8(1).
CO4	Implement and debug programs in PHP and MYSQL for a specific application.	Apply	PO1(1),PO2(2), PO3(2),PO4(2), PO5(2),PO8(1).

Syllabus

UNIT – 1

12 Hours

ESSENTIALS OF PHP: Define PHP, WAMP/XAMP server installation, Creating & running first PHP script, Variables, Data types; Operators -Arithmetic Operators, Assignment Operators, Bitwise Operators, Comparison Operators, Incrementing /Decrementing Operators, Logical Operators, String Operators, Expressions, Constants.

UNIT – 2

12 Hours

DECISIONS AND LOOPS: if, if-else, else if and switch statements, Compact coding with the Ternary operator, while, do- while, for, break, continue; Strings - Creating and Accessing Strings, Searching Strings, Replacing Text within Strings, Dealing with Upper case and Lowercase.

UNIT – 3

12 Hours

ARRAYS AND FUNCTIONS: Creating Arrays, Outputting an Entire Array with print_r()- Extracting a Range of Elements with array_slice()-Counting Elements in an Array, Arrays with for each loops, Working with multidimensional arrays; Functions - Use of function, Calling functions, Writing your own functions, Defining parameters, Optional parameters and Default values, Returning values from your functions, Understanding variable scope, Writing recursive functions.

UNIT – 4

12 Hours

HANDLING HTML FORMS WITH PHP: HTML Forms, Capturing form data with PHP, Dealing with Multi-value fields, Creating file upload forms.

UNIT – 5

12 Hours

DATA BASE CONCEPTS: MySQL data types - Numeric data types, Date and Time data types, String data types; MySQL Commands - Creating a new database, Creating a table, Adding data to a table, Reading data from a table, Updating data in a table, Deleting data from a table, Deleting tables and databases, Retrieving data with select; Connecting to MySQL from PHP, Manipulating MySQL data with PHP - Inserting records, Updating records, Deleting records.

Text Book:

Matt Doyle, “Beginning PHP 5.3”, 1st Edition, Wiley Publishing, Inc., 2010.

Reference Book:

Kevin Tatroe, Peter MacIntyre, and RasmusLerdorf, “Programming PHP”, 3rd Edition, 2013.

Course Name: MCA III YEAR I SEM
Subject Code : 4098193154

L	T	P	C
3	0	0	3

Multimedia Application Development (Elective-3)

Course Overview: Students should have knowledge of

- Formulate a working definition of interactive multimedia.
- Demonstrate competence in using the authoring program Hyper Studio.
- Demonstrate the use of animation, digitized sound, video control, and scanned images.
- Demonstrate the use of Netscape to access the Course Home Page and Tips and Tricks.
- Use basic instructional design principles in the development of stacks.
- Will develop conceptual maps of content and process for interactive multimedia instructional programs.

Course Objectives: The objectives of the course are:

- To learn and understand technical aspect of Multimedia Systems.
- To understand the standards available for different audio, video and text applications.
- To Design and develop various Multimedia Systems applicable in real time.
- To learn various multimedia authoring systems.
- To understand various networking aspects used for multimedia applications.
- To develop multimedia application and analyze the performance of the same.

Course Outcomes: After completion of course students will be able to:

- Developed understanding of technical aspect of Multimedia Systems.
- Understand various file formats for audio, video and text media.
- Develop various Multimedia Systems applicable in real time.
- Design interactive multimedia software.
- Apply various networking protocols for multimedia applications.
- To evaluate multimedia application for its optimum performance.

Syllabus

UNIT- I: Fundamental concepts in Text and Image:

Multimedia and hypermedia, world wide web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video

Unit-I Outcome:

- Developed understanding of technical aspect of Multimedia Systems.
- Understand various file formats for audio, video and text media.
- Develop various Multimedia Systems applicable in real time.

Activity/Event on Unit-1: Group Discussion

Unit-II : Fundamental Concepts in Video and Digital Audio:

Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

Unit-II Outcome:

- Demonstrate the use of animation, digitized sound, video control, and scanned images.
- Demonstrate the use of Netscape to access the Course Home Page and Tips and Tricks.
- Use basic instructional design principles in the development of stacks.

Activity/Event on Unit-II: Test / Seminar/Programming Contest

Unit-III:

Action Script I: Action Script Features, Object-Oriented Action Script, Data types and Type Checking, Classes, Authoring an Action Script Class.

Action Script II: Inheritance, Authoring an Action Script 2.0 Subclass, Interfaces, Packages, Exceptions.

Application Development:

An OOP Application Frame work, Using Components with Action Script Movie Clip Subclasses.

Unit-III Outcome:

- Learn various multimedia authoring systems.
- Understand various networking aspects used for multimedia applications.
- Develop multimedia application and analyze the performance of the same.

Activity/Event on Unit-III: Practicing real time applications

Unit-IV: Multimedia Data Compression:

Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zero tree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

Basic Video Compression Techniques:

Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

Unit-IV Outcome:

- Design interactive multimedia software.
- Apply various networking protocols for multimedia applications.
- To evaluate multimedia application for its optimum performance

Activity/Event on Unit-IV: Programming Contest

Unit-V: Multimedia Networks:

Basics of Multimedia Networks, Multimedia Network Communications and Applications Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM networks, Transport of MPEG- 4, Media-on- Demand (MOD).

Unit-V Outcome:

- To understand the standards available for different audio, video and text applications.
- To Design and develop various Multimedia Systems applicable in real time.
- To learn various multimedia authoring systems.
- To understand various networking aspects used for multimedia applications.

Activity/Event on Unit-V: Practicing examples

Text Books:

1. Fundamentals of Multimedia , Ze-Nian Li , Mark S. Drew, PHI/ PEA.
2. Multimedia Systems, Parag Havaldar, Gerard Medioni, cengage, 2009.
3. Essentials Action Script 3.0, Colin Moock, SPD O, Reilly, 2007.

Reference Books:

1. Multimedia Applications, Steinmetz, Nahrstedt, Springer.

2. Digital Multimedia, Nigel Chapman, Jenny Chapman, Wiley- Dreamtech.
3. Multimedia & Communications Technology, Steve Heath, Elsevier .
4. Multimedia Technology & Applications, David Hilman , Galgotia.
5. Multimedia Technologies, Banerji, Mohan Ghosh, MGH.

Course Name: MCA III YEAR I SEM
Subject Code : 4098193155

L	T	P	C
3	0	0	3

Human Computer Interaction (Elective-4)

Course Description: This course teaches students to design user interfaces based on the capabilities of computer technology and the needs of human factors. Students design a user interface for a system and implement a prototype from a list of informal requirements.

Course Outcomes: At the end of the course the student will be able to:

CO1: Design and Development processes and life cycle of Human Computer Interaction

CO2: Analyze product usability evaluations and testing methods.

CO3: Apply the interface design standards/guidelines for cross cultural and disabled users.

CO4: Categorize, Design and Develop Human Computer Interaction in proper architectural structure.

	Course outcome	Skill	PO
CO1	Design and Development processes and life cycle of Human Computer Interaction	Remember/ Understand	PO1(2),PO2(3), PO4(2), PO5(2).
CO2	Analyze product usability evaluations and testing methods.	Understand/Apply	PO1(1),PO2(3), PO8(1),
CO3	Apply the interface design standards/guidelines for cross cultural and disabled users.	Understand/Apply	PO1(2),PO2(2),PO3(1), PO4(3),PO6(2),PO7 (2),PO8(1).
CO4	Categorize, Design and Develop Human Computer Interaction in proper architectural structure.	Apply	PO1(1),PO2(1), PO3(1),PO4(3), PO5(2),PO8(1).

Syllabus

UNIT-I:

Introduction: Importance of user Interface, definition, importance of good design. Benefits of good design. A brief history of Screen design

The graphical user interface: Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user –interface popularity, characteristics- Principles of user interface.

UNIT-II:

Design process: Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, Understanding business junctions.

UNIT-III:

Screen Designing : Design goals, Screen planning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow, Visually pleasing composition, amount of information, focus and emphasis, presentation information simply and meaningfully, information retrieval on web, statistical graphics, Technological consideration in interface design.

UNIT-IV:

Windows: Windows new and Navigation schemes selection of window, selection of devices based and screen based controls.

Components: Components text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors.

UNIT-V:

Software tools: Specification methods, interface, Building Tools.

Interaction Devices: Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

TEXT BOOKS:

1. Human Computer Interaction. 3/e, Alan Dix, Janet Finlay, Goryd, Abowd, Russell Beal, PEA, 2004.
2. The Essential guide to user interface design, 2/e, Wilbert O Galitz, Wiley Dreama Tech.

REFERENCEBOOKS:

1. Designing the user interface. 4/e, Benhneidermann, PEA.
2. User Interface Design, Soren Lauesen , PEA.
3. Interaction Design PRECE, ROGERS, SHARPS, Wiley .
4. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.

Course Name: MCA III YEAR I SEM

Subject Code : 4098193110

L	T	P	C
0	0	3	1.5

Big Data Analytics Lab

Course Overview:

The main objective of this lab is to impart the knowledge on how to Store, manage, and analyze unstructured data and Query large data sets in near real time with Pig and Hive

Course Objectives:

1. Students will learn the basics of Hadoop
2. The main objective of this lab is to impart the knowledge on how to implement concept and challenge of big data (3 V's: volume, velocity, and variety).
3. Teach students in applying skills and tools to manage and analyze the big data.

Course Outcomes:

- To understand the basic principles, concepts of Big Data Analyze and interpret data using an ethically responsible approach.
- Collect, manage, store, query, and analyze various form of big data
- Gain hands-on experience on large-scale analytics tools to solve some open big data problems
- Understand the impact of big data for business decisions and strategy.

List of Experiments

Week 1, 2:

1. Implement the following Data structures in Java

a) Linked Lists b) Stacks c) Queues d) Set e) Map

Week 3, 4:

2. (i) Perform setting up and Installing Hadoop in its three operating modes: Standalone, Pseudo distributed, Fully distributed

(ii) Use web based tools to monitor your Hadoop setup.

Week 5:

3. Implement the following file management tasks in Hadoop:

- Adding files and directories
- Retrieving files
- Deleting files

Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

Week 6:

4. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

Week 7:

5. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.

Week 8:

6. Implement Matrix Multiplication with Hadoop Map Reduce

Week 9, 10:

7. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

Week 11, 12:

8. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes

Reference Books:

1. Hadoop in Practice by Alex Holmes, MANNING Publ.
2. Hadoop MapReduce Cookbook, Srinath Perera, Thilina Gunarathne.

Course Name: MCA III YEAR I SEM
Subject Code : 4098193111

L	T	P	C
0	0	3	1.5

IOT Lab

Course Overview:

Following are some of the programs that a student should be able to write and test on an Arduino /Raspberry Pi, but not limited to this only.

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices.

Course Outcomes:

- Identify problems that are amenable to solution by various methods, and which different methods may be suited to solving a given problem.
- Formalize a given problem in the language/framework of different methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
- Implement basic algorithms (e.g., standard search algorithms or dynamic programming).
- Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.

List of Experiments

1. Start Raspberry Arduino/Pi and try various Linux commands in command terminal window: ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.
2. Run some python programs on Arduino/Pi like:
 - a) Read your name and print Hello message with name
 - b) Read two numbers and print their sum, difference, product and division.
 - c) Word and character count of a given string
 - d) Area of a given shape (rectangle, triangle and circle) reading shape and appropriate values from standard input
 - e) Print a name 'n' times, where name and n are read from standard input, using for and while loops.
 - f) Handle Divided by Zero Exception.

- g) Print current time for 10 times with an interval of 10 seconds.
- h) Read a file line by line and print the word count of each line.

3. Light an LED through Python program

4. Get input from two switches and switch on corresponding LEDs

5. Flash an LED at a given on time and off time cycle, where the two times are taken from a file.

6. Flash an LED based on cron output (acts as an alarm)

7. Switch on a relay at a given time using cron, where the relay's contact terminals are connected to a load.

8. Get the status of a bulb at a remote place (on the LAN) through web.

The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to the Arduino/Pi.

Course Name: MCA III YEAR I SEM
Subject Code : 4098193112

L	T	P	C
0	0	3	1.5

Network Security & Cryptography Lab

S. NO.	TOPIC
1	Write a C program that contains a string (char pointer) with a value \ Hello World'. The program should XOR each character in this string with 0 and displays the result.
2	Write a C program that contains a string (char pointer) with a value \ Hello World'. The program should AND or and XOR each character in this string with 127 and display the result
3	Write a Java program to perform encryption and decryption using the following algorithms: a) Ceaser Cipher b) Substitution Cipher c) Hill Cipher
4	Write a Java program to implement the DES algorithm logic
5	Write a C/ JAVA program to implement the Blow Fish algorithm logic
6	Write a C/ JAVA program to implement the Rijndael algorithm logic.
7	Using Java Cryptography, encrypt the text "Hello world" using Blow Fish. Create your own key using Java key tool.
8	Write a Java program to implement RSA Algorithm
9	Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript. Consider the end user as one of the parties (Alice) and the JavaScript application as other party (bob).
10	Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
11	Calculate the message digest of a text using the SHA-1 algorithm in JAVA.

