MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
Approved by AICTE, New Delhi-Affiliated to JNTUA, Anantapur ; An ISO 9001-2008 Certified Institution
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Department of Computer Applications

3 Year MCA. – **Course Structure (with effective from the academic year 2014 - 2015)**

Semester	Course Number	Course Title	Instru. Periods per week				Credits	Max. Marks		Total
			L	T	P	Total		Sessional	University	
First	14MCA11TO1	Introduction to Computing	4			4	4	40	60	100
	14MCA11TO2	English for communication	4			4	4	40	60	100
	14MCA11TO3	Programming to python	4			4	4	40	60	100
	14MCA11TO4	Computer Organization	4			4	4	40	60	100
	14MCA11PO1	Python Programming –Lab			3	3	3	40	60	100
	14MCA11P02	Office Automation –Lab			3	3	3	40	60	100
	14MCA11P03	Communication Lab			3	3	3	40	60	100
						Total	**25**		**Total**	**700**
Second	14MCA12TO5	Database Management Systems	4			4	4	40	60	100
	14MCA12TO6	Data Structures through C++	4			4	4	40	60	100
	14MCA12TO7	Discrete Mathematics	4			4	4	40	60	100
	14MCA12TO8	Operating System	4			4	4	40	60	100
	14MCA12P04	Database Management Systems Lab			3	3	3	40	60	100
	14MCA12P05	Unix and Shell Programming Lab			3	3	3	40	60	100
	14MCA12P06	Data Structures Using C++ Lab			3	3	3	40	60	100
						Total	**25**		**Total**	**700**
Third	14MCA21T09	Java programming	4			4	4	40	60	100
	14MCA21T10	Accountancy and Financial management.	4			4	4	40	60	100
	14MCA21T11	Computer Networks	4			4	4	40	60	100
	14MCA21T12	Software Engineering	4			4	4	40	60	100
	14MCA21P07	Unified Modelling Language Lab			3	3	3	40	60	100
	14MCA21P08	Java Programming Lab			3	3	3	40	60	100
	14MCA21P09	Networks Lab			3	3	3	40	60	100
						Total	**25**		**Total**	**700**
Fourth	14MCA22T13	Web technology through Java	4			4	4	40	60	100
	14MCA22T14	Data Warehouse & Data Mining	4			4	4	40	60	100
	14MCA22T15	Mobile Application Development using Android	4			4	4	40	60	100
	 14MCA22E1a 14MCA22E1b 14MCA22E1c	Elective I: 1) Cloud Infrastructure and Services. 2) Information Retrieval System 3)Enterprise resource planning	4			4	4	40	60	100
	14MCA22P10	Web technology Lab Java			3	3	3	40	60	100
	14MCA22P11	Data Mining&DataWarehouse Lab			3	3	3	40	60	100
	14MCA22P12	Mobile Application Development using Android Lab			3	3	3	40	60	100
						Total	**25**		**Total**	**700**

Semester	Course Number	Course Title	Instru. Periods per week				Credits	Max. Marks		Total
			L	T	P	Total		Sessional / University		
Fifth	14MCA31T17	Big Data and Analytics	4			4	4	40	60	100
	14MCA31T18	Optimization Techniques	4			4	4	40	60	100
	14MCA31T19	Network Programming	4			4	4	40	60	100
	14MCA31T20	Elective II: 1) User Interface Design 2) Multimedia Systems. 3) Information Security.	4			4	4	40	60	100
	14MCA31P13	Big Data lab.			3	3	3	40	40	100
	14MCA31P14	Network Programming Lab through C++.			3	3	3	40	40	100
	14MCA31P15	Elective II lab			3	3	3			
						Total	**25**		**Total**	**700**
Sixth	14MCA32T21	Software Project Management	4			4	4	40	60	100
	14MCA32T22	Software Testing	4			4	4	40	60	100
	14MCA321D01	Major Project – Seminar (16 + 2)					**18**			
						Total	**26**		**Total**	
							151			

L-Lecture T-Tutorials P-Practical

MCA I Year - I SEM

L	T	C
4	0	4

INTRODUCTION TO COMPUTING
(14MCA11TO1)

Course Objectives:

- *To impart the knowledge for a student about the evolution of computers, its input and output devices and its architecture.*
- *To elucidate the student about the memory organization and processor description.*
- *To teach students about the operating systems, its evolution and its different types.*
- *To develop the student to manage the data using DBMS.*
- *To illuminate the student about the concepts of the networks, crimes and laws associated with it.*

Course Outcomes:

- *The student will acquire knowledge about the system in detail.*
- *The student will be able to store, retrieve and manage the data.*
- *Student will be aware of the crimes and laws related to networks.*

UNIT- I

COMPUTER BASICS: Algorithms, A Simple Model of a Computer, Characteristics of Computers, Problem-solving Using Computers.

DATA REPRESENTATION: Representation of Characters in computers, Representation of Integers, Representation of Fractions, Hexadecimal Representation of Numbers, Decimal to Binary Conversion, Error-detecting codes.

INPUT & OUTPUT DEVICES: Description of Computer Input Units, Other Input Methods, Computer Output Units (Printers, Plotters)

UNIT -II

COMPUTER MEMORY: Memory Cell, Memory Organization, Read Only Memory, Serial Access Memory, Physical Devices Used to Construct Memories, Magnetic Hard Disk, floppy Disk Drives, Compact Disk Read Only Memory, Magnetic Tape Drives.

PROCESSOR: Structure of Instructions, Description of a Processor, Machine Language and Instruction set. Processors used in desktops and laptops. Specification of a desktop and Laptop computer currently available in the market (Specifications of processor, motherboard &chipset, memory, interface & capacity of hard disk & DVD drives, I/O ports)

UNIT- III

COMPUTER ARCHITECTURE : Interconnection of Units, Processor to Memory communication, I/O to Processor Communication, Interrupt Structures, Multiprogramming, Processor Features, Reduced Instruction, Set Computers (RISC), Virtual Memory.

SOFTWARE CONCEPTS: Types of Software, Programming Languages, Software (Its Nature & Qualities), Programming Languages.

UNIT -IV

OPERATING SYSTEMS: History and Evolution. Main functions of OS Multitasking, Multiprocessing, Time Sharing, Real Time OS with Examples,

DATABASE MANAGEMENT SYSTEM: Purpose and Organization of Database, Introduction to Data Models.

COMPUTER GENERATION & CLASSIFICATIONS: First Generation of Computers, The Second Generation, The Third Generation, The Fourth Generation, The Fifth Generation, Moore's Law, Classification of computers, Distributed Computer System, parallel computers.

UNIT- V

COMPUTERS & COMMUNICATIONS: Introduction to Computer Communications, Introduction to Computer Networks, Types of Networks, OSI/TCP Model, LAN tech- nologies (fast Ethernet &Gigabit Ethernet), How LAN works, Brief survey of active and passive LAN components.

INTERNET: Network, Client and Servers, Host & Terminals, TCP /IP, World Wide Web, Hypertext, Uniform Resource Locator, Web Browsers, IP Address, Domain Name, Internet Services Providers, Internet Security, Internet Requirements, Web Search Engine, Net Surfing, Internet Services, Case Study, Intranet.

CYBER LAWS: Introduction to Cyber Laws, Cyber crime, Cyber contract, Cyber privacy, IT Act

Text Books:

1. P .K. Sinha, Fundamentals of Computers, BPB Publications
2. V. Rajaraman, Fundamentals of Computers, 3rdEdition, PHI Publications

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MCA I Year - I SEM

L	T	C
4	**0**	**4**

ENGLISH FOR COMMUNICATION

(14MCA11TO2)

Course Objectives

- *The Language Lab focuses on recognizing and production practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.*
- *To expose the students to a variety of self-instructional, learner-friendly modes of language learning.*
- *To help the students cultivate the habit of reading passages from the computer monitor, thus equip them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.*
- *To enable them learn better pronunciation through stress on word accent, intonation, and rhythm.*
- *To train them in using language effectively to face interviews, group discussions, public speaking.*
- *To expose them to different techniques in resume preparation, report writing, format-making etc.*

Learning Outcomes:

- *Students will get the required training in documentation, presentation, discussions, facing interviews and develop communicative competence.*

UNIT –I

VOCABULARY BUILDING-Synonyms and Antonyms, Word roots, One-word substitutes, Prefixes and Suffixes, Idioms and phrases – Grammar- use of articles, prepositions, tenses & Subject-Verb agreement – Common Errors

UNIT-II

NON-VERBAL COMMUNICATION (BODY LANGUAGE - KINESICS, PROXEMICS ETC) - Verbal Communication - Informal Vs Formal conversation – Features of and barriers to effective communication – Process and flow of communication

UNIT-III

COMMUNICATION SKILLS – Listening (barriers to & features of effective listening), Speaking (Jargons - rate of speech, pitch, tone - Clarity of voice etc.), Reading (techniques) and Writing (features of effective writing such "as clarity, brevity, appropriate tone, balance etc) - differences between spoken and written communication

UNIT-IV

TECHNICAL PRESENTATIONS - types of presentation –video conferencing-- participation in meetings - chairing sessions.

INTERVIEWS – planning - interviewing in different settings and for different purposes, interview through tele and video conferencing, recruiting.

Unit–V:

LETTER-WRITING - business letters - format - style – effectiveness, promptness - e-mail, fax –

TECHNICAL REPORT WRITING – Types of reports - progress reports, routine reports - Annual reports - formats - Analysis of sample reports from industry - Synopsis and thesis writing

Text Books:

1) Technical Communication by Meenakshi Raman and Sangeeta sharma, Oxford Univ.Press.
2) Effective Technical Communication, M Ashraf Rizvi, Tata Mc.Graw-Hill Pub,company Ltd.
3) Communication Skills,Sanjay Kumar & Pushp Lata, Oxford Univ.Press.
4) Basic Communication Skills for Technology, Andrea J. Rutherford: Pearson Education Asia, New Delhi.
5) GRE and TOEFL; Kaplan and Baron's English in Mind, Herbert Puchta and Jeff Stranks, Cambridge
6) Communication Skills, Lenne Sen, Prentice –Hall of India Pvt. Ltd., New Delhi.
7) Communicating at work, Ronald B. Adler, Seanne Marquardt Elmhurst ,Mc Graw Hill international editions.

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	L	T	C
MCA I Year - I SEM	**4**	**0**	**4**

PROGRAMMING TO PYTHON
(14MCA11TO3)

Course Objectives:

- *To develop skills to design and analyze the problems.*
- *Students should be able to design a flowchart for any real time problem.*
- *To inculcate the programming skills of python language.*
- *To make the students to feel comfort with the object oriented programming.*

Course Outcomes:

- *Students will able to design flowcharts for any specific problem.*
- *Students can learn python language constructs.*
- *Students will learn OOP concepts which will be helpful for them in further semesters.*
- *Students will have basic idea on data structures.*

UNIT- I:

INTRODUCTION TO COMPUTERS: Computer definition, Block diagram of Computer, Hardware Vs Software, Software development life cycle, Structured programming, Computer languages, Creating and running the programs, Number Systems.

INTRODUCTION TO COMPUTER PROBLEM SOLVING: Introduction, The problem solving aspect, Top down design, Bottom-up Approach, Implementation of algorithms, The efficiency of Algorithms, Basic Computing Steps and Flow charting (Assignment, Sequencing, Conditionals, Iterations)Practical: Scratch, Raptor

UNIT- II:

VARIABLES, EXPRESSIONS AND STATEMENTS: Values and types, keywords, Operators Expressions, Interactive mode and script mode, String operations, Comments.

FUNCTIONS & MODULES: Function calls, Type conversion functions, Math functions, Adding new functions, Definitions and uses, Flow of execution, Parameters and arguments, Random numbers, The time module, The math module.

CONDITIONALS: Conditional execution, Alternative execution, Chained conditionals, Nested conditionals. Iteration: Multiple assignment, Updating variables, the while statement, break, continue.

UNIT –III:

STRINGS: A string is a sequence, Traversal with for loop, String slices, Strings are immutable, Searching, Looping and counting, String methods, the in operator, String comparison.

TUPLES: Tuples are immutable, Tuple assignment, Tuples as return values, Lists and tuples, Dictionaries and tuples, Comparing tuples, Sequences of sequences,

DEBUGGING. LISTS: Traversing a list, List operations, List slices, List methods. Recursion: Stack diagrams for recursive functions, Infinite. Files: Persistence, Reading and writing, Filenames and paths

UNIT -IV:

CLASSES AND OBJECTS: User-defined types, Attributes, Instances as return values.

Methods: The init method, The str method, Operator overloading, Polymorphism. Inheritance: Importance, examples.

EVENT HANDLING: Key press events, Mouse events.

EXCEPTIONS: Catching exceptions, Raising our own exceptions, the finally clause of the try statement.

UNIT- V:

DEFINITION AND USE OF STACKS: Abstract data types, The Stack ADT, Implementing stacks with Python lists, pushing and popping, Using a stack to evaluate postfix, Parsing, Evaluating postfix.

QUEUES: The Queue ADT, Linked Queue, Performance characteristics, Improved Linked Queue, Priority queue.

Text Books:

1) Think Python - How to Think Like a Computer Scientist, Green Tea Press, Needham, Massachusetts, Allen Downey, Version 2.0.13, June 2014.

2) How to Think Like a Computer Scientist: Learning with Python 3, Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, Documentation Release 3rd Edition.

Reference Books:

1)How to Solve it by Computer by R.G. Dromey, Pearson

2)Introduction to Computation and Programming using Python by John V.Guttag, Spring 2013 Edition, The MIT Press Cambridge, Massachusetts, London, England.

3)Python for Everyone by Cay Horstmann, San Jose State University, Rance D. Necaise, College of William and Mary, Wiley.

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MCA I Year - I SEM	**L**	**T**	**C**
	4	**0**	**4**

COMPUTER ORGANIZATION
(14MCA11TO4)

Course Objectives

- *The main objective of computer organization course is to introduce the main concepts and components of computer organization and architecture.*
- *Understand the architecture of a modern computer with its various processing units.*
- *Understand the performance measurement of the computer system*
- *Understand the Cache memory and its importance.*
- *Students can calculate the effective address of an operand by addressing modes*

Course Outcomes:

- *Successful completion of this course should lead to the following learning outcomes:*
- *Understand the combinational and sequential logical circuits.*
- *Understand the basics of assembly language.*
- *Understand the main concepts of computer architecture.*
- *Design and analyze the main functional units of a computer.*
- *Implement assembly programs that accomplish basic computational and I/O operations.*
- *Discuss and work in a group in order to design the main functional units of a computer.*
- *Discuss and work in a group in order to design and implement assigned programming tasks in Assembly.*
- *Demonstrate designed functional units as well as implemented assembly programs.*

UNIT- I:

BASIC STRUCTURE OF COMPUTERS : Functional units – Basic operational concepts, logic gates, Sequential and combinational circuits, flip flop, adders, multiplexers, encoders, decoders – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface – Instruction set architecture, Fixed point and floating point operations, Karnaugh map.

UNIT- II:

BASIC PROCESSING UNIT : Fundamental concepts – Addressing modes – RISC – CISC, Registers, Instruction formats, ALU design Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control – Nano programming.

UNIT -III:

PIPELINING : Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations Exception handling.

UNIT- IV:

MEMORY SYSTEM : Basic concepts – Semiconductor, Magnetic, Optical memories, Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Improving cache performance – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.:

UNIT -V:

I/O ORGANIZATION: Accessing I/O devices – Programmed Input/Output -Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB), I/O devices and processors.

Text Books:

1.Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, Fifth Edition, Tata McGraw Hill, 2002.

Reference Books:

1.David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Softwareinterface”, Third Edition, Elsevier, 2005.
2.William Stallings, “Computer Organization and Architecture – Designing for Performance”, Sixth Edition, Pearson Education, 200UNIT III

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MCA I Year - I SEM	L	P	C
	0	3	3

PROGRAMMING TO PYTHON LAB
(14MCA11P01)

Course Objectives:

- *To develop skills to design and analyze the problems.*
- *Students should be able to design a flowchart for any real time problem.*
- *To inculcate the programming skills of python language.*
- *To make the students to feel comfort with the object oriented programming.*

Course Outcomes:

- *Students will able to design flowcharts for any specific problem.*
- *Students can learn python language constructs.*
- *Students will learn OOP concepts which will be helpful for them in further semesters.*
- *Students will have basic idea on data structures.*

LIST OF EXPERIMENTS

1.

a) Develop animated models using scratch tool

2.

a) Develop the flowchart for finding a number is even or odd.
b) Develop a flowchart for displaying reversal of a number.
c) Develop a flowchart for finding biggest number among three numbers

3.

a) Develop a flowchart for swapping two values using functions.
b) Develop a flowchart to sort the list of numbers.
c) Develop a flowchart to find largest element in an array.

4.

a) Implement Python script to read person’s age from keyboard and display whether he is eligible for voting or not.
b) Implement Python script to find biggest number between two numbers.

5.

a) Implement Python Script to generate prime numbers series up to n.
b) Implement Python Script to check given number is palindrome or not.
c) Implement Python script to print factorial of a number.

6.

a) Implement Python Script to perform various operations on string using string libraries.

b) Implement Python Script to check given string is palindrome or not.

7.

a) Define a function max_of_three() that takes three numbers as arguments and returns the largest of them.

b) Write a program which makes use of function to display all such numbers which are divisible by 7 but are not a multiple of 5, between 1000 and 2000.

8.

a) Define a function which generates Fibonacci series up to n numbers.

b) Define a function that checks whether the given number is Armstrong.

9.

a) Write a program which accepts a sequence of comma-separated numbers from console and generate a list and a tuple which contains every number.

Suppose the following input is supplied to the program:34,67,55,33,12,98. Then, the output should be: ['34', '67', '55', '33', '12', '98'] ('34', '67', '55', '33', '12', '98').

b) With a given tuple (1,2,3,4,5,6,7,8,9,10), write a program to print the first half values in one line and the last half values in one line.

10.

a) Write a python script to perform basic dictionary operations like insert, delete and display.

b) Write a python script to find frequency of words in a file using dictionaries.

11.

a) Write Python script to display file contents.

b) Write Python script to copy file contents from one file to another.

12.

a) Define a class named Rectangle which can be constructed by a length and width. The Rectangle class has a method which can compute the area.

b) Define a class named Circle which can constructed by radius. The derived classes Area, Circumference uses methods called calArea(), calCirc() respectively to calculate area, circumference of circle.

13.

a) Implement Python script to develop stack ADT and its operations.

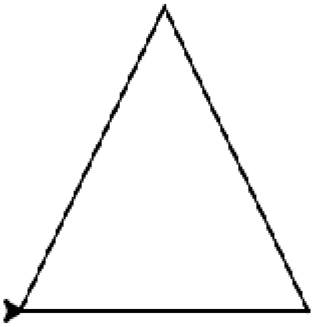
b) Implement Python script to evaluate postfix expression.

14.

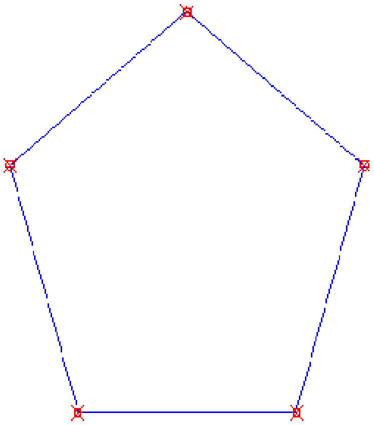
a) Implement Python script to develop queue ADT and its operations.

b) Implement Python script to perform tree traversals.

15. Write a python script to display following shapes using turtle.

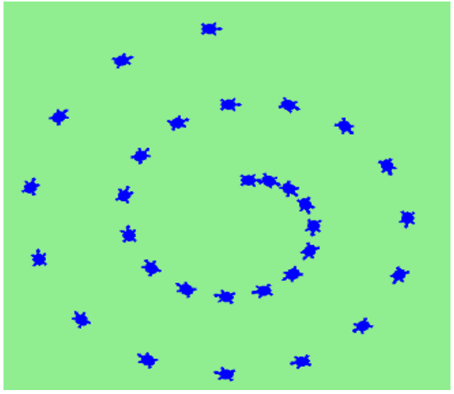


a)

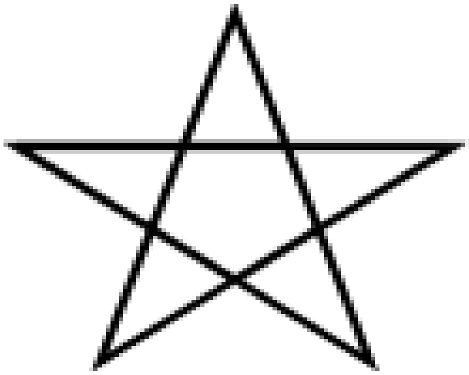


b)

16. Write a python script to display following shapes using turtle.



a)



b)

	L	P	C
MCA I Year - I SEM	**0**	**3**	**3**

OFFICE AUTOMATION LAB
(14MCA11P02)

Course Objectives

- *The objective of Office Automation Lab is to impart basic computer usage and develop skills that will aid in your day to day activities using computers.*
- *To provide the student on hands-on experience and technical training in Word processors, Spreadsheets, Presentations.*
- *To provide the knowledge about the Networking concepts of computers and usage of Internet facility for Browsing Searching and awareness about cyber hazards.*

Course Outcomes:

- *The will be able to prepare the Documents effectively using Word processors*
- *The student will be able to prepare presentations using animations and slide shows.*
- *The student will be able to create spread sheets for analysis of any information.*
- *The student will be able to work with database and commands over database.*
- *The student will gain knowledge to access and browse the Internet for any information requirement.*

List of Experiments

1.

WORD PROCESSOR: The tasks that are to be executed are creating document which includes editing, saving and organizing the data. Organization of data includes - inserting and deleting the characters, Inserting header and Footer, changing the font, changing the color, formatting paragraphs, spell checking, inserting images, page no’s. Creating tables, textboxes, Hyperlinks, Mail merge, Macros.

2.

SPREADSHEET: The task to be executed will include to create, open, save and edit the spread sheets. Spread sheet creation includes -creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells.

3.

PRESENTATIONS: The tasks are practiced by creating slides, opening, saving and running the presentations. Creation of slides include-Selecting the style for slides, formatting the slides with different fonts, colors, creating charts and tables, inserting and deleting text, graphics, bulleting and numbering, Tasks also include hyperlinks, animations, running the slide show and setting the timing for slide show.

4.

DATABASE: The tasks included are creation of Database, tables and relationships and generating reports. Oracle- Basic SQL commands which include Create, Insert, Delete, Drop, View and updating the tables.

5.

NETWORKING: Usage of web browsers, email creation, Browsing, Surfing.

Text Books:

1. MOS study guide for word, Excel, Power point & Outlook Exams", Joan Lambert, Joyce Cox, PHI.
2. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

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MCA I Year - I SEM

L	P	C
0	**3**	**3**

COMMUNICATION LAB
(14MCA11P03)

Course Objectives

- *The Language Lab focuses on recognizing and production practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.*
- *To expose the students to a variety of self-instructional, learner-friendly modes of language learning.*
- *To help the students cultivate the habit of reading passages from the computer monitor, thus equip them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.*
- *To enable them learn better pronunciation through stress on word accent, intonation, and rhythm.*
- *To train them in using language effectively to face interviews, group discussions, public speaking.*
- *To expose them to different techniques in resume preparation, report writing, format-making etc.*

Learning Outcomes:

- *Students can notice different accents of English and improve their fluency and common skills through various activities.*
- *Students are able to participate in every co-curricular activity and are able to face TOEFL, GRE and IELTS confidently and appear for any competitive exams.*
- *Students are able to participate in Group Discussions and face interviews.*

List of Experiments

The following course content is prescribed for the English Language Laboratory Practice
1. Phonetics- Introduction to the Sounds of English – vowels, Diphthongs and consonants
2. Introduction to Stress, Accent, Intonation and Rhythm
3. Interpersonal communications - Role play
4. Oral Presentations/Public speaking
5. Debate
6. Group Discussions

7. Facing interviews
8. Resume preparation

1. Phonetics – English pronunciation– basics in phonetics- introduction to sounds of English – vowels – diphthongs – consonants
2..Techniques to develop effective word accent- various stress patterns– developing voice, quality and tone– intonation– rhythm
3. Fundamentals of interpersonal communication– starting a conversation- responding appropriately and relevantly - Dialogues- Formal and informal– using the right body language
4.Role play in different situations.
5. Importance of Oral Presentations- developing and organizing the presentations– verbal and visual support in presentations– delivering the presentation
6. Informative, group and special occasion presentations– persuasive presentations
7. Formal and Informal debate– theory for debating– art of debating
8. Debate on various topics
9. Nature of group discussion– characteristics of successful GD‟ s– strategies– techniques for individual contribution- intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
10. Organizing Group Discussions
11. Interview Skills– concept and process, pre-interview planning, opening strategies, answering strategies, projecting a positive image, interview through tele and video-conferencing.
12. Organizing mock interviews
13. Resume design– structure and presentation, planning, defining the career objective, projecting one's strengths and skill-sets, summary.
14. Resume styles– job application letters
Minimum Requirements Computer aided multimedia language lab equipped with Computer systems in LAN facility.
Conventional Language Lab. with audio and video systems, speakers, headphones and a teacher console so as to accommodate at least 60 students.

Prescribed Software: Young India - Clarity SNET

Suggested Software:

- Cambridge Advanced Learners' Dictionary with exercises
- The Rosetta Stone English Library
- Clarity Pronunciation Power
- Mastering English in Vocabulary

Text Books:

1. ***Raymond Murphy's Intermediate English Grammar with CD,*** Raymond Murphy, Cambridge University Press, 2012.
2. ***Communication Skills,*** Sanjay Kumar & Pushpalatha, Oxford University Press, 2012.
3. ***A Course in Communication Skills***, Kiranmai, Dutt & Co Foundation Books, 2012.
4. ***Current English grammar and usage,*** S M Guptha, PHI, 2013.
5. ***Powerful Vocabulary Builder,*** Anjana Agarwal, New Age International Publishers, 2011.

Speak Well, Jayashree Mohanraj et al, Orient Blackswan.

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MCA I Year – II SEM

L	T	C
4	**0**	**4**

DATABASE MANAGEMENT SYSTEM
(14MCA12TO5)

Course Objectives:

- *To understand the role of a database management system in an organization.*
- *To understand basic database concepts, including the structure and operation of the relational data model.*
- *To construct simple and moderately advanced database queries using Structured Query Language (SQL).*
- *To Understand and successfully apply logical database design*
- *Principles, including E-R diagrams and database normalization.*
- *To Design and implement a small database project using Microsoft Access.*
- *To understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols.*
- *To Describe and discuss selected advanced database topics, such as distributed database systems and the data warehouse.*
- *To understand the role of the database administrator.*

Course Outcomes:

Upon successful completion of this course, students should be able to:

- *Describe fundamental elements of a relational database management system.*
- *Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and database language SQL .*
- *Identify other data models such as object-oriented model and XML model Skill*
- *Design entity-relationship diagrams to represent simple database application scenarios.*
- *Convert entity-relationship diagrams into relational tables, populate a relational database and formulate SQL queries on the data.*
- *Criticize a database design and improve the design by normalization.*

UNIT- I:

Database system Applications, Database system Vs File system, View of data, Data abstraction, Instances and Schemas, Database users, Database system structure, Database design and ER diagrams, Beyond - ER Design Entities, Attributes, Entity sets, Relationships and Relationship sets, Additional features of ER model.

UNIT -II:

Introduction to Relational model- Integrity constraints over the relations, Enforcing integrity constraints, Database Languages, DDL, DML, TCL, basic form of SQL query, Querying relational data, Logical database design, views, Destroying and altering tables/views. Nested queries correlated nested queries, Null values, Relation Algebra- selection, projection, renaming, join, examples.

UNIT- III:

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless-join Decomposition, Dependency- preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – Fourth Normal Form and Fifth Normal form.

UNIT -IV:

Overview of Transaction Management: ACID properties, Transactions and Schedules, Concurrent Execution of transactions, Lock Based Concurrency Control, Performance Locking, Transaction Support in SQL, Serializability and Recoverability, Introduction to Lock Management, Lock Conversions, Dealing with Dead Locks, Concurrency without Locking. Crash recovery – Aries Recovery Algorithm.

UNIT -V:

Structured Query Language, data types, logic operators, aggregate functions, character functions, triggers, cursors, exceptional handling, PL/SQL,

Text Books:

1. Data Base Management Systems, Raghurama Krishnan, Johannes Gehrke, TMH

Reference Books

1. Data Base System Concepts, 6/e, Silberschatz, Korth, TMH.

2. Data Base Management System, 5/e, Elmasri Navathe, Pearson

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DATASTRUCTURES THROUGH C++
(14MCA12TO6)

Course Objectives:

- *Objective of this course is to teach students various data structures and to explain them algorithms for performing various operations on these data structures. The course aims are:*
- *I. Demonstrate familiarity with major algorithms and data structures.*
- *Analyze performance of algorithms.*
- *Choose the appropriate data structure and algorithm design method for a specified application.*
- *Determine which algorithm or data structure to use in different scenarios.*

Course Outcomes:

- *Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs*
- *. Use various data structures effectively in application programs.*
- *Demonstrate understanding of various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort*
- *Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths*
- *Demonstrate understanding of various searching algorithms.*
- *Program multiple file programs in a manner that allows for reusability of code.*
- *Compare different implementations of data structures and to recognize the advantages and disadvantages of the different implementations*

UNIT- 1:

C++ CLASS OVERVIEW-

Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete), exception handling,Function Over Loading, Operator Overloading,

UNIT –II:

Generic Programming- Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control, runtime polymorphism using virtual functions, abstract classes, streamsI/O.

Introduction to Data Structures

Information and its meaning: Abstract Data Types, Sequences as Value Definitions, ADT for Varying length character Strings, Data Types, Pointers and review of Pointers, Data Structures

Arrays: the Array as an ADT, Using One-dimensional Arrays, Implementing One-Dimensional Arrays, Arrays as Parameters, Handling of Character Strings and Character Strings

UNIT- III:

The Stack Definition and examples, Primitive operations, Example, The stack as an ADT, Representing stacks ,Implementing the pop operation, Testing for exceptional conditions , Implementing the push operations , Examples for infix , postfix, and prefix expressions,
Applications of Stacks: Regular Expressions, Expression Evaluations, Recursion etc.

Queues and Lists

The queue and its sequential representation, the queue as ADT, Insert operation, Priority queue, Array implementation of a priority queue.

Linked lists: Inserting and removing nodes from a list, Linked implementations of stacks, getnode and Freenode operations, Linked implementation of queues, Linked list as a data Structure, Example of list operations, Header nodes, Array implementation of lists, Limitations of array implementation, allocating and freeing dynamic variables, Linked lists using dynamic variables, Non integer and non-homogenous lists,

UNIT - IV

Other list structures: Circular lists, Stack as a circular lists, doubly linked lists, Application of Linked Lists

Dictionaries, linear list representation, skip list representation, operations insertion, deletion and searching, hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing, comparison of hashing and skip lists.

UNIT- V:

Binary Trees

Tree traversals, Binary Search Tree and Operations, AVL Tree and Operations, Red-Black Tree, Threaded binary trees and operations,B-Trees, B-Tree of order m, height of a B-Tree, insertion, deletion and searching, Comparison of Search Trees.

Sorting &Searching

Bubble sort, Quick sort, Selection sort, Tree Sorting: Binary Tree Sort, Heap Sort, Insertion Sorts: Simple Insertion, Merge and Radix Sort.

Basic Search Techniques: Algorithmic Notations, Sequential searching, Searching an ordered table, Indexed sequential search, Binary search, Interpolation search.

Text Books:

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.
2. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and .Mount, Wiley student edition, John Wiley and Sons.
3. Data Structures Using C and C++ by Yedidyah Langsam and Moshe J. Augenstein and Aaron M Tenanbanum, 2nd Edition, Pearson Education Asia,2002.

Reference Books:

1. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
2. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
3. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
4. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

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DISCRETE MATHEMATICAL STRUCTURES (14MCA12TO7)

Course Objectives:

- *On completion ,the students will be able to explain and apply the basic methods of discrete (noncontinuous) mathematics in Computer Science. They will be able to use these methods in subsequent courses in the design and analysis of algorithms, computability theory, software engineering, and computer systems.*
- *In particular, students will be able to*
- *Reason mathematically about basic data types and structures (such as numbers, sets, graphs, and trees) used in computer algorithms and systems; distinguish rigorous definitions and conclusions from merely plausible ones; synthesize elementary proofs, especially proofs by induction.*
- *Model and analyze computational processes using analytic and combinatorial methods.*
- *Apply principles of discrete probability to calculate probabilities and expectations of simple random processes.*
- *Work in small teams to accomplish all the objectives above.*
-

Course Outcomes:

- *Students will be able to:*
- *Use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions, and integers.*
- *Evaluate elementary mathematical arguments and identify fallacious reasoning (not just fallacious conclusions).*
- *Synthesize induction hypotheses and simple induction proofs.*
- *Prove elementary properties of modular arithmetic and explain their applications in Computer Science, for example, in cryptography and hashing algorithms.*
- *Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.*
- *Derive closed-form and asymptotic expressions from series and recurrences for growth rates of processes.*
- *Problem solve and study in a small team with fellow students.*

UNIT- I:

Sets, Relations, Possets, Functions-Mathematical Inductions (Simple and Strong) Principles of counting (Addition and multiplication) Logic and Proof, Sets and Functions – Logic Propositional equivalence, Predicates and Quantities, Nested quantifiers, Methods of Proof, sets, set operations, functions.

UNIT -II:

The Integers and Division, Integers and Algorithms, Applications of Number theory, Mathematical reasoning, Induction and Recursion – Proof strategy, Sequences and Summations, Mathematical induction. Recursive definitions and Structural induction, Recursive algorithms, Program correctness.

UNIT- III:

The basics of counting, the pigeonhole principle, Permutations and Combinations, Binomial coefficients, Generalized permutations and combinations, Generating permutations and combinations, Recurrence relations, Solving recurrence relations.

Relations – Relations and their properties, n-ary Relations and their applications, Representing Relations, Closures of relations, Equivalence relations, Partial orderings. Languages and Grammers, Finite state machines with output, Finite state machines with no output, Language recognition, Turing machines.

UNIT- IV:

Graphs – Introduction to Graphs, Graph terminology, Representing graphs and Graph isomorphism, Connectivity, Euler and Hamilton Faths, Shortest Path problems, Planar graphs, Graph coloring.

UNIT -V:

Recurrence Relations and Generating Functions: Homogeneous and Non-homogeneous recurrence and their solutions-solving recurrences using generating functions

Text Books:

1 .Rosen K.H. Discrete Mathematics and its Applications, 5th edition, Tata McGraw – Hills, 2003.

Reference Books:

1. Johnson Baugh R, and Carman R, Discrete mathematics, 5th edition, Person Education, 2003.
2. Kolman B, Busoy R.C, and Ross S.C, Discrete Mathematical Structures, 5th edition, Pretitice – Hall, 2004.
3. Mott J.L, Kandel A, and Bake T.P, Discrete Mathematics for Computer Scientists & Mathematicians, 2nd edition, Prentice-Hall of India, 2002.
4. Gary Haggard, John Schlipf and sue Whitesides, Discrete

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OPERATING SYSTEMS
(14MCA12TO8)

Course Objective:

- *To study and apply concepts relating to operating systems:*
- *General understanding of structure of modern computers.*
- *To understand the services provided by and the design of an operating system.*
- *To understand the structure and organization of the file system.*
- *To understand what a process is and how processes are synchronized and scheduled.*
- *To understand different approaches to memory management.*
- *Students should be able to use system calls for managing processes, memory and the file system.*
- *Students should understand the data structures and algorithms used to implement an OS.*
- *Illustration of key OS aspects by example.*

Course Outcomes:

By the end of the course you should be able to

- *Describe the general architecture of computers.*
- *Describe, contrast and compare differing structures for operating systems.*
- *Understand and analyses theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files.*
- *A high-level understanding of the structure of operating systems, applications, and the relationship between them.*
- *Understand FAT filing systems and NTFS filing systems.*
- *Evaluate the security issues of FAT Tables and the more secure NTFS*
- *Prevent and repair infections of malware on a computer*

UNIT- I:

OPERATING SYSTEM INTRODUCTION: Operating Systems objectives and functions, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Special -Purpose Systems, Operating System services, User OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure, Virtual Machines.

UNIT- II:

UNIX INTRODUCTION TO SHELL: UNIX Features and Environment, UNIX Structure, Accessing UNIX,

LINUX UTILITIES-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands. Grep command, Vi Editor

SED – scripts, operation, addresses, commands, applications.**awk** – execution, fields and records, scripts, operation, patterns, actions, functions, uses system commands in awk.

UNIT -III:

WORKING WITH THE BOURNE AGAIN SHELL(BASH): Introduction, shell responsibilities, pipes and input Redirection, output redirection, command Execution, command line editing, quotes, command substitution, shell variables, Filters, shell meta characters, shell programming-control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

UNIT -IV:

PROCESS: Overview of Process, Process Scheduling, scheduling Algorithm, Multiple-Processor Scheduling,The Critical Section Problem,Synchronization Hardware,Semaphores, Classic Problems of Synchronization. Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

UNIT -V:

MEMORY MANAGEMENT: Logical & Physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging.,

STORAGE MANAGEMENT :File System – File Concept, Access methods, Directory Structure, File System Mounting, File Sharing, Protection. Mass Storage Structure – Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management, Free-space Management.

Text Books:

1.Operating System Principles , Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, Wiley Student Edition

2. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning

Reference Books:

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, Pearson/PHI
2. Operating Systems – Internals and Design Principles, W. Stallings, 6th Edition, Pearson Education.
3. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition,rp-2008.

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DATABASE MANAGEMENT SYSTEM LAB
(14MCA12P04)

Course Objectives

- *To provide a sound introduction to the discipline of database management asa subject in its own right, rather than as a compendium of techniques andproduct-specific tools.*
- *To familiarise the participant with the nuances of database environmentstowards an information-oriented data-processing oriented framework*
- *To give a good formal foundation on the relational model of data*
- *To present SQL and procedural interfaces to SQL comprehensively*
- *To give an introduction to systematic database design approaches coveringconceptual design, logical design and an overview of physical design*
- *To motivate the participants to relate all these to one or more commercialproduct environments as they relate to the developer tasks*
- *To present the concepts and techniques relating to query processing by SQLengines*
- *To present the concepts and techniques relating to ODBC and itsimplementations.*
- *To introduce the concepts of transactions and transaction processing*
- *To present the issues and techniques relating to concurrency and recovery inmulti-user database environments*

Course Outcomes:

- *Differentiate between Data Definition Language (DDL) and Data Manipulation Language (DML).*
- *Describe some essential SQL DDL and DML commands.*
- *Interpret and use different data types.*
- *Apply SQL DDL commands to create tables, views, and indexes.*

- *Apply SQL DML commands to select, insert, update, and delete data.*
- *Explain and use logical operators AND, OR, NOT*
- *Use special operators such as BETWEEN, IS NULL, LIKE, IN, and EXISTS in conjunction with the WHERE clause.*
- *Explain and use the aggregate functions: COUNT, MAX, MIN, SUM, and AVG for mathematical summaries.*

- *Use the ALTER command to add a column and drop a column.*
- *Use the DROP TABLE command to delete a table from the database.*
- *Use the ORDER BY clause to sort a listing in ascending or descending order.*

Use the GROUP BY clause in conjunction with an SQL aggregate function such as COUNT, MIN, MAX, AVG, and SUM to obtain summary row data, or subtotals in reports.

- *Explain and use SQL functions to manipulate dates, strings, and other data.*
- *Create and use sequences.*

Create and use simple triggers and stored procedures.

Recommended Systems/Software Requirements:

□ Intel based desktop PC

□ Mysql /Oracle latest version Recommended

List of Sample Problems/Experiments

1) Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.

2) Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.

Example:- Select the roll number and name of the student who secured fourth rank in the class.

3) Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

4) Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)

5) i)Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)

ii)Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

6) Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.

7) Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.

8) Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.

9) Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.

10) Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.

11) Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.

12) Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

Text Books::

1. Database Management Systems, Peter Rob, A.Ananda Rao and Carlos Coronel, Cengage Learning.

2. ORACLE PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rd Edition

3. SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.

4. Introduction to SQL, Rick F.Vander Lans, Pearson Education.

5. Oracle PL/SQL Programming,Steven Feuerstein,SPD.

6. The Database Book, N.Gehani, Universities Press.

7. Database Systems using Oracle: A Simplified Guide to SQL and PL/SQL, Shah, PHI.

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UNIX and Shell Programming Lab
(14MCA12P05)

Course Objectives:

- *This course is designed to give delegates practical experience in developing and writing shell scripts.*
- *Most of the built-in unix shell commands are introduced together with the main program control structures.*
- *The course also gives practical experience using a range of UNIX tools to manipulate text and incorporate into UNIX shell scripts.*
- *To provide the skills needed to develop and customize Unix shell programs*
- *To make effective use of a wide range of standard UNIX programming and development tools.*

Course Outcomes:

- *After completion of the course students will be able to*
- *Work confidently in Unix/Linux environment*
- *Write shell scripts to automate various tasks*
- *Write complex shell scripts.*
- *Master the basics of linux administration*
- *Students will learn Unix structure, commands, and utilities.Also, students will become versed with regular expressions and shell programming.*

List of Lab Exercises

1. Execution of various file/directory handling commands.

2. 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.

3. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

4. 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.

5. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.

6. 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.

7. Write a shell script to list all of the directory files in a directory.

8. Write a shell script to find factorial of a given integer.

9. Write a shell script to calculate simple arithmetic operator.

10. Write a shell script to find the length of a given string.

11. Write a shell program to find out reverse string of the given string and check the given string is palindrome or not

12. Write a shell program to calculate the Fibonacci series by using function.

13. Write a shell program to check given number is prime or not by using function.

14. Write an awk command to print first field and second field only if third field value is >=50 in the given input file. (input field separator is ":" and output field separator is ",")

15. Consider the marks.txt is a file that contains one record per line(comma separate fields) of the student data in the form of studentid, student name, Telugu marks, English marks, Maths Marks, Science marks, Social Marks. Write an awk script to generate result for every students in the form of studentid, studentname, Total Marks and result. Result is PASS if marks is >=30 in TELUGU and English, and if marks>=40 in other subjects. Result is fail otherwise.

16. Write an awk program to demonstrate user defined functions and system command.

17. Write an awk script to count the number of lines in a file that do not contain vowels.

18. Write an awk script to find the number of characters, words and lines in a file.

19. Write a grep command that selects the lines from the file1 that have exactly three characters

20. Write a grep command that selects the lines from the file1 that have at least three characters.

21. Write a grep command that selects the lines from the file1 that have three or fewer characters

22. Write a grep command that count the number blank lines in the file1

23. Write a grep command that copy the file to the monitor, but delete the blank lines.

24. Write a grep command that selects the lines from the file1 that have at least two digits without any other characters in between

25. Write a sed command that delete lines that contain **BEGIN** but not **END**

26. Write a sed command that swaps the first and second word in each line in the file

27. Write a sed command to delete character before last character in each line in a file

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Data Structures through C++
14MCA12P06

Course Objectives:

To make the student learn a programming language.

To teach the student to write programs in C++ to solve typical problems.

To introduce the student to simple linear data structures such as lists, stacks, queues.

Course Outcomes:

At the end of this lab session, the student will

- *Be able to design and analyze the time and space efficiency of the data structure*
- *Be capable to identity the appropriate data structure for given problem*
- *Have practical knowledge on the application of data structures*

List of Experiments:

1. Create a Stack and do the following operations using arrays and linked list.
   a. push
   b. pop
   c. peep
2. create a queue and do the following operations using arrays and linked list.
   a. add
   b. remove
   c. display queue elements.
3. Implement the operations on singly linked list.
4. Implement the operations on circular linked list.
5. Implement the operations on doubly linked list.
6. Write a c++ program that use non recursive functions to traverse tree in
   a. pre order
   b. in order
   c. postorder
7. Write a program to create BST (Binary Search tree)
8. write a program to implement sorting methods
   a. Bubble & Selection sort.

b. quick sort.
c. merge sort.

9. Write C++ programs that use both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers :

i) Linear search ii) Binary search

10. Write a program to convert postfix expression evaluation.

11. Write a program to convert infix to postfix conversion.

12. Write C program that uses both recursive and non-recursive functions

i) To find the factorial of a given integer.
ii) To find the GCD (greatest common divisor) of two given integers.
iii) To solve Towers of Hanoi problem.