*I Year MCA – I Sem***ester**

14300101 C Programming and Data Structures

Course Objective: ***This course is designed provide a comprehensive study of the Formulating algorithmic solutions to problems and implementing algorithms in C.***

Unit -I

Objective: Notion of Operation of CPU, Notion of an algorithm and computational procedure, editing and executing programs in IDE's.

Introduction to Computers, H/W and S/W concepts, Algorithm, pseudo code, flowchart, program development steps, Introduction to various IDE's and their use in C program development, structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation. Control structures such as if, go to, labels, and switch statements.

Unit -II

Objective: Understanding branching, iteration and data representation using arrays.

Loops- while, do-while and for statements, break, continue, Arrays - concepts, declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1- D arrays other than strings, 2-D character arrays – 2-D arrays other than character arrays – Multidimensional arrays.

Unit -III

Objective: Modular programming and recursive solution formulation. Understanding pointers and dynamic memory allocation.

Functions:

Basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C pre-processor. Passing 1-D arrays, 2-D arrays, and functions.

Pointers:

Concepts, initialization of pointer variables, pointers and function arguments, passing by address –dangling memory, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory management's functions, command line arguments.

Unit - IV

Objective: Understanding miscellaneous aspects of c. Comprehension of file operations and Data Structures using sorting techniques.

Derived types:

Structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, Input and output – concept of a file, text files

and binary files, Formatted I/o, file I/o operations.

Data Structures:
Introduction to Data Structures – Time Complexity – Space Complexity – Pattern matching – naive method – Robin Karp Algorithm - Searching – Linear and binary search methods, sorting – Bubble sort, selection sort, Insertion sort, Quick sort, merge sort.

Unit -V
Objective: Understand about linear & non-linear data structures and their applications.

Single linked lists, doubly linked lists, circular list, representing stacks and queues inC using arrays and linked lists, infix to post fix conversion, postfix expression evaluation. Trees- Binary tress, terminology, representation, traversals, Graphs - terminology, representation, graph traversals (DFS & BFS) – Warshalls – Dijkstra – Kruskal – Prims Algorithms (only Algorithms).

Course Outcomes:

1.To Understand Notion of Operation of CPU, Notion of an algorithm and computational procedure, editing and executing programs in IDE's.
2.To Understanding branching, iteration and data representation using arrays.
3.To Modular programming and recursive solution formulation. Understanding pointers and dynamic memory allocation.
4. To Understanding miscellaneous aspects of c. Comprehension of file operations and Data Structures using sorting techniques.
5. To Understand about linear non-linear data structures and their applications.

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. Frozen and R.F. Gilberg, Third edition, Thomson.

References:

1. Fundamentals of Data Structures in C , Horowitz, Sahni, Anderson-Freed, 2nd , Universities Press, 2008.
2. Classic Data Structures, Samanta, 2nd, PHI, 2009.
3. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, P H I / Pearson.
4. C Programming with problem solving, J.A. Jones & K. Harrow, Dramatic Press
5. Data Structures Using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson.
6. Programming in C, Stephen G. Kochan, III Edition, Pearson .
7. Data Structures and Program Design in C, R.Kruse,, Tondo, Leung, Shashi M, 2nd Edition, Pearson.
8. Data Structures and Algorithms, Aho, Hopcroft, Ullman, Pearson ,2006
9. C and Data Structures, Ashok N.Kamthane, Pearson.
10. C Programming and Data Structures, E Balaguruswamy, TMH, 2008.

Web Resources:

1. http://jntubitss.blogspot.in/2013/02/computer-programming-and-data.html
2. http://forum.jntuworld.com/showthread.php?5544-Computer-Programming-amp-Data-Structures-%28CPDS-C-amp-DS%29-Study-Materials-Notes
3. http://www.ajntuworld.in/2-1-cse-data-structures-pdf/
4. http://downloads.ziddu.com/download/7589002/CNotes_ww8.pdf.html/eng

I Year MCA – I Semester

14300102 Digital Logic and Computer Organization

Course objective: ***Understand the architecture of a modern computer with its various processing units. Also the performance measurement of the computer system. In addition to this the memory system of computer.***

Unit -I
Objective: Understand the architecture of modern computer.

Digital Components and Data Representation:
Introduction, Numbering Systems, Decimal to Binary Conversion, Binary Coded Decimal Numbers, Weighted Codes, Self-Complementing Codes, Cyclic Codes, Error Detecting Codes, Error Correcting Codes, Hamming Code for Error Correction, Alphanumeric Codes, ASCII Code.

Boolean Algebra and Logic Gates:
Introduction, Postulates of Boolean Algebra, Basic Theorems of Boolean Algebra, Duality Principle, Theorems, Precedence of operators, Venn Diagram , Boolean Functions and Truth Tables, Canonical Forms for Boolean Functions, Binary Operators and Logic Gates, Simplifying Boolean Expressions, Veitch-Karnaugh Map Method, Four Variable Karnaugh Map, Incompletely Specified Function, Quine-McCluskey Procedure.

Unit -II
Objective: Understand about data storage units and their design.

Digital logic circuits:
Combinatorial Switching Circuits: Introduction, Combinatorial Circuit Design Procedure, Integrated NAND-NOR Gates, CMOS Transistor Gates, Realization of Boolean Expressions Using NAND/NOR Gates, Combinatorial Circuits Commonly Used in Digital Systems, Design of Combinatorial Circuits with Multiplexers, Programmable Logic Devices, Realization with FPLAs, Realization with PALs.

Sequential Switching Circuits:
Types, Flip-Flops, Counters, Modelling Sequential Circuits – FSM. Synthesis of synchronous, Binary counters.

Unit -III
Objective: Understand of a computer performs arithmetic operations of numbers.

Arithmetic and Logic Unit:
Introduction, Binary Addition, Binary Subtraction, Complement, Representation of Numbers, Addition/Subtraction of Numbers in 1's Complement Notation, addition/Subtraction of Numbers in Two's Complement Notation, Binary Multiplication, Multiplication of signed Numbers, Binary division, Integer Representation, Floating Point Representation of Numbers, Binary Floating Point Numbers, IEEE Standard Floating Point Representation, Floating Point addition/Subtraction, Floating Point Multiplication, Floating Point Division, Floating Point Arithmetic Operations, Logic Circuits for Addition/Subtraction, Half- and Full-Adder Using Gates, A Four-bit Adder, MSI arithmetic Logic Unit, A Combinatorial Circuit for Multiplication.

Unit -IV
Objective: Understand CPU Instruction set format and addressing modes and micro program control.

Central Processing Unit: Learning Goals, Introduction, Operation Code Encoding and Decoding, Instruction Set and Instruction Formats, Addressing Modes, Register Sets, Clocks and Timing, CPU Buses, Dataflow, Data Paths and Microprogramming, Control Flow.

Microprogrammed

Control:
Control Memory, Address Sequencing, Conditional Branching, Mapping of Instruction, Subroutines, Micro program Example, Computer Configuration, Microinstruction Format, Symbolic Microinstructions, The Fetch Routine, Symbolic Micro program, Binary Micro program , Design of Control Unit, Micro program Sequencer.

Unit -V
Objective: To gain knowledge Memory and IO organization.

Memory Organization:
Introduction, Memory hierarchy, Dynamic Random Access Memory, Error Detection and Correction in Memories, Read Only Memory, Dual-Ported RAM, Enhancing Speed and Capacity of Memories, Program Behaviour and Locality Principle, Cache in Memory Organization, Design and Performance of Cache Memory System.

Input-Output Organization:
Introduction, device Interfacing, Overview of I/O Methods, Program Controlled Data Transfer, Interrupt Structures, Single level Interrupt Processing, Handling Multiple Interrupts, Interrupt Controlled data Transfer,DMA Based Data Transfer, Input/output (I/O) Processors, Bus Structure, Structure of a Bus, Types of Bus, Bus Transaction Type , Serial Data Communication, Asynchronous Serial data communication.

Course Outcomes:

1. To Understand the architecture of modern computer.
2. To Understand about data storage units and their design.
3. To Understand of a computer performs arithmetic operations of numbers.
4. To Understand CPU Instruction set format and addressing modes and micro program control.
5. To gain knowledge Memory and IO organization.

Text Books:

1. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006
2. Digital Logic Design, Moriss Mano, PHI
3. Computer System Architecture, 3rd ed ., M. Morris Mano, PHI, 1994

References:

1.Computer Organization, 5th ed., Hamacher, Vranesic and Zaky, TMH,2002

2.Computer System Organization & Architecture, John D. Carpinelli,Pearson, 2008

3.Computer System Organization, Naresh Jotwani, TMH, 2009

4.Computer Organization & Architecture: Designing for Performance, 7th ed., William Stallings, PHI, 2006

Web Resources:

1. http://jfufiles.com/my-jfufiles-downloads/1581532167
2. http://www.slideshare.net/vanithachandru/computer-organization-logic-gates- bool
3. http://home.adelphi.edu/~siegfried/cs371/371l3.pdf

14300103 Discrete Mathematical Structures and Graph Theory

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Course Objective: ***Read and understand definitions and proofs using basic discrete Mathematics.***

Unit -I
Objective: Understand Mathematical logic and Predicate calculus.

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, Automatic Theorem Proving.

Predicate Calculus:
Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus.

Unit -II
Objective: To gain knowledge about Set theory & relations and Functions.

Set Theory & Relations:
Introduction, Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial ordering, Hasse diagram.

Functions:
Composition of functions, Inverse Function, Recursive Functions, Lattice and its Properties, Pigeon hole Principles and its application.

Algebraic Structures:
Algebraic systems, Examples and general properties, Semi groups and monoids, groups, sub groups, Definitions, Examples, homomorphism, Isomorphism and related problems.

Unit -III
Objective: Understand Elementary Combinatory usage in life.

Elementary Combinatory:
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
Objective: Understand recurrence relations usage in solve recursive process.

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
Objective: Understand Graph Theory and it's applications.

Graph Theory:
Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees,

PlanarGraphs, Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits,Hamiltonian graphs, Chromatic Numbers.

Course Outcomes:

1.To Understand Mathematical logic and Predicate calculus.
2. To gain knowledge about Set theory & relations and Functions.
3. To Understand Elementary Combinatory usage in life.
4. To Understand recurrence relations usage in solve recursive process.
5. To Understand Graph Theory and it's applications.

Text Books:

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

References:

1. Elements of Discrete Mathematics, C L Liu, D P Mohanpatra,TMH
2. Discrete Mathematics, Schaum's Outlines,Lipschutz,Lipson TMH.
3. Discrete Mathematical Structures, Kolman, Busby, Ross, 6th ed., PHI, 2009
4. Discrete Mathematics, Johnsonbaugh, 6th ed., Pearson, 2005
5. Discrete Mathematics, Malik, Sen, 6th ed., Cengage Learning, 2004
6. Discrete Mathematics for computer science, Bogart, Stein and Drysdale,Springer,2005
7. Discrete Mathematics and Combinatorics, Sengadir, Pearson, 2009
8. Discrete and Combinatorial Mathematics, Grimaldi, Ramana, 5th ed., Pearson.2006
9. Mathematical Foundations of Computer Science, Rajendra Prasad, Rama Rao ET al.,USP, 2009
10. Discrete Mathematics, J K Sharma, 2nd ed., Macmillan, 2005
11. Discrete Mathematics with Combinatorics and Graph Theory, Santha, Cengage Learning, 2009
12. Applied Discrete Structures For Computer Science, Alan Doerr, Levassure, GP, 2005
13. Discrete Mathematics with Applications, Koshy, Elsevier,2006.
14. Discrete Mathematics and its Applications, Rosen, 5th ed, T M Graw-Hill ed, 2006.
15. Discrete Mathematics for Computer Science, Gary Haggard, John Schlipf, Sue Whiteside's, Cengage, 2006.
16. Discrete Mathematical, Kevin Ferland, Cengage, 2008.
17. Discrete Mathematical Structures, Jayant Ganguly, Sanguine, 2007.

Web Resources:

1. http://forum.jntuworld.com/showthread.php?6366-Mathematical-Foundations- of-Computer-Science--%28MFCS%29-Notes-Material
2. http://jkdirectory.blogspot.in/2010/11/mfcs.html
3. http://cs.bme.hu/fcs/graphtheory.pdf
4. http://math.tut.fi/~ruohonen/GT_English.pdf

*I Year MCA – I Sem***ester**

14300104 Probability and Statistical Applications

Course Objective: ***This subject gives the knowledge about Probability and Statistical Applications***

Unit -I
Objective: Understand baye's theorem, total probability theorem.

Probability Theory:
Sample spaces Events & Probability; Discrete Probability; Union , intersection and compliments of events; Conditional probability ;Baye's theorem.

Unit -II
Objective: Understand random variables and distributions.

Random variables and distribution:
Random variables Discrete Probability Distributions, Continuous probability distribution, Binomial, Poisson, uniform, Exponential, Normal.

Unit -III
Objective: The knowledge of testing of hypothesis for all size of samples.

Expectations and higher order moments – Moment Generating Function, Characteristic functions – Laws on large numbers – Weak Laws and strong laws of large numbers. Central limit theorem and other limit theorems.

Sampling Distribution:
Populations and samples - Sampling distributions of mean (σ known and unknown) proportions, sums and differences. Statistics based on Normal, Student's t and F distributions.

Unit -IV
Objective: This unit also gives the knowledge of finding out the coefficient of correlation, Regression line equations and queuing theory.

Tests of significance –Z-test, t-test, F-test, χ^2test.
Linear correlation coefficient linear regression;Non Linear regression least square fit; polynomial and Curve fittings.

Time Series and Forecasting:
Moving averages, Smoothening of curves Forecasting models and methods, Statistical Quality Control Methods-bar charts p-charts etc.

Unit -V
Objective: This unit also gives the knowledge of queuing theory.

Queuing theory – Markov Chains – Introduction to Queuing systems – Elements of a queuing model – Exponential distribution – Pure birth and death models. Generalized Poisson Queuing model – Specialized Poisson Queues.

Course Outcomes:

1. To Understand baye's theorem, total probability theorem.
2. To Understand random variables and distributions.
3. To gain the knowledge of testing of hypothesis for all size of samples.
4. This unit also gives the knowledge of finding out the coefficient of correlation, Regression line equations and queuing theory.

5. To able This unit also gives the knowledge of queuing theory.

Text Books:

1. Probability, Statistics and Random Processes Dr.K.Murugesan & P.Gurusamy By Anuradha Agencies, Deepti Publications.
2. Probability, Statistics and Random Processes, T.Veerarajan, TMH, India

References:

1. Probability and Statistics for Engineers: Miller and Freund, PHI.
2. Probability, Statistics and Queuing Theory Applications, 2nd ed, Trivedi, John Wiley and Sons.

Web Resources:

1. http://www.ziddu.com/download/15701672/PSNotes.rar.html
2. http://www.mediafire.com/?z217j9hnp3m2n8s
3. http://forum.jntuworld.com/showthread.php?17173-Probability-amp-Statistics-Important-Questions
4. http://www.ziddu.com/download/1463908/probability.pdf.html
5. http://forum.jntuworld.com/showthread.php?18027-Probability-and-Statistics-Notes-Study-
   Materials- For-JNTU-HYD-JNTU-KAKINADA-amp-JNTU-ANANTAPUR

*I Year MCA – I Sem***ester**

14300105 Accounting and Financial Management

Course Objective: ***This course is an introduction to financial accounting. The preparation and use of financial statements examined.***

Unit -I
Objective: To gain knowledge about Accounting principles, Preparation of trail balance and Final accounts.

Accounting Generally Accepted Accounting Principles (GAAP) & Accounting standards, Characteristics and limitations of single entry system, double entry system of accounting, introduction of basis books of accounts, ledgers.

Preparation of trail balance – Final accounts – company final accounts – Users of Accounting Information, Role of Accountant in modern Organizations.

Unit -II
Objective: Understand financial management, Ratio analysis and Fund flow analysis.

Financial Management – meaning and scope, role, objectives of time value of money – over vitalization – under capitalization – profit maximization – wealth maximization – EPS maximization. Ration Analysis - advantages - limitations - Fund flow analysis – meaning, importance, preparation and interpretation of Funds flow and cash flow statements – statements of changes in working capital.

Unit -III
Objective: Understand Costing, Marginal costing and Break –even analysis.

Costing – nature and importance and basic principles. Elements of cost – Absorption costing Vs. Marginal costing – Financial accounting vs. cost accounting vs. management accounting.

Marginal Costing and Break – Even Analysis :
Nature, scope and importance – practical applications of marginal costing, limitation and importance of cost – volume, profit analysis, short run decisions.

Unit -IV
Objective: To gain knowledge about Standard costing and budgeting variance and budget.

Standard Costing and Budgeting :
Nature, scope and computation and analysis – materials variance, labor variance and sales variance – cash budget, sales - budget – flexible Budgets, master budgets.

Unit -V
Objective: Understand computerized accounting system.

Introduction to Computerized Accounting System:
Coding logic and codes, master files, transaction files, introduction documents used for data collection, processing of different files and Outputs obtained.

Course Outcomes:

1. To gain knowledge about Accounting principles, Preparation of trail balance and Final accounts.
2. Understand financial management, Ratio analysis and Fund flow analysis.
3. Understand Costing, Marginal costing and Break –even analysis.
4. To gain knowledge about Standard costing and budgeting variance and budget.
5. Understand computerized accounting system.

Text Books:

1. Accounting for Managers, P. Vijaya Kumar, and Himalaya Publications.

References:

1. Accounting for Management. Vijaya Kumar.TMH.
2. Financial Accounting, S.N Maheswari and S.K. Maheswari, Vikas.
3. Financial Accounting, A. Mukherjee and M. Heneef, TMH.
4. Basic Financial Accounting for MPanagement, Ambaresh Gupta, Pearson.
5. Accounts and Finance for Non accounts, Chatterjee, D.K. Himalaya.
6. Financial Analysis and Accounting, P. Premchand Babu and M. Madam Mohan,Himalaya.
7. Essential of Financial Accounting, Ashish, K and Ballacharya, PHI.
8. Guide to Financial Management, John Tannent, Viva.

Web Resources:

1. http://archive.mu.ac.in/myweb_test/MCA%20study%20material/M.C.A.%20(Sem%20%20II)%20Accounting%20and%20Financial%20Management.pdf
2. http://www.slideshare.net/BabasabPatil/financial-and-management-accounting-notes-mba-bk
3. http://education.svtuition.org/2011/08/financial-management-notes.html
4. http://www.icai.org/post.html?post_id=6081
5. http://www.ziddu.com/downloadlink/1456128/MEFA_Most_Important_Questions.doc

I Year MCA – I Semester

14300111 English Language Communication Skills Lab

Course Objective: ***The language lab focuses computer-aided multi-media instruction and Language acquisition to achieve the following targets:***

1. ***To expose the students to a variety of self-instructional, learner-friendly modes of language learning.***
2. ***To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.***
3. ***To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.***
4. ***To train them to use language effectively to face interviews, group discussions, public speaking.***
5. ***To initiate them into greater use of the computer in resume preparation, report writing, format- making etc.***

However, depending upon the available of infrastructure and budget, the above targets can also be achieved by procuring the minimum required equipment suggested for the establishment of Conventional Lab the details of which are given below. The lab should cater to the needs of the students to build up their confidence to help them develop leadership qualities through their communicative competence.

English Language Laboratory Practice

1. Introduction to Phonetics. 2. Introduction to Vowels and Consonants and associated Phonetic symbols. 3. Introduction to Accent, Intonation and Rhythm. 4. Situational Dialogues/Role Play. 5. Debate 6. Public Speaking. 7. Group Discussions 8. Facing Interviews 9. Resume preparation 10. e-Correspondence

MODULE	TOPICS/SUB-TOPICS	LAB SESSION
1.	INTRODUCTION TOPHONETICS -Vowels, -Consonants, -Diphthongs INTRODUCTION TO STRESS & INTONATION -Articulation, -Respiration, -Phonation	3
2.	GROUP DISCUSSIONS FACING INTERVIEWS	4
3	SITUATIONAL/DIALOGUE/ ROLE PLAY RESUME PREPARATION	2
4	PUBLIC SPEAKING, DEBATE	2
5	GRE,TOEFL,GMAT MODELS, e-CORRESPONDENCE	3

Suggested Software for Lab classes:

Cambridge Advanced Learners' Dictionary with exercises
The Rosetta stone English Library
Clarity Pronunciation Power
Mastering English in Vocabulary, Grammar, Spellings, Composition
Dorling Kindersley series of Grammar, Punctuation, Composition etc.
Oxford Advanced Learner's Compass, 7th Edition
Language in Use, Foundation Books Pvt Ltd
Learning to Speak English - 4 CDs
Microsoft Encarta
Murphy's English Grammar, Cambridge
Time series of IQ Test, Brain-teasers, Aptitude Test etc.
English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

Course Outcomes:

The language lab focuses computer-aided multi-media instruction and Language acquisition to achieve the following targets:

1. To expose the students to a variety of self-instructional, learner-friendly modes of language learning.
2. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
4. To train them to use language effectively to face interviews, group discussions, public speaking.
5. To initiate them into greater use of the computer in resume preparation, report writing, format- making etc.

Reference Books:

1. The Human Touch: personal Skills for Professional Success – by Debra Paul.
2. The Definitive Book of body Language – by Allan Pease, Barbara Pease.
3. How to Face Interviews – by Clive Fletcher.
4. The 7 Habits of Highly Effective People – by StephenCovery.
5. The Google Resume: How to Prepare of a Career and Land a Job at Apple, Microsoft.
6. Good English –by G.H Vallns
7. Better English – G.H Vallins
8. Best English – G.H. Vallins
9. How to talk to anyone: 92 little tricks for big success in Relationships by Leli Lowndes.
10. The leader in you - by Dale Carnagie
11. 250 Job Interview Questions You 'I most likely be asked – by Peter veluki, Peter Verki.
12. Contemporary English Grammar, structures and Composition - by David Green.

I Year MCA – I Semester

14300112 Computer Programming Data Structures Lab

Course Objective: ***To learn/strengthen a programming language like C, To learn problem solving Techniques To introduce the student to simple linear and non linear data structure such as lists, stacks, queues, etc.,.***

Recommended Systems/Software Requirements:

- Intel based desktop PC, A N S I C Compiler with Supporting Editors, IDE's such as Turbo C, Bloodshed C.

Exercise l

a) Write a C program to find the sum of individual digits of a positive integer.
b) A Fibonacci sequence is defined as follows: the first and 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.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
d) Write a program which checks a given integer is Fibonacci number or not.

Exercise 2

a) Write a C program to calculate the following Sum:

$Sum=1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

b) Write a C program to find the roots of a quadratic equation.
c) Write a C program to implement Newton Raphson method for a quadratic equation.
d) Write a C program to implement Newton Raphson method for a general Purpose algebraic equation.

Exercise 3

a) Write C programs that use 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. iv) Write program to calculate probability of head/tail by generating random numbers using random () function.

Exercise 4

a) The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write 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 for different 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 larges 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 of Two Matrices
iii) Checking symmetricity of a square matrix. iv) Calculating transpose of a matrix in-place manner.

Exercise 6

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

i) To insert a sub-string in to given main string from a given position.
ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not

Exercise 7

a) Write a C program that displays the position/ index in the string S where the string T begins or 1 if S doesn't contain T.
b) Write a C program to count the lines, words and characters in a given text.

Exercise 8

a) Write a C program to generate Pascal's triangle.
b) Write a C program to construct a pyramid of numbers.

Exercise 9

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: $1+x+x^2+x^3+\ldots\ldots\ldots\ldots +x^n$
For example: if n are 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum
Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Exercise 10

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b) Write a C program to convert a Roman numeral to its decimal equivalent.

Exercise 11

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 12

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.
(Note: The file name and n are specified on the command line.)

Exercise 13

a) Write a C program that uses functions to perform the following operations on singly linked list.

i) Creation ii) Insertion iii) Deletion iv) Traversal

b) Adding two large integers which are represented in linked list fashion.

Exercise 14

Write a C program that uses functions to perform the following operations on doubly linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways

Exercise 15

a.) Write C programs that implement stack (its operations) using:
i) Arrays i i) Pointers iii) linked list.

Exercise 16

a. Write C programs that implement Queue (its operations) using:
i) Arrays i i) Pointers i i i) linked lists

Exercise 17

Write a C program that uses Stack operations to perform the following:
i) Converting infix expression into postfix expression ii) Evaluating the postfix expression

Exercise 18

a. Write a C program that uses functions to perform the following:
i) Creating a Binary Tree of integers
ii) Traversing the above binary tree in preorder, inorder and postorder
b. Program to check balance property of a tree.
c. Program to check for its strictness.

Exercise 19

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

Exercise 20

Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
i) Bubble sort ii) Quick sort

Exercise 21

a. Write C programs that implement the following sorting methods to sort a given list of integers

in ascending order:

i) Insertion sort i i) Bubble sort

b. Recursive implementation of sorting algorithms.

Exercise 22

Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

Exercise 23

a. Program to calculate mean and standard deviation of a population.

b. Write C programs to implement the linear regression and polynomial regression algorithms.

Exercise 24

a.Write C programs to implement Trapezoidal and Simpson methods. and b) Program for Calculating pi value.

Course Outcomes:

1. Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming
2. Acquire knowledge about the basic concept of writing a program.
3. Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
4. Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
5. Role of Functions involving the idea of modularity.
6. Concept of Array and pointers dealing with memory management.
7. Structures and unions through which derived data types can be formed
8. File Handling for permanent storage of data or record.
9. Near & Huge pointers.
10. Applications of Self- referential structure.
11. Programming using gcc compiler in Linux.

References:

1. Digital Fundamentals, Floyd, Jain, 8th ed , Pearson
2. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006

*I Year MCA– I Sem*ester

14300113 Digital Logic and Computer Systems Organization (DLCSO) Lab

Course Objective: ***To learn each and every thing related computer operations, hardware parts functioning and testing memory & storage components.***

Exercise 1

Boolean algebra: Theorems and logical guides, verification of truth tables.

Exercise 2

Realization of Boolean expressions; Using (i) AND – OR-NOT Gates (ii) NAND Gates (iii) NOR Gates.

Exercise 3

Latches Flip – Flops: RS, JK, T, D, Master –Slave FF, Edge – Triggered Flip – Flops.

Exercise 4

Counters: Binary Counter, Synchronous/Asynchronous Binary Counter, Ripple Counter, Decade Counter, Up/Down Counter.

Exercise 5

Modulo Counter: Modulo - 5, Modulo – 10.

Exercise 6

Adders / Sub tractors: Half Adder, Full Adder, 1 ‘s and 2’s complement addition.

Exercise 7

Multiplexers/ Data Selector: 2- input and 8- input, Demultiplexers , Logic Function Generator.

Exercise 8

Decoders and Encoders.

Exercise 9

BCD adders and Comparators.

Exercise 10

Registers: Basic Shift Register (SR), SI/SO SR, SI/PO SR, PI/SO SR, PI/PO SR.

Exercise 11

Johnson Counter, Sequence Generator, Parity Generators/ Checkers.

Exercise 12

Code Converters : Decimal –to-Binary, Binary – to – Decimal, Decimal – to- Hexa Decimal, BCD- to –Decimal, Binary – to- gray, gray- to –Binary.

Exercise 13

Buffers / Derivers: Open; collector Buffers.

Exercise 14

Gates: CMOS / NMOS/TTL – Basic Operational Characteristics and parameters.

Exercise 15

RAM, ROM, PROM, EPROM – Testing Memory Chips.

Course OutComes:

1. Students can understand the architecture of modern computer.
2. They can analyze the Performance of a computer using performance equation
3. Understanding of different instruction types.
4. Students can calculate the effective address of an operand by addressing modes
5. They can understand how computer stores positive and negative numbers.
6. Understanding of how a computer performs arithmetic operation of positive and negative numbers.
7. Understanding of how computer stores floating point numbers in IEEE 754 standard.
8. Cache memory and its importance.
9. Students can understand how cache mapping occurs in computer and can solve various problems related to this.
10. Secondary storage organization and problem solving

References:

1. Digital Fundamentals, Floyd & Jain, Pearson, 2005.
2. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI,2006