

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MASTER OF COMPUTER APPLICATIONS (MCA)
Effective from Academic Year 2019- 20 admitted batch
R19 COURSE STRUCTURE AND SYLLABUS
I Year – I Semester

Category	Course Title	L	T	P	Credits
Core Course – I	Mathematical Foundations of Computer Science	3	0	0	3
Core Course - II	Computer Organization & Architecture	3	0	0	3
Core Course - III	Computer Programming & Data Structures	3	0	0	3
Core Course - IV	Computer Oriented Statistical Methods	3	0	0	3
Core Course - V	Professional Communication Skills	3	0	0	3
Laboratory – I	Professional Communication Skills Lab	0	0	3	1.5
Laboratory – II	Computer Programming & Data Structures Lab	0	0	4	2
Laboratory - III	IT Workshop Lab	0	0	3	1.5
Total Credits		15	0	10	20

I Year – II Semester

Category	Course Title	L	T	P	Credits
Core Course - I	Computer Networks	3	0	0	3
Core Course - II	Operating Systems	3	0	0	3
Core Course - III	Database Management Systems	3	0	0	3
Core Course - IV	Object Oriented Programming	3	0	0	3
Core Course - V	Accountancy and Financial Management	3	0	0	3
Laboratory - I	Database Management Systems Lab	0	0	3	1.5
Laboratory - II	Web Designing Lab	0	1	2	2
Laboratory - III	Java Programming Lab	0	0	3	1.5
		15	1	8	20

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I - Year I - SEM

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

L	T	P	C
3	0	0	3

Prerequisites:

1. No Prerequisites
2. An understanding of Math in general is sufficient.

Course Objectives:

1. Introduces the elementary discrete mathematics for computer science and engineering.
2. Topics include formal logic notation, methods of proof, induction, sets, relations, graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

Course Outcomes:

1. Ability to understand and construct precise mathematical proofs
2. Ability to use logic and set theory to formulate precise statements
3. Ability to analyze and solve counting problems on finite and discrete structures
4. Ability to describe and manipulate sequences
5. Ability to apply graph theory in solving computing problems

UNIT - I

The Foundations Logic and Proofs: Propositional Logic, Applications of Propositional Logic, Propositional Equivalence, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy.

UNIT - II

Basic Structures, Sets, Functions, Sequences, Sums, Matrices and Relations: Sets, Functions, Sequences & Summations, Cardinality of Sets and Matrices Relations, Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

UNIT - III

Algorithms, Induction and Recursion: Algorithms, The Growth of Functions, Complexity of Algorithms.

Induction and Recursion: Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness.

UNIT - IV**Discrete Probability and Advanced Counting Techniques:**

An Introduction to Discrete Probability . Probability Theory, Bayes' Theorem, Expected Value and Variance.

Advanced Counting Techniques:

Recurrence Relations, Solving Linear Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-Exclusion, Applications of Inclusion-Exclusion.

UNIT - V

Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring.

Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees.

Textbooks:

1. Discrete Mathematics and Its Applications with Combinatorics and Graph Theory- Kenneth H Rosen, 7th Edition, TMH.

References:

1. Discrete Mathematical Structures with Applications to Computer Science-J.P. Tremblay and R. Manohar, TMH,
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe L. Mott, Abraham Kandel, Theodore P. Baker, 2nd ed. , Pearson Education.
3. Discrete Mathematics- Richard Johnsonbaugh, 7th Edtn., Pearson Education.
4. Discrete Mathematics with Graph Theory- Edgar G. Goodaire, Michael M. Parmenter.
5. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, 5th edition , Pearson Education,.

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MCA I - Year I - SEM

COMPUTER ORGANIZATION & ARCHITECTURE

L	T	P	C
3	0	0	3

Prerequisites No Prerequisites

Co-requisite: A Course on "Digital Logic Design and Microprocessors"

Course Objectives

1. The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
2. It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
3. Topics include computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors

Course Outcomes

1. Understand the basics of instructions sets and their impact on processor design.
2. Demonstrate an understanding of the design of the functional units of a digital computer system.
3. Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
4. Design a pipeline for consistent execution of instructions with minimum hazards.
5. Recognize and manipulate representations of numbers stored in digital computers

UNIT - I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

UNIT - II

Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT - III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT - IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT - V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.

Textbooks:

1. Computer System Architecture – M. Moris Mano, 3rd Edition, Pearson/PHI.

References:

1. Computer Organization – Car Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill.
2. Computer Organization and Architecture – William Stallings 6th Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson.

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MCA I - Year I - SEM

COMPUTER PROGRAMMING & DATA STRUCTURES

L	T	P	C
3	0	0	3

Prerequisites

1. Requires analytical skills and logical reasoning.

Course Objectives

1. This course covers the basics of computers and program development
2. It covers various concepts of C programming language
3. It introduces searching and sorting algorithms
4. It provides an understanding of data structures such as stacks and queues.

Course Outcomes

1. Ability to develop C programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings; and data structures like stacks, queues and linked lists.
2. Ability to implement searching and sorting algorithms

UNIT - I

Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

Introduction to C Language: Background, Simple C programs, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.

UNIT - II

Statements: if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Simple C Programming examples.

Designing Structured Programs: Functions, basics, user defined functions, inter function communication, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programs

UNIT - III

Arrays and Strings: Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples. Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

Pointers: Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments.

UNIT - IV

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, enumerated types, C programming examples.

Input and Output: Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C program examples.

UNIT-V

Sorting and Searching: selection sort, bubble sort, insertion sort, linear and binary search methods.

Data Structures: Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

Textbooks:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, 3rd Edition, Cengage Learning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 5th Edition, Pearson Education.
3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

References:

1. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
2. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
3. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

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MCA I - Year I - SEM

COMPUTER ORIENTED STATISTICAL METHODS

L	T	P	C
3	0	0	3

Prerequisites No pre requisites, Foundation course

Objectives: The aim of the course is to understand

1. The theory of Probability, and probability distributions of single and multiple random variables
2. The sampling theory and testing of hypothesis and making inferences
3. The regression and correlation

Outcomes: At the end of the course student is able to

1. Apply the concepts of probability and distributions to some case studies
2. Correlate the material of one unit to the material in other units
3. Resolve the potential misconceptions and hazards in each topic of study.

UNIT - I

Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Rule

Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Statistical Independence, Joint Probability Distributions.

UNIT - II

Mathematical Expectation: Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.

Discrete Probability Distributions: Introduction and Motivation, Binomial and Multinomial Distributions, Hypergeometric Distribution, Negative Binomial and Geometric Distributions, Poisson distribution.

UNIT - III

Continuous Probability Distributions: Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial, Gamma and Exponential Distributions, Chi-Squared Distribution, Beta Distribution, Lognormal Distribution.

Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S^2 , t -Distribution, F-Distribution.

UNIT - IV

One and Two-Sample Estimation Problems: Introduction, Statistical Inference, Classical Methods of Estimation. **Single Sample:** Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion. **Two Samples:** Estimating the Difference between Two Means, Paired Observations, Estimating the Difference between Two Proportions, Estimating the Ratio of Two Variances, Maximum Likelihood Estimation.

One and Two-Sample Tests of Hypotheses: Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, The Use of P-Values for Decision Making in Testing Hypotheses, Single Sample: Tests Concerning a Single Mean, Two Samples: Tests on Two Means, Choice of Sample Size for Testing Means, Graphical Methods for Comparing Means, One Sample: Test on a Single Proportion, Two Samples: Tests on Two Proportions, One- and Two-Sample Tests Concerning Variances.

UNIT - V**Linear Regression and Correlation**

Introduction to Linear Regression, The Simple Linear Regression Model, Least Squares and the Fitted Model, Properties of the Least Squares Estimators, Inferences Concerning the Regression Coefficients, Prediction, Choice of a Regression Model, Analysis-of-Variance Approach, Test for Linearity of Regression: Data with Repeated Observations, Correlation.

Textbook:

1. Probability & Statistics For Engineers & Scientists, by Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye. 9th Ed. Pearson Pub.

References:

1. Fundamentals Of Probability And Statistics For Engineers, T.T. Soong, *John Wiley & Sons, Ltd*, 2004.
2. Fundamentals of Mathematical statistics, khanna publications, S C Gupta and V K Kapoor.
3. Probability and statistics for Engineers and scientists, academic press, Sheldon M Ross.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I - Year I - SEM

PROFESSIONAL COMMUNICATION SKILLS

L	T	P	C
3	0	0	3

Prerequisites ---- NIL ----

Course Objectives

1. To learn the four language skills - Listening, Speaking, Reading and Writing; critical thinking skills to students.
2. To enable students comprehend the concept of communication.
3. To help students cultivate the habit of Reading and develop their critical reading skills.

Course Outcomes

1. Ability to convert the conceptual understanding of communication into every day practice.
2. Ability to communicate their ideas relevantly and coherently in professional writing.

UNIT - I

Introduction:

Basics of Communication - Principles of Communication - Types of Communication – Stages of Communication – Verbal and Non-verbal Communication – Channels of Communication – Barriers to Effective Communication – Formal and Informal Expressions in Various Situations.

UNIT - II

Reading & Study Skills:

Reading Comprehension – Reading Strategies - Skimming and Scanning- Intensive and Extensive Reading– Unknown Passage for Comprehension - Critical Reading of Short Stories – Study Skills – Note Making – Summarizing – Articles and Prepositions – Synonyms and Antonyms

UNIT - III

Writing Skills:

Difference between Spoken and Written Communication- Features of Effective Writing - Formation of a Sentence – SVOs and SVOC patterns – Types of sentences- Common errors in Writing - Writing coherent sentences using connectives and conjunctions- Written Presentation Skills – Tenses – Concord – Question Tags - Practice Exercises - One Word Substitutes – Words Often Confused and Misspelt.

UNIT - IV

Professional Writing:

Letter writing – Types, Parts and Styles of Formal Letters – Language to be used in Formal Letters – Letters of Enquiry, Complaint, and Apology with Replies – Letter of Application -Resume – E-mail – Active and Passive Voice.

UNIT - V

Report Writing:

Types of Reports – Formats of Reports – Memo Format – Letter Format and Manuscript Format- Parts of Technical Report – Informational, Analytical and Project Reports – Idioms and Phrases.

References:

1. Meenakshi Raman & Sangeetha Sharma. 2012. *Technical Communication*. New Delhi: OUP
2. Rizvi, M. A. 2005. *Effective Technical Communication*. New Delhi: Tata McGraw Hill

3. Sanjay Kumar & Pushp Latha. 2012. *Communication Skills*. New Delhi: OUP
4. Er. A. K. Jain, Dr. Pravin S. R. Bhatia & Dr. A. M. Sheikh. 2013. *Professional Communication Skills*. S. Chand Publishers. New Delhi.
5. Farhathullah, T.M. 2009. *English for Business Communication*. Bangalore: Prism Publishers
6. Bikram K Das. 2011. *Functional Grammar and Spoken and Written Communication in English*. Kolkata: Orient Blackswan
7. Kiranmai Dutt, P et al. 2011. *A Course in Communication Skills*. New Delhi: CUP India
8. Krishnaswamy, N. 2000. *Modern English – A Book of Grammar, Vocabulary and Usage*. Macmillan India Pvt. Ltd
9. Ramachandran, K K. et al. 2007. *Business Communication*. New Delhi: Macmillan
10. Taylor, Ken. 2011. *50 ways to improve your Business English*. Hyderabad: Orient Blackswan

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MCA I - Year I - SEM

PROFESSIONAL COMMUNICATION SKILLS LAB

L	T	P	C
0	0	3	1.5

Prerequisites ----NIL---

Course Objectives:

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussion and public speaking

Course Outcomes:

1. Better Understanding of nuances of language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking with clarity and confidence thereby enhancing employability skills of the students

Syllabus: Professional Communication Skills Lab shall have two parts:

- a. **Computer Assisted Language Learning (CALL) Lab**
- b. **Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the **Professional Communication Skills Lab**

Exercise – I

CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants

ICS Lab: Ice-Breaking activity and JAM session

Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise – II

CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Concord (Subject in agreement with verb) and Words often misspelt- confused/misused

Exercise - III

CALL Lab: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.

ICS Lab: Descriptions- Narrations- Giving Directions and guidelines.

Sequence of Tenses, Question Tags and One word substitutes.

Exercise – IV

CALL Lab: Intonation and Common errors in Pronunciation.

ICS Lab: Extempore- Public Speaking

Active and Passive Voice, –Common Errors in English, Idioms and Phrases

Exercise – V

CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice

ICS Lab: Information Transfer- Oral Presentation Skills

Reading Comprehension and Job Application with Resume preparation.

Minimum Requirement of infrastructural facilities for PCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

- i) P – IV Processor
 - a) Speed – 2.8 GHZ
 - b) RAM – 512 MB Minimum
 - c) Hard Disk – 80 GB
- ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

Suggested Software:

- ❖ **Cambridge Advanced Learners' English Dictionary with CD.**
- ❖ **Grammar Made Easy by Darling Kindersley**
- ❖ **Punctuation Made Easy by Darling Kindersley**
- ❖ Clarity Pronunciation Power – Part I
- ❖ Clarity Pronunciation Power – part II
- ❖ **Oxford Advanced Learner's Compass, 8th Edition**
- ❖ **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- ❖ Lingua TOEFL CBT Insider, by Dreamtech
- ❖ TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- ❖ **English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge**
- ❖ **English Pronunciation in Use** (Elementary, Intermediate, Advanced) Cambridge University Press
- ❖ Raman, M & Sharma, S. 2011. Technical Communication, OUP
- ❖ Sanjay Kumar & Pushp Lata. 2011. Communication Skills, OUP

SUGGESTED READING:

1. Rama Krishna Rao, A. *et al. English Language Communication Skills – A Reader cum Lab Manual Course Content and Practice.* Chennai: Anuradha Publishers
2. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories.* New Delhi: Foundation
3. *Speaking English Effectively* 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
4. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews.* Tata McGraw Hill

5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. *English Pronunciation in Use. (Elementary, Intermediate & Advance)*. Cambridge: CUP
7. Chris Redston, Gillie Cunningham, Jan Bell. *Face to Face* (2nd Edition). Cambridge University Press
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication*. New Delhi : Foundation
9. Soundararaj, Francis. 2012. *Basics of Communication in English*. New Delhi: Macmillan
10. A textbook of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)

DISTRIBUTION AND WEIGHTAGE OF MARKS

Professional Communication Skills Lab Practical Examination:

1. The practical examinations for the Professional Communication Skills Lab shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 30 sessional marks and 70 semester-end Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I - Year I - SEM

COMPUTER PROGRAMMING & DATA STRUCTURES LAB

L	T	P	C
0	0	4	2

Prerequisites:

1. Requires analytical skills and logical reasoning

Course Objectives:

1. It covers various concepts of C programming language
2. It introduces searching and sorting algorithms
3. It provides an understanding of data structures such as stacks and queues.

Course Outcomes:

1. Develop C programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
2. Implement searching and sorting algorithms

Week 1:

1. Write a C program to find the sum of individual digits of a positive integer.
2. 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.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to find the roots of a quadratic equation.

Week 2:

5. Write a C program to find the factorial of a given integer.
6. Write a C program to find the GCD (greatest common divisor) of two given integers.
7. Write a C program to solve Towers of Hanoi problem.
8. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)

Week 3:

9. Write a C program to find both the largest and smallest number in a list of integers.
10. Write a C program that uses functions to perform the following:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices

Week 4:

11. Write a C program that uses functions to perform the following operations:
 - i) To insert a sub-string in to a given main string from a given position.
 - ii) To delete n Characters from a given position in a given string.
12. Write a C program to determine if the given string is a palindrome or not
13. Write a C program that displays the position or index in the string S where the string T begins, or - 1 if S doesn't contain T.
14. Write a C program to count the lines, words and characters in a given text.

Week 5:

15. Write a C program to generate Pascal's triangle.

16. Write a C program to construct a pyramid of numbers.

17. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\dots+x^n$$

For example: if n is 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 without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 6:

18. 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.

19. Write a C program to convert a Roman numeral to its decimal equivalent.

Week 7:

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

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

(Note: represent complex number using a structure.)

Week 8:

21. i) Write a C program which copies one file to another.

ii) 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.)

22. i) Write a C program to display the contents of a file.

ii) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Week 9:

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

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

Week 10:

24. Write C programs that implement stack (its operations) using

- i) Arrays
- ii) Pointers

25. Write C programs that implement Queue (its operations) using

- i) Arrays
- ii) Pointers

Week 11:

26. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

- i) Bubble sort
- ii) Selection sort

Week 12:

27. 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

Textbooks:

- 1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, 3rd Edition, Cengage Learning.
- 2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 5th Edition, Pearson Education.
- 3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

References:

1. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
2. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
3. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I - Year I - SEM
IT WORKSHOP LAB

L	T	P	C
0	0	3	1.5

Course Objectives

1. The IT Workshop is a training lab course to get training on PC Hardware, Internet & World Wide Web, and Productivity tools for documentation, Spreadsheet computations, and Presentation.
2. To introduce to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers, hardware and software level troubleshooting process.
3. To introduce connecting the PC on to the internet from home and workplace and effectively usage of the internet, Usage of web browsers, email, newsgroups and discussion forums. To get knowledge in awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks.
4. To introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and power point presentations using open office tools and LaTeX.

Course Outcomes

1. Apply knowledge for computer assembling and software installation.
2. Ability how to solve the trouble shooting problems.
3. Apply the tools for preparation of PPT, Documentation and budget sheet etc.

PC Hardware: The students should work on working PC to disassemble and assemble to working condition and install operating system like Linux or any other on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Problem 1: Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor. Every student should disassemble and assemble the PC back to working condition.

Problem 2: Every student should individually install operating system like Linux or MS windows on the personal computer. The system should be configured as dual boot with both windows and Linux.

Problem 3: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition.

Problem 4: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Internet & World Wide Web.

Problem 5: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate how to access the websites and email.

Problem 6: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Problem 7: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. Usage of search engines like Google, Yahoo, ask.com and others should be demonstrated by student.

Problem 8: Cyber Hygiene: Students should learn about viruses on the internet and install antivirus software. Student should learn to customize the browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Problem 9: Develop home page: Student should learn to develop his/her home page using HTML consisting of his/her photo, name, address and education details as a table and his/her skill set as a list.

Productivity tools: LaTeX and Word

Word Orientation: An overview of LaTeX and Microsoft (MS) office / equivalent (FOSS) tool word should be learned: Importance of LaTeX and MS office / equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that should be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Problem 10: Using LaTeX and Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Problem 11: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Problem 12: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs in word.

Problem 13 - Spreadsheet Orientation: Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. **Creating a Scheduler:-** Gridlines, Format Cells, Summation, auto fill, Formatting Text

Problem 14: Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in spreadsheet – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, Sorting, Conditional formatting.

Problem 15: Creating Power Point: Student should work on basic power point utilities and tools in Latex and Ms Office/equivalent (FOSS) which help them create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and Charts

Textbooks:

1. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
4. IT Essentials PC Hardware and Software Companion Guide by David Anfinson and Ken Quamme. 3rd Edition – CISCO Press, Pearson Education.
5. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)