SCHOOL OF ENGINEERING
SRI SATYA SAI UNIVERSITY OF TECHNOLOGY AND MEDICAL SCIENCES
Programme : Master of Computer Application (MCA) - 2 Year Course

Subject Code	Subject Name	L	T	P	Credits	Hrs/week
MCA-2101	COMPUTER FUNDAMENTAL AND PROGRAMMING IN C	3	1	0	4	4

COURSE PREAMBLE: The subject provides the basic knowledge of Programming to understand the various disciplines of Computer Programming. This knowledge area consists of those skills and concepts that are essential to problem-solving and programming practice independent of the underlying paradigm. Student will learn various concepts and techniques for problem-solving and will implement those ideas using C programming.

COURSE OUTCOMES:
 At the end of the Course, the student will be able:
- To design Software and program in C Language.
- To understand the flow and working principle of programming in C.
- To understand Function, Array, Pointer and union in C programming.

UNIT-I

Computer: Definition, Classification, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software. Computer Application in eBusiness, Bio-Informatics, health Care, Remote Sensing & GIS, Meteorology and Climatology, Computer Gaming, Multimedia and Animation etc. Operating System: Definition, Function, Types, Management of File, Process & Memory.

UNIT-II

 Introduction to programming & Basics of C: Fundamentals of Programming languages Generation of languages, Algorithm and Flowcharts.

History of C; Structure of a C Program Concepts of Algorithm and Flowcharts, Process of compilation, Basic features of C Language like Identifier, Keywords, Variable, data types, Operators and Expression. Basic screen and keyboard I/O

UNIT-III

Control Statements: Test Conditions, Conditional execution and selection, Iteration and Repetitive Executions, Nested loops. Arrays: Introduction to contiguous data types. One dimensional arrays, multidimensional arrays, Array as strings, multidimensional character arrays. Operations on strings.

UNIT-IV

Functions: Concept of modular programming, Using functions, Scope of data, Recursive functions. Command line arguments. Pointers: Need of pointer, Types and uses of pointer, Array and Pointers, Pointers and strings, Pointer to Pointer, Pointers and functions, other aspect of pointers.

UNIT-V

Dynamic memory management: dynamic memory management functions like malloc( ), calloc( ), free( ); User Defined Data Types: Introduction to structures, usage of structure, nested structures, Union and its usage, Enumeration types, bit fields.

Miscellaneous Features: File handling and related functions; printf & scanf family;C preprocessor – basics, #Include, #define, #undef, conditional compilation directive like #if, #else, #elif, #endif, #ifdef and #ifndef; Variable argument list functions.

Reference Books:
1.Programming in ANSI C, by Balagurusamy, Publisher - Tata McGraw Hill.
2. Computer Science: A Structured Programming Approach Using C, by Behrouz A.
Forouzan & Richard F. Gilberg, Publisher – Thomson Education.
3. Programming with ANSI and Turbo C, by Ashok N Kamthane, Publisher – Pearson Education.
4. Let us C, by Yashwant Kanitkar, Publisher – BPB Publication

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MCA-2102	COMPUTER ORGANIZATION AND ARCHITECTURE	3	1	0	4	4

COURSE PREAMBLE: In the modern era, computer system is used in most aspects of life. You may use many different types of software on a computer system for particular applications ranging from simple document creation to space data processing. But, how does the Software is executed by the Computer Hardware? The answer to this basic question is contained in this Course.

COURSE OUTCOMES:
At the end of the Course, the student will be able:
- To design digital circuits by simplifying the Boolean functions.
- To understand the organization and working principle of computer hardware components.
- To understand mapping between virtual and physical memory.

Unit-I

Information Representation: Number systems, BCD codes, error detecting and correcting codes. Binary arithmetic operations, Booths multiplication. Binary Logic: Boolean algebra, Boolean functions, truth tables, canonical and standard forms, simplification of Boolean functions, digital logic gates. Encoders, decoders, multiplexers, de-multiplexers and comparators.

Unit II

Memory organization: Secondary Memory, Primary Memory :Random access memory, Read Only memory basic cell of static and dynamic RAM, Building large memories using chips, Concept of segmentation & Paging, Associative memory, cache memory organization, virtual memory organization.

UNIT-III

Architecture of a simple processor: A simple computer organization and instruction set, instruction formats, addressing modes, instruction cycle, instruction execution in terms of microinstructions, interrupt cycle ,concepts of interrupt and simple I/O organization, Synchronous & Asynchronous data transfer, Data Transfer Mode : Program Controlled, Interrupt driven, DMA(Direct Memory Access). Implementation of processor using the building blocks.

UNIT-IV

Register Transfer Language and Micro-operations: concept of bus, data movement among registers, a language to represent conditional data transfer, data movement from/to memory. Design of simple Arithmetic & Logic Unit & Control Unit, arithmetic and logical operations Along with register transfer, timing in register transfer.

UNIT-V

Processor Design: -Processor Organization: General register organization, Stack organization, Addressing mode, Instruction format, Data transfer & manipulations, Program Control, Reduced Instruction Set Computer.

Reference Books:
1.   Computer System Architecture, Morris Mano, PHI
2.   Computer Organization, Hamacher, MGH
3.   Computer Architecture, Carter, Schaum Outline Series, TMH
4.   System Architecture, Buad, VIKAS
5.   The Fundamentals of Computer Organization, Raja Rao, Scitech
6.   Computer Organization & Design, Pal Chowdhury, PHI

Subject Code	Subject Name	L	T	P	Credits	Hrs/week
MCA-2103	**SOFTWARE ENGINEERING**	3	1	0	4	4

COURSE PREAMBLE: This Software engineering deals with the Software development process models, planning the Software Project and many analyses related to development of software. The objectives of this Course are to make the learner efficiently work as software engineer. S/he should be well acquainted with all the phases of Software Development Life Cycle. The learner should be able to apply the concepts learned for doing research.

COURSE OUTCOMES:
At the end of the Course, the student will be able:
- To get an insight into the processes of software development
- To Model software projects into high level design using DFD,UML diagrams
- To Measure the product and process performance using various metrics

Unit I

The Software Product and Software Process: Software Product and Process Characteristics, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model, Evolutionary Process Models like Incremental Model, Spiral Model, Component Assembly Model, RUP and Agile processes. Software Process customization and improvement, CMM, Product and Process Metrics.

Unit II

Requirement Elicitation, Analysis, and Specification Functional and Non-functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability.

Unit III

Software Design The Software Design Process, Design Concepts and Principles, Software Modeling andUML, Architectural Design, Architectural Views and Styles, User Interface Design, Functionoriented Design, SA/SD Component Based Design, Design Metrics.

Unit IV

Software Analysis and Testing Software Static and Dynamic analysis, Code inspections, Software Testing, Fundamentals, Software Test Process, Testing Levels, Test Criteria, Test Case Design, TestOracles, Test Techniques, Black-Box Testing, White-Box Unit Testing and Unit, Testing Frameworks, Integration Testing, System Testing and other Specialized, Testing, Test Plan, Test Metrics, Testing Tools. , Introduction to Object-oriented analysis, design and comparison with structured Software Engg.

Unit V

Software Maintenance & Software Project Measurement Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project Management Concepts, Feasilibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance(SQA). Project Plan, Project Metrics.

Reference Books:
 1. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005
2. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning
3. R S. Pressman ,"Software Engineering: A Practitioner's Approach", Sixth edition2006, McGraw-Hill.
 4. Sommerville,"Software Enginerring",Pearson Education.
5. Richard H.Thayer,"Software Enginerring & Project Managements", WileyIndia
6. Waman S.Jawadekar,"Software Enginerring", TMH
7. Bob Hughes, M.Cotterell, Rajib Mall " Software Project Management", McGrawHill

Subject Code	Subject Name	L	T	P	Credits	Hrs/week
MCA-2104	**DISCRETE MATHEMATICAL STRUCTURE**	**3**	**1**	**0**	**4**	**4**

COURSE PREAMBLE: This is an introductory course in mathematics. This subject deals with the introduction to Set, Relation, Function Possets, Hasse Diagram and Lattice and Graph. The objectives of this Course are the student Know the theory and their application of Math function in computer. Solve the different types of problems by applying theory and appreciate the important application of mathematics in Computer.

COURSE OUTCOMES:
At the end of the Course, the student will be:
- To understand, develop and solve mathematical Set theory.
- Able to design and solve Boolean functions for defined problems
- Apply the acquired knowledge of finite automata theory and design discrete problems to solve by computers.

UNIT-I

Discrete Numeric function and Recurrence relation: Introduction to discrete numeric functions and generating functions introduction to recurrence relations and recursive algorithms, linear recurrence relations with constant coefficients, homogeneous solutions, particular solutions and total solutions

UNIT-II

Sets, Relations and Functions: Sets, Subsets, Power sets, Complement, Union and Intersection, De-Morgan's law Cartesian products, Relations, relational matrices, properties of relations, equivalence relation, functions ,Injection, Surjection and Bijective mapping, Composition of functions, the characteristic functions and Mathematical induction.

UNIT-III

Proportions & Lattices: Proposition & prepositional functions, Logical connections Truth-values and Truth Table, the algebra of prepositional functions-the algebra of truth values-Applications (switching circuits, Basic Computer Components).
Partial order set, Hasse diagrams, upper bounds, lower bounds, Maximal and minimal element, first and last element, Lattices, sub lattices, Isotonicity, distributive inequality, Lattice homomorphism, lattice isomorphism, complete lattice, complemented lattice distribution lattice.

UNIT-IV

Groups: Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

UNIT-V

Graph Theory: Introduction and basic terminology of graphs, Planer graphs, Multigraphs and weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity, Shortest path in weighted graph, Introduction to Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs.

Reference Books:
1. J.P.Trembley & R.P.Manohar "Discrete Mathematical Structure with applications to Computer Science".
2. Kenneth H. Rosen-203 "Discrete Math & its Applications" 5th ed.
3. K.A. Ross and C.R.B. Writht "Discrete Mathematics ".
4. Bernard Kolman & Robert C. Busby "Discrete Mathematical Structures for Computer Science"

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MCA-2105	**BUSINESS ENGLISH & COMMUNICATION**	3	1	0	4	4

COURSE PREAMBLE: Communicate effectively (Verbal and Non Verbal). The objectives of this Course are the Develop interview skills and Develop Leadership qualities and essentials of the student.

COURSE OUTCOMES:
- To understand, develop and solve problem in Communication.
- Improve Skill for communication
- Discussion of audio-visual

UNIT I
Spoken Skills:
Spoken Skills Preparing for oral presentation, conducting presentations,
Listening: Barriers of Listening skill-Approaches to Listening –How to improve Listening exercises. Speaking: Paralanguage: Sounds, stress, intonation- Art of conversation – Presentation skills – Public speaking- Expressing Techniques

UNIT II
Reading & Writing Skills:
Reading: Kinds of Reading – Causes of reading difficulties – Reading strategies – exercises. Writing: Effective writing – Paragraph ,Essay, Reports, Letters, Articles, Notices, Agenda & Minutes.

UNIT III
Communication:
Modes of Communication- Barriers – Interpersonal skills , Negotiation skills Non- Verbal communication – Etiquettes.

UNIT IV
Spoken Skills:
Group Dynamic skills: Group Discussion – Team building & Team work – Be a manager or leader – Decision making – creativity – Time & Stress management skills, Group Discussions. Group Discussions.

UNIT V
Media of Communication:
Interview skills: Types of Interviews – Preparing for interview – Preparing a CV – Structuring the interview, Mock Interview Quick Tips. Telephonic Conversation; Negotiations;.

Reference Books:

1. Sanghi, Seema, Improve your communication skills. 2nd edition.
2. Burnard, Philip. Interpersonal skills Training: A source book of activities. 2005.
3. Ashley, Roderic. How to enhance your employability. 1998.
4. Dr. Alex, K. Soft sill: know yourself & know the world. 2010.
5. Cornerstone. Developing softskills. 4th edition 2005.
6. Jones, Daniel. An outline of English phonetics.
7. Aggarwal, Rohini. Business communication and Organization & Management.
8. Grath. E.H. Basic Managerial skills for all.
9. Maxwell, John C. Developing the leader within you.

Subject Code	Subject Name	L	T	P	Credits	Hrs/week
MCA-2106	LAB- I (PROG. LAB IN C)	0	0	8	4	8

COURSE PREAMBLE: To make the student learn a programming language. To learn problem solving techniques. To teach the student to write programs in C and to solve the problems.

COURSE OUTCOMES:
After Completion of this course the student would be able to
• Read, understand and trace the execution of programs written in C language.
• Write the C code for a given algorithm.
• Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.
• Write programs that perform operations using derived data types

List of Experiment

1. WAP to identify whether given number is prime or not.
2. WAP to identify whether given number is even or odd.
3. WAP to print whether given year is leap year or not.
4. WAP to find the sum of the digits of a number.
5. WAP to input 3 sides of triangle and identify the type of triangle.
6. WAP to input 5 digit numbers and find the sum of the first and last digit.
7. WAP to check whether the number is power of 2 or not.
8. WAP to find out GCD of two numbers.
9. WAP to check whether given number is perfect power of any natural number.
10. WAP to determine sum of odd series from 1 to N 6.
11. WAP to calculate factorial of a number.

Reference Books:
1. Kerninghan & Ritchie "The C programming language", PHI
2. Schildt "C:The Complete reference" 4th ed TMH.
3. Cooper Mullish "The Spirit of C", Jaico Publishing House, Delhi
4. Kanetkar Y. "Let us C", BPB.

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Subject Code	Subject Name	L	T	P	Credits	Hrs/week
MCA-2107	LAB- II (COMMUNICATION LAB)	0	0	2	1	2

COURSE PREAMBLE: To inform the learners how to write clearly and logically.

COURSE OUTCOMES:
After Completion of this course the student would be able to
- Understand doing self-introspection and self-vigilance
- Achieve high quality of life, strength and sovereignty of a developed nation
- Understand the importance of writing skills and its techniques
- Envision the dangers of scientific and technological innovations
- Improve the exposure to universal happenings
- Communicate the necessity to exercise humour in the daily life

List of Experiments:-
1. Listening Comprehension.
2. Pronunciation, Intonation, Rhythm
3. Practicing everyday dialogues in English
4. Interviews.
5. Formal Presentation
6. Report Writing

Reference Books

1. Effective Technical Communication by Barun K. Mitra, Oxford Univ. Press, 2006, New Delhi
2. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., New Delhi.
3. How to Build Better Vocabulary by M.Rosen Blum, Bloomsbury Pub. London.
4. Word Power Made Easy by Norman Lewis, W.R.Goyal Pub. & Distributors; Delhi. India Ltd. Delhi.
5. Manual of Practical Communication by L.U.B. Pandey & R.P. Singh; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, Delhi.