UIT-RGPV (Autonomous) Bhopal

Subject code-CA-101   **Subject: Information Technology**

Semester: I

For credits & marks refer your scheme

COURSE OBJECTIVES:
The objective of this course is that students should have knowledge of IT , operating systems and memory management. The course content covers the basic design of assemblers, compilers , linkers and loaders.

Course Contents

Unit-I :
Basic concepts of IT, concepts of Data & Information, data processing, organization of computers, Various I/O devices , storage devices, system software, application software, numerical based on storage devices. Introduction to file organization techniques.

Unit-II : Operating System- functions, Types- Batch, Single, Multiprogramming, Multiprocessing, Resource Management, OS classification. Various Operating Systems like Disk Operating Systems, Widows and UNIX. Simple DOS commands, Internal and external commands. UNIX: An overview of UNIX. Basic UNIX commands, features of UNIX,

Unit-III :
Computer software, Types of computer software. System and application software's.
Assembler : Elements of assembly language programming, a simple assembly scheme, pass structure of assembler, design of two pass assemblers, a single pass assemblers. Macros & Macro Processors : Macro definition & Call, Macro expansion Nested macro calls, design of macro processors.

Unit-III :
Compilers & Interpreters : aspects of compilation, memory allocation, compilation of expression compilation of control structures, code optimization, interpreters. Software Tools: Software tools for program development, editors, debug monitors. Linker & Loader: Relocation and linking concepts.

Unit-V : Memory organization: Secondary Memory, Primary Memory :Random access memory, Read Only memory basic cell of static and dynamic RAM, Introduction of paging, segmentation, Associative memory, cache memory, virtual memory..

Course outcome- Students will be able to understand the basic terminology of information technology, System software, operating systems and their commands. They will also have the knowledge of memory management techniques and various utility packages available.
Evaluation- Evaluation will be continuous an integral part of the class as well through external assessment.

Reference Books:
1. Rajaraman V. "Fundamentals of Computers" (4nd edition.) Prentice Hall of India, New Delhi 2004.
2. Dhamdhere D.M. "Systems Programming and operating systems"
3. B.Ram "Computer Fundamentals ".
5. Alexis Leon and Methews Leon "Fundamental of Information Technology".

UIT-RGPV (Autonomous) Bhopal

Subject code- CA-102   **Subject: Mathematical Foundation of Computer Science**
Semester: I

For credits & marks refer your scheme

COURSE OBJECTIVES:
The objective of this course is to review mathematical concept already learnt in higher secondary classes. This course will also introduce fundamentals of mathematical functions, derivatives and aspects of calculus to students.

Course Contents
Unit-I
Sets, Relations and Functions:
Sets, Subsets, Power sets, Complement, Union and Intersection, Demorgan'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-II
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-III
Groups and Fields: Group axioms ,permutation group, sub group, co-sets, normal subgroup, semi group, Lagrange theorem, fields, minimal polynomials, reducible polynomials, primitive polynomial, polynomial roots, applications.

Unit-IV
Graphs: Finite graphs, incidence and degree, isomorphism, sub graphs and union of graphs, connectedness, walk, paths, and circuits Eulerian graphs ,tree properties of trees, pendant vertices in tree, center of tree, spanning trees and cut vertices, binary tree ,matrix representation of graph, incidence and adjacency matrix and their properties, applications of graphs in computer science.

Unit-V
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

Course outcome- The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concepts of mathematical functions like set theory, Proportions & Lattices, Groups, Fields and Graphs.

Evaluation- Evaluation will be continuous an integral part of the class as well through external assessment.

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".*

UIT-RGPV (Autonomous) Bhopal

Subject code- CA-103   **Subject: Programming and Problem Solving in C**
Semester: I

For credits & marks refer your scheme

COURSE OBJECTIVES:
The objective of this course is to review the concept of programming in computers as well the fundamentals of C Programming and to introduce the Modular Programming along with Advanced Programming Techniques & Miscellaneous Features like file handling, preprocessor directives etc.

Course Contents
This course is to design to provide a comprehensive study of the programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable, and portable code. The nature of C language is emphasized in the wide variety of examples and applications to learn and acquire art of computer programming.

Unit-1
An overview: Problem identification, analysis, design, coding, testing & debugging, implementation, modification & maintenance; algorithms & flowcharts; Characteristics of a good program - accuracy, simplicity, robustness, portability, minimum resource & time requirement, modularization; Rules/ conventions of coding, documentation, naming variables; Top down design; Bottom-up design.

Unit-II
Fundamentals of C Programming: History of C; Structure of a C Program; Data types; Constant & Variable, naming variables; Operators & expressions; Control Constructs – if-else, for, while, do-while; Case switch statement; Arrays; Formatted & unformatted I/O; Type modifiers & storage classes; Ternary operator; Type conversion & type casting; Priority & associativity of operators.

Unit-III
Modular Programming: Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variable, static variable; Calling a function; Recursion – basics, comparison with iteration, types of recursion- direct, indirect, tree and tail recursion, when to avoid recursion, examples.

Unit-IV
Advanced Programming Techniques: Special constructs – Break, continue, exit(), goto & labels; Pointers - & and * operators, pointer expression, pointer arithmetic, dynamic memory management functions like malloc(), calloc(), free(); String; Pointer v/s array; Pointer to pointer; Array of pointer & its limitation; Function returning pointers; Pointer to function, Function as parameter; Structure – basic, declaration, membership operator, pointer to structure, referential operator, self referential structures, structure within structure, array in structure, array of structures; Union – basic, declaration; Enumerated data type; Typedef; command line arguments.

Unit-V
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.

Course outcome: upon completion of the subject, students will be able to understand the basic terminology used in computer programming. Write, compile and debug programs in C language. Use of different data types in a computer program and design them. Involving decision structures, loops and Functions along with the call by value and call by reference and dynamic memory allocation by the use of pointers.

Evaluation- Evaluation will be continuous an integral part of the class as well through external assessment.

Reference Books:
1. *Kerninghan & Ritchie "The C programming language", PHI*
2. *Schildt "C:The Complete reference" 4th ed TMH.i*
3. *Kanetkar Y. "Let us C", BPB.*
4. *Kanetkar Y.: "Pointers in C" , BPB*
5. *Gottfried : "Problem Solving in C", Schaum Series*
6. *Jones, Harrow Brooklish "C Programming with Problem Solving", Wiley Dreamtech India.*

UIT-RGPV (Autonomous) Bhopal

Subject code- CA-104   Subject: Computer Organization & Assembly Language Programming
Semester: I

For credits & marks refer your scheme

COURSE OBJECTIVES:
The objective of this course is to review the concept of information in computers as well the basic functioning of register transfer language and Micro-operations, architecture of a simple processor and to introduce the assembly language programming along with Pin Diagram of 8086.

Course Contents
Unit-I
Representation of Information: Block Diagram of System Architecture ,Number systems, integer and floating-point representation, character codes (ASCII, EBCDIC), Error detection and correction codes : parity check code,cyclic redundancy code,Hamming code . Basic Building Blocks: Boolean Algebra, Simplification of Boolean Function.

Unit-II
Combinational blocks: Gates, Multiplexers, Decoders, Implementation of Boolean Function in form of gates etc. Sequential building blocks: flip-flops, Registers : Buffer register, Right &Left Shift register, Bidirectional Shift register. Counters : Ripple counter, Binary Counter,MOD-10 Counter, Ring Counter.

Unit-III
Register Transfer Language and Micro-operations: concept of bus, data movement among registers, 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-IV
Architecture of a simple processor: A simple computer organization and instruction set, instruction formats, addressing modes, instruction cycle, instruction execution in terms of microinstructions.
Pin Diagram of 8086, Architecture of 8086.

Unit-V
Memory Organization: Synchronous & Asynchronous data transfer, Data Transfer Mode, Program Controlled, Interrupt driven, DMA(Direct Memory Access). Numerical based on Memory Organization.

Course outcome-As an outcome of completing this course, students will be able to understand architecture of the computer system and simple processor, registers and microprocessors.

Evaluation- Evaluation will be continuous an integral part of the class as well through external assessment.
Reference Books:
1. M. Morris Mano, "Computer System Architecture", PHI, 3rd edition, 1993

2. Govindarajalu "Computer Architecture & Organisation".

3. Liu and Gibson, "8086/8088 Micro processor Assembly Language".

4. M.Mano "Digital Logic & Computer Design"

5. Malvino, "Digital Computer Electronics".

UIT-RGPV (Autonomous) Bhopal

Subject code- CA-105   **Subject: Communication Skills**
Semester: I
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For credits & marks refer your scheme

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COURSE OBJECTIVES:
The objective of this course is to improve the communication skills along with the personality development of students also to improve inter personal & written skills of students.

Course Contents
Unit-I
Communication: Meaning and process of communication, importance of effective communication, communication situation, barriers to communication. Objectives of communication, types of communication, principles of communication, essentials of effective communication.

Unit-II
Media of Communication: Written, oral, face-to-face, visual, audio-Visual, merits and demerits of written and oral communication.

Unit-III
Communication Skills : Developing communication skills; Listening; Speaking; Reading-Writing (Oral & Written). Body language; Utility of aids in Communication.

Unit-IV
Spoken Skills : Preparing for oral presentation, conducting presentations; Debates; Seminar; Speeches; Lectures; Interviews; Telephonic Conversation; Negotiations; Group Discussions.

Unit-V
Written Skills : Preparing of bio-data, seminar, paper, bibliography, and official correspondence; Mechanics of writing; Formal & Informal writings, letters; paragraphing, precise, report writing, technical reports, length of written reports, organizing reports, writing technical reports; Creative writing; Common Errors in Language.

Course outcome- On successful completion of the course student is expected to have skills of communication also the spoken and written skills to face personal interview that will also help in personality development of students.

Evaluation- Evaluation will be continuous an integral part of the class as well through external assessment.

Reference Books:
1. Rajendra Pal and J.S. Korlahalli "Essentials of Business Communication" , Sultan Chand & Sons
Publishers, New Delhi.
2. U.S.Rai & S.M. Rai "Business Communications" , Himalaya Publishing House.
3. Menzal and D.H. Jones "Writing a technical Paper", Mc Graw Hill, 1961.
4. Strategy and Skill "Business Communication", Prentice Hall New Jersey, 1987
5. Scot Ober "Contemporary Business Communication", Wiley India.