B.Sc.(Information Technology)	Semester-I
Course Name: Discrete Mathematics	Course code: USIT 104

Teaching Methodology : CHALK & TALK and PPT, REVERSE LEARNING

Month	Topic to be covered
September	**Unit 1: Introduction:** Variables, The Language of Sets, The Language of Relations and Function **Set Theory:** Definitions and the Element Method of Proof, Properties of Sets, Disproof's, Algebraic Proofs, Boolean Algebras, Russell's Paradox and the Halting Problem. **The Logic of Compound Statements:** Logical Form and Logical Equivalence, Conditional Statements, Valid and Invalid Arguments. **Unit 2:Quantified Statements:** Predicates and Quantified Statements, Statements with Multiple Quantifiers, Arguments with Quantified Statements
October	**Elementary Number Theory and Methods of Proof:** Introduction to Direct Proofs, Rational Numbers, Divisibility, Division into Cases and the Quotient-Remainder Theorem, Floor and Ceiling, Indirect Argument: Contradiction and Contraposition, Two Classical Theorems, Applications in algorithms. **Unit 3:Sequences, Mathematical Induction, and Recursion:** Sequences, Mathematical Induction, Strong Mathematical Induction and the Well-Ordering Principle for the Integers, Correctness of algorithms, defining sequences recursively, solving recurrence relations by iteration, Second order linear homogenous recurrence relations with constant coefficients. General recursive definitions and structural induction.
November	**Functions:** Functions Defined on General Sets, One-to-One and Onto, Inverse Functions, Composition of Functions, Cardinality with Applications to Computability **Unit 4: Relations:** Relations on Sets, Reflexivity, Symmetry, and Transitivity, Equivalence Relations, Partial Order Relations **Graphs and Trees:** Definitions and Basic Properties, Trails, Paths, and Circuits, Matrix Representations of Graphs, Isomorphism's of Graphs, Trees, Rooted Trees, Isomorphism's of Graphs, Spanning trees and shortest paths.
December	**Unit 5: Counting and Probability:** Introduction, Possibility Trees and the Multiplication Rule, Possibility Trees and the Multiplication Rule, Counting Elements of Disjoint Sets: The Addition Rule, The Pigeonhole Principle, Counting Subsets of a Set: Combinations, r-Combinations with Repetition Allowed, Probability Axioms and Expected Value, Conditional Probability, Bayes' Formula, and Independent Events.

Books And References:

Sr. No.	Title	Author/s	Publisher
1.	**Discrete Mathematics with Applications**	**Sussana S. Epp**	**CengageLearning**

Month	F.Y.B.Sc.IT – Semester I	Subject Name: Operating System
September 2020	**Unit I : Introduction(PPT and Videos)** What is an operating system? History of operating system, computer hardware, different operating systems, operating system concepts, System calls, operating system structure. **Processes and Threads:** Processes, threads, interprocess communication, scheduling, IPC Problems. **II Memory Management(Whiteboard and Video)** No memory abstraction, memory abstraction: address spaces, virtual memory, and page replacement algorithms, design issues for paging Systems, implementation issues, and segmentation. **File Systems: (Whiteboard ,PPT)** Files, directories, file system implementation, file-system management and optimization, MS-DOS file system, UNIX V7 file system, CD ROM file system.	
October 2020	**Unit II :Memory Management: (Whiteboard ,PPT)** No memory abstraction, memory abstraction: address spaces, virtual memory, and page replacement algorithms, design issues for paging Systems, implementation issues, and segmentation. **File Systems: (Whiteboard ,PPT)** Files, directories, file system implementation, file-system management and optimization, MS-DOS file system, UNIX V7 file system, CD ROM file system. **Unit III : Input-Output: (Whiteboard ,PPT)** Principles of I/O hardware, Principles of I/O software, I/O software layers, disks, clocks, user interfaces: keyboard, mouse, monitor, thin clients, power management, **Deadlocks: (Whiteboard ,PPT , Video)** Resources, introduction to deadlocks, the ostrich algorithm, deadlock detection and recovery, deadlock avoidance, deadlock prevention, Issues.	
November 2020	**Unit IV : Virtualization and Cloud: (Whiteboard ,PPT)** History, requirements for virtualization, type 1 and 2 hypervisors, techniques for efficient virtualization, hypervisor microkernels, memory virtualization, I/O virtualization, Virtual appliances, virtual machines on multicore CPUs, Clouds. **Multiple Processor Systems (Whiteboard ,PPT)** Multiprocessors, multicomputer, distributed systems	
December 2020	**Unit V: Case Study on LINUX and ANDROID: (Whiteboard ,PPT, Flip Classroom)** History of Unix and Linux, Linux Overview, Processes in Linux, Memory management in Linux, I/O in Linux, Linux file system, Security in Linux. Android **Case Study on Windows: (Whiteboard ,PPT, Flip Classroom)** History of windows through Windows 10, programming windows, system structure, processes and threads in windows, memory management, caching in windows, I/O in windows, Windows NT file System, Windows power management, Security in windows.	

Co-ordinator   Teacher   Principal

September 2020	**UNIT I:** **Number System:** Analog System, digital system, numbering system, binary number system, octal number system, hexadecimal number system, conversion from one number system to another, floating point numbers, weighted codes binary coded decimal, non-weighted codes Excess – 3 code, Gray code, Alphanumeric codes – ASCII Code, EBCDIC, ISCII Code, Hollerith Code, Morse Code, Teletypewriter (TTY), Error detection and correction, Universal Product Code, Code conversion. **Binary Arithmetic:** Binary addition, Binary subtraction, Negative number representation, Subtraction using 1's complement and 2's complement, Binary multiplication and division, Arithmetic in octal number system, Arithmetic in hexadecimal number system, BCD and Excess – 3 arithmetic. **UNIT II:** **Boolean Algebra and Logic Gates:** Introduction, Logic (AND OR NOT), Boolean theorems, Boolean Laws, De Morgan's Theorem, Perfect Induction, Reduction of Logic expression using Boolean Algebra, Deriving Boolean expression from given circuit, exclusive OR and Exclusive NOR gates, Universal Logic gates, Implementation of other gates using universal gates, Input bubbled logic, Assertion level.
October 2020	**UNIT II:** **Minterm, Maxterm and Karnaugh Maps:** Introduction, minterms and sum of minterm form, maxterm and Product of maxterm form, Reduction technique using Karnaugh maps – 2/3/4/5/6 variable K-maps, Grouping of variables in K-maps, K-maps for product of sum form, minimize Boolean expression using K-map and obtain K-map from Boolean expression, Quine McCluskey Method. **UNIT III:** **Combinational Logic Circuits:** Introduction, Multi-input, multi-output Combinational circuits, Code converters design and implementations **Arithmetic Circuits:** Introduction, Adder, BCD Adder, Excess – 3 Adder, Binary Subtractors, BCD Subtractor, Multiplier, Comparator.
November 2020	**UNIT IV: Multiplexer, Demultiplexer, ALU, Encoder and Decoder:** Introduction, Multiplexer, Demultiplexer, Decoder, ALU, Encoders. **Sequential Circuits: Flip-Flop:** Introduction, Terminologies used, S-R flip-flop, D flip-fop, JK flip-flop, Race-around condition, Master – slave JK flip-flop, T flip-flop, conversion from one type of flip-flop to another, Application of flip-flops.
December 2020	**Unit V: Counters**: Introduction, Asynchronous counter, Terms related to counters, IC 7493 (4-bit binary counter), Synchronous counter, Bushing, Type T Design, Type JK Design, Presettable counter, IC 7490, IC 7492, Synchronous counter ICs, Analysis of counter circuits. **UNIT V: Shift Register**: Introduction, parallel and shift registers, serial shifting, serial–in serial–out, serial–in parallel–out , parallel binary sequence generator, IC7495, Seven Segment displays, analysis of shift counters.

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F.Y.B.Sc.IT-SEM I	
SUBJECT: Imperative Programming	
Month	**Topics to be Covered**
SEPTEMBER	**UNIT I: Introduction:** Types of Programming languages, History, features& application. Simple program logic, program development cycle, pseudocode statements & flowchart symbols, sentinel value to end a program, programming & user environments, evolution of programming models., desirable program characteristics. **[TM:PPT,VIDEO,PRACTICAL-Online Implementation]**
OCTOBER	**UNIT I: Fundamentals:** Structure of a program, Compilation and Execution of a Program, Character Set, identifiers and keywords, data types, constants, variables and arrays, declarations, expressions, statements, Variable definition, symbolic constants **UNIT II: Operators and Expressions:** Arithmetic, unary, relational,logical, assignment, assignment , & the conditional operator, library functions. **Data Input and output:** Single character input and output, entering input data, scanf & printf function, gets and puts functions, interactive programming. **UNIT III: Conditional Statements and Loops:** Decision Making Within A Program, Conditions, Relational Operators, Logical Connectives, If Statement, If-Else Statement, Loops: While Loop, Do While, For Loop. Nested Loops, Infinite Loops, Switch Statement. **[TM:PPT,VIDEO,PRACTICAL-Online Implementation]**
NOVEMBER	**UNIT III :Functions:** Overview, defining a function, accessing a function, passing arguments to a function, specifying argument data types, function prototypes, recursion, modular programming and functions, standard library of c functions, prototype of a function: parameter list, return type, function call, block structure, passing arguments to a function: call by reference, call by value. **UNIT IV: Program structure:** Storage classes, automatic, external, & static variables, multifile programs, more library functions, Preprocessor: Features, #define and #include. **Directives and Macros Arrays:** Definition, processing, passing arrays to functions, multidimensional arrays, arrays and strings. **[TM:PPT,VIDEO,PRACTICAL-Online Implementation]**
DECEMBER	**UNIT V: Pointers:** Fundamentals, declarations, Pointers Address Operators, Pointer Type Declaration, Pointer Assignment, Pointer Initialization, Pointer Arithmetic, Functions and Pointers, Arrays And Pointers, Pointer Arrays, passing functions to other functions **Structures and Unions:** Structure Variables, Initialization, Structure Assignment, Nested Structure, Structures and Functions, Structures and Arrays: Arrays of Structures, Structures Containing Arrays, Unions, Structures and pointers. **[TM:PPT,VIDEO,PRACTICAL-Online Implementation]**

Course Outcome
IMPERATIVE PROGRAMMING — [F.Y.B.Sc.IT SEM-I]

1. How C provides a foundation for further study of programming languages.
2. Develop the ability to analyze a problem, develop an algorithm & flowchart to solve it.
3. To use simple input and output statements, Conditional operation, Control statements, Looping.
4. To use Pointers and pointer operators.
5. Familiarize the basic aspects of arrays, structure and file handling.