MASTER OF SCIENCE IN INFORMATION TECHNOLOGY
(A Choice Based Credit System Effective from 2018-21)

1. Duration of the Course

The Master of Science in Information Technology programme will be of four semesters duration under Choice based Credit system which will be conducted in two years. Each semester will be of approximately 5 months (minimum 90 working days in a semester) duration.

2. Eligibility:

Candidates seeking admission to the first semester of M.Sc.(CBCS) Information Technology must have a B.Sc. or equivalent/B.C.A degree (10+2+3 scheme) with minimum 48% marks and also must have studied Mathematics in their degree programme from a recognized university.

3. **Admissions**:

Admissions to the first year of M.Sc.(IT) will be made as per admission rules for M.Sc.(CBCS)

4. Medium of Instruction

The medium of instruction and examination shall be English.
5. **No. of Seats:** As given in the Information bulletin

6. Curriculum

6.1 M.Sc.(IT) programme has a two year , four semester prescribed course structure which in general terms is known as curriculum. It prescribes courses to be studied in each semester as given below

6.2 M.Sc.(IT) programme shall have a curriculum and course contents (syllabi) for the courses recommended by the committee courses in Informatics and Computational Sciences and approved by the academic council of the university.

6.3 The programme shall follow Choice Based Credit System(CBCS) and will be governed by the Common Rules and Regulations of Masters programme under CBCS approved by the Academic Council of the University.

7. Courses of Study and Examination (2018-21)

Semester – I

course	Paper Name	L-T-P	No.of credits	Max. Marks		Total
				University Exam.	Internal Assessment	
1	2		3	4	5	6
M1MIT01-CT01	Computer Architecture	3-1-0	4	80	20	100
M1MIT02-CT02	Introduction to Programming	3-0-2	4	80	20	100
M1MIT03-CT03	Data Structure	3-1-0	4	80	20	100
M1MIT04-CT04	Discrete Mathematics	3-1-0	4	80	20	100
M1MIT05-CP01	Practical-I Data Structure Programming	0-0-8	4	80	20	100
M1MIT06-CP02	Practical-II Web Development Using HTML & CSS	0-0-8	4	80	20	100
M1MIT07-SP01	Communication & Presentation Skill	0-0-4	2AC	80	20	100
	TOTAL		24(26)			

Courses of Study and Examination (2018-21)

Semester – II

course	Paper Name	L-T-P	No.of credits	Max. Marks		Total
				University Exam.	Internal Assessment	
1	2		3	4	5	6
M2MIT01-CT05	Database Systems	3-0-2	4	80	20	100
M2MIT02-CT06	Operating System	3-0-2	4	80	20	100
M2MIT03-CT07	Algorithms	3-0-2	4	80	20	100
M2MIT04-CT08	Object Oriented Programming using C++	3-0-2	4	80	20	100
M2MIT05-CP03	Practical-I: Algorithm Implementations	0-0-8	4	80	20	100
M2MIT06-EP01X	Practical-II: **Elective Lab-I : Web Application Development** A. Web Development using Dot NET B. Web Development using PHP& MYSQL	0-0-8	4	80	20	100
M2MIT07-EP02X	Practical-III:Minor Project or Elective skill Enhancement Course- I	0-0-6	3	80	20	100
	Total		27			

Courses of Study and Examination (2018-21)

Semester – III

course	Paper Name	L-T-P	No.of credits	Max. Marks University Exam.	Internal Assessment	Total
1	2		3	4	5	6
M3MIT01-CT09	Computer Networks	3-1-0	4	80	20	100
M3MIT02-CT10	Java Programming	3-0-2	4	80	20	100
M3MIT03-ET01X	Elective -1 A.Introduction to Data Science B. Computer Graphics	3-0-2	4	80	20	100
M3MIT04-ET02X	Elective-2 A. Software Engineering B. Image Processing	3-0-2	4	80	20	100
M3MIT05-EP03X	Practical-I: **Elective Lab-II** A. Android Programming B. Microprocessor & Micro-controller Programming	0-0-8	4	80	20	100
M3MIT06-EP04X	Practical-II: **Elective Lab-III** A. Big Data Analytics B. Cloud Computing C. Web Application Project	0-0-8	4	80	20	100
M3MIT07-EP05X	Practical-III: Minor Project OR Elective Skill Enhancement Course- II	0-0-6	3	80	20	100
M3MIT08-SP02X	Elective Skill Enhancement Course- III	0-0-4	2AC	80	20	100
	Total		27(29)			

Courses of Study and Examination (2018-21)Semester – IV

course	Paper Name	L-T-P	No.of credits	Max. Marks University Exam.	Internal Assessment	Total
1	2		3	4	5	6
M4MIT01-PW01	Project Work	0-0-36	18	80	20	100
Total Credits: Final Semester Project External Examination will be conducted at the University Department/Computer Centre by a Committee						

Elective Technology Courses

Elective Lab-I : Web Application Development (Semester II)
A.   Web Development using Dot NET
B.   Web Development using PHP& MYSQL

Elective Lab-II(Semester III)
A.   Android Programming
B.   Microprocessor & Micro-controller Programming

Elective Lab-III(Semester III)
A.   Big Data Analytics
B.   Cloud Computing
C.   Web Application Project*
(Only working projects tested and Accepted for implementation by hosting the application on web sites will be acceptable)

Minor Project, Elective Skill Enhancement Course
Note : Since this list is common for Semester II and III, it should be noted that a course cannot be repeated from semester to another. The student will have to opt for different courses in different semesters.
A.   Minor Project
B.   Communication and Presentation Skill
C.   Scientific Writing Skill
D.   Statistical Analysis of data
E.   Numerical Analysis Techniques using MATLAB
F.   Campus Network Configuration & Management
G.   Big Data Analytics
H.   Cloud Computing
I.   Data Mining
J.   Financial and Accounting Tools
K.   Computer Animation

Extra Credit Courses
A.   Summer Project
B.   Internship
C.   IT Industry Certification Courses

Course Code
Course codes are written in the following format
Mastersprogramme (M)+Semester (1,2,34)+MIT(Information Technology Discipline)+Serial Number of Course in the Semester(01,02,03 etc)+ hyphen("-") +Course type [Core Theory (CT), Core Practical(CP), Discipline Specific Theory (ET), Discipline Specific Practical (EP), Skill Practical(SP)]+Group Code (A,B,C etc)
For example the Course code M1MIT01-CT01 should read as Master Programme First Semester Information Technology First Course-Core Theory Course-01
In the Course code M3MIT06- EP01A should read as Master Programme Third Semester Information Technology Sixth Course-Discipline Specific Elective Practical Course-01 Group-A

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

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SYLLABUS

First Semester
CourseCT01:Computer Architecture

Unit I

Processor Basics: CPU Organization: Fundamentals, additional features. Data representation: Basic formats, fixed point numbers, floating-point numbers. Instuction sets: Instruction formats, instruction types, programming considerations.

Unit II

Datapath Design: Fixed point arithmetic: Addition and subtraction, multiplication, division. Arithmetic Logic Unit: Combinational ALUs, sequential ALUs. Advanced topics: Floating-point arithmetic, pipeline processing.

Unit III

Control Design: Basic concepts: Introduction, hardwired control, design examples. Micro-programmed control: Basic concepts, multiplier control unit, CPU control unit. Pipeline control: Instruction pipelines, pipeline performance, super-scalar processing.

Unit IV

Memory Organization: Memory technology: Memory device characteristics, random-access memories, serial-access memories. Memory systems: Multilevel memories, address translation, memory allocation. Caches: Main features, address mapping, structure versus performance.

Unit V

System Organization: IO and System Control: Programmed IO, DMA and interrupts, IO processors. Parallel processing: Processor-level parallelism, multiprocessors.

Text Books:

1. J.P. Hayes: Computer Architecture and Organization, McGraw-Hill International editions.

Course CT02:Introduction to Programming

Note: The practical aspects of the course must be taught as laboratory instructions using computers. Teacher is required to ensure that students carry out the computer implementation of the algorithm/program in the laboratory as a part of this course

UNIT - I

Algorithm development:problem identification, algorithms, flow charts, testing and debugging, algorithms for searching (linear and binary), sorting (selection, bubble & insertion), merging of ordered list, analysis of algorithm.

UNIT – II

Programming in C: history, structure of C programs, compilation and execution of C programs, debugging techniques, character set, keywords, data type and variables, expressions, operators, operator precedence and their order of evaluation.

Control statements :if-else, switch, break, continue, coma operator, goto statement. Loops **-** for, while, do-while.

UNIT – III

Functions: built-in and user-defined functions function declaration, parameter passing- call by value & call by reference, recursive functions. storage classes - auto, extern, global and static.

Array: one dimensional and multi-dimensional array, array handling, passing arrays to functions, arrays and strings, string-handling functions.

UNIT – IV

Pointers: pointer variable and its importance, pointer arithmetic, array of pointers, function of pointers, structure of pointers, dynamic memory allocation functions, pointer to pointer.

Structures and Union :declaration of structures, pointer to structure, array of structure, pointer to function, self-referential structure, unions, enumeration, macro.

UNIT – V

File handling: opening and closing data file, creating a data file, read and write functions, formatted and unformatted data files, command line arguments.

Recommended books : How to solve it by computer -G. Dromey
                    Programming with C – Schaum's outline Series

Course CT03: Data Structure

UNIT-I

Data Type - Data Object - Data Structure : Data abstraction and abstract data type; Notion of an algorithm - Complexity measures : Rate of growth, basic time analysis of an algorithm; ordering notion - detailed timing analysis - space complexity.

Arrays: Arrays and their representation-Single and multidimensional arrays-row major and column major ordering-address calculation.

Linked lists: Pointers and their uses- Continuous vs linked storage. Singly and doubly linked lists-Operations on lists-representation of Sparse matrices and polynomials using lists-Circular lists-generalized lists

UNIT-II

Storage management: Dynamic storage management-Reclamation and compaction-Boundary Tag method.
Stacks and Queues: Stacks and Queues-representation and Manipulation-Uses of stacks and Queues-Recursion, polish expressions

UNIT-III

Trees: Trees-Binary and N-ary trees-Representation of trees-Tree traversal algorithms-Threaded trees and advantages-Conversion of general trees to Binary trees-B trees-Applications: Decision trees, Game trees and expression parsing.

UNIT-IV

Graphs: Graphs and their representations**:** Matrix representation-List structure-Graph traversal algorithm, Application of graphs.

Strings and their features: Strings-Representation and Manipulation using Arrays and lists-String matching algorithms. Brute force, Knuth-Morris-Pratt and Boyer-Moore strategies.

UNIT-V

Sorting and Searching: Searching and sorting-Sequential, Binary and hashed Searching-Bubble sort, Insertion sort, shell sort, Merge sort and Quick sort-Comparison.

Tables: Decision tables-Symbol tables-Hash Tables-Examples of representation and implementation-Applications.

ReccomendedBooks :

1. Aho A.V. & Ullman J.E. : Data Structure & Algorithms
2. Aron M. Tannenbaum&Others : Data Structures using C
3. Mary E.S. Loomis : Data Management & File Structures
4. Bhagat Singh & Thomas Naps :Intrioduction to Data Structures
5. Trembley&Sorenson : An Introduction to Data Structures with Applications

Course CT04:Discrete Mathematics

UNIT-I

Set Theory: Introduction, sets and elements, universal set and empty set, subsets, venn diagram, set operations, algebra of sets and duality, finite sets, counting principle, classes of sets, power sets, partitions, mathematical induction.

Relations: Introduction, product set, relations, pictorial representation of relations, composition of relations, types of relations, closure properties, equivalence relations, partial ordering relations, n-ary relations.

UNIT-II

Functions: One-to-one onto and invertible functions, mathematical functions, exponential and logarithmic functions, sequences, indexed classes of sets, recursively defined functions, cardinality.

Logic and Propositional calculus: Propositions and compound propositions, basic logical operations, propositions and truth tables, tautologies and contradictions, logical equivalence, algebra of proposition, conditional and bi-conditional statements, arguments, logical implication, propositional functions, quantifiers, negation of quantified statements.

UNIT-III

Matrices: Matrix addition and scalar multiplication, matrix multiplication, transpose, square matrices, invertible matrices, inverse, determinants, elementary row operations, Gaussian elimination, boolean matrices.

UNIT-IV

Counting: Basic counting principles, factorial notation, binomial coefficient, permutations, combinations, the pigeon-hole principle, the inclusion-exclusion principle, ordered and unordered partition.

Probability Theory: Introduction, Sample space and events, finite probability space, conditional probability, independent events, independent repeated trials, binomial distribution, random variables.

UNIT-V

Property of Integers: Order and inequalities, absolute value, mathematical induction, division algorithm, divisibility, primes, greatest common divisor, Euclidean algorithm, fundamental theorem of arithmetic, congruence relation, congruence equations.

Recommended Books :
1. Lipschutz S., Lipson M. :Discrete Mathematics
2. KolmanB.,Robert C.B., Sharon R.: Discrete Mathematical Structures
3. Trembley J.P. and Manohar R.P. : Discrete Mathematical Structures with Applications o Computer Science.
4. Lew : Computer Science : A mathematical introduction

Course CP01: Practical-I :Data Structure Programming

Programming Exercises using C language based on Algorithm for data structures
List of programs will be made available on the course web site.

Course CP02: PRACTICAL -II :Web Development Using HTML & CSS

This course will be taught through practical training to prepare Web pages using HTML and CSS. Each student will be required to select independent web pages and web contents. List of practical will be available on course web site.