

Curriculum and Syllabus



MASTER OF COMPUTER APPLICATION (MCA)

(With Effect from July 2016)

**Department of Computer Application
Veer Surendra Sai University of Technology, Sambalpur
Burla-768018
Odisha**

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION

CURRICULUM FOR MASTER OF COMPUTER APPLICATION
(MCA)

First Semester (Autumn)					
Sub. Code	Subject (Theory)	L	T	P	C
	Problem Solving and C Programming	3	1	0	4
	Microprocessor and Assembly Language Programming	3	1	0	4
	Foundations of Computer Science	3	1	0	4
	Discrete Mathematics	3	1	0	4
	Computer Organization	3	1	0	4
Sub. Code	Subject (Sessional)	L	T	P	C
	Open Source Programming Laboratory	0	0	3	2
	Assembly Language Programming Laboratory	0	0	3	2
	C Programming Laboratory	0	0	3	2
	Computer Organization Laboratory	0	0	3	2
	Total	15	5	12	28

Second Semester (Spring)					
Sub. Code	Subject (Theory)	L	T	P	C
	Data Structures	3	1	0	4
	Computer Networks	3	1	0	4
	Object Oriented Programming Using C++	3	1	0	4
	Quantitative Techniques	3	1	0	4
	Operating Systems	3	1	0	4
Sub. Code	Subject (Sessional)	L	T	P	C
	Data Structures Laboratory (Using C/C++)	0	0	3	2
	Programming in C++ Laboratory	0	0	3	2
	Operating System Laboratory	0	0	3	2
	Computer Networks Laboratory	0	0	3	2
	Total	15	5	12	28

Third Semester (Autumn)					
Sub. Code	Subject (Theory)	L	T	P	C
	Database Management Systems	3	1	0	4
	Software Engineering	3	1	0	4
	Computer Graphics and Multimedia	3	1	0	4
	Professional Communication in English	3	1	0	4
	Theory of Computation	3	1	0	4
Sub. Code	Subject (Sessional)	L	T	P	C
	DBMS Laboratory	0	0	3	2
	Computer Graphics (Using C/C++) Laboratory	0	0	3	2
	Communicative English Laboratory	0	0	3	2
	Seminar	0	0	3	2
	Total	15	5	12	28

Fourth Semester (Spring)					
Sub. Code	Subject (Theory)	L	T	P	C
	Programming with Java	3	1	0	4
	Compiler Design	3	1	0	4
	Analysis and Design of Algorithms	3	1	0	4
	Elective-I	3	1	0	4
	Elective-II	3	1	0	4
Sub. Code	Subject (Sessional)	L	T	P	C
	Java Programming Laboratory	0	0	3	2
	Compiler Design Laboratory	0	0	3	2
	Algorithm Design Laboratory	0	0	3	2
	Minor Project - I	0	0	3	2
Total		15	5	12	28

Fifth Semester (Autumn)					
Sub. Code	Subject (Theory)	L	T	P	C
	Simulation and Modelling	3	1	0	4
	Web Technologies	3	1	0	4
	Mobile Computing	3	1	0	4
	Elective-III	3	1	0	4
	Elective-IV	3	1	0	4
Sub. Code	Subject (Sessional)	L	T	P	C
	Simulation Laboratory	0	0	3	2
	Comprehensive Viva-Voce	0	0	0	2
	Web Technology Laboratory	0	0	3	2
	Minor Project - II	0	0	3	2
Total		15	5	09	28

Sixth Semester (Spring)					
Sub. Code	Subject (Project)	L	T	P	C
	Major Project	-	-	-	16
	Project Seminar	-	-	-	4
Total					20

Elective-I and Elective-II	
Sub. Code	Subject
	Data Mining
	Cloud Computing
	Natural Language Processing
	Software Quality
	Wireless Sensor Networks
	Embedded System
	E-Commerce
	Information Security and Cyber Laws
	Cryptography and Network Security
	Information Retrieval Techniques
	Real-Time Systems
	Distributed Systems
	Statistical Analysis
Elective-III and Elective-IV	
Sub. Code	Subject
	Bio-informatics
	Advanced Java Programming
	Pattern Recognition
	Digital Image Processing
	Advanced Operating System
	Human Resource Management
	Big Data Analytics
	Object Oriented Design
	Human Computer Interaction
	Intellectual Property Rights
	Soft Computing
	Software Project management
	Marketing Systems and Business Intelligence
	Artificial Intelligence

VISION OF THE DEPARTMENT

The Department of Computer Application has a multi-objective mission:

- To enable students acquire good academic and computational skills and devotion to scientific and technical knowledge.
- To inculcate the values of perseverance, sincerity and honesty.
- To empower them to become socially and economically responsible citizens of this country.

MISSION OF THE DEPARTMENT

The Department of Computer Application at Veer Surendra Sai University of Technology, Burla aims to inculcate value based, socially committed professionalism in the students to the cause of overall development of students and society using a compound metric comprising of:

M1. To provide qualitative education and generate new knowledge by engaging in cutting edge research projects and by offering state of the art postgraduate programmes, leading to careers as Computer Science professionals in the widely diversified domains of industry, government and academia.

M2. To promote a teaching and learning process that yields advancements in state of the art in computer science, resulting in integration of intellectual foundation and technical knowledge into other scientific disciplines leading to new technologies and products.

M3. To harness human capital for sustainable competitive edge and social relevance by inculcating the philosophy of continuous learning and innovation in Computer Science and application.

PROGRAM OUTCOMES (POs)

POs describe what students are expected to know or be able to do by the time of post graduation from the programme. The Program Outcomes of the MCA Programme are described as below:

PO-1 : Strong foundation in core Computer Science and Application, both theoretical and applied concepts.

PO-2 : Ability to apply knowledge of mathematics, science, and engineering to real life problem solving.

PO-3 : Ability to analyze, design, model, and develop complex software and information management systems.

PO-4 : Ability to function effectively within teams.

PO-5 : Understanding of professional ethical responsibility.

PO-6 : Ability to communicate effectively, both in writing and oral.

PO-7 : Understanding the impact of Computer Science solutions in the societal and human context.

PO-8 : Ability to engage in lifelong learning.

PO-9 : Knowledge of contemporary issues.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Program Educational Objectives are broad statements that describe the career and professional accomplishments that the program is preparing postgraduates to achieve.

PEO-1 : Technical Knowledge

To bring the physical, analytical and computational approaches of Computer Science to bear on the challenges they take on, abstracting essential structure, recognizing sources of uncertainty, and applying appropriate models, technical tools, and evaluations to develop their solutions.

PEO-2 : Leadership

To bring to their careers the self-assurance, integrity, and technical strengths that drive innovation and the communication and collaboration skills to inspire and guide the groups they work with in bringing their ideas to fruition.

PEO-3 : Versatility

To develop abilities and talents leading to creativity and productivity in fields and professions beyond the regular MCA curriculum.

PEO-4 : Engagement

To promote lifelong self learning abilities to remain professionally effective to the society at large.

PEO-5 : Diversification

To promote among student postgraduates the ability to gain multidisciplinary knowledge through projects and industrial training, leading to a sustainable competitive edge in R&D and meeting societal needs.

PEO-6 : Projects

To inculcate group work and team management skills with cross cultural etiquettes, promoting knowledge transfer leading to conceptualization and delivery of projects with varied complexity.

PEO-7 : Ethics and Attitudes

To sensitize students towards issues of social relevance, openness to other international cultures and to introduce them to professional ethics and practice.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

PROBLEM SOLVING AND C PROGRAMMING

Semester	Course Name	PO	PEO	CO
1 st	Problem solving and C Programming	PO-1, PO-2, PO-3, PO-4, PO-6, PO-8 PO-9	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: To learn foundation of programming languages in general, Traditional view of computer hardware and its functioning.</p> <p>CO 2: To learn programming concept and data types manipulation at level that enables you to write C language programs for the compiler specification.</p> <p>CO 3: To use simple input and output statements. To use the for and do...while repetition statements to execute statements repeatedly</p> <p>CO 4: To understand the menu driven program using the switch selection statement. To use the break, continue to alter flow control and logical operators to form complex conditional expressions in control statements.</p> <p>CO 5: To be able to implement the program using functions, recursions pointers and its applications, arrays and its uses in fundamental areas in computer science and engineering such as searching sorting etc..</p> <p>CO 6: To use input and output streams. To use all print formatting capabilities and create, read, write and update files. Sequential access files processing. Random access files processing.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

PROBLEM SOLVING AND C PROGRAMMING	L	T	P	C
	3	1	0	4

UNIT- 1 **(06 Periods)**

Algorithm for Problem Solving: An Introduction, Properties of an algorithm, classification, algorithm logic, flowchart. Program design and implementation issues, Programming system design technique, programming technique, basic constructs of structured programming, Modular designing of programs. Programming environment: High level language, Low level programming language, Middle level programming language, assembler, compiler, interpreter.

UNIT- 2 **(08 Periods)**

Introduction to C Language: What is C: Historical development of C, where C stands, Getting Started with C: The C character set, Types of C constants, Types of C variables, C keywords, identifiers, literals. C Instructions: Type Declaration Instruction, arithmetic Integer, Long, Short, Signed, unsigned, storage classes, Integer and Float Conversions, type conversion in assignment, hierarchy of operations.

UNIT – 3 **(10 Periods)**

Flow of Control: Decision Control Structure: Control instructions in C, if, if-else, use of logical operators, hierarchy of logical operators, arithmetic operators, relational operators, assignment operators, increment and decrement operators, conditional operators, bitwise operators, special operators, &, *, ., >, "Sizeof". Loops control structure: while loop, for loop, do-while loop, odd loop, nested loop, break, continue, case control structure, goto, exit statement.

UNIT – 4 **(16 Periods)**

Array: what are arrays, array initialization, bound checking, 1D-array, 2D array, Multi-dimensional array. **Strings:** what are strings, standard library string functions, 2D array of characters. **Pointers:** Introduction, Features, Declaration and Arithmetic operations on pointers. Pointers and Arrays, Pointers and strings, void pointers. **Functions:** Declaration, Prototype, Type of functions, call by value and reference, **Structure and Preprocessor:** Declaration of structure, accessing structure elements, array of structure, Declaration of union, accessing union elements. Preprocessor : Features of C Preprocessor, macro expansion, macro with arguments.

Text Book:

1. V. Rajaraman, **"Computer Basics and C Programming"**, Prentice-Hall India Publication
2. E. Balaguruswamy, **"Programming in C"**, TMH Publication
3. Ashok Kamthane, **"Programming with ANSI & Turbo C"**, Pearson Publication

Reference Books:

1. S. K. Srivastava, **"C in Depth"**, BPB Publication
2. Gottfried, Schaums Outline Series, **"Programming with C"**, TMH Publication

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

Semester	Course Name	PO	PEO	CO
1 ST	Microprocessor and Assembly Language Programming	PO-1, PO-2, PO-3, PO-4, PO-6, PO-8	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: To broaden the knowledge of standard Intel Architectures.</p> <p>CO 2: To learn a microprocessor programming model at a level that enables you to write assembly language programs for the processor meeting given specifications.</p> <p>CO 3: To learn concepts associated with interfacing a microprocessor to memory and to I/O devices.</p> <p>CO 4: To learn how to control components of a microprocessor based system through the use of interrupts.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING	L	T	P	C
	3	1	0	4

UNIT- 1

(12 Periods)

Microprocessors: 8085 architecture, bus organization, registers, ALU, control section, pin-diagram, basic fetch and execute cycle of a program, timing diagrams, types of instructions, instruction format, data format, addressing modes, instruction set of 8085, Programming the 8085, Interrupts and ISR.

UNIT- 2

(08 Periods)

Memory Interfacing: address space partitioning, logic devices for interfacing, R/W and ROM models, memory map addresses, memory address range of 1K memory chip, memory address lines, memory word size, memory classification, memory structure and its requirements, basic concepts in memory interfacing, address decoding and memory addresses, interfacing the 8155 memory chip, absolute vs. partial decoding.

UNIT- 3

(12 Periods)

Data transfer techniques & support chips: Data transfer techniques, programmed data transfer, direct memory access data transfer, basic idea about 8212, 8255, 8257 and 8259, analog to digital interfacing, A/D and D/A converters, analog signal conditioning circuits, data acquisition systems.

UNIT- 4

(08 Periods)

8086 microprocessor & Microcontroller: Features of advanced microprocessors, 8086 microprocessor architecture, register organization, addressing modes; Microcontrollers and embedded processors, overview of the 8051 microcontroller family.

Text Books:

1. Ramesh S. Gaonkar, "**Microprocessor Architecture, Programming and Application with the 8085**", Fourth Edition, Penram International Publishing (India).
2. B. Ram, "**Fundamentals of Microprocessors and Microcomputers**", Dhanpat Rai Publication.

Reference Books:

1. D.V. Hall, "**Microprocessors and Interfacing**", 2nd Edition Tata McGraw-Hill Publication
2. M.A. Mazidi and J.G. Mazidi, "**The 8051 Microcontroller and Embedded Systems**", Pearson Education, India.
3. A.K.Ray and K.M.Bhurchandi – "**Advanced Microprocessors & Peripherals**", Tata McGraw Hill Publication

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

FOUNDATION OF COMPUTER SCIENCE

Semester	Course Name	PO	PEO	CO
1st	Foundation of Computer Science	PO-1, PO-5, PO-7, PO-8, PO-9	PEO-1, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO1. Graduates will be able to understand basics of a Computer System and its Computer Organization to provide an insight of how basic Computer components work.</p> <p>CO2. Graduates will be able to have a basic understanding of Different programming languages and programming environment components.</p> <p>CO3. Graduates will be able to understand how different network topologies function and the communication system works.</p> <p>CO4. Graduates will be able to explain the working of important application softwares and their use to perform any engineering activity.</p> <p>CO5. Graduates will be able to get knowledge of concepts that govern the proper usage of Internet and computing resources.</p> <p>CO6. Graduates will be able to connect to the Internet, send e-mail, access remote servers, and identify resources available on the Web.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

FOUNDATION OF COMPUTER SCIENCE

L T P C

3 1 0 4

UNIT- 1

(08 Periods)

Introduction To Computer & Operating Systems : Basic concepts of Computer, Concepts of Data and Information, Organization of computer, input and output devices, Storage devices and File organization.
Operating System: System software, application software, utility packages

UNIT- 2 (10 periods) Programming Languages : Machine language, assembly languages, high level languages, forth generation languages, General concepts of OOPS (Object oriented programming) and SQL (Structured Query Languages); Computer Viruses, worms; Compiler, Interpreter, Assembler; Algorithm & Flowchart.

UNIT- 3 (12 periods) Communication Technologies : Communication system elements communication modes (analog and digital, synchronous and asynchronous, simplex, half duplex and full duplex, circuit switching and packet switching) **Communication media** : (speed and capacity, twisted pair, coaxial fiber optics, wireless), common network components, hosts and servers, work stations, network topologies and network protocols (ISO/OSI Ref. Model and TCP/IP)

UNIT- 4 (10 Periods) Applications : Applications in business, industry, home education and training, entertainment, science and engineering and medicine, multimedia data types (graphics, images, audio video), Virtual reality applications, Internet, World Wide Web (WWW), Domain names, e-mail, teleconferencing, e-commerce, hypermedia, data warehousing.

Text Books:

1. D.H. Sanders, "**Computers Today** ", McGraw Hill Publication
2. S. K. Basandra, "**Computers Today**", Galgotia Publication

Reference Books:

1. Leon & Leon, "**Computers Today**", Leon Vikas Publication
2. S Jaiswal, "**Information Technology Today**", Galgotia Publication
3. P. K. Sinha . "**Introduction to Computers**", BPB Publication
4. V. Rajaraman "**Fundamental of Computer**" PHI Publication

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DISCRETE MATHEMATICS

L	T	P	C
3	1	0	4

UNIT- 1

(10 Periods)

Logic: Propositional equivalence, predicates and quantifiers, Methods of proofs, proof strategy, sequences and summation, mathematical induction, recursive definitions and structural induction, program correctness.

Counting: The basics of counting, the pigeonhole principle, permutations and combinations, recurrence relations, solving recurrence relations, generating functions, inclusion-exclusion principle, application of inclusion-exclusion.

UNIT- 2

(10 Periods)

Relations: Relations and their properties, n-ary relations and their applications, representing relations, closure of relations, equivalence of relations, partial orderings.

Graph theory: Introduction to graphs, graph terminology, representing graphs and graph isomorphism, connectivity, Euler and Hamilton paths, planar graphs, graph coloring, introduction to trees, application of trees.

UNIT- 3

(10 Periods)

Group theory: Groups, subgroups, generators and evaluation of powers, cosets and Lagrange's theorem, permutation groups and Burnside's theorem, isomorphism, automorphisms, homomorphism and normal subgroups, rings, integral domains and fields.

UNIT- 4

(10 Periods)

Lattice theory: Lattices and algebras systems, principles of duality, basic properties of algebraic systems defined by lattices, distributive and complemented lattices, Boolean lattices and Boolean algebras, uniqueness of finite Boolean expressions, propositional calculus. Coding theory: Coding of binary information and error detection, decoding and error correction.

Text Books:

1. K.H. Rosen, "**Discrete Mathematics and its application**", 5th edition, Tata McGraw Hill Publication
2. C. L. Liu, "**Elements of Discrete Mathematics**", 2nd edition, Tata McGraw Hill Publication

Reference Books:

1. G. Shankar Rao, "**Discrete Mathematical Structure**", New Age Publisher
2. D. P. Acharjaya, Sreekumar "**Fundamental Approach to Discrete Mathematics**", New Age Publisher

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPUTER ORGANIZATION

Semester	Course Name	PO	PEO	CO
1st	Computer Organization	PO-1, PO-2, PO-4, PO-5, PO-7, PO-8, PO-9	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6, PEO-7	<p>CO1. Graduates will be able to understand theory of Digital Design and Computer Organization to provide an insight of how basic computer components are specified.</p> <p>CO2. Graduates will be able to Convert and calculate in binary, decimal, and hexadecimal number systems and Convert the numbers from one radix to another, .</p> <p>CO3. Graduates will be able to understand how different logic gates function and the combinatorial circuit works.</p> <p>CO4. Graduates will be able to An in depth understanding of instructions, Components associated with instruction processing, different stages of an instruction execution</p> <p>CO5. Graduates will be able to Design a pipeline for consistent execution of instructions with minimum hazards.</p> <p>CO6. Graduates will be able to demonstrate memory hierarchy and its impact on computer cost/performance.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPUTER ORGANIZATION

L	T	P	C
3	1	0	4

UNIT- 1

(06 Periods)

Number system - Binary, decimal, octal, hexadecimal, **Conversion** - Binary to decimal, decimal to binary, octal to decimal, decimal to octal, octal to binary, binary to octal, hexadecimal to binary, binary to hexadecimal, hexadecimal to Decimal, decimal to hexadecimal, hexadecimal to octal, octal to hexadecimal, **Binary arithmetic** – Addition, subtraction (simple method), **Logic gates** - AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR, **Combinational circuits** - Design of Combinational Circuits – Adder / Subtractor – Encoder – Decoder – MUX / DEMUX, Flip-Flops, Counters, Registers

UNIT- 2

(10 Periods)

Basic Computer Organization and Design: Instruction codes, computer registers, computer instructions, timing & control, instruction cycle, memory reference instructions, input-output and interrupts, design of basic computer, design of accumulator logic. **Microprogrammed Control Unit:** Control memory, address sequencing. **Central Processing Unit:** Introduction, general register organization, stack organization, instruction formats, addressing modes.

UNIT- 3

(16 Periods)

Pipeline and Vector processing: Parallel Processing, pipelining, arithmetic pipeline, RISC Pipeline, Vector Processing, Array Processors. **Input-Output Organization:** Peripheral devices, input-output interface, asynchronous data transfer, modes of data transfer, priority interrupt, direct memory access, input-output processor

UNIT- 4

(08 Periods)

Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory, memory management hardware. **Multiprocessors:** Characteristics of multiprocessor, Interconnection Structure, Interprocessor Communication & Synchronization.

Text Books:

1. M. Mano, “**Computer System and Architecture**”, Pearson Publication
2. W Stallings, “**Computer Organization & Architecture**”, PHI Publication

Reference Books:

1. J. P. Hayes, “**Computer Architecture and Organization**”, McGraw Hill Publication
2. Andrew S. Tanenbaum, “**Structured Computer Organization**”, PHI Publication
3. P. V. S Rao, “**Computer System Architecture**”, PHI Publication

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
Open source Laboratory

Semester	Course Name	PO	PEO	CO
1st	Open Source Programming Lab	PO-1, PO-5, PO-7, PO-8, PO-9	PEO-1, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO1. Graduates will be able to describe and use the LINUX operating system.</p> <p>CO2. Graduates will be able to describe and write shell scripts in order to perform basic shell programming.</p> <p>CO3. Graduates will be able to understand the LINUX file system.</p> <p>CO4. Graduates will be able to understand the different processes running in the system along with their functions in a network.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA

**DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)**

OPEN SOURCE PROGRAMMING LABORATORY

L T P C

0 0 3 2

LIST OF EXPERIMENTS :

1. **Operating System Overview:** (UNIX/LINUX) Operating System and Software Installation
2. **Command Line Interface :** Basic Commands(pwd, whoami, grep...)
3. **User and Group Management :** (sudo, su...)
4. **File & Directories Structure Overview :** Create, delete, navigate, list, copy, rename(mkdir, cd, rm, ls...)
5. **Link, File Comparison, Meta Characters**
6. **File Compression,Decompression, Permissions**
7. **Network and Proxy Settings :** a) Networking Commands (mail...)
b) Working With Remote Server (SSH, SFTP, SCP)
8. **Redirection Operators, Pipes and Filters**
9. **Process Overview and Control.**
10. **Editing Files**
11. **Shell Scripting I**
12. **Shell Scripting II**
13. **Shell Scripting III**
14. **Shell Scripting IV**
15. **Shell Scripting V**

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

Semester	Course Name	PO	PEO	CO
1ST	Microprocessor and Assembly Language Programming	PO-1, PO-2, PO-3, PO-4, PO-6, PO-8	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: To broaden the knowledge of standard Intel Architectures.</p> <p>CO 2: To learn a microprocessor programming model at a level that enables you to write assembly language programs for the processor meeting given specifications.</p> <p>CO 3: To learn concepts associated with interfacing a microprocessor to memory and to I/O devices.</p> <p>CO 4: To learn how to control components of a microprocessor based system through the use of interrupts.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

ASSEMBLY LANGUAGE PROGRAMMING LABORATORY

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS :

1. Program for addition of two 8-bit numbers whose sum is 8-bit.
2. Program for subtraction of two 8-bit numbers whose difference is 8-bit.
3. Program for addition of two 8-bit numbers whose sum is 16-bit or more.
4. Program for addition of two 16-bit numbers whose sum is 16-bit or more.
5. Programs to find the 1's complement of an 8-bit and a 16-bit number.
6. Programs to find the 2's complement of an 8-bit and a 16-bit number.
7. Programs to shift an 8-bit and a 16-bit number left by 1-bit.
8. Program to swap two numbers.
9. Program to find the sum of numbers from 1 to 100.
10. Program to print numbers from 1 to 10.
11. Program for finding the largest and smallest number in a data array.
12. Program for finding the sum of a series of 8-bit decimal numbers whose sum is 16-bits.
13. Program for multiplication of two 8-bit numbers.
14. Program for division of two 8-bit numbers.
15. Code Conversion programs (Binary to Gray / Gray to Binary / ASCII to Binary / Binary to ASCII).

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

PROBLEM SOLVING AND C PROGRAMMING LABORATORY

Semester	Course Name	PO	PEO	CO
1 st	Problem solving and C Programming	PO-1, PO-2, PO-3, PO-4, PO-6, PO-8 PO-9	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: To learn foundation of programming languages in general, Traditional view of computer hardware and its functioning.</p> <p>CO 2: To learn programming concept and data types manipulation at level that enables you to write C language programs for the compiler specification.</p> <p>CO 3: To use simple input and output statements. To use the for and do...while repetition statements to execute statements repeatedly</p> <p>CO 4: To understand the menu driven program using the switch selection statement. To use the break, continue to alter flow control and logical operators to form complex conditional expressions in control statements.</p> <p>CO 5: To be able to implement the program using functions, recursions pointers and its applications, arrays and its uses in fundamental areas in computer science and engineering such as searching sorting etc..</p> <p>CO 6: To use input and output streams. To use all print formatting capabilities and create, read, write and update files. Sequential access files processing. Random access files processing.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

C PROGRAMMING LABORATORY

L T P C

0 0 3 2

LIST OF EXPERIMENTS :

1. Write a C program to find the area and volume of sphere.
2. Write a C program to find out whether the character pressed through the keyboard is a digit or not (using conditional operator).
3. Write a C program to shift the input data by two bits right.
4. Write a C program to swap the values of two variables with/without using a third variable.
5. Write a C program to add the individual digits of a 3-digit number by % and / operator.
6. Write a C program to print the given 3 integers in ascending order using if-else.
7. Write a C program to examine a character entered from the keyboard is a lowercase letter or upper case, digit, punctuation mark or a space character.
8. Write a C program to provide multiple functions such as ADD, SUB, MUL, DIV and MOD using switch case.
9. Write a C program to find Sum of individual digits of a positive integer.
10. Write a C program to generate the first n terms of the Fibonacci sequence.
11. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
12. Write a C program to check the given number is perfect number or not.
13. Write a C program to print the factors of a given number.
14. Write a C program to find the factorial of a given number using non-recursive and recursive function.
15. Write a C program to find the GCD (greatest common divisor) of two given integers using non-recursive and recursive function.
16. Write a C program to a) Convert decimal number to binary number b) Convert Binary number to decimal number using non recursive functions.
17. Write a C program to print Fibonacci series using recursion.
18. Write a C program to find minimum, maximum, sum and average of the given one dimensional array.
19. Write a C program to merge two sorted arrays into another array in a sorted order.
20. Write a C program to print the individual digits of a number using array.
21. Write a C program to print the binary equivalent of a given decimal number using array.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

C PROGRAMMING LABORATORY

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS :

22. Write a C program that uses functions to perform the following
 - a) Addition of two Matrices
 - b) Multiplication of two Matrices
23. Write a C program to add two numbers using pointers.
24. Write a C program to swap two numbers using pointers.
25. Write a C program to find the length of string using pointers.
26. Write a C program to compare two strings using pointers.
27. Write a C program to find the length of a given string.
28. Write a C program to count the number of vowels in a given string and also print the vowels.
29. Write a C program to check how many alphabets and non alphabets are there in a string.
30. Write a C program to remove blank spaces from a string.
31. Write a C program to capitalize all the letters of a string.
32. Write a C program to determine if the given string is a palindrome or not.
33. Write a C program that displays the position or index in the string S where the string T begins or 1 if S does not contain T.
34. Write a C program to count the lines, words and characters in a given text.
35. Write a C program to copy one structure to another of same type.
36. Write a C program that passes a pointer to a structure and returns nothing.
37. Write a C program to define a structure named time, which contains three int members.
38. Write a C program to create a structure containing 5 strings: address1, address2, city, state and zip.
39. Create a typedef called record that can be used to create instances of this structure.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPUTER ORGANIZATION LABORATORY

Semester	Course Name	PO	PEO	CO
1st	Computer Organization	PO-1, PO-2, PO-4, PO-5, PO-7, PO-8, PO-9	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6, PEO-7	<p>CO1. Graduates will be able to understand Knowledge of Digital Design and Computer Organization to provide an insight of how basic computer components are specified.</p> <p>CO2. Graduates will be able to Convert and calculate in binary, decimal, and hexadecimal number systems and Convert the numbers from one radix to another, .</p> <p>CO3. Graduates will be able to understand how different logic gates function and the combinatorial circuit works.</p> <p>CO4. Graduates will be able to An in depth understanding of instructions, Components associated with instruction processing, different stages of an instruction execution</p> <p>CO5. Graduates will be able to Design a pipeline for consistent execution of instructions with minimum hazards.</p> <p>CO6. Graduates will be able to demonstrate memory hierarchy and its impact on computer cost/performance.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPUTER ORGANIZATION LABORATORY

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS :

1. A Study on the different components of Computer.
2. A Study on Motherboard and its components.
3. A Study on PC Assembling and De-assembling.
4. Study the features of Logisim simulator.
5. Develop circuits of all the Gates using Logisim simulator.
6. Develop circuits of adder, subtractor using Logisim simulator.
7. Develop circuits of plexers – multiplexer, demultiplexer using Logisim simulator.
8. Develop circuits of flip flops – RS Flip flop, JK Flip Flop & D Flip Flop. using Logisim simulator.
9. Develop circuits of Shift register. using Logisim simulator.
10. Develop Circuits for Counter. using Logisim simulator.
11. Develop Circuits for Decoder using Logisim simulator.
12. Design a 4x4 RAM using Logisim simulator.
13. Design an Associative Cache Memory using Logisim simulator.
14. Design a Direct Mapping Cache Memory using Logisim simulator.
15. Design an 8-bit single cycle CPU using Logisim simulator.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DATA STRUCTURE

Semester	Course Name	PO	PEO	CO
2 nd	Data Structure	PO-1, PO-2, PO-3, PO-4, PO-5, PO-8, PO-9	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6, PEO-7	<p>CO1. Graduates will be able to design algorithms using stack, queue and principles of recursion.</p> <p>CO2. Graduates will be able to demonstrate the use of data structures like linked lists, stacks and queues.</p> <p>CO3. Graduates will be able to understand the implementation of linked data structures such as linked lists and binary trees, balanced search trees, hash tables, priority queues.</p> <p>CO4. Graduates will be able to explain the working of several sub-quadratic sorting algorithms including quick sort, merge sort and heap sort.</p> <p>.</p> <p>CO5. Graduates will be able to get knowledge of some graph algorithms such as shortest path and minimum spanning tree.</p> <p>CO6. Graduates will be able to get knowledge of hashing techniques and their applications in Computer Science.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DATA STRUCTURE

L T P C

3 1 0 4

Unit – 1

(10 Periods)

Introduction: Basic Terminology, Elementary Data Organization, Algorithm Complexity and Time-Space trade-off.

Stacks: Representation and Implementation of stack, Operations on Stacks: Push & Pop, Application of stack,

Queues: representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and Priority Queues.

Unit – 2

(08 Periods)

Linked list: Representation and Implementation of Singly Linked Lists, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Doubly linked list, Polynomial representation and addition, Garbage Collection and Compaction.

UNIT – 3

(12 Periods)

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Representation of Binary trees, Traversing Binary Trees, Search Tree (BST), Insertion and Deletion in BST, **Searching and Hashing:** Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

UNIT – 4

(10 Periods)

Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, **Graphs:** Terminology & Representations, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Spanning Trees, Minimum Cost Spanning Trees.

Text Books:

1. Horowitz and Sahani, “**Fundamentals of data Structures**”, Galgotia Publication Pvt. Ltd.
2. R. Kruse et al, “**Data Structures and Program Design in C**”, Pearson Education Asia

Reference Books:

1. M. Tenenbaum, “**Data Structures using C & C++**”, Prentice-Hall of India Pvt. Ltd
2. K Loudon, “**Mastering Algorithms with C**”, Shroff Publisher & Distributors Pvt. Ltd.
3. Bruno R Preiss, “**Data Structures and Algorithms with Object Oriented Design Pattern in C++**”, John Wiley & Sons, Inc.
4. Adam Drozdek, “**Data Structures and Algorithms in C++**”, Thomson Asia Pvt. Ltd.(Singapore)

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
COMPUTER NETWORKS

Semester	Course Name	PO	PEO	CO
2 nd	Computer Networks	PO-1, PO-2, PO-3, PO-4, PO-6, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: To be able to describe communication protocols and layered network architectures and to explain Conventional computer system interfacing standards and peer to peer data link communication protocols.</p> <p>CO 2: To be able to design basic network systems using routing methods and analyze data communication technology.</p> <p>CO 3: To be able to describe the operation of a packet based sliding window protocol, Encryption and Decryption methods.</p> <p>CO 4: To be able to describe the operation of application layer using SMTP, TELNET, DNS, FTP etc.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPUTER NETWORKS

L	T	P	C
3	1	0	4

Unit – 1

(10 Periods)

Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model. **Physical Layer:** Guided transmission media, wireless transmission media. **Data Link Layer** - design issues, CRC codes, Elementary Data Link Layer Protocols, sliding window protocol

Unit – 2

(08 Periods)

Multi Access Protocols - ALOHA, CSMA, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT – 3

(12 Periods)

Network Layer: Network Layer Design issues, store and forward packet switching, connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Hierarchical Routing, Congestion control algorithms, admission control. **Internetworking:** Tunneling, Internetwork Routing, Packet fragmentation, IPv4, IPv6 Protocol, IP addresses, CIDR, ICMP, ARP, RARP, DHCP.

UNIT – 4

(10 Periods)

The Internet Transport Protocols : UDP, TCP, The TCP Service Model, The TCP Sliding Window, The TCP Congestion Control, **Application Layer**- Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

Text Books:

1. Behrouz A. Forouzan, “**Data Communications and Networking**”, McGraw Hill Publication
2. Andrew S Tanenbaum, “**Computer Networks**”, Pearson Education

Reference Books:

1. L. L. Peterson and B. S. Davie, “**Computer Networks**”, Elsevier.
2. James F. Kurose, K. W. Ross, “**Computer Networking: A Top-Down Approach Featuring the Internet**”, Pearson Education.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

OBJECT ORIENTED PROGRAMMING USING C++

Semester	Course Name	PO	PEO	CO
2ND	Object-Oriented Programming	PO-1, PO-3, PO-4, PO-7, PO-8	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: Familiar to map real world problems into the programming language using classes and objects.</p> <p>CO 2: To solve the problems in a systematic way using class and method paradigms.</p> <p>CO 3: Efficiently implement Inheritance, Polymorphism, Delegation, Exception handling and File handling techniques.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

OBJECT ORIENTED PROGRAMMING USING C++	L	T	P	C
	3	1	0	4

Unit – 1 **(10 Periods)**

Introduction to Object Oriented Programming : user defined types, polymorphism, and encapsulation. Getting started with C++ - syntax, data-type, variables, strings, functions, exceptions and statements, namespaces and exceptions operators. Flow control, functions, recursion. Arrays and pointers, structures.

Unit – 2 **(10 Periods)**

Abstraction Mechanisms: Classes, private, public, constructors, destructors, member functions, static members, references etc. class hierarchy, derived classes. **Inheritance**: simple inheritance, polymorphism, object slicing, base initialization, virtual functions.

UNIT – 3 **(10 Periods)**

Prototypes: linkages, operator overloading, ambiguity, friends, member operators, operator function, I/O operators etc. **Memory management**: new, delete, object copying, copy constructors, assignment operator, this Input/output. **Exception handling**: Exceptions and derived classes function exception declarations, unexpected exceptions, Exceptions when handling exceptions, resource capture and release etc.

UNIT – 4 **(10 Periods)**

Templates and Standard Template library: template classes declaration, template functions, namespaces, string, iterators, hashes, iostreams and other type. **Design using C++ design and development** : design and programming, role of classes.

Text Books:

1. Herbert Schildt, “**C++. The Complete Reference**”, Tata McGraw Hill Publications
2. E. Balaguruswamy, “**Object Oriented Programming with C++**”, Tata McGraw Hill Publications.
3. A.K.Kamthane, “**Object Oriented Programming with ANSI & Turbo C++.**”, Pearson Education.

Reference Books:

1. R. Venugopal, Rajkumar, and T. Ravishanker “**Mastering C++**”, Tata McGraw Hill Publications
2. Bjarne Stroustrup , “**The C++ Programming Language**”, Addison Welsley

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

QUANTITATIVE TECHNIQUES

L	T	P	C
3	1	0	4

Unit – 1 **(10 Periods)**

Operation Research: Behavioral versus quantitative decision making, role of models. Linear programming, Graphical and Simplex procedure, sensitivity analysis; Transportation and Assignment problems, Application of linear programming in business and other systems.

Unit – 2 **(10 Periods)**

Integer linear Programming: Branch and Bound Algorithm, Zero – one Implicit Enumeration Algorithm, Cutting Plane Algorithm. Introduction to queuing, Single and Multiple server models, finite population models, queuing costs and applications. **Theory of games:** optimal solution of Two – Person Zero sum games, solution of mixed strategy games. Minimal spanning tree Algorithm, shortest Route problem..

UNIT – 3 **(10 Periods)**

Probability: Classical, relative frequency and axiomatic definitions of probability, addition rule and conditional probability multiplication rule, total probability, Baye's Theorem, and independence.

Random Variables: Discrete, Continuous and mixed random variable, Probability mass, Probability density and Commutative distribution functions, Mathematical Expectations, moments, moment generating function, chebyshevi Inequality.

UNIT – 4 **(10 Periods)**

Special Distributions: Discrete uniform, Binomial, Geometric Poisson, Exponential, Normal distributions, Functions of a Random variable. **Joint Distributions:** Joint, marginal, and conditional distributions, Product moments, Correlation, independence of random variables, bivariate normal distribution.

Text Books:

1. Taha, "**Operation Research**", PHI Publications
2. John. E. Freund, "**Mathematical Statistics**", PHI Publications

Reference Books:

1. Trivedi, "**Probability Statistics**", PHI Publications

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
OPERATING SYSTEMS

Semester	Course Name	PO	PEO	CO
2 nd	Operating System	PO-1, PO-2, PO-3, PO-4, PO-6, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: Analyzing the working of an operating system and its components.</p> <p>CO 2: Defining and Analyzing the synchronization process.</p> <p>CO 3: Identifying the working methodology of multithreaded applications.</p> <p>CO 4: Determining the reasons of deadlocks, and their remedial measures in an operating system.</p> <p>CO 5: Learning the management of different type of memories in the computer system.</p> <p>CO 6: Comparing and analyzing different file systems being used in different operating systems.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

OPERATING SYSTEMS

L	T	P	C
3	1	0	4

Unit – 1 (10 Periods)

Introduction to Operating Systems: The need for OS, Types of OS, Goals of OS, Functions of OS, OS Architectures.

Unit – 2 (10 Periods)

Process Management: Introduction, Terminology, PCB, Context Switching, Schedulers, Process scheduling, Basics of Critical section and Semaphore, Scheduling algorithms, Deadlocks, Conditions for deadlocks, Deadlock prevention, deadlock avoidance, deadlock detection algorithms, deadlock recovery, Multithreading.

UNIT – 3 (10 Periods)

Memory Management: Introduction, Memory partitioning, Memory allocation strategies, Paging, swapping, segmentation, virtual memory, demand paging, page replacement algorithms.

UNIT – 4 (10 Periods)

File Management: Introduction, File structure, file naming and file types, file access, directory And implementation, file allocation methods, free space management. **I/O Management:** Introduction, types of devices, Types of I/O softwares. **Disk Management:** Introduction, Disk scheduling, disk scheduling algorithms.

Text Books:

1. Silberschatz and Galvin, “**Operating System Concepts**”, John Wiley Publishing
2. Naresh Chauhan, “**Principles of Operating Systems**”, Oxford India Publications

Reference Books:

1. Pabitra Pal Choudhury, “**Operating System Principles and Design**”, PHI Publication
2. Sibsankar Halder and Alex A. Aravind, “**Operating System**”, Pearson Education
3. William Stallings, “**Operating Systems Internals & Design Principles**”, Pearson Education

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DATA STRUCTURE LABORATORY

Semester	Course Name	PO	PEO	CO
2 nd	Data Structure	PO-1, PO-2, PO-3, PO-4, PO-5, PO-8, PO-9	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6, PEO-7	<p>CO1. Graduates will be able to design algorithms using stack, queue and principles of recursion.</p> <p>CO2. Graduates will be able to demonstrate the use of data structures like linked lists, stacks and queues.</p> <p>CO3. Graduates will be able to understand the implementation of linked data structures such as linked lists and binary trees, balanced search trees, hash tables, priority queues.</p> <p>CO4. Graduates will be able to explain the working of several sub-quadratic sorting algorithms including quick sort, merge sort and heap sort.</p> <p>.</p> <p>CO5. Graduates will be able to get knowledge of some graph algorithms such as shortest path and minimum spanning tree.</p> <p>CO6. Graduates will be able to get knowledge of hashing techniques and their applications in Computer Science.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DATA STRUCTURES LABORATORY

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS :

1. Write a Program in C to Perform Recursion in C : a) Factorial numbers , b) Fibonacci series
2. Write a Program in C to implement Stack Using Array
3. Write a Program in C to implement Queue Using Array
4. Write a Program in C to implement Conversion of Infix to Postfix
5. Write a Program in C to implement Single Linked list
6. Write a Program in C to implement Doubly Linked List
7. Write a Program in C to implement Stack Using Linked List
8. Write a Program in C to implement Queue Using Linked List
9. Write a Program in C to implement Binary Tree Traversal
10. Write a Program in C to implement Binary Search Tree
11. Write a Program in C to implement Bubble Sort
12. Write a Program in C to implement Selection Sort
13. Write a Program in C to implement Insertion Sort
14. Write a Program in C to implement Quick Sort
15. Write a Program in C to implement Merge Sort
16. Write a Program in C to implement Linear Search
17. Write a Program in C to implement Binary Search
18. Write a Program in C to implement Directed Graph
19. Write a Program in C to implement BFS.
20. Write a Program in C to implement DFS.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

OBJECT ORIENTED PROGRAMMING USING C++ LABORATORY

Semester	Course Name	PO	PEO	CO
2ND	Object-Oriented Programming	PO-1, PO-3, PO-4, PO-7, PO-8	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: Familiar to map real world problems into the programming language using classes and objects.</p> <p>CO 2: To solve the problems in a systematic way using class and method paradigms.</p> <p>CO 3: Efficiently implement Inheritance, Polymorphism, Delegation, Exception handling and File handling techniques.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

PROGRAMMING USING C++ LABORATORY

L T P C

0 0 3 2

LIST OF EXPERIMENTS :

1. Programs on concept of functions.
2. Programs on function overloading and handling ambiguities.
3. Programs on function calls (call by value, call by address and call by reference).
4. Programs on concept of classes and objects.
5. Programs on friend functions and friend classes.
6. Programs to perform operations using constructors and destructors.
7. Programs on different types of inheritance.
8. Programs on delegation.
9. Programs on static and dynamic polymorphism, use of virtual functions.
10. Programs to perform operator overloading using friend functions and member functions.
11. Programs to perform dynamic memory management, use of new and delete operators.
12. Programs on namespaces.
13. Programs on generic programming using template functions and template classes.
14. Programs on exception handling.
15. Programs on file handling.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
OPERATING SYSTEMS LABORATORY

Semester	Course Name	PO	PEO	CO
2 nd	Operating System	PO-1, PO-2, PO-3, PO-4, PO-6, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: Analyzing the working of an operating system and its components.</p> <p>CO 2: Defining and Analyzing the synchronization process.</p> <p>CO 3: Identifying the working methodology of multithreaded applications.</p> <p>CO 4: Determining the reasons of deadlocks, and their remedial measures in an operating system.</p> <p>CO 5: Learning the management of different type of memories in the computer system.</p> <p>CO 6: Comparing and analyzing different file systems being used in different operating systems.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

OPERATING SYSTEM LABORATORY

L T P C

0 0 3 2

LIST OF EXPERIMENTS :

1. Simulate the FCFS CPU Scheduling Algorithm.
2. Simulate the SJF CPU Scheduling Algorithm.
3. Simulate the Round Robin CPU Scheduling Algorithm.
4. Simulate the Priority CPU Scheduling Algorithm.
5. Simulate the file allocation strategy using Sequential file allocation methods
6. Simulate the file allocation strategy using Indexed file allocation methods
7. Simulate the file allocation strategy using Linked file allocation methods
8. Simulate Multiple Programming with fixed Number of Tasks (MFT)
9. Simulate Multiple Programming with Variable Number of Tasks (MVT)
10. Simulate Banker's Algorithm for Deadlock Avoidance
11. Simulate Algorithm for Deadlock Prevention
12. Simulate FIFO page replacement algorithm
13. Simulate LRU page replacement algorithm
14. Simulate LFU page replacement algorithm
15. Simulate Paging Technique of memory management

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
COMPUTER NETWORKS LABORATORY

Semester	Course Name	PO	PEO	CO
2 nd	Computer Networks	PO-1, PO-2, PO-3, PO-4, PO-6, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: To be able to describe communication protocols and layered network architectures and to explain Conventional computer system interfacing standards and peer to peer data link communication protocols.</p> <p>CO 2: To be able to design basic network systems using routing methods and analyze data communication technology.</p> <p>CO 3: To be able to describe the operation of a packet based sliding window protocol, Encryption and Decryption methods.</p> <p>CO 4: To be able to describe the operation of application layer using SMTP, TELNET, DNS, FTP etc.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPUTER NETWORK LABORATORY

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS :

1. Implement the Data link layer framing methods such as Bit Stuffing
2. Implement the Data link layer framing methods such as Character Stuffing
3. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
4. Implement Dijkstra's algorithm to compute the Shortest path through a given graph.
5. Obtain Routing table at each node using distance vector routing algorithm for a given subnet.
6. Implement Broadcast tree for a given subnet of hosts.
7. Implement the DES algorithm to encrypt 64 bit Plain Text.
8. Implement the DES algorithm to decrypt 64 bit Plain Text.
9. Implement the RSA algorithm for Encryption and Decryption.
- 10 Write a C program to determine if the IP address is in Class A, B, C, D, or E.
11. Write a C program to translate dotted decimal IP address into 32 bit address.
12. Write a C program to generate Hamming code.
13. Implement the following forms of IPC a) Pipes b) FIFO
14. Implement TCP Client and Server application to transfer file
15. Implement UDP Client and Server application to transfer file

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DATABASE MANAGEMENT SYSTEMS

Semester	Course Name	PO	PEO	CO
3 rd	Database Management Systems	PO-1, PO-2, PO-3, PO-4, PO-5, PO-6, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: Able to handle with different Data Base languages and various data models for Data Base.</p> <p>CO 2: Able to write queries mathematically and design data base and normalize data.</p> <p>CO 3: Understand how query are being processed and executed.</p> <p>CO 4: Deal with online transactions and control Concurrency.</p> <p>CO 5: Understand types of Data Base failures and Recovery.</p> <p>CO 6: Acquire knowledge about advanced topics and can research on that.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DATABASE MANAGEMENT SYSTEMS	L	T	P	C
	3	1	0	4

Unit – 1 (10 Periods)

Introduction to DBMS: concept and overview of DBMS, data models, DB languages, DB users and Administrator, 3-schema architecture of DBMS, data independence. **ER Model:** basic concepts, design issues, keys, ER diagram, Weak entity sets, Extended ER features. **Relational model:** structure of relational model, Relational algebra, Extended relational algebra Operations.

Unit – 2 (10 Periods)

Relational database design: FDs, Anamolies in designing DB, Normalization using FDs, various Normal forms- 1NF, 2NF, 3NF, BCNF, 4NF, 5NF.

UNIT – 3 (10 Periods)

SQL and Integrity Constraints: Concepts of DDL, DML, DCL, various SQL operations: set operations, aggregate functions, constraints, view, nested sub queries, PL/SQL, cursor, trigger.

UNIT – 4 (10 Periods)

Internals of RDBMS: Query optimization, various optimization algorithms, Transaction processing, concurrency control and recovery management. **Advanced Database:** OODB, WEB based DB, Data warehousing and Data mining.

Text Books:

- 1) Er. Rajiv chopra, “**Database management systems, A Practical Approach**”, S.Chand Publishing
- 2) Ramkrishna, “**Database management systems**”, Tata McGraw Hill Publication

Reference Books:

- 1) Korth, Silverschatz, Abraham, “**Database system concepts**”, Tata McGraw Hill Publication
- 2) R. Elmasri, S.B Navathe, “**Fundamentals of Database System**”, Adesion Wesley Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

SOFTWARE ENGINEERING

Semester	Course Name	PO	PEO	CO
3 rd	Software Engineering and OOAD	PO-1, PO-2, PO-3, PO-4, PO-5, PO-6, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: To be able to understand the concepts of software and engineering discipline in software development, different models of software development and apply knowledge of mathematics, science, and engineering.</p> <p>CO 2: To be able to identify, formulate, and solve engineering problems, project planning and understanding characteristics of good software design.</p> <p>CO 3: To be able to understand the software quality models and use the techniques, skills, and modern engineering tools necessary for engineering practice.</p> <p>CO 4: analyze, design, verify, validate, implement, apply, and maintain software systems and the ability to work in one or more significant application domains.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

SOFTWARE ENGINEERING

L	T	P	C
3	1	0	4

Unit – 1

(10 Periods)

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models. **Software Requirements analysis & specifications:** Requirement engineering, requirement elicitation techniques like FAST, QFD & Use case approach, Requirements analysis using DFD, Data dictionaries, Requirements documentation, Nature of SRS, Characteristics & organization of SRS

Unit – 2

(10 Periods)

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Putnam resource allocation model, Validating Software Estimates, Risk Management. **Software Design:** Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design.

UNIT – 3

(10 Periods)

Software Metrics & Measurements: What & Why, Token Count, Halstead Software Science Measures, Data Structure Metrics, Information Flow Metrics. **Software Reliability:** Importance, Hardware Reliability & Software Reliability, Failure and Faults, Reliability Models- Basic Model, Logarithmic Poisson Model, Software Quality Models, CMM & ISO 9001.

UNIT – 4

(10 Periods)

Software Testing: Testing process, Design of test cases, Introduction to functional testing & Structural testing, Unit Testing, Integration and System Testing, Debugging, Alpha & Beta Testing. **Software Maintenance:** Management of Maintenance, Maintenance Process, Maintenance Models, Regression Testing, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

Text Books:

1. K. K. Aggarwal and Yogesh Singh, “**Software Engineering**”, New Age International Publishing
2. R. S. Pressman, “**Software Engineering – A Practitioner’s Approach**”, McGraw Hill Int. Publication
3. Pankaj Jalote, “**An Integrated Approach to Software Engineering**”, Narosa Publication

Reference Books:

1. Stephen R. Schach, “**Classical & Object Oriented Software Engineering**”, IRWIN Publication
2. James Peter, W. Pedrycz, “**Software Engineering: An Engineering Approach**”, John Wiley & Sons.
3. Sommerville, “**Software Engineering**”, Addison Wesley Publishing
4. Rajib Mall, “**Fundamental of Software Engineering**”, PHI Publication

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPUTER GRAPHICS AND MULTIMEDIA

Semester	Course Name	PO	PEO	CO
3rd	Computer Graphics and Multimedia	PO-1, PO-2, PO-3, PO-4, PO-6, PO-8	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO1:- Students will get the Practical concepts of Graphics display devices, different types of graphics drawing algorithms.</p> <p>CO2:- Students will get the concepts how to use of 2D and 3D Geometrical Transformations</p> <p>CO3:- Students will get the concepts of Viewing, Curves and surfaces</p> <p>CO4:- Students will get the practical concepts of Hidden Line/surface elimination techniques</p> <p>CO5:- Students will get the concepts of some Scan Conversion algorithms</p> <p>CO6:- Students will get the concepts of Illumination and Shading Models</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPUTER GRAPHICS AND MULTIMEDIA

L	T	P	C
3	1	0	4

Unit – 1

(10 Periods)

Introduction to Computer Graphics & Graphics Systems : Overview of computer graphics, representing pictures, preparing, presenting & interacting with pictures for presentations; Visualization & image processing; RGB color model, direct coding, lookup table; storage tube graphics display, Raster scan display, 3D viewing devices, Plotters, printers, digitizers, Light pens etc.; Active & Passive graphics devices; Computer graphics software. **Scan conversion**: Points & lines, Line drawing algorithms; DDA algorithm, Bresenham's line algorithm, Circle generation algorithm; scan conversion of a character, polygon filling algorithm, flood fill algorithm.

Unit – 2

(10 Periods)

2D Transformation & Viewing : Basic transformations: translation , rotation, scaling ; Matrix representations & homogeneous coordinates, transformations between coordinate systems; reflection shear; Transformation of points, lines , parallel lines, intersecting lines. Viewing pipeline, Window to viewport co-ordinate transformation , clipping operations - line clipping, clipping polygons

3D Transformation & Viewing : 3D transformations: translation, rotation, scaling & other transformations. Rotation about an arbitrary axis in space, reflection through an arbitrary plane; general parallel projection transformation; clipping, viewport clipping, 3D viewing..

UNIT – 3

(10 Periods)

Curves : Curve representation, surfaces , designs , Bezier curves , B-spline curves, end conditions for periodic B-spline curves, rational B-spline curves. **Hidden surfaces** : Depth comparison, Z-buffer algorithm, Back face detection, scan-line algorithm; Hidden line elimination, wire frame methods

UNIT – 4

(10 Periods)

Multimedia : Introduction to Multimedia: Concepts, uses of multimedia, hypertext and hypermedia.; Image, video and audio standards. Audio: digital audio, MIDI, processing sound, sampling, compression. Video: MPEG compression standards, compression through spatial and temporal redundancy, inter-frame and intraframe compression . Animation: types, techniques, key frame animation, utility, morphing.

Text Books:

1. Hearn, Baker, “ **Computer Graphics (C version)**”, Pearson education
2. Z. Xiang, R. Plastock, “ **Schaum's outlines Computer Graphics**”, Tata McGraw Hill Publication
3. D. F. Rogers, J. A. Adams, “ **Mathematical Elements for Computer Graphics**” – Tata McGraw Hill Publication
4. Mukherjee, “**Fundamentals of Computer Graphics & Multimedia**”, PHI

Reference Books:

1. Andleigh & Thakrar, “**Multimedia**”, PHI Publication
2. Mukherjee Arup, “**Introduction to Computer Graphics**”, Vikas Publication

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

PROFESSIONAL COMMUNICATION IN ENGLISH	L	T	P	C
	3	1	0	4

Unit – 1 **(08 Periods)**

Communication Process : Elements, Objectives, Principles, Barriers in communication, Communication in Organization. Note-taking from lectures and written materials: Listening - Introduction, Advantages and Importance, How to become a good listener, Barriers in effective listening.

Unit – 2 **(12 Periods)**

Written Presentation of Technical material : Preparation of Bibliography with special reference to technical reports, its structure and layout; Planning and Preparation; Use of Illustrations; Writing the Report, Formal and Informal Reports, Elements of letter writing and style of writing. Basics of Official Correspondence: Handling Correspondence, Receipt and Dispatch of Mails, Filing system, Classification of Mails; Quotation, Orders, Tenders, Sales Letters; Letter Writing - Principles, Structure and Lay out, Planning, Preparation of Resume, Advertising and Jobs Description.

UNIT – 3 **(10 Periods)**

Precis Writing: Steps of Precis Writing, DOS and Don'ts of Precis Writing. Principle Planning, Preparation for Presentation; Meetings, Conferences, Interviews. Audio-Visual Communications, Telephonic Conversations

UNIT – 4 **(10 Periods)**

Seminars: Preparation, Presentation and Practice; Principles of Effective Oral Communication, Speech Preparation, Pronunciation, Voice Control, Physical Behaviour, Techniques of Effective Speech and Interpersonal Communication. **Group Discussion**: Definition, Process, Characteristics and Formation of Groups, Do's and Don'ts, Helpful Expression and Evaluation.

Text Books:

1. Ludlow.R and Panton.F , “**Essentials of Effective Communication**”, Prentice Hall, India Pvt. Ltd
2. RC Sharma and Krishna Mohan, “**Business Correspondence and Report Writing**”, Prentice Hall, India.

Reference Books:

1. Rajendra Pal and JS Kurlahalli , “**Essentials of Business Communication**”, S.Chand Publishing
2. Krishna Mohan and Meera Banerjee, “**Developing Communication Skills**”, McMillan India Ltd.
3. Asha Kaul, “**Business Communication**”, Prentice Hall India Pvt Ltd
4. Alok Jain, P.S. Bhatia and A.M. Shiekh, “**Professional Communication Skills**”, S.Chand Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

THEORY OF COMPUTATION

Semester	Course Name	PO	PEO	CO
3 rd	Theory of Computation	PO-1, PO-2, PO-3, PO-5, PO-7, PO-9	PEO-1, PEO-3, PEO-4, PEO-5	<p>CO1. Understand the overview of the theoretical foundation of computer science from the perspective of formal languages.</p> <p>CO2. To classify machines by their power to recognize languages</p> <p>CO3. Employ finite state machines to solve problems in computing.</p> <p>CO4. Explain deterministic and nondeterministic machines</p> <p>CO5. Comprehend the hierarchy of problems arising in the computer sciences.</p> <p>CO6. Students will be able to excel himself/herself as a design engineer in any industries/R&D sector, pursue his research on the design field or face any competitive examinations in engineering.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

THEORY OF COMPUTATION	L	T	P	C
	3	1	0	4

Unit – 1 **(12 Periods)**

Automata and Language Theory: Overview of Theoretical Computer Science (including computationally intractable problems) , Introduction to System software including various phases / Modules in the design of a typical compiler , Chomsky Classification, Finite Automata, Deterministic Finite Automata (DFA), Non-Deterministic Finite Automata (NFA),statement of Kleen's Theorem, Regular Expressions, Equivalence of DFAs, NFAs and Regular Expressions, Closure properties of Regular Language, Non-Regular Languages, Pumping Lemma, Use of Regular expressions in the Design of scanner (lexical analyzer).

Unit – 2 **(12 Periods)**

Context Free Languages: Context Free Grammar (CFG), Parse Trees, Push Down Automata (deterministic and nondeterministic) (PDA), Equivalence of CFGs and PDAs, Closure properties of CFLs, Pumping Lemma.

UNIT – 3 **(10 Periods)**

Turing Machines and Computability Theory: Definition of Turing Machine, Extensions of Turing machines, Non – deterministic Turing machines, Equivalence of various Turing Machine Formalisms, Church – Turing Thesis, Decidability, Halting Problem, Reducibility, Recursion Theorem.

UNIT – 4 **(10 Periods)**

Complexity Theory: Time and Space measures, Hierarchy theorems, Complexity classes P, NP, space complexity , Savich theorem , L, NL, PSPACE complexity , Post correspondence problem, Probabilistic computation

Text Books:

1. M. Sipser, “**Introduction to the Theory of Computation**”, Cengage Publication
2. J. Hopcroft, R. Motwani, and J. Ullman, “**Introduction to Automata Theory, Language and Computation**”, Pearson Publication

Reference Books:

1. K. L. Mishra and N. Chandrasekharan, “**Theory of Computer Science Automata Language Computation**”, PHI Publication
2. Peter Linz, “**Introduction to Formal Languages and Automata**”, Narosa Publication.
3. Behera H.S,Nayak.J, Pattanayak,H.,” **Formal Languages and Automata Theory**” Vikas Publication.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DATABASE MANAGEMENT SYSTEMS LABORATORY

Semester	Course Name	PO	PEO	CO
3 rd	Database Management Systems	PO-1, PO-2, PO-3, PO-4, PO-5, PO-6, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: Acquire knowledge in fundamentals of Data Base Management System and be able to analyze the difference between traditional file system and DBMS.</p> <p>CO 2: Able to handle with different Data Base languages and various data models for Data Base.</p> <p>CO 3: Able to write queries mathematically and design data base and normalize data.</p> <p>CO 4: Understand how query are being processed and executed.</p> <p>CO 5: Deal with online transactions and control Concurrency.</p> <p>CO 6: Understand types of Data Base failures and Recovery.</p> <p>CO 7: Acquire knowledge about advanced topics and can research on that.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DBMS LABORATORY

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS :

1. Execute a single line and group functions for a table.
2. Execute DCL and TCL Commands.
3. Create and manipulate various DB objects for a table.
4. Create views, partitions and locks for a particular DB
5. Write PL/SQL procedure for an application using exception handling
6. Write PL/SQL procedure for an application using cursors.
7. Write a DBMS program to prepare reports for an application using functions.
8. Write a PL/SQL block for transaction operations of a typical application using triggers.
9. Write a PL/SQL block for transaction operations of a typical application using package.
10. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).
11. Create table for various relation.
12. Implement the query in sql for a) insertion b) retrieval c) updating d) deletion.
13. Creating Views
14. Writing Assertion
15. Writing Triggers
16. Implementing operation on relation using PL/SQL
17. Creating Forms
18. Generating Reports

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPUTER GRAPHICS AND MULTIMEDIA

Semester	Course Name	PO	PEO	CO
3rd	Computer Graphics and Multimedia	PO-1, PO-2, PO-3, PO-4, PO-6, PO-8	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO1:- Students will get the concepts of Graphics display devices, different types of graphics drawing algorithms.</p> <p>CO2:- Students will get the concepts of 2D and 3D Geometrical Transformations</p> <p>CO3:- Students will get the concepts of Viewing, Curves and surfaces</p> <p>CO4:- Students will get the concepts of Hidden Line/surface elimination techniques</p> <p>CO5:- Students will get the concepts of some Scan Conversion algorithms</p> <p>CO6:- Students will get the concepts of Illumination and Shading Models</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPUTER GRAPHICS LABORATORY	L	T	P	C
	0	0	3	2

LIST OF EXPERIMENTS :

1. Write a Program to draw a Line using DDA Line Drawing Algorithm.
2. Write a Program to draw a Line using Bresenham's Line Drawing Algorithm.
3. Write a Program to draw a Circle using Bresenham's Circle Drawing Algorithm.
4. Write a Program to draw a Circle using Mid-Point Circle Drawing Algorithm.
5. Write a Program to rotate a Triangle about the Origin.
6. Write a Program to Scale a Triangle to desired Size.
7. Write a Program to translate a Triangle to desired Coordinate.
8. Write a Program to rotate a Point about an arbitrary Point.
9. Write a Program to rotate a Point about an Point (0,0).
10. Write a Program to reflect a Triangle in a desired axis or Coordinate System.
11. Write a Program to Clip a Line.
12. Write a Program to implement Sutherland – Hodgeman Polygon clipping Algorithm.
13. Write a Program to do 3D transformations - Translation, Rotation, Scaling.
14. Write a Program to do composite 3D transformations - Translation, Rotation, Scaling.
15. Write a Program to demonstrate Polygon Filling.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMMUNICATIVE ENGLISH LABORATORY

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS :

1. (a) Some people touch their elder's feet and how their heads. What do they communicate ?
 (b) What do the colours, red, amber and green suggest in the traffic signal ?
 (c) Make a list of similar non-verbal communication.
2. **What language functions do the following have ?**
 (a) India is a large country (b) If you can't do it, go to hell (c) Thanks very much
 Give some more examples of descriptive, expressive and social functions of language.
3. **Do you find the following acceptable ?**
 i) Amrita Pritam is a fine poetess ii) Smita Patil was a fine actor iii) Has every body brought his book ?
 iv) His only daughter is mentally retarded
 These are examples of biased language. Give some more similar examples.
4. **Identify the time and tense in the following sentences.**
 i) Then president is arriving tomorrow. It shows that there is no one for one correspondence between time and tense.
 a) **Give sentences with the following tense and time.**
 i) Present Tense expressing future time ii) Past Tense expressing future time iii) Present Tense expressing past time
 b) **Do you find the following grammatical ?**
 i) Are you understanding what you say ? ii) I am living in Burla since two years
 c) **Make a list of verbs which do not take the progressive form.**
5. How do the vowels contrast in the following pairs of words :
 a) i) feel, fill (ii) pull, pool (iii) cart, cat (iv) cot, caught, : Practice pronunciation of these words
Say the pairs of words : i) bag, beg (ii) foot, food (iii) sit, seat (iv) same, shame (v) judge, jazz (vi) major, measure
Say the following words as noun and verb : Progress, object, record, supplement
Say the following words with correct stress : Teacher, college, village, building, ago, above, apart, accuse, advice, education, engineer
6. **Develop the idea in the following sentences into a paragraph:** Cricket now is the opium of masses.
7. As the person in-charge of customer care department of a Cable Service, write a letter of reply to a customer who has complained about poor service.
8. As the Secretary of a society propose a vote of thanks at the end of a meeting
9. Draft a resolution urging the Govt. to enforce the ban on smoking in public places your job-did you quarrel with your employer-did you leave it in a huff) How would you handle the question?

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMMUNICATIVE ENGLISH LABORATORY

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS :

10. As the leader of a Group discussing team sum up the main points of a discussion on the following topics : i)
People above the age of sixty should not be allowed in politics
ii) Imagine that in a job interview you are asked an uncomfortable question about a short break in your professional career
(were you thrown out of your job-did you quarrel with your employer-did you leave it in a huff)
iii) The teacher will regularly conduct interviews and group discussions. How would you handle the question ?
11. Write the recommendation part of a report on creating more jobs for engineers
12. Make a brief presentation on the benefits of two insurance policies that your company has introduced.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

SEMINAR

L	T	P	C
0	0	3	2

The students are expected to give at least One presentation on their topics of interest / latest technological advancements, along with submission of Seminar Report duly recommended by the Seminar Guide, which will be assessed during presentation, by the Departmental committee constituted for this purpose. This course is mandatory and a student has to pass the course to become eligible for the award of degree. Marks will be awarded out of 100 and appropriate grades assigned as per performance and the existing regulations.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

PROGRAMMING WITH JAVA

Semester	Course Name	PO	PEO	CO
4 th	Programming with JAVA	PO-1, PO-2, PO-3, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: Understand the use of core Java concept.</p> <p>CO 2: Understand the concept of control flow, exception and perform different operation on arrays and file.</p> <p>CO 3: Understand the framework to construct classes, objects as per the need of problem definition.</p> <p>CO 4: Understand and implement the concept of inheritance and overriding functions.</p> <p>CO 5: Understand and develop programs using interface and package.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

PROGRAMMING WITH JAVA

L	T	P	C
3	1	0	4

Unit – 1 :

(10 Periods)

Introduction : C++ Vs JAVA, JAVA and Internet and WWW, JAVA support systems, JAVA environment. JAVA program structure, Tokens, Statements, JAVA virtual machine, Constant & Variables, Data Types, Declaration of Variables, Scope of Variables, Symbolic Constants, Type Casting. Operators : Arithmetic, Relational, Logical Assignments, Increment and Decrement, Conditional, Bitwise, Special, Expressions & its evaluation. If statement, if...else... statement, Nesting of if...else... statements, else...if Ladder, Switch, ? operators, Loops – While, Do, For, Jumps in Loops, Labelled Loops.

Unit – 2 :

(10 Periods)

Classes & Methods : Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods. Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract methods and Classes, Visibility Control.

UNIT – 3 :

(10 Periods)

Arrays & Threads : Arrays: One Dimensional & two Dimensional, strings, Vectors, wrapper Classes, Defining Interface, Extending Interface, Implementing Interface, Accessing Interface Variable, System Packages, Using System Package, Adding a Class to a Package, Hiding Classes. Creating Threads, Extending the Threads Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface.

UNIT – 4

(10 Periods)

Local and Remote Applets Vs Applications : Writing Applets, Applets Life Cycle, Creating an Executable Applet Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing Parameters to Applets, Aligning the Display, HTML Tags & Applets, Getting Input from the User.

Text Books:

1. E. Balaguruswamy, “**Programming In Java**”, TMH Publications

Reference Books:

2. Peter Norton, “**Peter Norton Guide To Java Programming**”, Techmedia Publications

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPILER DESIGN

Semester	Course Name	PO	PEO	CO
4 th	Compiler Design	PO-1, PO-3, PO-5, PO-7, PO-9	PEO-1, PEO-3, PEO-4, PEO-5	<p>CO1. Acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer, and also able to use the Compiler tools like LEX, YACC, etc.</p> <p>CO2. Parser and its types i.e. Top down and Bottom up parsers.</p> <p>CO3. Construction of LL, SLR, CLR and LALR parse table.</p> <p>CO4. Syntax directed translation, synthesized and inherited attributes.</p> <p>CO5. To understand the Techniques for code optimization, symbol table organization.</p> <p>CO7. To understand the Process of Code generation, its limitations and Run time environment.</p> <p>CO8. Students will be able to design different types of compiler tools to meet the requirements of the realistic constraints of compilers.</p> <p>CO9. Students will be able to excel himself/herself as a design engineer in any industries/R&D sector, pursue his research on the design field or face any competitive examinations in engineering.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPILER DESIGN

L	T	P	C
3	1	0	4

Unit – 1 :

(10 Periods)

Compiler Structure: Analysis-synthesis model of compilation, various phases of a compiler, tool based approach to compiler construction. Lexical analysis: Interface with input parser and symbol table, token, lexeme and patterns, difficulties in lexical analysis, error reporting and implementation. Regular grammar & language definition, Transition diagrams, design of a typical scanner using LEX or Flex.

Unit – 2 :

(10 Periods)

Syntax Analysis: Context free grammars, ambiguity, associability, precedence, top down parsing, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing LL(1) grammar, Nor LL(1) grammar, Bottom up parsing, operator precedence grammars, LR parsers (SLR, LALR, LR), Design of a typical parser using YACC

UNIT – 3 :

(10 Periods)

Syntax directed definitions: Inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions. Type checking: type: type system, type expressions, structural and name equivalence of types, type conversion, overloaded function and operators, polymorphic function. Run time system: storage organization, activation tree, activation record, parameter passing symbol table, dynamic storage allocation. Intermediate code generation: intermediate representation, translation of declarations, assignments, Intermediate Code generation for control flow, Boolean expressions and procedure calls, implementation issues.

UNIT – 4

(10 Periods)

Code generation and instruction selection: Issues, basic blocks and flow graphs, register allocation, code generation, DAG representation of programs, code generation from DAGS, peep hole optimization, code generator generators, specification of machine. Code optimization: source of optimizations, optimization of basic blocks, loops, global dataflow analysis, solution to iterative dataflow equations, code improving transformations, dealing with aliases, data flow analysis of structured flow graphs.

Text Books:

1. K. C. Loudon, “**Compiler Construction, Principle and Practice**”, Cengage Publication
2. Alfred V. Aho, Ravi Sethi, and Ullman, “**Compilers Principles, Techniques and Tools**”, Pearson Publication

Reference Books:

1. V.Raghvan, “**Principles of Compiler Design**”, TMH Publication
2. Levine, Mason and Brown, “**Lex & Yacc**”, O’ Reilly Publication

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

ANALYSIS AND DESIGN OF ALGORITHMS

Semester	Course Name	PO	PEO	CO
4TH	Analysis and Design of Algorithms	PO-1, PO-2, PO-6, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO 1: To be able to analyse the correctness and the running time of the basic algorithms for those classic problems in various domains and to be able to apply the algorithms and design techniques to advanced data structures.</p> <p>CO 2: To be able to analyse the complexities of various problems in different domains and be able to demonstrate how the algorithms are used in different problem domains.</p> <p>CO 3: To be able to design efficient algorithms using standard algorithm design techniques and demonstrate a number of standard algorithms for problems in fundamental areas in Computer Science and Engineering such as sorting, searching and problems involving graphs.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

ANALYSIS AND DESIGN OF ALGORITHMS

L	T	P	C
3	1	0	4

Unit – 1 :

(10 Periods)

Notion of Algorithm : Growth of functions, Summations, Recurrences: The substitution method, The iteration method, Asymptotic Notations and Basic Efficiency Classes (Use of Big O , θ , etc.) in analysis .Mathematical Analysis of few Non-recursive and Recursive Algorithms , Proof of Correctness..

Unit – 2 :

(10 Periods)

Sorting and Searching Techniques : Selection Sort , Bubble Sort , Insertion Sort , Sequential Search Binary Search , Depth first Search and Breadth First Search. , Balanced Search trees , AVL Trees , Red-Black trees , Heaps and Heap sort , Hash Tables, disjoint set and their implementation , Divide and conquer Paradigm of Problem solving , complexity analysis and understanding of Merge sort , Quick Sort , Binary Search Trees, Sorting in linear time, Medians and Order statistics.

UNIT – 3 :

(10 Periods)

Greedy Techniques : Prim's Algorithm, Kruskal's Algorithm , Dijkstra's and Bellman Ford Algorithm , Huffman trees. Knapsack Problem , **Dynamic Programming paradigm** : Floyd's Algorithm, Warshall 's Algorithm, Optimal Binary Search trees , Matrix multiplication Problem , 0/1 Knapsack Problem , maximum network flow problem , **Naive String Matching algorithm** : string matching with finite automata Knuth Morris Pratt algorithm , The Rabin-Karp Algorithm.

UNIT – 4

(10 Periods)

Backtracking : n-Queen's Problem, Hamiltonian Circuit problem, Subset-Sum problem, Branch and bound, Assignment problem, travelling salesman problem . **Introduction to Computability**: Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP-Complete problems, Proof of cook's theorem.

Text Books:

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, “**Introduction to Algorithms**”, PHI Publication

Reference Books:

1. A.V. Aho, J. E. Hopcroft and J.D.Ullman, “**The Design and Analysis of Computer Algorithms**”, Pearson Education,
2. R. S. Salaria, Khanna, “**Data Structure & Algorithms**”, Khanna Book Publishing Co. (P) Ltd.,

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

PROGRAMMING WITH JAVA LABORATORY

Semester	Course Name	PO	PEO	CO
4 th	Programming with JAVA	PO-1, PO-2, PO-3, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: Understand the use of core Java concept.</p> <p>CO 2: Understand the concept of control flow, exception and perform different operation on arrays and file.</p> <p>CO 3: Understand the framework to construct classes, objects as per the need of problem definition.</p> <p>CO 4: Understand and implement the concept of inheritance and overriding functions.</p> <p>CO 5: Understand and develop programs using interface and package.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

JAVA PROGRAMMING LABORATORY

L T P C
0 0 3 2

LIST OF EXPERIMENTS:

1. Write a Java Program to define a class, describe its constructor, overload the Constructors and instantiate its object.
2. Write a Java Program to define a class, define instance methods for setting and Retrieving values of instance variables and instantiate its object.
3. Write a Java Program to define a class, define instance methods and overload them and use them for dynamic method invocation.
4. Write a Java Program to demonstrate use of sub class.
5. Write a Java Program to demonstrate use of nested class.
6. Write a Java Program to implement array of objects.
7. Write a Java program to practice using String class and its methods.
8. Write a Java program to practice using String Buffer class and its methods.
9. Write a Java Program to implement Vector class and its methods.
10. Write a Java Program to implement Wrapper classes and their methods.
11. Write a Java Program to implement inheritance and demonstrate use of method overriding.
12. Write a Java Program to implement multilevel inheritance by applying various access controls to its data members and methods.
13. Write a program to demonstrate use of implementing interfaces.
14. Write a program to demonstrate use of extending interfaces.
15. Write a Java program to implement the concept of importing classes from user defined package and creating packages.
16. Write a program to implement the concept of threading by extending Thread Class.
17. Write a program to implement the concept of threading by implementing Runnable Interface.
18. Write a program to implement the concept of Exception Handling using predefined exception.
19. Write a program to implement the concept of Exception Handling by creating user defined exceptions.
20. Write a program using Applet to display a message in the Applet.
21. Write a program using Applet For configuring Applets by passing parameters.
22. Write a Java Program to demonstrate Keyboard event.
23. Write a Java Program to demonstrate Mouse events.
24. Write programs for using Graphics class
 - to display basic shapes and fill them
 - draw different items using basic shapes
 - set background and foreground colors.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPILER DESIGN LABORATORY

Semester	Course Name	PO	PEO	CO
4 th	Compiler Design	PO-1, PO-3, PO-5, PO-7, PO-9	PEO-1, PEO-3, PEO-4, PEO-5	<p>CO1. Acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer, and also able to use the Compiler tools like LEX, YACC, etc.</p> <p>CO2. Parser and its types i.e. Top down and Bottom up parsers.</p> <p>CO3. Construction of LL, SLR, CLR and LALR parse table.</p> <p>CO4. Syntax directed translation, synthesized and inherited attributes.</p> <p>CO5. To understand the Techniques for code optimization, symbol table organization.</p> <p>CO7. To understand the Process of Code generation, its limitations and Run time environment.</p> <p>CO8. Students will be able to design different types of compiler tools to meet the requirements of the realistic constraints of compilers.</p> <p>CO9. Students will be able to excel himself/herself as a design engineer in any industries/R&D sector, pursue his research on the design field or face any competitive examinations in engineering.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPILER DESIGN LABORATORY

L T P C

0 0 3 2

LIST OF EXPERIMENTS:

1. Write a program to do following on a statement (i/p).
 - Count no. of characters.
 - Count no. of words.
 - Count no. of lines.
2. Write a program to do following on a statement (i/p).
 - Count frequency of a particular alphabet.
 - Count frequency of a particular operator.
 - Count frequency of a particular white space.
3. Write a program to do following on a statement (i/p).
 - Count no. of identifiers.
 - Count no. of keywords.
 - Count no. of operators.
 - Count no. of symbols.
4. Write a program on lex specification. Simplest lex specification file. No patterns and no actions. So all string match the default action, i.e. printing on screen, after you are done press ^d to exit.
5. Simplest lex specification file with used code and the yylex function; but without any pattern specified. yylex is automatically inserted if not provided. yylex function starts the lexical analysis.
6. Providing ending character instead of ^d. after entering the text, insert the provided end mark to end your file and start with analysis.
7. Parsing a file through unix redirection.
8. Taking a file command line using yyin file pointer.
9. Write a lex specification file to change all characters in the input to stars '*'.
10. Write a lex specification file to show a file in double spacing.
11. Write a lex specification file to remove every line starting with 'a' from input file.
12. Write a lex specification file to read and add line numbers to it.
13. Write a lex specification file to enclose every line in parenthesis.
14. Write a lex specification file to enclose every word in parenthesis.
15. Write a lex specification file to put last word of the file inside the parenthesis.
16. Write a lex specification file to replace spaces of 1 to 4 spaces in a file with a ~ symbol and space of 5 to 8 with @ symbol.
17. Write a lex specification file to replace characters between a to k with * symbol and numbers between 3 to 6 with ~ symbol.
18. Write a lex specification file to find a multiple pattern of abc in a text file and replace with a ~.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

ANALYSIS AND DESIGN OF ALGORITHMS LABORATORY

Semester	Course Name	PO	PEO	CO
4TH	Analysis and Design of Algorithms	PO-1, PO-2, PO-6, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO 1: To be able to analyse the correctness and the running time of the basic algorithms for those classic problems in various domains and to be able to apply the algorithms and design techniques to advanced data structures.</p> <p>CO 2: To be able to analyse the complexities of various problems in different domains and be able to demonstrate how the algorithms are used in different problem domains.</p> <p>CO 3: To be able to design efficient algorithms using standard algorithm design techniques and demonstrate a number of standard algorithms for problems in fundamental areas in Computer Science and Engineering such as sorting, searching and problems involving graphs.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

ALGORITHM DESIGN LABORATORY

L T P C

0 0 3 2

LIST OF EXPERIMENTS:

1. Implementation of Stack, Queue and Linked list – Operations and Applications.
2. Implementation of different searching algorithms.
3. Implementation of different sorting algorithms.
4. Problem solving using Divide and Conquer technique.
5. Problem solving using Dynamic Programming technique.
6. Problem solving using Greedy technique.
7. Problem solving using Backtracking technique.
8. Problem solving using disjoint-set data structure operations.
9. Problem solving using branch and bound technique.
10. Problem solving for the maximum flow problem.
11. Implementation of graph traversal algorithms – Breadth-First-Search (BFS) and Depth-First-Search (DFS).
12. Implementation of minimum spanning tree construction algorithms – Kruskal and Prim.
13. Implementation of different string matching algorithms.
14. Problem solving for different computational geometric problems.
15. Problem solving using Approximation technique.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

MINOR PROJECT – I

L T P C
0 0 3 2

Identification of a problem related to the program of study / research interest / current technological trend, and carry out wholesome research on it leading to Findings of results / comparisons, which will facilitate development of a new / improved product, algorithm / process / comparative analysis for the benefit of the society/researchers. It may be based on database concepts, object oriented concepts, image processing, computer vision, optimization tools, compiler design, networking etc.

MCA projects should be socially relevant and application / research oriented ones. Each student is expected to do an individual project. The project work is carried out in entirely in 4th semester.

Objective of the mini project:

Working on Mini project is to get used to the larger project, which will be handled in the 6th semester

The project work constitutes an important component of the MCA programme of VSSUT and it is to be carried out with due care and should be executed with seriousness by the students. The objective of this mini project is to help the student develop the ability to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

Guidelines:

A student is expected to devote about 3-4 months in planning, analyzing, designing and implementing the project. The initiation of project should be with the project proposal that is to be treated as an assignment:

Mini-project evaluation:

The evaluation of the mini-project will be based on the project reports submitted by the student, followed by a presentation and a demonstration before the departmental evaluation committee.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

SIMULATION AND MODELING

Semester	Course Name	PO	PEO	CO
5TH	Simulation and Modeling	PO-1, PO-2, PO-3, PO-5, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO 1: Understand the modelling concepts and types of models used to represent different classes of real world systems.</p> <p>CO 2: Applying concepts of computer simulation for types of inputs, system models, output behaviour and performance estimation.</p> <p>CO 3: Understand how to evaluate, validate and verify models for different systems like queuing, inventory and scheduling systems.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

SIMULATION AND MODELLING

L	T	P	C
3	1	0	4

Unit – 1 : (10 Periods)

Inventory Concept: The technique of Simulation, Major application areas, concept of a System, Environment, Continuous and discrete systems, systems modeling types of models progress of a Simulation Study, Monte Carlo Method, Comparison of Simulation and Analytical Methods. Numerical Computation Technique for discrete and continuous models, Continuous System Simulation.

Unit – 2 : (10 Periods)

Probability Concepts in Simulation : Stochastic variables, Discrete and Continuous Probability Functions, Numerical evaluation of continuous probability functions, continuous uniformly distributed random numbers, Random Number Generators – Linear congruential Generator, Mid Square Method, Multiplicative Congruential generator, rejection Method, Testing of random Numbers, Generation of Stochastic variates, Arrival Patterns Service times.

Unit – 3 : (10 Periods)

Discrete System Simulation and GPSS: Discrete Events, Representation of Time, generation of arrival patterns, fixed time step versus next event simulation, Simulation of a Telephone System, delayed calls. Introduction to GPSS : Creating and moving transactions, queues, facilities and storages, gathering statistics, conditional transfers, program control statements, priorities and parameters, standard numerical attributes, functions, gates, logic switches and tests, Variables, Select and Count.

Unit – 4 (10 Periods)

Simulation Languages and Practical Systems: Continuous and discrete systems languages, factors in the selection of discrete systems simulation language. Computer model of queuing, inventory and scheduling systems. Design and Evaluation of simulation Experiments: Length of simulation runs, validation, variance reduction techniques, experimental layout, analysis of simulation output, Recent trends and development.

Text Books:

1. Geoffrey Gordon, “**System Simulation**”, PHI Publication
2. Narsingh Deo, “**System Simulation with Digital computer**”, PHI Publication

Reference Books:

1. Jerry Banks and John S.Carson, Barry L. Nelson, David M.Nicol, “**Discrete Event System Simulation**”, 3rd Edition, Prentice Hall Publication
2. Shannon, R.E, “**Systems simulation, The art and science**”, Prentice Hall Publication.
3. Thomas J. Schriber, “**Simulation using GPSS**”, John Wiley Publication

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

WEB TECHNOLOGIES

Semester	Course Name	PO	PEO	CO
5TH	Web Technologies	PO-1, PO-3, PO-4, PO-5, PO-7, PO-8	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: To be able to understand the technologies and protocols used on the Internet.</p> <p>CO 2: To be able to understand how effectively Internet tools technologies including current web based applications, email, And social networking tools can be used.</p> <p>CO 3: To be able to understand the basics of web search strategies.</p> <p>CO 4: To be able to understand the basics of web authoring.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

WEB TECHNOLOGIES

L	T	P	C
3	1	0	4

Unit – 1 : (10 Periods)

Introduction: Internet Principles, Basic Web Concepts, Client/Server model, retrieving data from Internet, HTML and Scripting Languages, Standard Generalized Mark –up languages, Next Generation, Internet, Protocols and Applications.

Unit – 2 : (10 Periods)

Common Gateway Interface Programming: HTML forms, CGI Concepts, HTML tags Emulation, Server – Browser Communication, E-mail generation, CGI client Side applets, CGI server applets, authorization and security.

Unit – 3 : (10 Periods)

Scripting Languages: Dynamic HTML, Cascading style sheets, Object model and Event model, Filters and Transitions, Active X Controls, Multimedia, Client side script, VB Script programming, Forms, Scripting Object.

Unit – 4 (10 Periods)

Server side Programming, Servelets & JSP: XML, Server side includes communication, DTD, Vocabularies, DOM, methods, Firewalls, Proxy Servers. JSP Technology Introduction, JSP and Servelets, Running JSP Applications, Basic JSP, JavaBeans Classes, JSP-Tag Libraries and Files, Support for the Model, View-Controller Paradigm, Case Study, Related Technologies.

Text Books:

1. Deitel H.M. and Deitel P.J., “**Internet and World Wide Web How to program**”, Pearson International.
2. Gopalan N.P. and Akilandeswari J., “**Web Technology**”, Prentice Hall of India
3. Paul Dietel and Harvey Deitel,”**Java How to Program**”, Prentice Hall of India

Reference Books:

1. Mahesh P. Matha, “**Core Java A Comprehensive study**”, Prentice Hall of India
2. Uttam K.Roy, “**Web Technologies**”, Oxford University Press

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

MOBILE COMPUTING

Semester	Course Name	PO	PEO	CO
5TH	Mobile Computing	PO-1, PO-3, PO-5, PO-7, PO-8	PEO-1, PEO-3, PEO-5, PEO-6	<p>CO 1: Introduction of an advanced element of learning in the field of wireless communication.</p> <p>CO 2: The students to the concepts of wireless devices and mobile computing.</p> <p>CO 3: To introduce wireless communication and networking principles, that support connectivity to cellular networks, wireless internet and sensor devices.</p> <p>CO 4: To understand the use of transaction and e-commerce principles over such devices to support mobile business concepts</p> <p>CO 5: To appreciate the social and ethical issues of mobile computing, including privacy.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

MOBILE COMPUTING

L	T	P	C
3	1	0	4

Unit – 1 : (10 Periods)

Introduction: Cellular Mobile Wireless Networks: Systems and Design Fundamentals, Propagation Models Description of Cellular system, Frequency Reuse, Co channel and Adjacent channel interference, Propagation Models for Wireless Networks, Multipath Effects in Mobile Communication, Models for Multipath Reception Evolution of Modern Mobile Wireless Communication System, Wireless Multiple Access protocols , channel Allocation.

Unit – 2 : (10 Periods)

Data management issues: mobility, wireless communication and portability, data replication Schemes , basic concept of multihopping, Adaptive Clustering for mobile Network , Multicluster Architecture.

Unit – 3 : (10 Periods)

Location Management: Introduction, Location Based Services , Automatically Locating Mobile Users, Locating and Organizing Services, Is Use and future directions, mobile IP, Comparison of TCP wireless.

Unit – 4 (10 Periods)

Transaction management: Introduction, Data Dissemination, Cache Consistency, Mobile transaction processing, mobile database research directions, Security fault tolerance for mobile N/W.

Text Books:

1. Schiller, “**Mobile Communications**”, Pearson Publication.
2. Shambhu Upadhyaya, Abhjeet Chaudhary, Keviven Kwiat, Mark Weises, “**Mobile Computing**”, Kluwer Academic Publishers.
3. UIWE Hansmann, Other Merk , Martin-S-Nickious, Thomas Stohe, “**Principles of Mobile computing**”, Springer international Edition.

Reference Books:

1. Sipra DasBit, Biplab K. Sikdar, “**Mobile Computing**”, PHI Publication
2. Kumkum Garg, “**Mobile Computing**”, Pearson Publication

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

SIMULATION AND MODELING LABORATORY

Semester	Course Name	PO	PEO	CO
5TH	Simulation and Modeling	PO-1, PO-2, PO-3, PO-5, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO 1: Understand the modelling concepts and types of models used to represent different classes of real world systems.</p> <p>CO 2: Applying concepts of computer simulation for types of inputs, system models, output behaviour and performance estimation.</p> <p>CO 3: Understand how to evaluate, validate and verify models for different systems like queuing, inventory and scheduling systems.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

SIMULATION LABORATORY

L T P C
0 0 3 2

LIST OF EXPERIMENTS:

1. Programs on simulation of real time systems for automation purpose.
2. Programs on Monte Carlo method of computation.
3. Simulation of continuous systems.
4. Simulation of discrete systems.
5. Programs on generation of random numbers using Linear Congruential methods, mid-square and Rejection techniques.
6. Programs on testing the random number set for uniformity and independence – Kolmogorov-Smirnov test, Chi-square test, Runs test and Autocorrelation test.
7. Programs on generation of random variates according to various distributions.
8. Programs on simulation of single and two-server queuing systems.
9. Programs on simulation of an inventory system.
10. Programs on simulation of a scheduling system.
11. Programs on simulation of an auto-pilot system.
12. Programs on simulation of a supermarket model.
13. Programs on simulation of a telephone system.
14. Programs on simulation of systems to include concepts of input selection, output analysis etc.
15. Programs on validation checking.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

COMPREHENSIVE VIVA VOCE

L T P C
0 0 3 2

The students are expected to appear one Comprehensive viva-voce on the topics studied upto fifth(5th) semester which will be assessed by a Departmental committee constituted for this purpose in the presence of External Expert from Academia.

This course is mandatory and a student has to pass the course to become eligible for the award of degree. Marks will be awarded out of 100 and appropriate grades assigned as per the regulations.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

WEB TECHNOLOGIES LABORATORY

Semester	Course Name	PO	PEO	CO
5TH	Web Technologies	PO-1, PO-3, PO-4, PO-5, PO-7, PO-8	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: To be able to understand the technologies and protocols used on the Internet.</p> <p>CO 2: To be able to understand how effectively Internet tools technologies including current web based applications, email, And social networking tools can be used.</p> <p>CO 3: To be able to understand the basics of web search strategies.</p> <p>CO 4: To be able to understand the basics of web authoring.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

WEB TECHNOLOGY LABORATORY

L T P C

0 0 3 2

LIST OF EXPERIMENTS:

1. Write programs in Java to demonstrate the use of following components:
 - Text fields, buttons, Scrollbar, Choice, List and Check box.
2. Write Java programs to demonstrate the use of various Layouts like Flow Layout,
 - Border Layout, Grid Layout and card layout.
3. Write programs in Java to create applets incorporating the following features:
 - i. Create a color palette with matrix of buttons
 - ii. Set background and foreground of the control text area by selecting a color from color palette.
 - iii. In order to select Foreground or background use check box control as radio buttons
4. Write programs in Java to do the following.
 - i. Set the URL of another server.
 - ii. Download the homepage of the server.
 - iii. Display the contents of homepage with date, content type, and Expiration date. Last modified and length of the home page.
5. Write programs in Java using sockets to implement the following:
 - i. HTTP request
 - ii. FTP
 - iii. SMTP
 - iv. POP3
6. Write a program in Java for creating simple chat application with datagram sockets and datagram packets.
7. Write programs in Java using Servlets:
 - i. To invoke servlets from HTML forms
 - ii. To invoke servlets from Applets
8. Write programs in Java to create three-tier applications using servlets for conducting on-line examination for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.
9. Create a web page with the following using HTML
 - i. To embed a map in a web page
 - ii. To fix the hot spots in that map
 - iii. Show all the related information when the hot spots are clicked.
10. Create a web page with the following.
 - i. Cascading style sheets.
 - ii. Embedded style sheets.
 - iii. Inline style sheets. Use our college information for the web pages.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

WEB TECHNOLOGY LABORATORY

L T P C
0 0 3 2

LIST OF EXPERIMENTS:

11. Create a database with user information. The user information should be dynamically checked From the database using JDBC, Servlets and JSP.
12. Implement DHTML application using filters.
13. Designing of scientific calculator.
14. Implement a program to find factorial of the given number.
15. Program for finding whether a given number is palindrome or not using JSP.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

MINOR PROJECT - II

L T P C
0 0 3 2

Identification of a problem related to the program of study / research interest / current technological trend and carry out wholesome research on it leading to Findings of results / comparisons, which will facilitate **development of a new / improved product, algorithm / process / comparative analysis** for the benefit of the society / researchers. It may be based on database concepts, object oriented concepts, image processing, computer vision, optimization tools, compiler design, networking etc.

MCA projects should be socially relevant and application / research oriented ones. Each student is expected to do an individual project. The project work is carried out in entirely in 5th semester.

Objectives of the mini project:

Working on Mini project is to get used to the larger project, which will be handled in the 6th semester

The project work constitutes an important component of the MCA programme of VSSUT and it is to be carried out with due care and should be executed with seriousness by the students. The objective of this mini project is to help the student develop the ability to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

Guidelines:

A student is expected to devote about 3-4 months in planning, analyzing, designing and implementing the project. The initiation of project should be with the project proposal that is to be treated as an assignment:

Mini-project evaluation:

The evaluation of the mini-project will be based on the project reports submitted by the student, followed by a presentation and a demonstration before the departmental evaluation committee.

**VEER SURENDRA SAI UNIVERSITY OF
TECHNOLOGY, BURLA DEPARTMENT OF
COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)**

MAJOR PROJECT

L T P C
0 0 0 16

Identification of a problem / technology related to the program of study / research interest at an Organization of repute for the entire sixth semester duration (Min.16 Weeks or More) and carry out wholesome research / development on it leading to Findings of results / comparisons, which will facilitate development of a new / improved product, algorithm / process / comparative analysis for the benefit of the society / researchers.

MCA projects should be socially relevant and application / research oriented ones. Each student is expected to do an individual project under the Guidance of Departmental Guide and External Guide from the Industry. The project work is carried out in entirely in 6th semester

Students are advised to carry out the project work in-order to understand systematic and good software development methodologies either in an industry / R&D institutions for duration of a full semester and submit a detailed project report. The Master's level projects should be done individually.

Guidelines:

A student is expected to devote about 4-5 months in planning, analyzing, designing and implementing the project. The initiation of project should be with the project proposal which is to be treated as an Objective Statement.

Project evaluation:

The evaluation of the project will be based on the project reports submitted by the student, a presentation and a

demonstration at the evaluation time by the Departmental Committee in the presence of External Expert from

Academia. The students are also advised to publish a technical paper, based on the work carried out in the

project, either in international or national conference.

**VEER SURENDRA SAI UNIVERSITY OF
TECHNOLOGY, BURLA DEPARTMENT OF
COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)**

PROJECT SEMINAR

**L T P C
0 0 0 4**

Project Seminar in the sixth semester is based on the Workflow of the Major Project work done by each student in the Semester at the Industry / R&D Institute. The Successful Completion of the Seminar in the presence of Departmental Committee would ensure that the student is permitted for submission of the Major Project & Viva – Voce only after the successful completion of this seminar.

Guidelines:

A student is expected to submit a Seminar Report describing implementation of the project. The Seminar content must adhere to the Project Proposal Submitted Earlier in the Semester.

Project evaluation:

The evaluation of the project will be based on the project demonstration and seminar delivered by the student, for evaluation by the Departmental Committee in the presence of External Expert from Academia. The student is permitted for the Major Project Viva only after the successful completion of this seminar.

**VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)**

Elective-I and Elective-II

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
DATA MINING

Semester	Course Name	PO	PEO	CO
4 th (Elective-I and Elective-II)	Data Mining	PO-1, PO-2, PO-3, PO-5, PO-7, PO-9	PEO-1, PEO-3, PEO-4, PEO-5	CO1. Understand the overview of Data Mining, Data Warehouse and OLAP. CO2. Able to understand the knowledge representation in Data mining. CO3. Able to perform Attribute-oriented analysis in real life application. CO4. To understand Data mining algorithms such as Association rules, Classification, clustering and Prediction etc. CO5. Acquire ability to use data mining principle and methodology to solve various real and challenging problems. CO6. Students will be able to excel himself/herself as a design engineer in any industries/R&D sector.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DATA MINING

L	T	P	C
3	1	0	4

UNIT- 1

(10 Periods)

Introduction to Data Mining: What is data mining?, Related technologies - Machine Learning, DBMS, OLAP, Statistics, Data Mining Goals, Stages of the Data Mining Process, Data Mining Techniques, Knowledge Representation Methods, Applications.

UNIT- 2

(08 Periods)

Data Warehouse and OLAP: Data Warehouse and DBMS, Multidimensional data model, OLAP operations. **Data preprocessing:** Data cleaning, Data transformation, Data reduction.

(10 Periods)

UNIT-3

Data mining knowledge representation: Background knowledge, Interestingness measures, Representing input data and output knowledge, Visualization techniques.

Attribute-oriented analysis: Attribute generalization, Attribute relevance, Class comparison, Statistical measures

UNIT – 4

(12 Periods)

Data mining algorithms: Association rules (Motivation and terminology, Basic idea about item sets, Generating item sets and rules efficiently, Correlation analysis) , **Classification** (Basic learning/mining tasks, Inferring rudimentary rules: 1R algorithm, Decision trees, Covering rules) , **Prediction** (The prediction task, Statistical (Bayesian) classification, Bayesian networks, Instance-based methods (nearest neighbor), Linear models)

Text Book:

1. J. Han and M. Kamber, “**Data Mining: Concepts and Techniques**”, Morgan Kaufman Publisher
2. H. Witten and E. Frank, “**Data Mining: Practical Machine Learning Tools and Techniques**”, Morgan Kaufmann Publisher

Reference Books:

1. M. H. Dunham. Data Mining, “**Introductory and Advanced Topics**” Pearson Education Publisher
2. D. Hand, H. Mannila and P. Smyth, “**Principles of Data Mining**” Prentice-Hall Publisher

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
CLOUD COMPUTING

Semester	Course Name	PO	PEO	CO
4 th (Elective I & II)	Cloud Computing	PO-1, PO-2, PO-3, PO-4, PO-5, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6, PEO-7	<p>CO1. Graduates will be able to understand the key dimensions and the challenges of Cloud Computing.</p> <p>CO2. Graduates will be able to assess the concept of existing Hosting Platforms and computing paradigms currently being used in industry and academia.</p> <p>CO3. Graduates will be able to understand and assess the principles, practices and advantages of Cloud Computing and its evolution and features.</p> <p>CO4. Graduates will be able to familiarize with the issues related to Cloud Computing and analyse IASS/ PAAS and SAAS services along with Cloud models..</p> <p>CO5. Graduates will be able to assess the concepts of various Cloud Platforms with comparative analysis and the concepts of virtualization with the advantages in Cloud.</p> <p>CO6. Graduates will be able to Identify problems, and explain, analyze, and evaluate various cloud computing solutions and to generate new ideas, innovations in cloud computing</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

CLOUD COMPUTING

L	T	P	C
3	1	0	4

UNIT- 1

(12 Periods)

Cloud Computing Fundamental: Cloud computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs. private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery; next generation Cloud Applications.

UNIT- 2

(06 Periods)

Cloud Applications: Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages

UNIT- 3

(12 Periods)

Cloud Services Management: Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment; Cloud Economics: Cloud Computing infrastructures available for implementing cloud based services. Economics of choosing a Cloud platform for an organization, based on application requirements, economic constraints and business needs (e.g Amazon, Microsoft and Google, Salesforce.com, Ubuntu and Redhat).

UNIT- 4

(10 Periods)

Application Development: Service creation environments to develop cloud based applications. Development environments for service development; Amazon, Azure, Google App.

Text Books:

1. Gautam Shroff, “**Enterprise Cloud Computing Technology Architecture Applications**”, BPB Publications.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, “**Cloud Computing, A Practical Approach**” Tata McGraw Hill Publications.

Reference Books:

1. Dimitris N. Chorafas, “**Cloud Computing Strategies**” CRC Press.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
NATURAL LANGUAGE PROCESSING

Semester	Course Name	PO	PEO	CO
4TH (Elective – I/II)	Natural Language Processing	PO-1, PO-2, PO-3, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-5, PEO-6	<p>CO 1: To understand the natural language, its scope and application areas.</p> <p>CO 2: To study grammars and parsing, its types and features.</p> <p>CO 3: To study the details of its concept to implement the implement the natural language.</p> <p>CO 4: understanding the Ambiguity Resolution by using different methodology and processes</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

NATURAL LANGUAGE PROCESSING	L	T	P	C
	3	1	0	4

UNIT- 1 (10 Periods)

Introduction to Natural Language Understanding: The study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English syntax. Introduction to semantics and knowledge representation, Some applications like machine translation, database interface.

UNIT- 2 (10 Periods)

Grammars and Parsing: Grammars and sentence Structure, Top-Down and Bottom-Up Parsers, Transition Network Grammars, Top-Down Chart Parsing. Feature Systems and Augmented Grammars: Basic Feature system for English, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks.

UNIT- 3 (10 Periods)

Grammars for Natural Language: Auxiliary Verbs and Verb Phrases, Movement Phenomenon in Language, Handling questions in Context-Free Grammars. Human preferences in Parsing, Encoding uncertainty, Deterministic Parser.

UNIT- 4 (08 Periods)

Ambiguity Resolution: Statistical Methods, Probabilistic Language Processing, Estimating Probabilities, Part-of-Speech tagging, Obtaining Lexical Probabilities, Probabilistic Context- Free Grammars, Best First Parsing. Semantics and Logical Form, Word senses and Ambiguity, Encoding Ambiguity in Logical Form.

Text Books:

1. James Allen, "**Natural Language Understanding**", 2/e, Pearson Education
2. L.M. Iivansca, S. C. Shapiro, "**Natural Language Processing and Language Representation**", University Press

Reference Books:

1. T. Winograd, "**Language as a Cognitive Process**", Addison-Wesley Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
SOFTWARE QUALITY

4TH (Elective – I/II)	Software Quality	PO-1, PO-3, PO-4, PO-8, PO-9	PEO-1, PEO-3, PEO-5, PEO-6, PEO-7	<p>CO 1: To be able to understand Software Engineering Paradigm and Life Cycle Models of software.</p> <p>CO 2: To be able to understand some Process of Software.</p> <p>CO 3: To be able to learn requirements of software.</p> <p>CO 4: To be able to understand Analysis and Design Concepts of software.</p> <p>CO 5: To be able to understand the Principles of Software.</p> <p>CO 6: To be able to learn about Software Testing.</p> <p>CO 7: To be able to study software Quality Assurance.</p>
-----------------------------	------------------	--	---	--

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

SOFTWARE QUALITY

L	T	P	C
3	1	0	4

UNIT- 1

(06 Periods)

Software Product and Process: Introduction, S/W Engineering Paradigm, Verification, Validation, Life Cycle Models, System Engineering, Computer Based System, Business Process Engineering Overview, Product Engineering Overview.

UNIT- 2

(08 Periods)

Software Requirements: Functional and Non-Functional, Software Document, Requirement Engineering Process, Feasibility Studies, Software Prototyping, Functional and Behavioral Models, Structured Analysis, Data Dictionary.

UNIT- 3

(12 Periods)

Analysis, Design Concepts and Principles: Systems Engineering, Analysis Concepts , Design Process And Concepts, Modular Design, Design Heuristic, Architectural Design, Data Design , User Interface Design, Real Time Software Design, System Design, Data Acquisition System, Monitoring And Control System.

UNIT- 4

(14 Periods)

Testing: Taxonomy Of Software Testing, Types Of S/W Test, Black Box Testing, Testing Boundary Conditions, Structural Testing, Test Coverage Criteria Based On Data Flow Mechanisms, Regression Testing, Unit Testing, Integration Testing, Validation Testing, System Testing And Debugging, Software Implementation Techniques

Software Quality Assurance: Process and Product Quality, Quality Assurance and Standards, Quality Planning and Control, Software metrics, Process Improvement, Software configuration Management.

Text Books:

1. Ian Sommerville, “**Software engineering**”, Pearson Education Asia Publishing
2. Rajib Mall “**Fundamentals of Software Engineering**”, PHI Publishing

Reference Books:

1. Norman E. Fenton and Shari Lawrence Pfleeger, “**Software Metrics**”. Thomson Publishing
2. Roger S. Pressman, “**Software Engineering A practitioner’s Approach**”, McGraw Hill Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
WIRELESS SENSOR NETWORKS

Semester	Course Name	PO	PEO	CO
4 TH (Elective – I/II)	Wireless Sensor Networks	PO-1, PO-2, PO-3, PO-5, PO-7 PO-8	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: To be able to understand Overview of Wireless Sensor Networks & it's Challenges.</p> <p>CO 2: To be able to understand Architectures of Wireless Sensor Networks.</p> <p>CO 3: To be able to learn different Protocols of Wireless Sensor Network.</p> <p>CO 4: To be able to study Infrastructure Establishment of Wireless Sensor Network.</p> <p>CO 5: To be able to study Sensor Network Platforms and Tools.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

WIRELESS SENSOR NETWORKS	L	T	P	C
	3	1	0	4

UNIT- 1 **(06 Periods)**

Overview of Wireless Sensor Networks: Introduction, Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks.

UNIT- 2 **(10 Periods)**

Architectures: Single-Node Architecture, Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network Architecture Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

UNIT- 3 **(12 Periods)**

Networking Sensors: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing.

UNIT- 4 **(12 Periods)**

Infrastructure Establishment: Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control. **Sensor Network Platforms and Tools:** Sensor Node Hardware, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming

Text Books:

1. Holger Karl & Andreas Willig, "**Protocols And Architectures for Wireless Sensor Networks**", John Wiley.
2. Anna Hac, "**Wireless Sensor Network Designs**", John Wiley & Sons.

Reference Books:

1. Edgar H. Callaway, Jr. and Edgar H. Callaway, "**Wireless Sensor Networks: Architectures and Protocols**," CRC Press.
2. Victor Lesser, Charles L. Ortiz, and Milind Tambe, "**Distributed Sensor Networks: A Multiagent Perspective**," Kluwer Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
EMBEDDED SYSTEM

Semester	Course Name	PO	PEO	CO
4TH (Elective – I/II)	Embedded System	PO-1, PO-2, PO-3, PO-4, PO-6, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO 1: To understand the difference between a microprocessor and a microcontroller.</p> <p>CO 2: To study microcontroller architecture and applications.</p> <p>CO 3: To study the different addressing modes, interrupts and interfacing with I/O devices.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

EMBEDDED SYSTEM

L T P C

3 1 0 4

UNIT- 1 :

Introduction to Embedded Systems : Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT - 2 :

Typical Embedded System: Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT - 3:

Embedded Firmware: Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages. **RTOS Based Embedded System Design:** Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling

UNIT - 4:

Task Communication: Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

Text Books:

1. Shibu K.V, “**Introduction to Embedded Systems**”, McGraw Hill Publishing

Reference Books:

1. Raj Kamal, “**Embedded Systems**”, TMH Publishing
2. Frank Vahid, Tony Givargis, “**Embedded System Design**”, John Wiley Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

E-COMMERCE

Semester	Course Name	PO	PEO	CO
4 th (Elective I & II)	E-Commerce	PO-1, PO-2, PO-3, PO-4, PO-6, PO-7, PO-8, PO-9	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6, PEO-7	<p>CO1. Graduates will be able to understand various components of e-commerce.</p> <p>CO2. Graduates will be able to describe E-Commerce payment systems.</p> <p>CO3. Graduates will be able to understand Web marketing approaches and elements of branding.</p> <p>CO4. Graduates will be able to explain the working of Internet technology and its utility in commercial activities.</p> <p>CO5. Graduates will be able to get knowledge of some graph algorithms such as shortest path and minimum spanning tree.</p> <p>CO6. Graduates will be able to get knowledge of methods for online business dealings using e-commerce infrastructure.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

E-COMMERCE

L	T	P	C
3	1	0	4

UNIT- 1

(08 Periods)

Introduction to E-commerce: Introduction, E-commerce or Electronic Commerce- An Overview, Electronic Commerce – Cutting edge, Electronic Commerce Framework

Evolution of E-commerce: Introduction, History of Electronic Commerce, Advantages and Disadvantage of E-commerce, Roadmap of e-commerce in India

UNIT- 2

(10 Periods)

Network Infrastructure: Introduction, Network Infrastructure- An Overview, The Internet Hierarchy, Basic Blocks of e-commerce, Networks layers & TCP/IP protocols, The Advantages of Internet, World Wide Web

E-commerce Infrastructure: Introduction, E-commerce Infrastructure-An Overview, Hardware, Server Operating System, Software, Network Website

UNIT- 3

(10 Periods)

Managing the e-Enterprise: Introduction, e-Enterprise, Managing the e-Enterprise, E-business Enterprise, Comparison between Conventional Design and E-organization, Organization of Business in an e-Enterprise. **e-Commerce Process Models:** Introduction, Business Models, E-business Models Based on the Relationship of Transaction Parties, e-commerce Sales Life Cycle (ESLC) Model

UNIT- 4

(12 Periods)

Management of Risk: Introduction, Introduction to Risk Management, Disaster Recovery Plans, Risk Management Paradigm

Electronic Data Interchange(EDI): The Meaning of EDI, History of EDI, EDI Working Concept, Implementation difficulties of EDI, Financial EDI, EDI and Internet

E-Marketing: The scope of E-Marketing, Internet Marketing Techniques

Website Design Issues: Factors that Make People Return to Your Site, Strategies for Website Development

Text Books:

1. David Whitley, “**E-Commerce-Strategy, Technologies & Applications**”, TMH Publishing
2. Kamlesh K. Bajaj, “**E-Commerce- The cutting edge of Business**”, TMH Publishing

Reference Books:

1. Ravi Kalakota & Andrew B Whinston, “**Frontiers of Electronic Commerce**”, Pearson Education.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
INFORMATION SECURITY AND CYBER LAW

Semester	Course Name	PO	PEO	CO
4TH (Elective – I/II)	Information Security and Cyber Laws	PO-1, PO-2, PO-8, PO-9,	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO1:- To recognize the developing trends in Cyber law and the legislation impacting cyberspace in the current situation.</p> <p>CO2:- To generate better awareness to battle the latest kinds of cybercrimes impacting all investors in the digital and mobile network.</p> <p>CO3:- To recognize the areas for stakeholders of digital and mobile network where Cyber law needs to be further evolved.</p> <p>CO4:- To work in the direction of creating an international network of cybercrimes. Legal authorities could then be a significant voice in the further expansion of cyber-crimes and cyber law legislations throughout the globe.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

INFORMATION SECURITY AND CYBER LAWS

L	T	P	C
3	1	0	4

UNIT- 1

(12 Periods)

Introduction to information systems : Types of information Systems, Development of Information Systems, Introduction to information security, Need for Information security, Threats to Information Systems, Information Assurance, Cyber Security, and Security Risk Analysis

UNIT- 2

(06 Periods)

Application security : Database, E-mail and Internet, Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall and VPNs, Intrusion Detection, Access Control. Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail viruses, Macro viruses, Malicious Software, Network and Denial of Services Attack, Security Threats to E-Commerce- Electronic Payment System, e-Cash, Credit/Debit Cards. Digital Signature, public Key Cryptography.

UNIT- 3

(12 Periods)

Developing Secure Information Systems : Application Development Security, Information Security Governance & Risk Management, Security Architecture & Design Security Issues in Hardware, Data Storage & Downloadable Devices, Physical Security of IT Assets, Access Control, CCTV and intrusion Detection Systems, Backup Security Measures.

UNIT- 4

(10 Periods)

Security Policies : Why Policies should be developed, WWW policies, Email Security policies, Policy Review Process-Corporate policies-Sample Security Policies, Publishing and Notification Requirement of the Policies. Information Security Standards-ISO, IT Act, Copyright Act, Patent Law, IPR. Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law: Copy Right Law, Software License, Semiconductor Law and Patent Law.

Text Books:

1. Charles P. Pfleeger, Shari Lawerance Pfleeger, "**Analysing Computer Security** ", Pearson Education India.
2. V.K. Pachghare, "**Cryptography and information Security**", PHI Publishing
3. Schou, Shoemaker, "**Information Assurance for the Enterprise**", Tata McGraw Hill Publishing

Reference Books:

1. Dr. Surya Prakash Tripathi, Ritendra Goyal, Praveen kumar Shukla, "**Introduction to Information Security and Cyber Law**", Willey Dreamtech Press.
2. Chander, Harish, "**Cyber Laws And It Protection**", PHI Learning Private Limited

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

CRYPTOGRAPHY AND NETWORK SECURITY

Semester	Course Name	PO	PEO	CO
4TH (Elective – I/II)	Cryptography and Network Security	PO-2, PO-5, PO-7, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO 1: Students will have the basic knowledge of different types of Security attacks. To discuss on various types of attacks and their characteristics</p> <p>CO 2: To illustrate the basic concept of encryption and decryption for secure data transmission. Students will be able to analyze and compare different security mechanisms and services.</p> <p>CO 3: Students will be able to analyze different modern encryption algorithms. Students will have the basic knowledge of different authentication Mechanisms.</p> <p>CO4:- Students will have the knowledge on latest techniques used in different Security aspects (e.g. network security, web security etc.)</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

CRYPTOGRAPHY AND NETWORK SECURITY	L	T	P	C
	3	1	0	4

UNIT- 1 **(10 Periods)**

Introduction: Services, Mechanisms and attacks, the OSI security Architecture, Network security model, Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).

Finite Fields And Number Theory : Groups, Rings, Fields Modular arithmetic, Euclid's algorithm, Finite fields, Polynomial Arithmetic, Prime numbers, Fermat's and Euler's theorem, The Chinese remainder theorem- Discrete logarithms.

UNIT- 2 **(10 Periods)**

Block Ciphers: Data Encryption Standard, Block cipher principles, block cipher modes of operation, Advanced Encryption Standard (AES)

Public key cryptography: Principles of public key cryptosystems, The RSA algorithm, Key management, Hash Function and Digital Signatures: Authentication requirement, Authentication function, MAC, Hash function, Security of hash function and MAC, MD5, SHA, HMAC, CMAC, Digital signature and authentication Protocols.

UNIT- 3 **(08 Periods)**

Security Practice and System Security: Authentication applications, Kerberos, Internet Firewalls, Roles of Firewalls, Firewall related terminology, Firewall designs, Intruder, Intrusion detection system, Virus and related threats, Countermeasures, Firewalls design principles.

UNIT- 4 **(12 Periods)**

E-mail Security: Security Services for Email attacks, establishing keys privacy, authentication of the source, Message Integrity

IP Security: Overview of IPSec, IP and IPv6, Authentication Header, Encapsulation Security Payload (ESP) Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding).

Web Security: SSL/TLS Basic Protocol, computing the keys- client authentication, PKI as deployed by SSL Attacks fixed in v3, Exportability, Encoding, Secure Electronic Transaction (SET).

Text Books:

1. Wade Trappe, Lawrence C Washington, " **Introduction to Cryptography with coding theory**", Pearson Publishing
2. William Stallings, "**Crpytography and Network security - Principles and Practices**", Pearson Publishing.

Reference Books:

1. W. Mao, "**Modern Cryptography – Theory and Practice**", Pearson Education.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger "**Security in computing**" Prentice Hall of India.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

INFORMATION RETRIVAL TECHNIQUES

Semester	Course Name	PO	PEO	CO
4 th (Elective-I and Elective-II)	Information Retrieval Techniques	PO-1, PO-2, PO-3, PO-5, PO-7, PO-9	PEO-1, PEO-3, PEO-4, PEO-5	<p>CO1. Understand the Introductory concepts information retrieval such as Basic Concepts, Practical Issues, Retrieval Process, Architecture and Boolean Retrieval etc.</p> <p>CO2. Able to understand Modelling concepts with examples and concepts such as IR Models, Boolean Model, Vector Model, Term Weighting, Scoring and Ranking, Language Models, Set Theoretic Models, Probabilistic Models, Algebraic Models, Structured Text Retrieval Models and Models for Browsing etc.</p> <p>CO3. To understand Indexing mechanism used in information retrieval techniques.</p> <p>CO4. To understand to concepts of Classification and Clustering task and may able to use it in various real life application in the area of science and engineering.</p> <p>CO5. Students will be able to excel himself/herself as a design engineer in any industries/R&D sector.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

INFORMATION RETRIEVAL TECHNIQUES	L	T	P	C
	3	1	0	4

UNIT- 1

(08 Periods)

Introduction: Motivation, Basic Concepts, Practical Issues, Retrieval Process, Architecture, Boolean Retrieval, Retrieval Evaluation, Open Source IR Systems, History of Web Search, Web Characteristics, The Impact of the web on IR, IR Versus Web Search, Components of a Search engine

UNIT- 2

(12 Periods)

Modeling: Taxonomy and Characterization of IR Models, Boolean Model, Vector Model, Term Weighting, Scoring and Ranking, Language Models, Set Theoretic Models, Probabilistic Models, Algebraic Models, Structured Text Retrieval Models, Models for Browsing

Indexing: Static and Dynamic Inverted Indices, Index Construction and Index Compression Searching, Sequential Searching and Pattern Matching, Query Operations, Query Languages, Query Processing, Relevance Feedback and Query Expansion, Automatic Local and Global Analysis, Measuring Effectiveness and Efficiency.

UNIT- 3

(10 Periods)

Classification and Clustering: Text Classification and Naïve Bayes, VectorSpace Classification, Support vector machines and Machine learning on documents. Flat Clustering, Hierarchical Clustering, Matrix decompositions and latent semantic indexing, Fusion and Meta learning

UNIT- 4

(10 Periods)

Searching and Ranking: Searching the Web, Structure of the Web, IR and web search, Static and Dynamic Ranking, Web Crawling and Indexing, Link Analysis, XML Retrieval Multimedia IR: Models and Languages, Indexing and Searching Parallel and Distributed IR, Digital Libraries

Text Books:

1. Ricardo Baeza-Yates, Berthier Ribeiro Neto, **“Modern Information Retrieval: The concepts and Technology behind Search”**, ACM Press Books.
2. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, **“Introduction to Information Retrieval”**, Cambridge University Press.

Reference Books:

1. Stefan Butcher, Charles L. A. Clarke, Gordon V. Cormack, **“Information Retrieval Implementing and Evaluating Search Engines”**, The MIT Press, Cambridge, Massachusetts London, England.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
REAL-TIME SYSTEMS

Semester	Course Name	PO	PEO	CO
4TH (Elective – I/II)	Real time System	PO-1, PO-2, PO-5, PO-7, PO-8	PEO-1, PEO-4, PEO-5, PEO-6	<p>CO 1: Understand the Introductory concepts Real time System such as Basic Principles, System Calls, Files, Processes, Design and Implementation of processes, Communication between processes, RPC, Client server model, Distributed file system, Design strategies etc.</p> <p>CO 2: To be able to study different Models and Languages of Real Time.</p> <p>CO 3: To be able to learn Kernel of Real Time which includes Principles, Design issues, Polled Loop Systems, RTOS Porting to a Target, Comparison and study of RTOS VX works.</p> <p>CO 4: To be able to understand Domains of RTOS Application such as RTOS for Image Processing, Embedded RTOS for voice over IP, RTOS for fault Tolerant Applications, RTOS for Control Systems</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

REAL-TIME SYSTEMS

L	T	P	C
3	1	0	4

UNIT- 1

(08 Periods)

Review of Operating Systems: Basic Principles, System Calls, Files, Processes, Design and Implementation of processes, Communication between processes, Operating System structures.

Distributed Operating Systems: Topology, Network types, Communication, RPC, Client server model, Distributed file system, Design strategies.

UNIT- 2

(12 Periods)

Real Time Models and Languages: Event Based, Process Based and Graph based Models, Petrinet Models, Real Time Languages, RTOS Tasks, RT scheduling, Interrupt processing, Synchronization, Control Blocks, Memory Requirements

UNIT- 3

(10 Periods)

Real Time Kernel: Principles, Design issues, Polled Loop Systems, RTOS Porting to a Target, Comparison and study of RTOS VX works.

UNIT- 4

(10 Periods)

RTOS Application Domains: RTOS for Image Processing, Embedded RTOS for voice over IP, RTOS for fault Tolerant Applications, RTOS for Control Systems.

Text Books:

1. Charles Crowley, “**Operating Systems-A Design Oriented approach**”, McGraw Hill Publishing
2. C.M. Krishna, Kang, G.Shin, “**Real Time Systems**”, McGraw Hill Publishing

Reference Books:

1. Tanenbaum, “**Distributed Operating Systems**”, Pearson Education Publishing
2. Raymond J.A.Bhur, Donald L.Bailey, “**An Introduction to Real Time Systems**”, PHI Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DISTRIBUTED SYSTEMS

Semester	Course Name	PO	PEO	CO
4 TH (Elective – I/II)	Distributed System	PO-1, PO-3, PO-5, PO-7, PO-8	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: Understand the Introductory concepts Distributed System and its different characteristics.</p> <p>CO 2: To be able to study Communication between distributed objects.</p> <p>CO 3: To be able to learn about Remote Procedure Call and Remote Method Invocation.</p> <p>CO 4: To be able to learn Distributed File Systems such as File service architecture, Sun Network File System, Name Services and the Domain Name System, Directory Services, Global Name Service etc.</p> <p>CO 5: To be able to study about Design and implementation issues of Distributed Shared Memory.</p> <p>CO 6: To be able to understand Different Models and Case study Distributed Shared Memory.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DISTRIBUTED SYSTEMS	L	T	P	C
	3	1	0	4

UNIT- 1 **(10 Periods)**

Characterization of Distributed Systems: Resource Sharing and Web-Challenges, System Models, Inter process Communication, API for Internet protocols, External data representation and marshalling, Client-server communication, Group communication, Case study: Inter process Communication in UNIX.

UNIT- 2 **(10 Periods)**

Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure calls-Events and notifications-Case study: Java RMI. Operating System Support-Introduction-OS layer, Protection-Processes and threads, Communication and invocation OS architecture.

UNIT- 3 **(10 Periods)**

Distributed File Systems: File service architecture, Sun Network File System, Enhancements and further developments. Name Services, Name Services and the Domain Name System, Directory Services, Global Name Service.

UNIT- 4 **(10 Periods)**

Distributed Shared Memory: Design and implementation issues, Sequential Consistency and Ivy case study Release consistency and Munin case study, Other Consistency models. CORBA Case Study, Introduction, CORBA RMI-CORBA services.

Text Books:

1. George Coulouris, Jean Dollimore, Tim Kindberg, "**Distributed Systems: Concepts and Design**", Pearson Education Publishing
2. Tanenbaum and M. V. Steen, "**Distributed Systems: Principles and Paradigms**", Prentice Hall Publishing
3. M.L.Liu, "**Distributed Computing Principles and Applications**", Pearson Publishing

Reference Books:

1. Mukesh Singhal, "**Advanced Concepts In Operating Systems**", McGrawHill Publishing
2. Nancy A. Lynch, "**Distributed Algorithms**", Morgan Kaufmann Publishers.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

STATISTICAL ANALYSIS

Semester	Course Name	PO	PEO	CO
4 th (Elective-I and Elective-II)	Statistical Analysis	PO-1, PO-2, PO-3, PO-5, PO-7, PO-9	PEO-1, PEO-3, PEO-4, PEO-5	CO1: Ability to understand Probability and Expectation and Principle of Probability Distribution. CO2. Ability to analyze Statistical Decision Theory, Sampling and Sampling Distributions and Parameter estimation. CO3. Ability of perform Hypothesis Test. CO4. Ability to understand logical operators, Implications, Tautologies, validity of arguments, and quantifiers. CO5. Ability to understand and use Regression Analysis. CO6. Ability to understand Statistical Quality control and Case Studies.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

STATISTICAL ANALYSIS

L	T	P	C
3	1	0	4

UNIT- 1

(10 Periods)

Probability and Expectation: Approaches to probability. Addition, multiplication and Bayes Theorem, Mathematical Expectation. **Probability Distribution:** Binomial, Poisson, Exponential, Beta and Normal Distributions.

UNIT- 2

(10 Periods)

Statistical Decision Theory: Risk and uncertainty, Expected value approach, Marginal analysis, Decision tree. **Sampling and Sampling Distributions:** Methods of sampling, Sampling distribution of a statistic and its standard error. Point Estimation and interval estimation, Properties of an estimator. **Parameter estimation:** general concepts. Samples, estimators, bias. Estimators for mean, variance, covariance.

UNIT- 3

(10 Periods)

Hypothesis Testing; Power of a test, Large sample tests for proportions, means and standard deviations. Small sample tests – t and F tests. Design of Experiments and analysis of variance. **Non-Parametric Tests:** Chi-square test, Sign test, Median test and Rank correlation test.

UNIT- 4

(10 Periods)

Regression Analysis: Simple and multiple linear regression analysis up to three variables. **Statistical Quality Control:** Control charts for variables and attributes, Acceptance sampling. **Case Studies:** Application of statistics to some cases of business enterprise

Text Books:

1. Spiegel, M.R., **"Theory and Problems of Statistics"**, Schaum Publishing Company.
2. Aczel, Amir D., **"Complete Business Statistics"**, McGraw Hill Publishing

Reference Books:

1. Levin, R.I. and D.S. Rubin, **"Statistics for Management"**, Prentice-Hall of India Publishing

**VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)**

Elective-III and Elective-IV

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

BIOINFORMATICS

Semester	Course Name	PO	PEO	CO
5TH (Elective – III/IV)	Bio-Informatics	PO-1, PO-2, PO-6, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: To be able to understand scope of Bioinformatics.</p> <p>CO 2: To be able to understand popular bio-informatics databases.</p> <p>CO 3: To be able to learn fundamentals of databases and sequence alignment.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

BIOINFORMATICS

L	T	P	C
3	1	0	4

UNIT- 1

(06 Periods)

Introduction: Historical overview, Bioinformatics Applications, Bioinformatics Major databases, Molecular biology.

UNIT- 2

(12 Periods)

Data Visualization and Statistics: Sequence Visualization, Structure visualization, statistical concepts, micro arrays, imperfect data, quantitative randomness, data analysis, tool selective, and statistics of alignment, clustering and classification.

UNIT- 3

(12 Periods)

Data Mining and Pattern Matching: Methods & Technology overview, infrastructure, pattern recognition & discovery, machine learning, text mining & tools, dot matrix analysis, substitution matrices, dynamic programming, word methods, multiple sequence alignment, tools for pattern matching.

UNIT- 4 (10 Periods) Modeling, Simulation and Tools: Drug discovery, fundamentals, protein structure, System biology, standards, Issues. Tools Introduction, working with FASTS, working with BLAST, FASTA & BLAST algorithms & comparison

Text Books:

1. S.C.Rastogi, N.Mendiratta, P.Rastogi, **"Bioinformatics-Methods & Application"**, PHI Publishing
2. Bryan Bergeron, **"Bioinformatics Computing"**, Pearson Education.

Reference Books:

1. Imtiyaz Alam Khan, **"Elementary Bioinformatics"**, Pharma Book Syndicate.
2. Indu Shekhar Thakur, **"Environmental Biotechnology"**, IK International Publication.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

ADVANCED JAVA PROGRAMMING

Semester	Course Name	PO	PEO	CO
5TH (Elective – III/IV)	Advanced Java Programming	PO-1, PO-2, PO-3, PO-4, PO-5, PO-8,	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO 1: To learn the graphics and animation on the web pages, using Java Applets</p> <p>CO 2: To learn and design a full set of Event driven UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings.</p> <p>CO 3: To learn Java Data Base Connectivity (JDBC) so as to retrieve and manipulate the information on any relational database through Java programs.</p> <p>CO 4: To learn Java Bean so as to make the reusable software components.</p> <p>CO 5: To learn the invocation of the remote methods in an application using RMI.</p> <p>CO 6: To learn Hibernate for the mapping of Java classes and objects associations to the relational database tables.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

ADVANCED JAVA PROGRAMMING

L	T	P	C
3	1	0	4

UNIT- 1

(10 Periods)

Advanced GUI Development using Java :Swings, Buttons, Labels, Checkbox, Text Components and Menu Components in Swings, JTree Class, JTable Class, Events and Exception Handling, Event Classes, Event Generators, Event Listener, Key Events, Mouse Event, Exception Class, Try and Catch, Multiple Catch-Exception Types, Throw and Throws, User Defined Exceptions.

UNIT- 2 (10 Periods) JDBC : Java Database Connectivity, JDBC Drivers, Statements, Caching

Database Results, Storing

Classes, Images and Other Large Objects, Controlling Transactions, Escaping Characters, Mapping Database Types, Mapping Date Types

UNIT- 3

(10 Periods)

Thread and Multi-Threading : Multithreading, Multitasking and Multithreading, The Thread Class , Defining and Running a Thread, Methods of Thread Class, Lab Projects

UNIT- 4

(10 Periods)

Servlet based Application Development : Java Servlet, Servlet Environment and Role, Protocol Support, HTML Support, Replacing CGI Scripts, Installing Servlets Using Java Web Server , Servlet API, The Servlet Life Cycle, Welcome Servlet, Servlet Context, HTTP Support, HTML to Servlet Communication

Text Books:

1. C. Xavier, "**Java Programming: A practical approach**", McGraw Hill Publishing.

Reference Books:

1. Herbert Schildt, "**The Complete Reference – Java 2**", Tata McGraw Hill Publishing.
2. E. Balagurusamy, "**Programming with Java – A Primer**", Tata McGraw-Hill Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
PATTERN RECOGNITION

Semester	Course Name	PO	PEO	CO
5TH (Elective – III/IV)	Pattern Recognition	PO-1, PO-2, PO-5, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO 1: Explain and compare a variety of pattern classification, structural pattern recognition, and pattern classifier combination techniques. To explain the concept of pattern recognition and its different phases.</p> <p>CO 2: To discuss on the idea of feature extraction and different approaches towards prototype selection. Summarize, analyze, and relate research in the pattern recognition area verbally and in writing.</p> <p>CO 3: Apply performance evaluation methods for pattern recognition, and critique comparisons of techniques made in the research literature. Apply pattern recognition techniques to real-world problems such as document analysis and recognition.</p> <p>CO4 :- Implement simple pattern classifiers, classifier combinations, and structural pattern recognizers.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

PATTERN RECOGNITION

L	T	P	C
3	1	0	4

UNIT- 1

(10 Periods)

Pattern Classifier : Overview of Pattern recognition, Discriminant functions, Supervised learning, Parametric estimation, Maximum Likelihood Estimation, Bayesian parameter Estimation, Problems with Bayes approach, Pattern classification by distance functions, Minimum distance pattern classifier.

UNIT- 2

(10 Periods)

Clustering : Clustering for unsupervised learning and classification, Clustering concept, K Means algorithm, Hierarchical clustering, Graph theoretic approach to pattern Clustering, Validity of Clusters.

Feature Extraction and Structural Pattern Recognition : KL Transforms, Feature selection through functional approximation, Binary selection, Elements of formal grammars, Syntactic description , Stochastic grammars, Structural representation.

UNIT- 3

(10 Periods)

Hidden Markov Models and Support Vector Machine : State Machines, Hidden Markov Models , Training, Classification, Support vector Machine, Feature Selection.

UNIT- 4

(10 Periods)

Recent Advances : Fuzzy logic, Fuzzy Pattern Classifiers, Pattern Classification using Genetic Algorithms, Case Study Using Fuzzy Pattern Classifiers and Perception

Text Books:

1. M. Narasimha Murthy and V. Susheela Devi, "**Pattern Recognition**", Springer.
2. S.Theodoridis and K.Koutroumbas, "**Pattern Recognition**", Academic Press.

Reference Books:

1. C.M.Bishop, "**Pattern Recognition and Machine Learning**", Springer.
2. R.O.Duda, P.E.Hart and D.G.Stork, "**Pattern Classification**", John Wiley.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DIGITAL IMAGE PROCESSING

Semester	Course Name	PO	PEO	CO
5TH (Elective – III/IV)	Digital Image Processing	PO-1, PO-2, PO-3, PO-6, PO-7, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO 1: To discuss on the basics of digital image processing and digital image formation. To illustrate different mathematical preliminaries to deal with digital image processing.</p> <p>CO 2: To be able to Develop Fourier transform for image processing in frequency domain. To be able to Evaluate the methodologies for image segmentation, restoration, enhancement, etc.</p> <p>CO 3: To be able to Implement image process and analysis algorithms. To be able to Apply image processing algorithms in practical applications.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

DIGITAL IMAGE PROCESSING

L	T	P	C
3	1	0	4

UNIT- 1

(10 Periods)

Fundamentals of Image Processing: Introduction, Steps in image processing systems, Image acquisition, Sampling and Quantization, Pixel relationships, Color fundamentals and models, File formats, Image operations, Arithmetic, Geometric and Morphological.

UNIT- 2

(10 Periods)

Image Enhancement: Spatial Domain: Gray level Transformations, Histogram processing, Spatial filtering smoothing and sharpening. **Frequency Domain:** Filtering in frequency domain, DFT, FFT, DCT, Smoothing and sharpening filters, Homomorphic Filtering. **Image Segmentation and Feature Analysis:** Detection of Discontinuities, Edge operators, Edge linking and Boundary Detection, Thresholding, Region based segmentation, Morphological Watersheds, Motion Segmentation, Feature Analysis and Extraction.

UNIT- 3

(10 Periods)

Multi Resolution Analysis and Compressions: Multi Resolution Analysis: Image Pyramids, Multi resolution expansion, Wavelet Transforms. Image compression: Fundamentals, Models, Elements of Information Theory, Error free compression, Lossy Compression, Compression Standards.

UNIT- 4

(10 Periods)

Applications of Image Processing:

Image classification, Image recognition, Image understanding, video motion analysis, Image fusion, Steganography, Digital compositing, Mosaics, Color Image Processing

Text Books:

1. Rafael C. Gonzalez and Richard E. Woods, “**Digital Image Processing**”, Pearson Education.
2. Anil K. Jain, “**Fundamentals of Digital Image Processing**”, Pearson Education.

Reference Books:

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, “**Image Processing, Analysis and Machine Vision**”, Thomson Learning.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
ADVANCED OPERATING SYSTEM

Semester	Course Name	PO	PEO	CO
5TH (Elective – III/IV)	Advanced Operating System	PO-1, PO-2, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-7	<p>CO 1: To be able to understand different advanced OS concepts.</p> <p>CO 2: To practice pipelining and I/O redirecting.</p> <p>CO 3: To manage UNIX-based networks and write complex shell scripts.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

ADVANCED OPERATING SYSTEM

L	T	P	C
3	1	0	4

UNIT- 1

(10 Periods)

Architectures of Distributed Systems : System Architecture types, issues in distributed operating systems, communication networks, communication primitives. Theoretical Foundations, inherent limitations of a distributed system, lamp ports logical clocks, vector clocks, casual ordering of messages, global state, cuts of a distributed computation, termination detection. Distributed Mutual Exclusion, the classification of mutual exclusion and associated algorithms, a comparative performance analysis.

UNIT- 2

(10 Periods)

Distributed Deadlock Detection: Deadlock handling strategies in distributed systems, issues in deadlock detection and resolution, control organizations for distributed deadlock detection, centralized and distributed deadlock detection algorithms, hierarchical deadlock detection algorithms. Agreement protocols, the system model, a classification of agreement problems, solutions to the Byzantine agreement problem, applications of agreement algorithms. **Distributed resource management:** introduction-architecture, mechanism for building distributed file systems. design issues, log structured file systems.

UNIT- 3

(10 Periods)

Distributed shared memory: Distributed Scheduling, issues in load distributing, components of a load distributing algorithm, load distributing algorithm, performance comparison, selecting a suitable load sharing algorithm, requirements for load distributing, task migration and associated issues.

Failure Recovery and Fault tolerance: introduction, basic concepts, classification of failures, backward and forward error recovery, backward error recovery, recovery in concurrent systems, consistent set of check points, synchronous and asynchronous check pointing and recovery, check pointing for distributed database systems, recovery in replicated distributed databases.

UNIT- 4

(10 Periods)

Multiprocessor operating systems: Basic multiprocessor system architectures, inter connection networks for multiprocessor systems, Multiprocessor Operating System, structures of multiprocessor operating system.

Database Operating systems: Introduction, requirements of a database operating system Concurrency control, intra concurrency control model of database systems, the problem of concurrency control, serializability theory, distributed database systems, concurrency control algorithms, basic synchronization primitives, lock based algorithms, timestamp based algorithms, optimistic algorithms, concurrency control algorithms, data replication.

Text Books:

1. Mukesh Singhal, Niranjana G. Shivaratri, "**Advanced concepts in operating systems: Distributed, Database and multiprocessor operating systems**", TMH Publishing

Reference Books:

1. Andrew S. Tanenbaum, "**Modern operating system**", PHI Publishing
2. Pradeep K. Sinha, "**Distributed operating system-Concepts and design**", PHI Publishing
3. Andrew S. Tanenbaum, "**Distributed operating system**", Pearson education.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
HUMAN RESOURCE MANAGEMENT

Semester	Course Name	PO	PEO	CO
5TH (Elective – III/IV)	Human Resource Management	PO-1, PO-2, PO-4, PO-5, PO-6, PO-7, PO-8, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6, PEO-7	<p>CO 1: To be able to understand scope of Human Resource Management in industry and its definition, role and positions.</p> <p>CO 2: To be able to understand Procurement and Placement as Need for Human Resource Planning, placement importance and induction, employment exchange etc..</p> <p>CO 3: To be able to learn field of Training & Development in human resource management.</p> <p>CO 4: To be able to understand scope of human resource management in Job analysis & Design and Human Relations and Industrial Relations.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

HUMAN RESOURCE MANAGEMENT

L	T	P	C
3	1	0	4

UNIT- 1 **(10 Periods)**

Introduction: Introduction to Human Resource Management and its definition, functions of Human Resource Management & its relation to other managerial functions. Nature, Scope and Importance of Human Resource Management in Industry, Role & position of Personnel function in the organization.

UNIT- 2 **(10 Periods)**

Procurement and Placement: Need for Human Resource Planning; Process of Human Resource Planning; Methods of Recruitment; Psychological tests and interviewing; Meaning and Importance of Placement and Induction, Employment Exchanges (Compulsory Notification of vacancies) Act 1959, The Contract Labour (Regulation & Abolition) Act 1970.

UNIT- 3 **(10 Periods)**

Training & Development: Difference between training and Development; Principles of Training; Employee Development; Promotion-Merit v/s seniority Performance Appraisal, Career Development & Planning.

UNIT- 4 **(10 Periods)**

Job analysis & Design: Job Analysis, Job Description & Job Specification, Job Satisfaction: Job satisfaction and its importance; Motivation, Factors affecting motivation, introduction to Motivation Theory; Workers Participation, Quality of work life. **Human Relations and Industrial Relations:** Difference between Human Relations and Industrial Relations, Factors required for good Human Relation Policy in Industry; Employee, Employer relationship Causes and Effects of Industrial disputes; Employees Grievances & their Redressal, Administration of Discipline, Communication in organization, Absenteeism, Labour Turnover, Changing face of the Indian work force and their environment, Importance of collective Bargaining; Role of trade unions in maintaining cordial Industrial Relations.

Text Books:

1. T.N.Chhabra, “**Human Resource Management**”, Dhanpat Rai Publishing

Reference Books:

1. Lowin B. Flippo, “**Principles of Personnel Management**”, McGraw-Hill Publishing
2. R.C. Saxena, “**Labour Problems and Social Welfare**”, K.Math Publishing
3. A Minappa and M. S. Saiyada, “**Personnel Management**”, McGraw-Hill Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
BIG DATA ANALYTICS

Semester	Course Name	PO	PEO	CO
5 th (Elective-III and Elective-IV)	Big Data Analytics	PO-1, PO-2, PO-3, PO-4, PO-5, PO-7, PO-9	PEO-1, PEO-3, PEO-4, PEO-5	<p>CO1. Acquire knowledge on overview of Big Data concepts such as Big data sources, Acquisition, Nuts & Bolts of Big data and Features of Big Data etc</p> <p>CO2. Students may get acquainted with various Data Analysis such as Convergence, analytic data sets, Analytic methods, analytic tools, Analysis approaches and Statistical significance tests etc.</p> <p>CO3. To understand the Techniques for Stream Computing such as Introduction to Streams Concepts, Stream data model and architecture, Stream Computing, Sampling data in a stream and Filtering streams etc.</p> <p>CO4. To understand the Predictive Analytics and Visualization : Predictive Analytics, Supervised, Unsupervised learning, Neural networks and Kohonen models etc.</p> <p>CO5. Students will be able to understand different types of mining algorithm concepts such as Mining Frequent item sets, Market based model, Apriori Algorithm and Handling large data sets etc.</p> <p>CO6. Students will be able to excel himself/herself as a design engineer in any industries/R&D sector, pursue his research on the design field or face any competitive examinations in engineering.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

BIG DATA ANALYTICS

L	T	P	C
3	1	0	4

UNIT- 1

(10 Periods)

Introduction to Big Data : Analytics, Nuances of big data, Value, Issues, Case for Big data, Big data sources, Acquisition, Nuts and Bolts of Big data. Features of Big Data, Security, Compliance, auditing and protection, Evolution of Big data, Best Practices for Big data Analytics, Big data characteristics, Volume, Veracity, Velocity, Variety, Data Appliance and Integration tools, Greenplum, Informatica

UNIT- 2

(10 Periods)

Data Analysis : Evolution of analytic scalability, Convergence, parallel processing systems, Cloud computing, grid computing, map reduce, enterprise analytic sand box, analytic data sets, Analytic methods, analytic tools, Cognos, Microstrategy, Pentaho. Analysis approaches, Statistical significance, business approaches, Analytic innovation, Traditional approaches, Iterative

UNIT- 3

(10 Periods)

Stream Computing : Introduction to Streams Concepts, Stream data model and architecture, Stream Computing, Sampling data in a stream, Filtering streams, Counting distinct elements in a stream, Estimating moments, Counting oneness in a window, Decaying window, Realtime Analytics Platform(RTAP) applications, IBM Infosphere, Big data at rest, Infosphere streams, Data stage, Statistical analysis, Intelligent scheduler, Infosphere Streams

UNIT- 4

(10 Periods)

Predictive Analytics and Visualization : Predictive Analytics, Supervised, Unsupervised learning, Neural networks, Kohonen models, Normal, Deviations from normal patterns, Normal behaviours, Expert options ,Variable entry, Mining Frequent itemsets, Market based model, Apriori Algorithm, Handling large data sets in Main memory, Limited Pass algorithm, Counting frequent itemsets in a stream, Clustering Techniques, Hierarchical, K- Means, Clustering high dimensional data Visualizations, Visual data analysis techniques, interaction techniques; Systems and applications

Text Books:

1. Frank J Ohlhorst, “**Big Data Analytics: Turning Big Data into Big Money**”, Wiley and SAS Business Series
2. Colleen Mccue, “**Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis**”, Elsevier
3. Michael Berthold, David J. Hand, “**Intelligent Data Analysis**”, Springer.

Reference Books:

1. Anand Rajaraman and Jeffrey David Ullman, “**Mining of Massive Datasets**”, Cambridge University Press.
2. Jiawei Han, Micheline Kamber “**Data Mining Concepts and Techniques**”, Second Edition, Elsevier

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

OBJECT ORIENTRD DESIGN

Semester	Course Name	PO	PEO	CO
5 th (Elective III & IV)	Object Oriented Design	PO-1, PO-2, PO-3, PO-4, PO-5, PO-6, PO-7, PO-8, PO-9	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6, PEO-7	<p>CO1. Graduates will be able to have an exposure to the model, architecture, design of a software development lifecycle.</p> <p>CO2. Graduates will be able to apply class, object and behavioral modelling to design OO system.</p> <p>CO3. Graduates will be able to understand accomplish the architectural view of a modeling.</p> <p>CO4. Graduates will be able to apply OOP concepts to analyze, model and design an effective Object Oriented system.</p> <p>CO5. Graduates will be able to apply concepts of Object Oriented Analysis & Processes for Projects.</p> <p>CO6. Graduates will be able to Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, State chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

OBJECT ORIENTED DESIGN

L	T	P	C
3	1	0	4

UNIT- 1

(10 Periods)

An Overview of Object Oriented Systems Development: Introduction, Two Orthogonal Views of the Software, Object Oriented Systems Development Methodology, Why an Object Orientation? **WHY WE MODEL:** The Importance of Modeling, Principles of Modeling, Object Oriented Modeling. **INTRODUCING THE UML:** An overview of the UML, A Conceptual Model of the UML, Architecture, Software Development Life Cycle

UNIT- 2 (10 Periods) Basic Structural Modeling: Classes, Relationships, Common Mechanisms, and diagrams, class

Diagrams. **Advanced Structural Modeling:** Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Object Diagrams

UNIT- 3

(10 Periods)

Basic Behavioral Modeling: Interactions, Interaction diagrams, Use cases, Use case diagrams, Activity Diagrams.

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT- 4 (10 Periods) Architectural Modeling I: Component, Deployment, Component diagrams and Deployment diagrams. **Architectural Modeling II:** Patterns and Frameworks, Collaborations, Systems and Models.

Case Study: Bank ATM Application, Railway Reservation System.

Text Books:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, “**The Unified Modeling Language User Guide**”, Pearson Education.
2. Ali Bahrami, “**Object Oriented Systems Development using the unified modeling language**”, TMH Publishing

Reference Books:

1. Atul Kahate, “**Object Oriented Analysis & Design**”, TMH Publishing
2. Mark Priestley, “**Practical Object-Oriented Design with UML**”, TMH Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

HUMAN COMPUTER INTERACTION

Semester	Course Name	PO	PEO	CO
5TH (Elective – III/IV)	Human Computer Interaction	PO-1, PO-2, PO-3, PO-5, PO-6, PO-7, PO-9	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5, PEO-6, PEO-7	<p>CO 1: Understand the Introductory concepts of Human Computer Interaction.</p> <p>CO 2: To study Design goals, Screen planning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow.</p> <p>CO 3: To be able to learn information retrieval on web and statistical graphics.</p> <p>CO 4: To study about Windows and its Components such as text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors, Software tools, Specification methods, interface, Building Tools.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

HUMAN COMPUTER INTERACTION

L	T	P	C
3	1	0	4

UNIT- 1

(10 Periods)

Introduction: Importance of user Interface, definition, importance of good design, Benefits of good design, a brief history of Screen design. The graphical user interface, popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user, Interface popularity, characteristics and Principles of user interface. Design process, Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT- 2

(10 Periods)

Screen Designing : Design goals, Screen planning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow, Visually pleasing composition, amount of information, focus and emphasis, presentation information simply and meaningfully, information retrieval on web, statistical graphics, Technological consideration in interface design.

UNIT- 3

(10 Periods)

Windows: New and Navigation schemes selection of window, selection of devices based and screen based controls. **Components:** text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors, Software tools, Specification methods, interface, Building Tools.

UNIT- 4

(10 Periods)

Interaction Devices: Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

Text Books:

1. Wilbert O Galitz, “**The essential guide to user interface design**”, Pearson Education
2. Ben Shneidermann, “**Designing the user interface**”, Pearson Education

Reference Books:

1. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell, “**Human Computer Interaction**”, Pearson Education
2. Soren Lauesen, “**User Interface Design**”, Pearson Education

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
INTELLECTUAL PROPERTY RIGHTS

Semester	Course Name	PO	PEO	CO
5 TH (Elective – III/IV)	Intellectual Property Rights	PO-1, PO-3, PO-4, PO-5, PO-7, PO-9	PEO-1, PEO-2, PEO-3, PEO-5, PEO-6, PEO-7	<p>CO 1: Understand the Introductory concepts such as types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.</p> <p>CO 2: To understand intellectual property rights & law of trademarks.</p> <p>CO 3: To understand patent law & international patent law.</p> <p>CO 4: States intellectual property rights & law of trademarks.</p> <p>CO 5: The candidate demonstrates the ability to understand the industrial dynamics of innovation.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

INTELLECTUAL PROPERTY RIGHTS	L	T	P	C
	3	1	0	4

UNIT- 1

(10 Periods)

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights. **Trade Marks:** Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT- 2

(10 Periods)

Law of copy rights: Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law. **Law of patents:** Foundation of patent law, patent searching process, ownership rights and transfer

UNIT- 3

(10 Periods)

Trade Secrets: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competiitiion: Misappropriation right of publicity, False advertising.

UNIT- 4

(10 Periods)

New development of intellectual property: new developments in trade mark law; copy right law, patent law, intellectual property audits. International overview on intellectual property, international - trade mark law, copy right law, international patent law, international development in trade secrets law.

Text Books :

1. Deborah, E. Bouchoux, “**Intellectual property rights**”, Cengage learning.
2. Prabuddha Ganguli, “**Intellectual property right - Unleashing the knowledge economy**”, Tata Mc Graw Hill Publishing Company Ltd.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)
SOFT COMPUTING

Semester	Course Name	PO	PEO	CO
5 TH (Elective – III/IV)	Soft Computing	PO-1, PO-3, PO-4, PO-5, PO-7, PO-9	PEO-1, PEO-2, PEO-3, PEO-5, PEO-6, PEO-7	CO 1: To know various Soft Computing techniques. CO 2: To know Neural Network techniques and its applications. CO 3: To know applications of advanced Neural Networks. CO 4: Get knowledge of fuzzy logic CO 5: Get knowledge of Applications of Hybrid soft computing techniques.

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

SOFT COMPUTING

L	T	P	C
3	1	0	4

UNIT- 1

(10 Periods)

Introduction to Soft Computing: Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT- 2

(10 Periods)

Genetic Algorithms: Introduction, Building block hypothesis, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, crossover, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, JSPP (Job Shop Scheduling Problem), TSP (Travelling Salesman Problem), Differences & similarities between GA & other traditional methods, Applications of GA.

UNIT- 3

(10 Periods)

Neural Networks: Machine Learning using Neural Network, Adaptive Networks, Feed Forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks, Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance Architectures, Advances in Neural Networks.

UNIT- 4

(10 Periods)

Fuzzy Logic: Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions, Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making. **Neuro-Fuzzy Modelling:** Adaptive Neuro-Fuzzy Inference Systems, Coactive Neuro-Fuzzy Modeling, Classification and Regression Trees, Data Clustering Algorithms, Rule base Structure Identification, Neuro-Fuzzy Control – Case Studies

Text Books:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, **"Neuro-Fuzzy and Soft Computing"**, PHI India
2. Kwang H.Lee, **"First course on Fuzzy Theory and Applications"**, Springer–Verlag Berlin Heidelberg

Reference Books:

1. S.N.Sivanandam, S.N.Deepa, **"Introduction To Genetic Algorithms"**, Springer
2. Eiben, Smith, **"Introduction To Evolutionary Computing"**, Springer

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

SOFTWARE PROJECT MANAGEMENT

Semester	Course Name	PO	PEO	CO
5 th (Elective III & IV)	Software Project management	PO-1, PO-2, PO-3, PO-4, PO-6, PO-7, PO-8, PO-9	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6, PEO-7	<p>CO1. Graduates will be able to Understand and practice the process of project management and its application in delivering successful projects.</p> <p>CO2. Graduates will be able to have good knowledge of the issues and challenges faced while doing the Software project Management.</p> <p>CO3. Graduates will be able to understand why majority of the software projects fails and how that failure probability can be reduced effectively.</p> <p>CO4. Graduates will be able to explain the organization of project scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques.</p> <p>CO5. Graduates will be able to understand and manage project's critical issues such as Resource planning, Risk assessment and financial Planning.</p> <p>CO6. Graduates will be able to assess the quality of the project using various metrics like quality indicators and management indicators</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

SOFTWARE PROJECT MANAGEMENT	L	T	P	C
	3	1	0	4

UNIT- 1 (10 Periods)

Introduction to Software Project Management :Project Definition, Contract Management, Activities Covered By Software Project Management, Overview Of Project Planning, Stepwise Project Planning.

Project Evaluation : Strategic Assessment, Technical Assessment, Cost Benefit Analysis, Cash Flow Forecasting, Cost Benefit Evaluation Techniques, Risk Evaluation.

UNIT- 2 (10 Periods)

Activity Planning : Objectives, Project Schedule, Sequencing and Scheduling Activities, Network Planning Models, Forward Pass, Backward Pass, Activity Float, Shortening Project Duration, Activity on Arrow Networks, Risk Management, Nature Of Risk, Types Of Risk, Managing Risk, Hazard Identification, Hazard Analysis, Risk Planning And Control.

UNIT- 3 (10 Periods)

Monitoring and Control : Creating Framework, Collecting The Data, Visualizing Progress, Cost Monitoring, Earned Value, Prioritizing Monitoring, Getting Project Back To Target, Change Control, Managing Contracts, Introduction, Types Of Contract, Stages In Contract Placement, Typical Terms Of A Contract, Contract Management, Acceptance.

UNIT- 4 (10 Periods)

Managing People and Organizing Teams : Introduction, Understanding Behavior, Organizational Behaviour: A Background, Selecting The Right Person For The Job, Instruction In The Best Methods, Motivation , The Oldman, Hackman Job Characteristics Model, Working In Groups, Becoming A Team, Decision Making, Leadership, Organizational Structures, Stress, Health And Safety

Text Books:

1. Bob Hughes, Mikecoterrell, “**Software Project Management**”, Tata McGraw Hill Publishing

Reference Books:

1. Ramesh, Gopalaswamy, “**Managing Global Projects**”, Tata McGraw Hill Publishing
2. Royce, “**Software Project Management**”, Pearson Education Publishing
3. Jalote, “**Software Project Management in Practice**”, Pearson Education Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

MARKETING SYSTEMS AND BUSINESS INTELLIGENCE

Semester	Course Name	PO	PEO	CO
5 TH (Elective – III/IV)	Marketing Systems and Business Intelligence	PO-1, PO-3, PO-5, PO-7, PO-8	PEO-1, PEO-3, PEO-4, PEO-5, PEO-6	<p>CO 1: Understand the Introductory concepts & analyze the characteristics and contributions of enterprising people.</p> <p>CO 2: To analyze the characteristics and contributions of enterprising people.</p> <p>CO 3: To be able to learn about Product Decisions.</p> <p>CO 4: Identify core concepts of marketing and the role of marketing in business and society.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER OF COMPUTER APPLICATION (MCA)

MARKETING SYSTEMS AND BUSINESS INTELLIGENCE	L	T	P	C
	3	1	0	4

UNIT- 1

(10 Periods)

Introduction: Concept, nature, scope and importance of marketing; Marketing concept and its evolution; Marketing mix; Strategic marketing planning an overview. Market Analysis and Selection: Marketing environment macro and micro components and their impact on marketing decisions; Market segmentation and positioning; Buyer behavior; consumer versus organizational buyers; Consumer decision making process. **Product Decisions:** Concept of a product; Classification of products; Major product decisions; Product line and product mix; Branding; Packaging and labeling; Product life cycle strategic implications; New product development and consumer adoption process. Pricing Decisions: Factors affecting price determination; Pricing policies and strategies; Discounts and rebates.

UNIT- 2

(10 Periods)

Distribution Channels and Physical Distribution Decisions: Nature, functions, and types of distribution channels; Distribution channel intermediaries; Channel management decisions; Retailing and wholesaling. Promotion Decisions: Communication Process; Promotion mix advertising, personal selling, sales promotion, publicity and public relations; Determining advertising budget; Copy designing and testing; Media selection; Advertising effectiveness; Sales promotion tools and techniques. **Marketing Research:** Meaning and scope of marketing research; Marketing research process. Marketing Organisation and Control: Organising and controlling marketing operations. **Issues and Developments in Marketing:** Social, ethical and legal aspects of marketing; Marketing of services; International marketing; Green marketing; Cyber marketing; Relationship marketing and other developments of marketing.

UNIT- 3

(10 Periods)

Introduction to Business Intelligence and Business Models : Design and implementation aspect of OLAP/Data Warehouse, BI Definitions & Concepts, Business Applications of BI, Role of DW in BI, BI system components, Components of Data Warehouse Architectures. **Dimensional Modelling and DW Design :** Star schema, Snow flake schema, and Fact Constellation schema, Grain of dimensional model, transactions, Recurring Snapshots, Accumulating Snapshots, Dimensions (SCD types, conformed dimensions), Clickstream Source Data (Google Analytics as a Clickstream Data Source), Facts (additive, semi-additive, non-additive), Hierarchy in dimensions, parent child relationships, Many-Many Dimensional relationship, Multi Valued Dimensions and Dimension Attributes.

UNIT- 4

(10 Periods)

Analytics concepts and use in Business Intelligence : Exploratory and statistical techniques:- Cluster analysis, Data visualization, Predictive analysis :- Regression, Time series, Data Mining :- Hierarchical clustering, Decision tree Text analytics :- Text mining, In-Memory Analytics and In-DB Analytics, Case study: Google Analytics

Text Books:

1. Kotlar, Philip, "**Marketing Management**", Prentice Hall Publishing
2. Stanton, Etzel, Walker, "**Fundamentals of Marketing**", Tata-McGraw Hill Publishing
3. Jiawei Han, Micheline Kamber, "**Data Mining: concepts and techniques**", Elsevier Publishing

Reference Books:

1. McCarthy, E.J., "**Basic Marketing: A managerial approach**", Irwin Publishing

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER IN COMPUTER APPLICATION (MCA)

ARTIFICIAL INTELLIGENCE

Semester	Course Name	PO	PEO	CO
5TH (Elective – I/II)	Artificial Intelligence	PO-1, PO-2, PO-3, PO-4, PO-5, PO-7, PO-9	PEO-1, PEO-3, PEO-4, PEO-5	<p>CO1. Graduates will be able to assess critically the techniques presented and to apply them to real world problems.</p> <p>CO2. Graduates will be able aware of the major challenges facing AI and the complexity of typical problems within the field.</p> <p>CO3. Graduates will get to understand the major areas and challenges of AI.</p> <p>CO4. Graduates will be able to apply basic AI algorithms to solve problems.</p> <p>CO5. Graduates will be able to get a knowledge of applications in different areas of computing including the web and human interaction.</p> <p>CO6. Students will be able to excel himself/herself as a design engineer in any industries/R&D sector, pursue his research on the design field or face any competitive examinations in engineering.</p>

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
DEPARTMENT OF COMPUTER APPLICATION
SYLLABUS FOR MASTER IN COMPUTER APPLICATION (MCA)

ARTIFICIAL INTELLIGENCE

Unit -1

(10 Periods)

Introduction to Artificial Intelligence: The Foundations of Artificial Intelligence, The History of Artificial Intelligence, and the State of the Art. Intelligent Agents: Introduction, How Agents should Act, Structure of Intelligent Agents, Environments. Solving Problems by Searching: problem-solving Agents, Formulating problems, Example problems, and searching for Solutions, Search Strategies, Avoiding Repeated States, and Constraint Satisfaction Search. Informed Search Methods: Best-First Search, Heuristic Functions, Memory Bounded Search, and Iterative Improvement Algorithms.

Unit-2

(10 Periods)

Agents That Reason Logically; A Knowledge-Based Agent, The Wumpus World Environment, Representation, Reasoning & Logic propositional Logic : A very simple Logic, An agent for the Wumpus World. Building a Knowledge Base; Properties of Good and Bad Knowledge Bases, Knowledge Engineering. Inference in First-Order Logic : Inference Rules Involving Quantifiers, An Example Proof. Generalized Modus Ponens, Forward and Backward, Chaining & Completeness, Resolution: A complete Inference Procedure, Completeness of Resolution.

Unit-3

(10 Periods)

Planning A Simple Planning Agent From Problem Solving to Planning. Planning in Situation Calculus. Basic Representations for Planning. A Partial-Order planning Example, A partial Order planning algorithm, Planning With partially Instantiated Operators, Knowledge Engineering for Planning. Learning in Neural and Belief Networks' How the Brain Works, Neural Networks, perceptions, Multi-layered Feed Forward Networks Applications Back propagation algorithm Applications of Neural Networks.

Unit IV-4

(10 Periods)

Knowledge in Learning: Knowledge in Learning, Explanation-based Learning, Learning Using Relevance Information, Inductive Logic Programming. Agents that Communicate: Communication as action, Types of Communicating Agents, A Formal Grammar for A subset of English Syntactic Analysis (Parsing), Definite Clause Grammar (DCG), Augmenting A Grammar. Semantic Interpretation. Ambiguity and Disambiguation.

Text Books:

1. Russell S.J. & Norvig P, Artificial Intelligence – A modern Approach (ISBN 0-131-038-052) Prentice Hall Inc, 2002.
2. Winston P.H, Artificial Intelligence (3rd Edigion), McGraw Hill.
3. E.Rich and K.Knight, Artificial Intelligence, - TMH

Text Books:

1. Padhy N.P., Artificial Intelligence and Intelligence Systems, Oxford