



माँ शाकुम्भरी विश्वविद्यालय, सहारनपुर
Maa Shakumbhari University, Saharanpur

Syllabus

B.Voc.(IT)

For

Affiliated Colleges

Maa Shakumbhari University, Saharanpur

From the Session 2023-24

(Prof. Karamjit Bhatia)

(Prof. Mahesh Kumar)

(Prof. Naveen Kumar Sharma)

(Dr. Jay Prakash)

(Prof. Praveen Kumar)

Course Objective

B.Voc.(IT) is an undergraduate academic degree program that is focused on providing students with a strong foundation in computer science and applications. The program is designed to provide students with a comprehensive understanding of computer science, software development, and computer applications.

The duration of the B.Voc.(IT) program is three years, and it is divided into six semesters. The course curriculum of B.Voc.(IT) includes subjects such as computer programming, data structures, algorithms, software engineering, computer networks, database management systems, web development, and computer graphics.

The program also includes practical sessions, lab assignments, and project work to provide hands-on experience to the students. The objective of the B.Voc.(IT) program is to prepare students for a career in the field of computer science and technology.

After completing the B.Voc.(IT) program, students can pursue higher education in the field of computer science or technology, or they can start their career as a software developer, web developer, database administrator, or IT consultant

Eligibility Criteria

10+2 With 45% (SC 40%) Marks in any discipline with Maths at 10th or 12th Standard compulsory.

B.Voc. (IT)**Year -I, Semester-I**

Semester	Paper	Course Code	Course Title	Th/ Pr	Credits	(MM-100)		Min Marks	Min Marks
						IE	UE	UE	Total
B.Voc. (IT)-1 SEM	1	0197901	Mathematical Foundation for Computer Science	TH	4	25	75	25	40
	2	0197902	Computer Fundamental & Office Automation	TH	4	25	75	25	40
	3	0197903	Programming in “C”	TH	4	25	75	25	40
	4	0197904	Digital Electronics & Computer Organization	TH	4	25	75	25	40
	5	0197980	C & OFFICE LAB	PR	4	-	100		40
	6	0120008	Value added course Environmental Studies	TH	2 Qualifying		100		33

Year- I, Semester-II

Semester	Paper	Course Code	Course Title	Th/ Pr	Credits	(MM-100)		Min Marks	Min Marks
						IE	UE	UE	Total
B.Voc. (IT)-2 SEM	1	0297901	Mathematics-I	TH	4	25	75	25	40
	2	0297902	Advance C-Programming	TH	4	25	75	25	40
	3	0297903	Computer Architecture & Assembly language	TH	4	25	75	25	40
	4	0297904	Principle of Management	TH	4	25	75	25	40
	5	0297980	C Prog. Lab.	PR	4	-	100		40

Year - 2, Semester-III

Semester	Paper	Course Code	Course Title	Th/ Pr	Credits	Evaluation (MM-100)		Min Marks	Min Marks
						IE	UE	UE	Total
B.Voc. (IT)-3 SEM	1	0397901	Object Oriented Programming Using C++	TH	5	25	75	25	40
	2	0397902	Data Structure Using C & C++	TH	5	25	75	25	40
	3	0397903	Operating System concepts	TH	5	25	75	25	40
	4	0397904	Numerical Methods	TH	5	25	75	25	40
	5	0397980	C++ & DS LAB	PR	4	-	100		40

Year - 2, Semester - IV

Semester	Paper	Course Code	Course Title	Th/ Prac	Credits	Evaluation (MM-100)		Min Marks	Min Marks
						IE	UE	UE	Total
	1	0497901	Introduction to Python	TH	5	25	75	25	40
	2	0497902	Software Engineering	TH	5	25	75	25	40
	3	0497903	Introduction to DBMS	TH	5	25	75	25	40
	4	0497904	Optimization Techniques	TH	5	25	75	25	40
	5	0497980	Python Prog. & DBMS LAB	PR	4	-	100		40

Year - 3, Semester - V

Semester	Paper	Course Code	Course Title	Th/ Prac	Credits	Evaluation (MM-100)		Min Marks	Min Marks
						IE	UE	UE	Total
B.Voc. (IT)-5 SEM	1	0597901	Java Programming	TH	5	25	75	25	40
	2	0597902	Computer Network	TH	5	25	75	25	40
	3	0597904 0597905	Elective –Any one of the following (A) IT Trends & Technologies (B) Introduction to STATISTICS	TH	5	25	75	25	40
	4	0597965	Minor Project	PR	5	100			40
	5	0597980	Java LAB	P	4		100		40

Year - 3, Semester - VI

Semester	Paper	Course Code	Course Title	Th/ Pr	Credits	Evaluation (MM-100)		Min Marks	Min Marks
						IE	UE	UE	Total
B.Voc. (IT)-6 SEM	1	0697901	Computer Network Security	TH	5	25	75	25	40
	2	0697902	E-Commerce	TH	5	25	75	25	40
	3	0697903 0697904	Elective – Any one of the following (A)Cloud Computing (B)Data Ware Housing & Data Mining	TH	5	25	75	25	40
	4	0697965	Major Project	PR	9		100	40	40

Detail Syllabus (Semester-wise)

SEMESTER-I

Course Code	Course Name
0197901	Mathematical Foundation for Computer Science
0197902	Computer Fundamental and Office Automation
0197903	Programming in “C”
0197904	Digital Electronics & Computer Organization
0197980	Computer Laboratory and Practical Work of Computer Fundamental and Office Automation & Programming in “C”
0120008	Environmental Studies

Course Name: Mathematical Foundation for Computer Science
Course Code: 0197901 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Matrix Theory Review of fundamentals, equivalent matrices, elementary row (column) operations, rank of a matrix by reducing it to the normal form, rank of a matrix by reducing it to echelon form.

UNIT-II

Mathematical Logic Connectives, Negation, Conjunction, Disjunction, conditional, bi-conditional, statement formulas, Tautology and contradiction, Equivalence formulae
Normal forms: Principle conjunctive and disjunctive normal forms, Theory of inferences for statement calculus validating using truth tables.

UNIT-III

Graph Theory: Definition of a Graph, Finite and infinite Graphs, Incidence and Degree of a vertex, Null Graph, Sub graphs, Walks, Paths, Circuits, Connected, Disconnected graphs and Components, Euler Graph, Hamiltonian Path and Hamiltonian Circuits.

UNIT-IV

Trees and Matrix Representation: Properties of Trees, Distance and Centres in a Tree, Rooted and Binary Trees, Spanning Trees and Fundamental Circuits. Cutset, properties of a Cutset. Matrix Representation of graphs: Incidence matrix, Circuit matrix, Fundamental Circuit matrix, Cutset matrix, Path matrix, Adjacency matrix

Planar and Dual Graphs Planar Graphs, Kuratowski's two Graphs, Different Representations of a Planar Graph, Detection of Planarity.

UNIT-V

Directed Graphs: Definition, Some types of Digraphs, Digraphs and Binary relations, Directed paths and Connectedness, Euler Digraphs, Trees with directed edges, Fundamental Circuits in Digraphs, Adjacency Matrix of a Digraph.

Referential Books:

- Engineering Mathematics by H.C. Das, Chand publications.
- Graph theory – Narasingh Deo
- Discrete mathematical Structures by J.P. Trembley and R. Manohar, TMH Publications.
- Discrete Mathematics by Liu.
- B.Voc.(IT), Mathematics Vol-II G.K. Ranganath and B. Soorya Narayana.

Course Name: Computer Fundamental and Office Automation

Course Code: 0197902 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Introduction to Computers

Introduction, Characteristics of Computers, Block diagram of computer. Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers, Super Computers. Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages). Data Organization, Drives, Files, Directories. Types of Memory (Primary And Secondary) RAM, ROM, PROM, EPROM. Secondary Storage Devices (FD, CD, HD, Pen drive) I/O Devices (Scanners, Plotters, LCD, Plasma Display) Number Systems, Introduction to Binary, Octal, Hexadecimal system Conversion, Simple Addition, Subtraction, Multiplication

UNIT-II

Algorithm and Flowcharts

Algorithm: Definition, Characteristics, Advantages and disadvantages, Examples, Flowchart: Definition, Define symbols of flowchart, Advantages and disadvantages, Examples

UNIT-III

Operating System and Services in O.S.

DOS History, Files and Directories, Internal and External Commands, Batch Files, Types of Operative System.

UNIT-IV

Windows Operating Environment

Features of MS – Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons, Windows Accessories, Notepad, Paintbrush.

UNIT-V

Editors and Word Processors

Basic Concepts, Examples: MS-Word, Introduction to desktop publishing.

UNIT-VI

Spreadsheets and Database packages

Purpose, usage, command, MS-Excel, Creation of files in MS-Access, Switching between application, MS-PowerPoint.

Referential Books:

- Fundamentals of computers-By P.K.Sinha.
- Fundamentals of computers-By V.Rajaraman B.P.B Publications
- M.S-Office 2000 – By Steve Sagman

Course Name: Programming in “C”

Course Code: 0197903

Internal/External Marks: 25/75

Credit: 5

UNIT-I

Introduction to ‘C’ Language History, Structures of ‘C’ Programming, Function as building blocks.

Language Fundamentals Character set, C Tokens, Keywords, Identifiers, Variables, Constant, Data Types, and Comments.

UNIT-II

Operators: Types of operators, Precedence and Associativity, Expression, Statement and types of statements

Build in Operators and function Console based I/O and related built in I/O function: printf(), scanf(), getch(), getchar(), putchar(); Concept of header files, Preprocessor directives: #include, #define.

UNIT-III

Control structures :Decision making structures: If, If-else, Nested If-else, Switch; Loop Control structures: While, Do-while, for, Nested for loop; other statements: break, continue, goto, exit

UNIT-IV

Simple Arithmetic Problems

Addition / Multiplication of integers, Determining if a number is +ve / -ve / even / odd, Maximum of 2 numbers, 3 numbers, Sum of first n numbers, given n numbers, Integer division, Digit reversing, Table generation for n, ab, Factorial, sine series, cosine series, nC_r , Pascal Triangle, Prime number, Factors of a number, Other problems such as Perfect number, GCD numbers etc (Write algorithms and draw flowchart), Swapping

UNIT-V

Functions

Basic types of function, Declaration and definition, Function call, Types of function, Parameter passing, Call by value, Call by reference, Scope of variable, Storage classes, Recursion.

Reference Books:

- Let us C-Yashwant Kanetkar
- Programming in C-Balguruswamy
- The C programming Lang., Pearson Ecl - Dennis Ritchie

Course Name: Digital Electronics and Computer Organisation

Course Code: 0197904 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Logic gates and circuit

Gates (OR, AND, NOR, NAND, XOR & XNOR); Demorgan's laws; Boolean laws, Circuit designing techniques (SOP, POS, K-Map).

UNIT-II

Combinational Building Blocks: Multiplexes; Decoder; Encoder; Adder and Subtractor.

UNIT-III

Memories

ROMs, PROMs, EPROMs, RAMs, Hard Disk, Floppy Disk and CD-ROM.

UNIT-IV

Sequential Building Blocks

Flip-Flop (RS, D, JK, Master-slave & T flip-flops); Registers & Shift registers; Counters; Synchronous and Asynchronous Designing method.

UNIT-V

Memory Organization: Basic cell of static and dynamic RAM; Building large memories using chips; Associative memory; Cache memory organisation and Virtual memory organisation.

Referential Books:

- Digital Logic and Computer design (PHI) 1998 : M.M. Mano
- Computer Architecture (PHI) 1998 : M.M. Mano
- Digital Electronics (TMH) 1998 : Malvino and Leach
- Computer Organization and Architecture : William Stallings

Syllabus of Value Added Course in Environmental Studies for UG programmes

Course Title: Environmental Studies

Credits-2

Max Marks: 100

Max Marks:100 Marks.

Duration:2 Hrs

Learning objectives: This course attempts to create pro-environment attitude and a behavioral pattern in student community and society that attaches importance and priority to create sustainable life style and awareness on various environmental issues.

Learning outcomes: This course is expected to inculcate a critical thinking on various dimensions of environment through knowledge, skill, critical thinking and problem-solving

Unit 1: Understanding the Environment

- 1.1. Environment: concept, importance and components
- 1.2. Ecosystem: Concept and structure of Ecosystem
- 1.3 Functions of Ecosystem: Food chain, Food Web, Ecological Pyramids and Energy Flow
- 1.4. Ecosystem services: (Provisioning, regulating and cultural)

Unit 2: Natural resources and Environmental Pollution

- 2.1. Natural resources: Renewable and non-renewable (Global status, distribution and production)
- 2.2. Management of natural resources: Individual, community and government managed
- 2.3. Air, water and soil pollution: Causes, consequences and control
- 2.4. Solid waste management: Collection, segregation, transportation and disposal; 3R's

UNIT 3: Biodiversity and Issues in Environment

- 3.1 Concept of Biodiversity - levels, values and hot spots of Biodiversity
- 3.2 Threats to biodiversity and conservation of Biodiversity
- 3.3 Climate change, causes and consequences
- 3.4 Concept and objectives of Environmental Education, Environmental Ethics

UNIT-IV Introduction to Environment

- 4.1. Introduction to Environment, components of Environment and need of Environmental Education
- 4.2. Environmental Pollution-Types and effects on human beings and Environment
- 4.3. Human Population explosion and exploitation of Natural resources

UNIT V- Global Environmental issues

- 5.1. Global Warming and Climate Change, Ozone Depletion and Acid Rain.
- 5.2. Conventional and non-conventional Energy resources
- 5.3. Global Biodiversity loss and Species Extinction

Unit VI: Environmental law and policy

- 6.1 Constitutional provisions for environmental protection (article 21, 48A, 51A), Environment Protection Act, 1986
- 6.2 The National Green Tribunal Act, 2010
- 6.3 National Environment Policy-2006

Unit VII: Environmental Protocols and Movements

- 7.1 Earth Summit and role of IPCC in Climate Change Monitoring
- 7.2 Kyoto Protocol and Montreal Protocol
- 7.3 Green Belt Movement and Chipko Movement

1. Suggested Reading:

1. Asthana, D. K. Text Book of Environmental Studies. S. Chand Publishing.
2. Basu, M., Xavier, S., Fundamentals Of Environmental Studies, Cambridge University Press, Basu, R. N. (Ed.) Environment. University of Calcutta, Kolkata.
3. Bharucha, E., Textbook of Environmental Studies for Undergraduate Courses. Universities Press.
4. Miller T.O. Jr., Environmental Science, Wadsworth Publishing Co. Wagner K.D. Environmental Management. W.B. Saunders Co. Philadelphia, USA
5. Conover, M. 2001 Resolving Human Wildlife Conflict, CRP Press.
6. Dickman, A.J.2010.Complexities of Conflict: the importance of considering social factors for effectively resolving human-wildlife conflict, Animal Conservation 13:458-466.
7. Thangavel, P. & Sridevi, G.2015.Environmental Sustainability: Role of Geen Technologies. Springer Publications.
8. Shastri, S.C. 2015, Environmental Law, Eastern Book Company.
9. Rao, M.N. &Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt.Ltd.
10. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
11. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi1992.
12. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
13. Latifi, N.R., Akhter, S. 2022. Environmental Sciences, Wisdom Press.
14. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
15. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.

SCHEME OF EXAMINATION

The paper shall consist of 100 objective question of 100 marks. There are VII units in the syllabus paper setter have to take at least 10 question from each unit.

SEMESTER -II

Course Code	Course Name
0297901	Mathematics-I
0297902	Advance C-Programming
0297903	Computer Architecture & Assembly language
0297904	Principle of Management
0297980	Practical Work of Advance- C Programming

Course Name: Mathematics-I

Course Code: 0297901 Internal/External Marks: 25/75 Credit: 5

UNIT-I (SETS)

Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Compliments of Sets, Cartesian Product, Cardinality of Set, Simple Applications.

UNIT-II (RELATIONS AND FUNCTIONS)

Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions, Introduction of Trigonometric, Logarithmic and Exponential Functions.

UNIT-III (PARTIAL ORDER RELATIONS AND LATTICES)

Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, glb, lub, Lattices & Algebraic Systems, Principle of Duality.

UNIT-IV. (DETERMINANTS)

Definition, Minors, Cofactors, Properties of Determinants MATRICES: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, Cramers Rule, Rank of Matrix Dependence of Vectors, Eigen Vectors of a Matrix, Caley-Hamilton Theorem (without proof).

UNIT-V. (LIMITS & CONTINUITY)

Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity at a Point, Continuity Over an Interval, Intermediate Value Theorem, Type of Discontinuities

UNIT-VI. (DIFFERENTIATION & INTEGRATION)

Derivative, Derivatives of Sum, Differences, Product & Quotients, Chain Rule, Derivatives of Composite Functions, Logarithmic Differentiation
Integral as Limit of Sum, Fundamental Theorem of Calculus (without proof.), Indefinite Integrals, Methods of Integration Substitution, By Parts.

Referential Books:

- S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.
- Shanti Narayan, "Integral Calculus", S. Chand & Company, 1999
- Kolman, Busby and Ross, "Discrete Mathematical Structure", PHI, 1996.
- S.K.Sarkar, "Discrete Maths"; S. Chand & Co., 2000

Course Name: Advance C-Programming

Course Code: 0297902 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Arrays : Definition, declaration and initialization of one dimensional array; Accessing array elements; Displaying array elements; Sorting arrays; Arrays and function; Two-Dimensional array: Declaration and Initialization, Accessing and Displaying, Memory representation of array [Row Major, Column Major]; Multidimensional array

UNIT-II

Pointers: Definition and declaration, Initialization; Indirection operator, address of operator; pointer arithmetic; dynamic memory allocation; arrays and pointers; function and pointers

UNIT-III

Strings: Definition, declaration and initialization of strings; standard library function: strlen(), strcpy(), strcat(), strcmp(); Implementation without using standard library functions

UNIT-IV

Structures : Definition and declaration ; Variables initialization; Accessing fields and structure operations; Nested structures; Union: Definition and declaration; Differentiate between Union and structure

UNIT-V

Introduction C Preprocessor: Definition of Pre-processor; Macro substitution directives; File inclusion directives; Conditional compilation

Bitwise Operators

Bitwise operators; Shift operators; Masks; Bit field

UNIT-VI

File handling: Definition of Files, Opening modes of files; Standard function: fopen(), fclose(), feof(), fseek(), rewind(); Using text files: fgetc(), fputc(), fscanf() Command line arguments.

Referential Books:

- Let us C-Yashwant Kanetkar
- Programming in C-Balguruswamy
- The C programming Lang., Pearson Ecl - Dennis Ritchie

Course Name: Computer Architecture & Assembly Language

Course Code: 0297903 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Basic computer organization and design, Instructions and instruction codes, Timing and control/ instruction cycle, Register/ Types of register/ general purpose & special purpose registers/ index registers, Register transfer and micro operations/ register transfer instructions, Memory and memory function, Bus/ Data transfer instructions, Arithmetic logic micro-operations/ shift micro- operations, Input/ Output and interrupts, Memory reference instructions, Memory interfacing memory/ Cache memory.

UNIT-II

Central Processing Unit: General Register Organization/ stacks organizations instruction formats, addressing modes, Data transfer and manipulation. Program control reduced computer, pipeline/ RISC/ CISC pipeline vector processing/ array processing.; Arithmetic Algorithms: Integer multiplication using shift and add, Booth's algorithm, Integer division, Floating-point representations.

UNIT-III

Computer Arithmetic: Addition, subtraction and multiplication algorithms, divisor algorithms. Floating point, arithmetic operations, decimal arithmetic operations, decimal arithmetic operations.

UNIT-IV

Input – Output Organization: Peripheral devices, Input/output interface, ALU Asynchronous Data transfer, mode of transfer, priority interrupts, Direct memory Address (DMA), Input/ Output processor (IOP), serial communication.

UNIT-V

Evaluation of Microprocessor: Overview of Intel 8085 to Intel Pentium processors Basic microprocessors, architecture and interface, internal architecture, external architecture memory and input/ output interface.

UNIT-VI

Assembly language, Assembler, Assembly level instructions, macro, use of macros in I/C instructions, program loops, programming arithmetic and logic subroutines, Input-Output programming.

Referential Books:

- Leventhal, L.A, "Introduction to Microprocessors", Prentice Hall of India . Mathur, A.P.,
- "Introduction to Microprocessors" , Tata McGraw Hill
- Rao,P.V.S., "Prospective in Computer Architechture" , Prentice Hall of India

Course Name: Principle of Management

Course Code: 0297904 Internal/External Marks: 25/75 Credit: 5

UNIT-I Nature of Management:

Meaning, Definition, it's nature purpose, importance & Functions, Management as Art, Science & Profession- Management as social System Concepts of management- Administration- Organization, Management Skills, Levels of Management.

UNIT-II Evolution of Management Thought:

Contribution of F.W.Taylor, Henri Fayol, Elton Mayo, Chester Barhard & Peter Drucker to the management thought. Business Ethics & Social Responsibility: Concept, Shift to Ethics, Tools of Ethics.

UNIT-III Functions of Management: Part-I

Planning – Meaning- Need & Importance, types, Process of Planning, Barriers to Effective Planning, levels – advantages & limitations. Forecasting- Need & Techniques

Decision making-Types - Process of rational decision-making & techniques of decision-making

Organizing – Elements of organizing & processes: Types of organizations, Delegation of authority – Need, difficulties Delegation – Decentralization

Staffing – Meaning & Importance, Direction – Nature – Principles, Communication – Types & Importance

UNIT-IV Functions of Management: Part-II

Motivation – Importance – theories

Leadership – Meaning –styles, qualities & function of leader Controlling - Need, Nature, importance, Process & Techniques, Total Quality Management Coordination – Need – Importance

UNIT – V

Management of Change: Models for Change, Force for Change, Need for Change, Alternative Change Techniques, New Trends in Organization Change, Stress Management.

UNIT-VI Strategic Management

Definition, Classes of Decisions, Levels of Decision, Strategy, Role of different Strategist, Relevance of Strategic Management and its Benefits, Strategic Management in India

Referential Books:

- Essential of Management - Horold Koontz and Itainz Weibrich- McGrawhills International
- Management Theory & Practice - J.N.Chandan
- Essential of Business Administration - K.Aswathapa, Himalaya Publishing House
- Principles & practice of management - Dr. L.M.Parasad, Sultan Chand & Sons - New Delhi

SEMESTER -III

Course Code	Course Name
0397901	Object Oriented Programming Using C++
0397902	Data Structure Using C & C++
0397903	Operating System concepts
0397904	Numerical Methods
0397980	Computer Laboratory and Practical Work of OOPS prog using C++ & DS

Course Name: Object Oriented Programming Using C++

Course Code: 0397901 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Introduction : Introducing Object – Oriented Approach, Relating to other paradigms {Functional, Data decomposition}.

Basic terms and ideas: Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++ - cin, cout, new, delete, operators.

UNIT-II

Classes and Objects: Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, State identity and behaviour of an object, Constructors and destructors, instantiation of objects, Default parameter value, object types, C++ garbage collection, dynamic memory allocation, Meta class / abstract classes.

UNIT-III

Inheritance and Polymorphism: Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric Polymorphism

UNIT-IV

Generic function: Template function, function name overloading, overriding inheritance methods, Run time polymorphism, Multiple Inheritance.

UNIT-V

Files and Exception Handling: Streams and files, Namespaces, Exception handling, Generic Classes

Referential Books:

- R.Lafore, “Object Oriented Programming using C++”, Galgotia Publications, 2004 4. D.Parasons.
- “Object Oriented Programming using C++”, BPB Publication.

Course Name: Data Structure Using C & C++

Course Code: 0397902 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Introduction to Data Structure and its Characteristics Array

Representation of single and multidimensional arrays; Sparse arrays – lower and upper triangular matrices and Tri diagonal matrices with Vector Representation also.

UNIT-II

Stacks and Queues : Introduction and primitive operations on stack; Stack application; Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion between prefix, infix and postfix, introduction and primitive operation on queues, D- queues and priority queues.

UNIT-III

Lists: Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion searching, Two way lists and Use of headers

UNIT-IV

Trees: Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion; Binary Search Tree

UNIT-V

B-Trees: Introduction, The invention of B-Tree; Statement of the problem; Indexing with binary search trees; a better approach to tree indexes; B-Trees; working up from the bottom; Example for creating a B-Tree

UNIT-VI

Sorting Techniques; Insertion sort, selection sort, merge sort, heap sort, searching Techniques: linear search, binary search and hashing

Referential Books:

- E.Horowitz and S.Sahani, “ Fundamentals of Data structures”, Galgotia Book source Pvt. Ltd.2003
- R.S.Salaria, “ Data Structures & Algorithms” , Khanna Book Pblishing Co. (P) Ltd.,2002
- . Y.Langsam et. Al., “ Data Structures using C and C++” , PHI, 1999

Course Name: Operating System Concepts

Course Code: 0397903 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Introduction, What is an operating system, Simple Batch Systems, Multi-programmed Batch systems, Time- Sharing Systems, Personal – Computer Systems, Parallel systems, Distributed systems, Real- Time Systems.

Memory Management: Background, Logical versus physical Address space, swapping, Contiguous allocation, Paging, Segmentation

Virtual Memory: Demand Paging, Page Replacement, Page- replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations

UNIT-II

Processes: Process Concept, Process Scheduling, Operation on Processes

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple – Processor Scheduling.

Process Synchronization: Background, The Critical – Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization

UNIT-III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

UNIT-IV

Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering, Secondary Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap- Space Management, Disk Reliability

UNIT-V

Information Management: Introduction, A Simple File system, General Model of a File System, Symbolic File System, Basic File System, Access Control Verification, Logical File System, Physical File system File – System Interface; File Concept, Access Methods, Directory Structure, Protection, Consistency Semantics File – System Implementation: File – System Structure, Allocation Methods, Free- Space Management

Referential Books:

- Silberschatz and Galvin, “ Operating System Concepts”, Person, 5th Ed. 2001
- Madnick E., Donovan J., “ Operating Systems:”,Tata McGraw Hill,2001
- Tannenbaum, “Operating Systems”, PHI, 4th Edition, 2000

Course Name: Numerical Methods

Course Code: 0397904 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Roots of Equations: Bisections Method, False Position Method, Newton's Raphson Method, Rate of convergence of Newton's method.

UNIT-II

Interpolation and Extrapolation : Finite Differences, The operator E, Newton's Forward and Backward Differences, Newton's dividend differences formulae, Lagrange's Interpolation formula for unequal Intervals, Gauss's Interpolation formula, Starling formula, Bessel's formula, Laplace-Everett formula.

UNIT-III

Numerical Differentiation Numerical Integration : Introduction, direct methods, maxima and minima of a tabulated function, General Quadratic formula, Trapezoidal rule, Simpson's One third rule, Simpson's three- eight rule.

UNIT-IV

Solution of Linear Equation: Gauss's Elimination method and Gauss's Siedel iterative method.

UNIT-V

Solution of Differential Equations: Euler's method, Picard's method, Fourth-order Ranga – Kutta method.

Referential Books:

- Scarbourogh, "Numerical Analysis".
- Gupta & Bose S.C. "Introduction to Numerical Analysis, "Academic Press, Kolkata,
- S.S.Shashtri, " Numerical Analysis", PHI

SEMESTER -IV

Course Code	Course Name
0497901	Introduction to Python
0497902	Software Engineering
0497903	Introduction to DBMS
0497904	Optimization Techniques
0497980	Computer Laboratory and Practical Work of PYTHON & DBMS

Course Name: Introduction to Python

Course Code: 0497901 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Planning the computer program: concept of problem solving, problem definition, program design, debugging, types of errors in programming, documentation. Techniques of problem solving: flowcharting, decision table, algorithms, structured programming concepts, programming methodologies viz. Top-down and bottom-up programming. Overview of programming: structure of a python program, elements of pythonMemory

UNIT-II

Introduction to python: python interpreter, using python as calculator, python shell, indentation. Atoms, identifiers and keywords, literals, strings, operators (arithmetic operator, relational operator, logical or Boolean operator, assignment, operator, ternary operator, bit wise operator, increment or decrement operator) Creating python programs: input and output statements, control statements(branching, looping, conditional statement, exit function, difference between break, continue and pass.), defining functions, default arguments, errors and exceptions. Iteration and recursion: conditional execution, alternative execution, nested conditionals, the return statement.

UNIT-III

Recursion, stack diagrams for recursive functions, multiple assignment, the while statement, tables, two-dimensional tables Strings and lists: string as a compound data type, length, traversal and the for loop, string slices, string comparison, a find function.

UNIT-IV

Looping and counting, list values, accessing elements, list length, list membership, lists and for loops, list operations, list deletion. Cloning lists, nested lists Object oriented programming: introduction to classes, objects and methods, standard libraries.

UNIT-V

Data structures: arrays, list, set, stacks and queues. Searching and sorting: linear and binary search, bubble, selection and insertion sorting.

Referential Books:

- T. Budd, Exploring Python, TMH, 1st Ed, 2011
- How to think like a computer scientist: learning with Python / Allen Downey, Jeffrey Elkner, Chris Meyers.

Course Name: Software Engineering

Course Code: 0497902 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Software Engineering: Definition and paradigms, A generic view of software engineering.

UNIT-II

Requirements Analysis: Statement of system scope, isolation of top level processes and entities and their allocation to physical elements, refinement and review.

Analyzing a problem, creating a software specification document, review for correctness, consistency, and completeness.

UNIT-III

Designing Software Solutions: Refining the software Specification; Application of fundamental design concept for data, architectural and procedural designs using software blue print methodology and object oriented design paradigm; Creating design document: Review of conformance to software requirements and quality.

UNIT-IV

Software Implementation: Relationship between design and implementation, Implementation issues and programming support environment, Coding the procedural design, Good coding style and review of correctness and readability.

UNIT-V

Software Maintenance: Maintenance as part of software evaluation, reasons for maintenance, types of maintenance (Perceptive, adoptive, corrective), designing for maintainability, techniques for maintenance.

UNIT-VI

Comprehensive examples using available software platforms/case tools, Configuration Management.

Referential Books:

- K.K.Aggarwal & Yogesh Singh “Software engineering”, 2nd Ed., New Age International 2005.
- I.Sommerville, “Software Engineering”, Addison Wesley, 2002.
- James Peter, W. Pedrycz, “Software Engineering: An Engineering Approach” John Wiley & Sons

Course Name: Introduction to DBMS

Course Code: 0497903 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Introduction: Characteristics of database approach, data models, DBMS architecture and data independence.

UNIT-II

E-R Modeling: Entity types, Entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modeling, Sub classes; Super classes, inheritance, specialization and generalization.

UNIT-III

File Organization: Indexed sequential access files; implementation using B & B++ trees, hashing, hashing functions, collision resolution, extendible hashing, dynamic hashing approach implementation and performance.

UNIT-IV

Relational Data Model: Relational model concepts, relational constraints, relational algebra

SQL: SQL queries, programming using SQL.

UNIT-V

EER and ER to relational mapping: Data base design using EER to relational language.

UNIT-VI

Data Normalization: Functional Dependencies, Normal form up to 3rd normal form.

Concurrency Control: Transaction processing, locking techniques and associated, database recovery, security and authorization. Recovery Techniques, Database Security

Referential Books:

- Abraham Silberschatz, Henry Korth, S.Sudarshan, "Database Systems Concepts", 4 th Edition, McGraw Hill, 1997.
- Jim Melton, Alan Simon, "Understanding the new SQL: A complete Guide", Morgan
- A.K.Majumdar, P. Bhattacharya, "Database Management Systems", TMH, 1996.
- Bipin Desai, "An Introduction to database systems", Galgotia Publications, 1991.

Course Name: Optimization Techniques

Course Code: 0497904 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Linear programming

Central Problem of linear Programming various definitions included Statements of basic theorem and also their properties, simplex methods, primal and dual simplex method, transport problem, tic-tac problem, and its solution. Assignment problem and its solution. Graphical Method Formulation, Linear Programming Problem.

UNIT-II

Queuing Theory

Characteristics of queuing system, Classification of Queuing Model Single Channel Queuing Theory, Generalization of steady state M/M/1 queuing models(Model-I, Model-II).

UNIT-III

Replacement Theory

Replacement of item that deteriorates replacement of items that fail. Group replacement and individual replacement.

UNIT-IV

Inventory Theory

Cost involved in inventory problem- single item deterministic model economics long size model without shortage and with shorter having production rate infinite and finite.

UNIT-V

Job Sequencing

Introduction, solution of sequencing problem Johnson s algorithm for n jobs through 2 machines

Referential Books:

- Gillet B.E. “Introduction to Operation Research”
- Taha,H.A. “Operation Research - an introduction”
- Kanti Swarup “Operation Research”

SEMESTER -V

Course Code	Course Name
0597901	Java Programming
0597902	Computer Network
0597903 or 0597904	Elective -I (A) IT Trends & Technologies or (B) INTRODUCTION TO STATISTICS
0597965	Minor Project
0597980	Computer Laboratory and Practical Work of Java

Course Name: Java Programming

Course Code: 0597901 Internal/External Marks: 25/75 Credit: 5

UNIT-I

JAVA DATA TYPES AND OPERATORS: Genesis of Java: Creation of Java, why java is important to internet, The java Buzz words, An overview of Java Object Oriented Programming. Data types: Simple types, Integers, Floating point types, characters, Booleans, A closer Look at Literals, Variables, Type conversion and casting, Automatic type promotion in Expressions, Strings. Arrays: One Dimensional Array, Multi Dimensional Array. Operator: Arithmetic Operators, Bitwise operators, Relational operators, Boolean Logical operators, Assignment operators – Conditional operators–Operator Precedence

UNIT-II

INTRODUCING CLASSES, METHODS AND INHERITANCE Class Fundamentals, Declaring objects, Assigning object Reference variables, Introducing Methods, Constructors, Garbage collection, Finalize () Method, Stack class. A Closer Look at Methods and classes: Overloading Methods, Using object as parameters, Argument passing, Returning objects, Recursion, Introducing Access control, understanding static, Introducing final, Nested and Inner classes, String class, Using command line arguments. Inheritance Basics, Using super creating Multilevel Hierarchy, Method overriding, Dynamic Method Dispatch Using Abstract class, Using final with inheritance, The object class.

UNIT-III

PACKAGES, INTERFACES, EXCEPTION HANDLING AND MULTITHREADING:

Packages Access Protection Importing packages Interfaces. Exception Handling Introduction – Exception Types Uncaught Exceptions Using try and catch Multiple catch clauses –Nested try statements – throw- throws- finally Java's Built in Exception creating your own Exception subclasses. Multithreaded Programming: Java Thread Model – Main Thread Creating a Thread - Creating Multiple Threads Using is Alive () and join () Thread priorities Synchronization Inter thread Communication Suspending Resuming: and stopping Threads – Using Multithreading

UNIT-IV

APPLETS AND EVENT HANDLING:

I/O, Applets and other topics: I/O Basics Reading console Input – writing console output – The Print Writer class – Reading and Writing Files. The Applet class: Applet Basics – Applet Architecture – Applet Skeleton – Applet Display method – Requesting Repainting – HTML APPLET tag- Passing Parameters to Applet – Audio Clip Interface. Event Handling Mechanisms – Delegation Event Model – Event classes (The Action Event Item Event, Key Event, Mouse Event) – Sources of Events – Event Listener Interfaces (Action Listener, Item Listener, Key Listener, Mouse Listener) – Adapter Classes.

UNIT-V

INTRODUCING AWT AND AWT CONTROLS:

AWT Classes – Window fundamentals – working with Frame Windows - working with Graphic Using AWT controls: Controls fundamentals – Labels – using Buttons – Applying check Boxes – Check Box group – Choice controls – Using a Text field – Using a Text Area – Understanding Layout Managers (Flow Layout only) – Menu Bars and Menus.

Referential Books:

- Introduction to OOP through Java – ISRD Group Tata McGraw hill.
- Programming with Java - a primer 3/E E. BALAGURUSWAMY.
- Patrick Naughton and Herbertz Schildt, “Java-2 The Complete Reference” 199, TMH.

Course Name: Computer Network

Course Code: 0597902 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Basic Concepts: Components of data communication, distributed processing, standards and organizations. Line configuration, topology, Transmission mode, and categories of networks.

OSI and TCP/IP Models: Layers and their functions, comparison of models.

Digital Transmission: Interfaces and Modems: DTE-DCE Interface, Modems, Cable modems.

UNIT-II

Transmission Media: Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon capacity, comparison of media

UNIT-III

Telephony: Multiplexing, error detection and correction: Many to one, One to many, WDM, TDM, FDM, Circuit switching, packet switching and message switching.

Data link control protocols: Line discipline, flow control, error control, synchronous and asynchronous protocols, character and bit oriented protocols, Link access procedures.

Point to point controls: Transmission states, PPP layers, LCP, Authentication, NCP.

ISDN: Services, Historical outline, subscriber's access, ISDN Layers and broadcast ISDN.

UNIT-IV

Devices: Repeaters, bridges, gateways, routers, The Network Layer; Design issues, Routing algorithms, Congestion control Algorithms, Quality of service, Internet working, Network-Layer in the internet.

UNIT-V

Transport and upper layers in OSI Model: Transport layer functions, connection management, functions of session layers, presentation layer and application layer.

Referential Books:

- A.S.Tanenbaum, "Computer Networks"; Pearson Education Asia, 4th Ed. 2003.
- Behrouz A.Forouzan, "Data Communication and Networking", 3rd Ed. Tata MCGraw Hill, 2004.
- William stallings, "Data and computer communications", Pearson education Asia, 7 th Ed., 2002.

Elective I-(A)

Course Name: IT Trends & Technologies

Course Code: 0597903 Internal/External Marks: 25/75 Credit: 5

UNIT-I

E-governance, E-democracy, Government efforts to encourage citizen participation, PPP model, E-governance websites & services, MP ONLINE services, UIDI & Aadhar, E governance mobile apps like UMANG, Digital Locker, Digital Library.

Introduction to cyber crime, types of attacks like spyware, malware, spam mail, logic bombs, denial of service, types of cyber crime like email fraud, phishing, spoofing, hacking, identity theft.

UNIT-II

E-Commerce-introductions, concepts, Advantages and Disadvantages, technology in E-Commerce, Benefits and impact of e-commerce

Electronic Payment Systems: Introduction, Types of Electronic Payment Systems, RTGS, IMPS, NEFT, Payment gateway, debit& credit card, internet banking, mobile wallet, UPI, BHIM, PAYTM app, online shopping, online marketing

UNIT-III

Introduction to wireless communication, Blue tooth, WiFi, WiMax, LiFi, Mobile technology, 2G,3G, 4G, 5G services, IMEI, SIM, IPTelephony, Soft phone, Voice mail, Ad-hoc & sensor networks, GIS, ISP, Mobile Computing, Cellular System Cell, Mobile Switching office, Hands off, Base Station.

UNIT-IV

Artificial Intelligence and Expert system - Concepts of AI & Expert Systems, Merits and Demerits of Expert system, Application of Expert system and AI.

Cloud computing- Introduction, types, application, services, Google play store, Apple store, IOT- Introduction, Application & use , Big data- Introduction, Application & use.

UNIT-V

Introduction to MIS, System Development Life Cycle, Various phases of system development, Considerations for system planning, Initial Investigation, Determining Users Requirements and Analysis, Fact Finding Process and Techniques, Data Analysis, data Dictionary, decision table, decision tree & form design process.

Referential Books:

- Fundamentals Of InformationTechnology Publications. Alex Leon & Mleon, Vikas Publications.
- E-Commerce An Indian Perspective (Second Edition) By Pt Joseph, S.J. Prentice-Hall Of India.
- System Analysis & Design by V K Jam, Dreamtech Press.
- Information Technology & Computer Applications by V K .Kapoor, Sultan Chand & Sons, New Delhi.

Elective I-(B)

Course Name: INTRODUCTION TO STATISTICS

Course Code: 0597904 Internal/External Marks: 25/75 Credit: 5

UNIT-I

COMBINATORICS: Permutation and Combination, Repetition and Constrained Repetition, Binomial Coefficients, Binomial Theorem.

UNIT-II

Frequency distributions, Histograms and frequency polygons, Measures of central tendency: Mean, Mode, Median, Dispersion, Mean deviation and standard deviation. Moments, Skewness, kurtosis,

UNIT-III

Elementary probability theory: Definition, conditional probability, Probability distribution, mathematical expectation.

Theoretical distribution: Binomial, poisson and Normal distribution, Relation between the binomial, poisoned Normal distribution.

UNIT-IV

Correlation and Regression: Linear Correlation, Measure of Correlation, Least Square Regression lines.

Curve fitting: Method of least square, least square line, least squares Parabola. chi-square test: definition of chi-square; signification test: contingency test, coefficient of contingency

UNIT-V

Basic of sampling theory: Sample mean and variance, students t-test, test of Hypotheses and significance, degree of freedom, Z-test, small and large sampling, Introduction to Monte Carlo method.

Referential Books:

- Advanced Engineering Mathematics: H.K. Dass; S. Chand & Co., 9 Revised Edition, 2001.
- Discrete Mathematics: S.K. Sarkar; S. Chand & Co., 2000.
- Numerical Analysis: S.S. Sastry; Prentice Hall of India, 1998.
- Mathematical Statistics: J.N. Kapoor and H.C. Saxena.
- Mathematical Statistics: M. Ray and H. Sharma

SEMESTER -VI

Course Code	Course Name
0697901	Computer Network Security
0697902	E-Commerce
0697903 or 0697904	Elective -II (A) Cloud Computing Or (B) Data Ware Housing & Data Mining
0697965	Major Project

Course Name: Computer Network Security

Course Code: 0697901 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Introduction: Attack, Services and Mechanism, Model for Internetwork Security.

Cryptography: Notion of Plain Text, Encryption, Key, Cipher Text, Decryption and cryptanalysis; Public Key Encryption, digital Signatures and Authentication.

UNIT-II

Network Security:

Authentication Application: Kerberos, X.509, Directory Authentication Service, Pretty Good Privacy, S/Mime.

UNIT-III

IP security Architecture: Overview, Authentication header, Encapsulating Security Payload combining Security Associations, Key Management.

UNIT-IV

Web Security: Requirement, Secure Socket Layer, Transport Layer Security, and Secure Electronic Transactions.

UNIT-V

Network Management Security: Overview of SNMP Architecture-SMMPV1 Communication Facility, SNMPV3.

UNIT-VI

System Security: Intruders, Viruses and Related Threats, Firewall Design Principles. Comprehensive examples using available software platforms/case tools, Configuration Management.

Referential Books:

- W. Stallings, Networks Security Essentials: Application & Standards, Pearson Education, 2000.
- W. Stallings, Cryptography and Network Security, Principles and Practice, Pearson Education, 2000.

Course Name: E-Commerce

Course Code: 0697902 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Introduction to E-Commerce: The Scope of Electronic Commerce, Definition of Electronic Commerce, Electronic E-commerce and the Trade Cycle, Electronic Markets, Electronic Data Interchange, Internet Commerce, E-Commerce in Perspective.

Business Strategy in an Electronic Age: Supply Chains, Porter's Value Chain Model, Inter Organizational Value Chains, Competitive Strategy, Porter's Model, First Mover Advantage Sustainable Competitive Advantage, Competitive Advantage using E -Commerce, Business Strategy, Introduction to Business Strategy, Strategic Implications of IT, Technology, Business Environment, Business Capability, Exiting Business Strategy, Strategy Formulation & Implementation Planning, E-Commerce Implementation, E-Commerce Evaluation.

UNIT-II

Business-to-Business Electronic Commerce: Characteristics of B2B EC, Models of B2B Ec, Procurement Management Using the Buyer's Internal Marketplace, Just in Time Delivery, Other B2B Models, Auctions and Services from Traditional to Internet Based EDI, Intergration with

Back-end Information System, The Role of Software Agents for B2B EC, Electronic marketing in B2B, Solutions of B2B EC, Managerial Issues, Electronic Data Interchange (EDI), EDI: The Nuts and Bolts, EDI & Business.

UNIT-III

Internet and Extranet : Automotive Network Exchange, The Largest Extranet, Architecture of the Internet, Intranet and Extranet, Intranet software, Applications of Intranets, Intranet Application Case Studies, Considerations in Intranet Deployment, The Extranets, The structures of Extranets, Extranet products & services, Applications of Extranets, Business Models of Extranet Applications, Managerial Issues.

Electronic Payment Systems : Is SET a failure, Electronic Payments & Protocols, Security Schemes in Electronic payment systems, Electronic Credit card system on the Internet, Electronic Fund transfer and Debit cards on the Internet, Stored – value Cards and E- Cash, Electronic Check Systems, Prospect of Electronic Payment Systems, Managerial Issues.

UNIT-IV

Public Policy: From Legal Issues to Privacy : EC- Related Legal Incidents, Legal Incidents, Ethical & Other Public Policy Issues, Protecting Privacy, Protecting Intellectual Property, Free speech, Internet Indecency & Censorship, Taxation & Encryption Policies, Other Legal Issues: Contracts, Gambling & More, Consumer & Seller Protection In EC.

UNIT-V

Infrastructure For EC : It takes more than Technology, A Network Of Networks, Internet Protocols, Web- Based client/ Server, Internet Security, selling on the web, Chatting on the Web, Multimedia delivery, Analyzing Web Visits, Managerial Issues.

Referential Books:

- David Whiteley, "E-Commerce", Tata McGraw Hill, 2000.
- Eframi Turban, Jae Lee, David King, K. Michale Chung, "Electronic Commerce", Pearson Education, 2000

Elective II-(A)

Course Name: Cloud Computing.

Course Code: 0697903 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Introduction to Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano-computing, Network Computing. Cloud Computing Fundamentals: Motivation, Need, Definition of Cloud Computing. Principles of Cloud computing: Five Essential Characteristics, Four Cloud Deployment Models, Three Service Offering Models, Cloud Ecosystem, Requirements for Cloud Services. Cloud Computing Architecture: cloud Architecture, User/Client Layer, Network Layer, Cloud Management Layer, Hardware Resource Layer, , Network Connectivity in Cloud Computing, Public Cloud Access Networking, Private Cloud Access Networking.

UNIT-II

Cloud Computing Management: Cloud Application, Benefits and Drawbacks Applications on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure, Managing the Cloud Application, Migrating Application to Cloud, Cloud Deployment Models: Private Cloud, Outsourced Private Cloud, Community Cloud, On-Premise Community Cloud, Hybrid Cloud. Cloud Service Models: Infrastructure as a Service, : Platform as a Service, Software as a Service, Introduction to Open Source Tools for IaaS, Paas & SaaS : Apache..

UNIT-III

Technological Drivers for Cloud Computing: SOA and Cloud, SOA and SOC, Benefits of SOA, Multi-core Technology: Multi-core Processors and VM Scalability, Memory and Storage Technologies, Cloud Storage Requirements, Networking Technologies, Web 2.0 : Characteristics, Difference from Web 1.0, Applications, Social Media, Marketing, Education. Web 3.0: Components , Semantic Web, Web Services, Characteristics, Convergence of Cloud and Web 4.0, Connecting Information: Facebook. Agile Software Models: Agile SDLC for Cloud Computing, Features of Cloud SDLC, Agile Software Development Process, Advantages of Agile. Cloud Application Development Platforms: Windows Azure, Google App Engine, Forcecom. IBM Cloud Computing API .

UNIT-IV

Virtualization : Full Virtualization, Para virtualization, Hardware-Assisted Virtualization, Hypervisor, OS Virtualization, Server Virtualization, Memory Virtualization, Storage Virtualization, Network Virtualization, Application Virtualization, Processor Virtualization, Memory Virtualization, Storage Virtualization, Network Virtualization, Data Virtualization, Application Virtualization, Hypervisors, Types of Hypervisors, Security Issues and Recommendations, From Virtualization to Cloud Computing VMware. Microsoft Hyper-V.

UNIT-V

Cloud Service Providers ; EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue Service, Microsoft Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM Smart Cloud. Security in Cloud Computing, Cloud General Challenges,

Referential Books:

- Essentials of Cloud Computing, K Chandrasekaran, CRC Press [ISBN: 3: 978--4822-0544- 2]
- Raj Kumar Buyya, James Broberg and rezeiM.Goscinski, -Cloud Computing: Principles and Paradigms,-Wiley 2011.

Elective II-(B)

Course Name: **DATA WAREHOUSING & DATA MINING**

Course Code: 0697904 Internal/External Marks: 25/75 Credit: 5

UNIT-I

Data Warehousing:- Introduction to Data Warehouse, its competitive advantage, Data warehouse Vs Operational Data, Things to consider while building Data Warehouse

UNIT-II

Implementation:- Building Data warehousing team, Defining data warehousing project, data warehousing project management, Project estimation for data warehousing, Data warehousing project implementation

UNIT-III

Techniques:- Bitmapmed indexes, Star queries, Read only table spaces, Parallel Processing, Partition views, Optimizing extraction process

UNIT-IV

Data Mining:- Introduction to Data Mining, benefits of Data Mining, How it helps in decision making, Data mining techniques, Introduction to Data Mart, Data Mart Tools, Data warehouse vs Data Mart, OLAP and its need, MOLAP and ROLAP

Referential Books:

- Data Warehousing in the real world, Sam Anchory and Dennis Murray.
- Data Mining, Pieter Adrians and Doif Zantinge.

Course Name: **Major Project**

Course Code: 0697965 External Evaluation Marks: 100 Credit: 9

GUIDELINES FOR PROJECT WORK

COURSE OBJECTIVES:

- * The aim of the Project work is to acquire practical knowledge on the implementation of the programming concepts studied.
- * Each student should carry out group Project Work and it may be a work using the software packages that they have learned or the implementation of concepts from the papers studied or implementation of any innovative idea.
- * The Project work should be compulsorily done in the college only under the supervision of the Department staff concerned (Internal assessment 100 marks. Done by college committee)
 - Viva-voce will be conducted at the end of VI semester for 100 marks.