GOVERNMENT COLLEGE
(AUTONOMOUS)
KALABURAGI

POST-GRADUATE DEPARTMENT OF COMPUTER SCIENCE

COURSE MATRIX AND SYLLABUS OF M.Sc. COURSE BASED ON CHOICE BASED CREDIT SYSTEM

EFFECTIVE FROM THE ACADEMIC YEAR 2018-19

GOVERNMENT COLLEGE
(AUTONOMOUS)
KALABURAGI

POST-GRADUATE DEPARTMENT OF
COMPUTER SCIENCE

COURSE MATRIX AND SYLLABUS OF
M.Sc. COURSE BASED ON
CHOICE BASED CREDIT SYSTEM

Approved by Academic Council.

PRINCIPAL
Govt. College
Kusnoor Road, GULBARGA-585 105

EFFECTIVE FROM THE
ACADEMIC YEAR 2018-19

Approved by the BOS vide Resolution No. 3 dated 17-04-2018.

GOVERNMENT COLLEGE (AUTONOMOUS) KALABURAGI
Department of Computer Science
Course Matrix of Master of Science in Computer Science
(With effect from the Academic year 2018-19 and onwards)

Subject Code	Subjects	Total Credit	Teaching Hours / week	Marks Allocation					Total Max. Marks
				Internal		Semester and Exam			
				Max Marks	Min Marks	Duration	Max. Marks	Min Marks	
Semester – I									
CCT1.1	Digital Computer Fundamentals	4	4	20	--	3 hrs	80	32	100
CCT1.2	Mathematical Foundation of Computer Science	4	4	20	--	3 hrs	80	32	100
CCT1.3	OOP Using C++	4	4	20	--	3 hrs	80	32	100
DSET1.1	(a)Operating System Principles (b) LINUX & SHELL Programming	4	4	20	--	3 hrs	80	32	100
Practical 1.1	OOP Using C++ Lab	4	8	20	--	4 hrs	80	32	100
Practical 1.2	(a)OS Lab (b) LINUX & SHELL Programming Lab	4	8	20	--	4 hrs	80	32	100
	Total	24							600
Semester – II									
CCT2.1	DataStructures using C++	4	4	20	--	3 hrs	80	32	100
CCT2.2	Relational Database Management System	4	4	20	--	3 hrs	80	32	100
DSET2.1	(a)Data Communications & Networks (b) System Software	4	4	20	--	3 hrs	80	32	100
GET2.1	(a)Libre Office (b)Computer Fundamentals and C-Programming	4	4	20	--	3 hrs	80	32	100
Practical 2.1	Data Structure using C++ Lab and RDBMS Lab	4	8	20	--	4 hrs	80	32	100
Practical 2.2	(a)Data Communications & Networks (b) System Software Lab	4	8	20	--	4 hrs	80	32	100
	Total	24							600

Semester – III									
CCT3.1	Java Programming	4	4	20	--	3 hrs	80	32	100
CCT3.2	C# and.NET programming	4	4	20	--	3 hrs	80	32	100
DSET3.1	(a)Computer Graphics (b) Data Warehousing and Mining	4	4	20	--	3 hrs	80	32	100
GET3.1	(a)E-Commerce and Cyber space (b) Web Design Using HTML and Dream Weaver	4	4	20	--	3 hrs	80	32	100
Practical 3.1	Java and C# and.NET Lab	4	8	20	--	4 hrs	80	32	100
Practical 3.2	(a)Computer Graphics (b) Data warehousing and Mining	4	8	20	--	4 hrs	80	32	100
	Total	24							600
Semester – IV									
CCT4.1	Web designing using Java Script	4	4	20	--	3 hrs	80	32	100
CCT4.2	Software Engineering	4	4	20	--	3 hrs	80	32	100
DSET4.1	(a)Digital Image Processing (b) Software Testing (c) Cloud Computing. (d) Problem Solving using Python	4	4	20	--	3 hrs	80	32	100
Practical 4.1	Web designing using Java Script and SE Lab	4	8	20	--	4 hrs	80	32	100
Practical 4.2	(a)Digital Image Processing (b) Software Testing (c) Cloud Computing. (d) Problem Solving using Python	4	8	20	--	4 hrs	80	32	100
CCPR 4.1	Project	6	6	30	--	--	120	48	150
	Total	26							650

Total Credits for the Course: 98

CCT – Core Course Theory
CCP – Core Course Practical
DSET – Discipline Specific Elective Theory
DSEP – Discipline Specific Elective Practical
GET – General Elective Theory
CCPR – Core Course Project

In the beginning of the Semester III & IV, the Department concerned shall notify the actual DSET course that it wants to offer depending on the availability of staff and facility. Accordingly, the students will be allotted the DSET Course.

(Shivakumar Kalaburgi) (Pushpalata.G) (Shashikiran M Hanchinal)

(Dr. Parashuram Bannigidad) (Proff.Aziz Makandar) (Prof.P.M.Hadalgi)

(Mruthunjaya) (Nilofer Begaum)

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SEMESTER-I

M.Sc. I SEMESTER COMPUTER SCIENCE

(w.e.f 2018-19 and onwards)

CCT 1.1: DIGITAL COMPUTER FUNDAMENTALS

Teaching: 4 Hrs./ Week | **Max Marks: 80**

Credits: 04 :64 | **I.A.Marks: 20**

Unit I **16Hrs**

Digital Computers and Digital Systems: Binary Number, Number Base Conversion, Octal and Hexadecimal Number, Complements, Binary Codes, Binary Storage and Registers, Binary Logic and Integrated Circuits, Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra ,Boolean Functions, Canonical and Standard Forms, Digital Logic Gates.

Unit II **16Hrs**

Simplification of Boolean Function: Two, Three and Four variable maps, Sum of Products and Product of Sums Simplification, NAND and NOR implementation, Non degenerate forms, AND-OR-INVERT method Determination and Selection of Prime- Implicants. Combinational Circuit, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure, Multilevel NAND and NOR circuits, Exclusive-OR and Equivalence Functions.

Unit III **16Hrs**

Adder and Multiplexers: Binary Parallel Adder, Decimal Adder ,Magnitude Comparators, Decoders, Multiplexers, Read-only memory, Programmable Logic Array Sequential circuit. Flip-Flops, Analysis of Clocked Sequential Circuits, Flip-Flop Excitation Tables, Design Procedure, Design of Counters, Design with State Equations.

Unit IV **16Hrs**

Registers: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Timing Sequence, The Memory Unit, Example of Random Access Memory. Inter registers Transfer, Arithmetic logic and Shift Micro-operations, Conditional Control Statement, Fixed-point binary data Overflow, Arithmetic Shifts, Decimal Data, Floating-Point Data, on-numeric Data, Instruction Code, Design of Simple Computer.

References:

1. Floyd and Jain, Digital Fundamentals, 8/e, PearsonEducation.
2. William Stallings, Computer Organization and Architecture, Pearson.
3. Alan B Markowitz, Introduction to logic and Computer Design, McGraw-Hill.
4. Ronald J. Tocci, Digital Systems: Principals and Applications, 8/e, Pearson Education.
5. Bartee J. C., Digital Computer Fundamentals, 6/e,TMH.
6. M. M. Mano and C. R. Kime, Logic and Computer Design Fundamentals, Pearson Education
7. Morris Mano M., Digital logic and Computer Design, PHI

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CCT 1.2: Mathematical Foundation of Computer Science

Teaching: 4 Hrs./ Week **Max Marks: 80**

Credits: 04 :64 **I.A.Marks: 20**

Unit - I **16Hrs**

Sets, Functions and Relations: Sets, set operations, functions, relations, equivalence relations and partial orderingRelations:, Relations Properties of Binary relation, Matrix representation of relations, Closures of relations, Equivalence relations, Partial order relation.

Function: Types, Composition of function. Algebraic Structures: Properties, Semi group, Monoid, Group, Abelian group, Subgroup, Cyclic group, Cosets, Normal Subgroups, Lagrange's Theorem, Permutation groups.

Unit - II **16Hrs**

Counting: Basics of counting, the pigeonhole principle, permutations and combinations, Binomial Co-efficient, recurrence relations.Lattices and Boolean Algebra: Introduction, Partially Ordered Set, Hasse diagram, Well ordered set, Lattices, Properties of lattices, Bounded lattices, Complemented and Distributive lattices, Boolean Algebra

Unit - III **16Hrs**

Propositional Logic: Prepositions, logical operations, Tautologies, Contradictions, Logical implication, Logical equivalence, Normal forms, Theory of Inference and deduction. Predicate Calculus: Predicates and quantifiers. Mathematical Induction.

Unit-IV **16Hrs**

Graph Theory: Introduction, Paths and Cycles, Hamiltonian Cycles and the Traveling Salesperson problem, a shortest-path algorithm, representations of graphs, isomorphism's of graphs, planar graphs. Trees: Terminology and characterizations of trees, spanning trees, minimal spanning trees, binary trees, tree traversals, decision trees and the minimum time for sorting, isomorphism of trees.

References:

1. J.P. Tremblay andR.Manohar, Discrete Mathematical structures with applications to Computer Science, Tata McGraw Hill.
2. Robin. J.Wilson, Introduction to Graph theory.
3. Goodaire E.Parmenter M.Discrete Mathematics with Graph Theory, 2/e, Pearson Education.
4. Rosen K. H.,Discrete Mathematics and Its Applications, 3/e, McGraw Hill, Singapore

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M.Sc. I SEMESTER COMPUTER SCIENCE

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CCT 1.3: OOP Using C++

Teaching: 4 Hrs./ Week	**Max Marks: 80**
Credits: 04 :64	**I.A.Marks: 20**

Unit I **16Hrs**

Overview of C++: Object Oriented Programming concepts, advantages, C++ program development environment, the C++ language standards, C++ as a superset of C.

Classes & Objects: classes, structure & classes, union & classes, inline function, scope resolution operator, static class members: static data member, static member function, passing objects to function, returning objects, object assignment, constructors & destructors, friend function, friend classes.

Unit II **16Hrs**

References & Dynamic Allocation Operators: array of objects, pointers to object, type checking C++ pointers, the this pointer, pointer to derived types, pointer to class members, reference parameter, call by reference and return by reference, passing references to objects, returning reference, C++'s dynamic allocation operators, allocating objects,

Unit III **16Hrs**

Overloading as polymorphism: function & operator overloading, operator overloading restrictions, operator overloading using friend function. Namespaces: global namespace and namespace std, nested namespaces **Inheritance :** base class access control, inheritance & protected members, protected base Class inheritance, inheriting multiple base classes, constructors, destructors & inheritance, execution of constructor & destructor functions, passing parameters to base class constructors, granting access, virtual base classes . Virtual Functions & Polymorphism: virtual function, pure virtual functions, early vs. late binding.

Unit IV **16Hrs**

Templates and Exception Handling: Exception handling in C++, try, throw, catch sequence, multiple catch blocks, uncaught exceptions, catch-all exception handler, Templates: Reason for templates, compactness of flexibility, function template, class templates. The C++ I/O System Basics: C++ Streams, the basic stream classes, C++ predefined streams, formatted I/O, file processing.

References:

1. Herbert Schildt, C++ The Complete Reference, Tata McGraw Hill Publication.
2. Al Stevens++ Programming, Wiley Publications.
3. B. A. Forouzon, R. F. Gilberge, Computer Science: A Structured Approach Using C++, Thomson Learning.
4. Stroubstrup B., The C++ Programming Language, Addison Wesley. William H. Murray, Chris H. Pappas, Data structures with STL Prentice Hall.

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M.Sc. I SEMESTER COMPUTER SCIENCE

(w.e.f 2018-19 and onwards)

DSET 1.1: Operating System Principles

Teaching: 4 Hrs./ Week	Max Marks: 80
Credits: 04 :64	I.A.Marks: 20

Unit I **16Hrs**

Introduction: Computer-system organization, computer-system architecture, operating-system structures, operating-system operations, distributed systems, special-purpose systems, computing environments, open-source operating systems. Operating system overview-objectives and functions, Evolution of Operating System.

Unit II **16Hrs**

Process Management: Process concept, Process scheduling, Operations on processes, Inter-process communication.Multi-Threaded Programming: Overview, Multithreading models, Thread Libraries, Threading issues. Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple-Processor scheduling, Thread scheduling.

Unit III **16Hrs**

Memory Management Strategies: Background, Swapping, Contiguous memory allocation, Paging, Structure of page table, Segmentation. Virtual Memory Management: Background, Demand paging, Page replacement, Allocation of frames, Thrashing. Mass storage structures, Disk structure, Disk attachment, Disk scheduling, Disk management, Swap space management.

File System: File concept, Access methods, Directory structure, file system implementation, Directory implementation, Allocation methods, Free space management.

Unit IV **16Hrs**

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection and recovery from deadlock. Process Synchronization: The Critical section problem, Peterson's solution, Synchronization hardware, Semaphores, Classical problems of synchronization, Monitors

References:

1. Iresh A. Dhotre OperatingSystems,Technical Publications.
2. Milan Milenkovic, Operating Systems, Tata McGraw Hill.
3. William Stallings, Operating Systems, PHI
4. A.S. Tanenbaum, Modern Operating Systems, Pearson Education.
5. Dhananjay M. Dhamdhere, "Operating Systems – A Concept – Based Approach", Tata McGraw – Hill, 3rd Edition, 2012.
6. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, 8/e, John Wiley and Sons.

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DSET 1.2: : LINUX AND SHELL PROGRAMMING

Teaching: 4 Hrs./ Week | Max Marks: 80

Credits: 04 :64 | I.A.Marks: 20

Unit I **16Hrs**

Linux introduction and file system - Basic Features, Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell. Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories. Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, creating and viewing files using cat, file comparisons – cmp&comm, View files, disk related commands, checking disk free spaces. Partitioning the Hard drive for Linux, Installing the Linux system, System startup and shut-down process, init and run levels.

Unit II **16Hrs**

Essential Linux commands Understanding shells, Processes in Linux-process fundamentals, connecting processes with pipes, tee, Redirecting input output, manual help, Background processing, managing multiple processes, changing process priority with nice, scheduling of processes at command, cron, batch commands, kill, ps, who, sleep, Printing commands, find, sort, touch, file, file related commands-ws, sat, cut, dd, etc. Mathematical commands,bc, expr, factor, units. Creating and editing files with vi, joe& vim editor

Unit III **16Hrs**

System administration Common administrative tasks, identifying administrative files – configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disable user's accounts, creating and mounting file system, checking and monitoring system performance file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel. Backup and restore files.

Unit IV **16Hrs**

Shell programming- Basic of shell programming, Various types of shell available in Linux, comparisons between various shells, shell programming in bash, read command, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automate system tasks. Simple filter commands,pr,head,tail,cut, paste, sort, uniq, tr. Filter using regular expressions – grep, egrep, and sed. awk programming – report printing with awk.

References:

1. Unix System Programming using C++, T. Chan, PHI.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Unix Network Programming, W. R. Stevens, PHI.
4. Beginning Linux Programming, 4th Edition, N. Mathew, R. Stones, Wrox, Wiley India Edition.

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M.Sc. I SEMESTER COMPUTER SCIENCE
PRACTICALS
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Teaching: 8 Hrs./ Week	Max Marks: 80
Credits: 04	I.A.Marks: 20

Practical 1.1	OOP Using C++ Lab
Practical 1.2	(a) Operating System (b) LINUX and SHELL Programming LAB

Note: Practical based on syllabus

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SEMESTER-II

M.Sc. II SEMESTER COMPUTER SCIENCE

(w.e.f 2018-19 and onwards)

CCT 2.1: DATA STRUCTURES USING C++

Teaching: 4 Hrs./ Week **Max Marks: 80**

Credits: 04 :64 **I.A.Marks: 20**

Unit I **16Hrs**

Introduction: Definition, Elementary data organization, Data Structures, data structures operations, Abstract data types, algorithms complexity, time-space, trade-off. Preliminaries: Mathematical notations and functions, Algorithmic notations, control structures, Complexity of algorithms, asymptotic notations for complexity of algorithms. String Processing: Definition, Storing Stings, String as ADT, String operations, word/text processing, Pattern Matching algorithms.

Unit II **16Hrs**

Linked list: Definition, Representation of Singly linked list in memory, Traversing a Singly linked list, Searching a Singly linked list, Memory allocation, Garbage collection, Insertion into a singly linked list, Deletion from a singly liked list; Doubly liked list, Header liked list, Circular linked list.

Unit III **16Hrs**

Stack and Queue: Definition, Array representation of stacks, Linked representation of stacks, Stack as ADT, Arithmetic Expressions: Polish Notation, Conversion of infix expression to postfix expression, Evaluation of Postfix expression, Application of Stacks, Recursion, Towers of Hanoi, Implementation of recursive procedures by stack. Queues: Definition, Array representation of queue, Linked list representation of queues Types of queue: Simple queue, Circular queue, Double ended queue, Priority queue, Operations on Queues, Applications of queues.

Unit IV **16Hrs**

Trees and Graphs: Graph theory terminology, Sequential representation of Graphs: Adjacency matrix, traversing a Graph. Trees: Basic Terminology, Binary tree, Operations of Binary tress (Insertion, Deletion, Traversal, Merging), Binary Tree Traversal (Inorder, postorder, preorder), Expression trees, Applications of binary tree. Graph: Terminology, Operations on graphs, graph traversal (BFS, DFS), Applications of graphs, Search trees in BST, AVL trees.

References:

1. Samanta. D., Classic Data Structures, PHI.
2. R. F. Gilberg and B. A. Forouzan, Data Structures-A Pseudocode Approach with C++, Thomson Learning.
3. Mark A. Weiss, Data Structures and Algorithm Analysis in C++, 2/e, Pearson Education.
4. Paul S. Wang, Standard C++ with Object Oriented Programming, Thomson Learning.
5. B. A. Forouzon, R. F. Gilberge, Computer Science: A Structured Approach Using C++, Thomson Learning.
6. HerbertSchildt, C++-The Complete Reference, TMH.

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CCT 2.2: RELATIONAL DATABASE MANAGEMENT SYSTEM

Teaching: 4 Hrs./ Week — Max Marks: 80
Credits: 04 :64 — I.A.Marks: 20

Unit I — 16Hrs

Introductory concepts of DBMS: Introduction and applications of DBMS, Purpose of data base, Data, independence, Database System architecture- levels, Mappings, Database, users and DBA.

Relational Model: Structure of relational databases, Domains, Relations, Relational algebra – fundamental operators and syntax, relational algebra queries, tuple relational calculus.

Unit II — 16Hrs

Entity-Relationship model :

Basic concepts, Design process, constraints, Keys, Design issues, E-R diagrams, weak entity sets, extended E-R features – generalization, specialization, aggregation, reduction to E-R database schema.

Relational Database design Functional Dependency – definition, trivial and non-trivial FD, closure of FD set, closure of attributes, irreducible set of FD, Normalization – 1Nf, 2NF, 3NF, Decomposition using FD- dependency preservation, BCNF, Multi- valued dependency, 4NF, Join dependency and 5NF.

Unit III — 16Hrs

Transaction Management :Transaction concepts, properties of transactions, serializability of transactions, testing for serializability, System recovery, Two- Phase Commit protocol, Recovery and Atomicity, Log-based recovery, concurrent executions of transactions and related problems, Locking mechanism, solution to concurrency related problems, deadlock, two-phase locking protocol, Isolation, Intent locking

Security: Introduction, Discretionary access control, Mandatory Access Control, Data Encryption

Unit IV — 16Hrs

PL/SQL Concepts : Basics of SQL, DDL,DML,DCL, structure creation, alteration, defining constraints Primarykey,foreignkey,unique,notnull,check,IN operator, Functions - aggregate functions, Built-in functions numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All , view and its types. Transaction control commands Commit, Rollback, Save point PL/SQL: Structure, Data types, Declaring Variables, Conditional Statements, Looping Statements.

References:

1. Silberschatz A, Korth H.F and Sudarshan S, Database System Concepts, Tata McGraw Hill
2. S K Singh, Database Systems-Concepts, Design and Applications, Pearson Education.
3. Bipin C. Desai, An Introduction to Database Systems, Galgotia Publications.
4. Date, C. J., An Introduction to Database Systems, Addison-Wesley.
5. Elmasri and Navathe, Fundamentals of Database Systems, Addison Wesley
6. SQL,PL/SQL Programming Language Oracle 4th Revised Edition Ivan Bayross

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DSET 2.1: (a) DATA COMMUNICATIONS AND NETWORKS

Teaching: 4 Hrs./ Week | Max Marks: 80

Credits: 04 :64 | I.A.Marks:20

Unit I **16Hrs**

Introduction: Data Communications, Networks, the internet, protocols and standards, network models–OSI model, TCP/IP protocol suite, addressing.

Data and Signals: Periodic analog signals, digital signals, transmission impairment, data rate limits, performance.

Unit II **16Hrs**

Digital transmission: Digital to digital conversion, analog-to-digital conversion, transmission modes.

Physical Layer and Media: Analog transmission: Digital-to-analog conversion, analog-to-analog conversion. Multiplexing Spread spectrum. Transmission media – Guided media and unguided media.

Unit III **16Hrs**

Switching: Circuit-switched networks, datagram networks, virtual-circuit networks, structure of a switch. Telephone networks, dialup modems, digital subscriber line, cable-tv networks,

Detection and Correction: Errors, redundancy, detection versus correction, block coding, linear block codes, cyclic codes, checksum.

Unit IV **16Hrs**

Data Link Control: Framing, flow and error control, noisless and noisy channels, HDLC, point-to-point control.

Multiple Access: Random access ALOHA, controlled access, channelization.

References:

1. Data and Computer Communications, William Stallings, Pearson education
2. Data Communications, Computer Networks and Open Systems, fourth edition-Fred Halsall, AddisonWesley
3. Behrouza A Forouzan, Data Communications and Networking, McGrawHill.
4. Computer Networks - Andrew s. Tanenbaum, Pearson Education.

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DSET 2.1: (b) SYSTEM SOFTWARE

Teaching: 4 Hrs./ Week **Max Marks: 80**

Credits: 04 :64 **I.A.Marks:20**

Unit I **16Hrs**

INTRODUCTION : System software and machine architecture –The Simplified Instructional Computer (SIC) - Machinearchitecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.

Unit II **16Hrs**

ASSEMBLERS : Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures -Machine dependent assembler features - Instruction formats and addressing modes - Program relocation –Machine independent assembler features- Literals-Symbol defining statements- Expressions- One pass assemblers and And Multi pass assemblers- Implementation example-MASM assembler.

Unit III **16Hrs**

LOADERS AND LINKERS: Basic loader functions - Design of an Absolute Loader – A Simple Bootstrap Loader - Machine dependentloader featuresRelocation Program Linking Algorithm and Data Structures for Linking Loader - Machine-independent loader features - Automatic Library Search- Loader Options - Loader design options- Linkage editors – Dynamic Linking – Bootstrap Loaders - Implementation example - MSDOS linker.

Unit IV **16Hrs**

MACRO PROCESSORS : Basic macro processor functions - Macro Definition and Expansion –Macro Processor algorithm and datastructures - Machine-

Dependent macro processor features Concatenation of Macro Parameters –Generation of Unique Labels- Conditional Macro Expansion – Keyword Macro Parameters-Macro withinMacro-Implementation example - MASM Macro Processor – ANSI C Macro language.

Compilers: Basic Compiler Functions, Machine-Dependent Compiler Features, Machine-Dependent Compiler Features, Compiler Design Options, Implementation Examples.

References:

1. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 1999.
2. John J. Donovan "Systems Programming", Tata McGraw-Hill Edition, 1972.
3. John R. Levine, Linkers & Loaders – Harcourt India Pvt. Ltd., Morgan Kaufmann Publishers, 2000.

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M.Sc. II SEMESTER COMPUTER SCIENCE

(w.e.f 2018-19 and onwards)

GET 2.1: (a)LIBRE OFFICE

Teaching: 4 Hrs./ Week | Max Marks: 80
Credits: 04 :64 | I.A.Marks: 20

Unit I **16Hrs**

Introduction: Introducing Writer, Setting up Writer, Working with Text, Formatting Pages, Digital signing of documents. Introducing to Styles, Working with Styles, Working with Graphics, Working with Tables, Working with Templates, Using mail Merge, Tables of Contents Indexes, Working with Master Documents, Working with Fields.

Unit II **16Hrs**

Formatting: Introducing to Calc, Entering Editing & Formatting Data, Creating Charts and Graphs, Using Styles and Templates in Calc, Using Graphics in Calc, Using Formulas and functions.

Unit III **16Hrs**

Data Analysis: Using Pivot Tables, Data Analysis, linking calc data, Sharing and reviewing documents, Calc macros, Calc as simple database, Setting up and customizing Calc.

Unit IV **16Hrs**

Graphics and Design: Introducing to Impress, Using Slide Masters, Styles and Templates, Adding and Formatting Text, Adding and Formatting Pictures, Managing Graphic Object. Formatting Graphic Objects, Including Spreadsheets Charts & Other Objects, Adding and Formatting Slides Notes and Handouts, Slide Shows, Printing E-mailing Exporting and Saving Slide Shows, Setting up and Customizing Impress.

References:

1. " Writer Guide ", IIT Bombay Spoken Tutorial, Shroff Publishers,2014
2. ." Calc Guide ", IIT Bombay Spoken Tutorial, Shroff Publishers,2014
3. ." Impress Guide ", IIT Bombay Spoken Tutorial, Shroff Publishers,2014

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GET 2.1: (b) COMPUTER FUNDAMENTALS & C- PROGRAMMING

Teaching: 4 Hrs./ Week — Max Marks: 80

Credits: 04 :64 — I.A.Marks: 20

Unit I — **16Hrs**

Evolution of Computers - Generations, Types of computers, Computer system characteristics, Basic components of a Digital Computer - Control unit, ALU, Input/output functions and memory, Memory addressing capability of a CPU, Word length of a computer, processing speed of a computer, Computer Classification, Input/output Units, Memory - RAM, ROM, EPROM, PROM and other types of memory, Storage fundamentals - Primary Vs Secondary Data Storage,

Unit II — **16Hrs**

Number Systems and Boolean Algebra: Introduction to number systems- Numeric and Non-numeric representation of data - Decimal, Binary (Addition, subtraction, Multiplication, division, 1"s and 2"s complement methods), Octal and hexadecimal number systems. Conversion from one number system to another number system.

Unit III — **16Hrs**

Introduction to C language: History, Features and Applications of „C". Programming preliminaries – Character set, definitions and declarations of identifiers, Variables, Constants, Keywords, Data types with examples. Operators and expressions – Various operators and expressions, Operator precedence with example programs.

Unit IV — **16Hrs**

Input-output statements: various types of standard input output statements, standard mathematical functions, with example programs. Control structures – Decisions making- Different forms of if statements, switch statements, unconditional branching statements (with example programs), Looping statements with example programs

References:

1. Computer Fundamentals – B. Ram – New Age International Publishers
2. S.K.Basandra, "Computers Today ", Galgotia Publications.
3. Computer Fundamentals – P. K. Sinha –BPB Publication.
4. C-Programming – P.B.Kottur

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M.Sc. II SEMESTER COMPUTER SCIENCE
PRACTICALS
(w.e.f 2018-19 and onwards)

Teaching: 8 Hrs./ Week	Max Marks: 80
Credits: 04	I.A.Marks: 20

Practical 2.1	Data Structure using C++ Lab and RDBMS.
Practical 2.2	(a) Data Communication and Network Lab (b) System Software Lab

Note: Practical based on syllabus

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SEMESTER-III

CCT 3.1 JAVA PROGRAMMING

Teaching: 4 Hrs./ Week **Max Marks: 80**
Credits: 04 :64 **I.A.Marks: 20**

Unit-I **16Hrs**

Object-Oriented Languages, Java's History, Creation of Java, Importance of Java for the Internet, Byte-code, Its Features, Object-Oriented Programming in Java. Java Program Structure and Java's Class Library, Data Types, Variables, and Operators, Operator Precedence. Selection Statements, Scope of Variable, Iterative Statement. Defining Classes &Methods, Constructors, Creating Objects of a Class, Assigning Object Reference Variables, and Variable.

Arrays and Strings: Arrays, Arrays of Characters, String Handling Using String Class, Operations onString Handling Using, String Buffer Class.

Unit-II **16Hrs**

Extending Classes and Inheritance: Using Existing Classes, Class Inheritance, Choosing Base Class, Access Attributes, Polymorphism, Multiple Levels of Inheritance, Abstraction through Abstract Classes, Using Final Modifier, The Universal Super class-Object Class.

Packages & Interfaces: Understanding Packages, Defining a Package, Packaging up Your Classes, Adding Classes from a Package to Your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages, Concept of Interface.

Exception Handling: The concept of Exceptions, Types of Exceptions, Dealing with Exceptions, Exception Objects, Defining Your Own Exceptions

Unit-III **16Hrs**

Multithreading Programming: The Java Thread Model, Understanding Threads, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Deadlocks Inter-thread Communication, Deadlocks.

Input/output in Java: I/O Basic, Byte and Character Structures, I/O Classes, Reading Console Input Writing Console Output, Reading and Writing on Files, Random Access Files, Storing and Retrieving Objects from File, Stream Benefits.

Creating Applets in Java: Applet Basics, Applet Architecture, Applet Life Cycle, Simple Applet Display Methods, Requesting Repainting, Using The Status Window.

Unit-IV **16Hrs**

Working with Windows: AWT Classes, Window Fundamentals, Working with Frame, Creating a Frame Window in an Applet, Displaying Information Within a Window.

Working with Graphics and Texts: Working with Graphics, Working with Colour, Setting the Paint Mode, Working with Fonts, Managing Text Output Using Font Metrics, Exploring Text and Graphics. Working with AWT Controls, Layout Managers and Menus.

References:

BruceEckel, Thinking in Java, 3/e, Prentice Hall.
C. Muthu, Programming with JAVA, Thomson-Vijay Nicole.
M.T.Somshekara et al."Object Oriented Programming with Java ", PHI Learning, New Delhi, 2017
Dr R .NageswraRao "Core Java an Integrated Approach java7" by Dreamtech publication

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M.Sc. III SEMESTER COMPUTER SCIENCE

(w.e.f 2018-19 and onwards)

CCT4.2 : C# AND .NET PROGRAMMING

Teaching: 4 Hrs./ Week | **Max Marks: 80**
Credits: 04 :64 | **I.A.Marks: 20**

Unit I **16Hrs**

INTRODUCTION TO C#: Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators, checked and unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations, boxing and unboxing.

Unit II **16Hrs**

OBJECT ORIENTED ASPECTS OF C# :Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading, polymorphism, sealed class and methods, interface, abstract class, abstract and interface, operator overloading, delegates, events, errors and exception, Threading.

Unit III **16Hrs**

APPLICATION DEVELOPMENT ON .NET: Building windows application, Creating our own window forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog box(Modal and Modeless), accessing data with ADO.NET, Dataset, typed dataset, Data Adapter, updating database using stored procedures, SQL Server with ADO.NET, handling exceptions, validating controls, windows application configuration.

Unit IV **16Hrs**

WEB BASED APPLICATION DEVELOPMENT ON .NET: Programming web application with web forms, ASP.NET introduction, working with XML and .NET, Creating Virtual Directory and Web Application, session management techniques, web.config, web services, passing datasets, returning datasets from web services, handling transaction, handling exceptions, returning exceptions from SQL Server.

1. **References:**
2. C# Unleashed – By Joseph Mayo, Techmedia, First Edition
3. Programming C# - By Jesse Liberty, Shroff Publishers, 4TH
4. Programming In C# - By Barbara Doyle, Cengage \ Delmar Learning India Pvt, First Edition

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M.Sc. III SEMESTER COMPUTER SCIENCE

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DSET 3.1: (a) COMPUTER GRAPHICS

Teaching: 4 Hrs./ Week	**Max Marks: 80**
Credits: 04 :64	**I.A.Marks: 20**

Unit I **16Hrs**

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, and raster-scan systems, random scan systems, graphics monitors and work stations and input devices. Output Primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

Unit II **16Hrs**

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. 2-D Viewing : The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT III **16Hrs**

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces. 3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT IV **16Hrs**

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, area sub-division and octree methods. Basic illumination models, polygon rendering methods. Computer animation: Design of animation sequence, general computer animation functions, raster animation and computer animation languages.

References:

1. Donald Hearn and M. Pauline Baker, Computer Graphics-C version, 2/e, Pearson Education.
2. James D. Foley, Andres Van Dam, Steven K. Feiner, and John F. Hughies, Computer Graphics-Principles and Practice, 2/e, Pearson Education(2006).
3. Francis S. Hill Jr, Computer Graphics using open GL, 2/e. Pearson Education.
4. Roy A. Plastock and Zhigarg Xiang, Schaum's Outline of Computer Graphics, 2/e, TMH.

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DSET3.1 : (b) DATA WARE HOUSING AND MINING

Teaching: 4 Hrs./ Week | **Max Marks: 80**

Credits: 04 :64 | **I.A.Marks: 20**

Unit I — **16Hrs**

Introduction to Data Warehousing:

Need for data warehouse, definition, goals of data warehouse, Data Mart, Data warehouse architecture, extract and load process, clean and transform data, star, snowflake and galaxy schemas for multidimensional databases, fact and dimension data, Designing fact tables

Unit II — **16Hrs**

Fundamentals of Data Mining: Fundamentals of Data mining Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining. Data Pre-processing: Need for Pre-processing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

Unit III — **16Hrs**

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent tem set Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

Classification: Basic Concepts, Decision tree induction, Bays Classification Methods, Rule-Based classification, Model evaluation and selection, Techniques to improve classification accuracy.

Unit IV — **16Hrs**

Cluster Analysis: Basic concepts and methods: Cluster Analysis, Partitioning methods, Hierarchical Methods, Density-based methods, Grid-Based Methods, Evaluation of clustering. Data mining trends and esearch frontiers: Mining complex data types, other methodologies of data mining, Data mining pplications.

References:

Data Mining Techniques", Arun K Pujari, 2nd edition, Universities Press.

"Data Warehousing in the Real World", Sam Aanhory& Dennis Murray Pearson Edn Asia.

"Insight into Data Mining", K.P.Soman, S.Diwakar, V.Ajay, PHI, 2018.

"Data Warehousing Fundamentals", PaulrajPonnaiah Wiley, student Edition

"Data Mining Concepts and Techniques", Jiawei Han, MichelineKamber, Jian Pei ELSEVIER(MK) 3rd dition 2017.

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M.Sc. III SEMESTER COMPUTER SCIENCE

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GET3.1 : (a) E-COMMERCE and CYBER SPACE

Teaching: 4 Hrs./ Week	Max Marks: 80
Credits: 04 :64	I.A.Marks: 20

Unit I **16Hrs**

Introduction to E-Commerce: Introduction, An Overview of e-Commerce - Cutting edge, e-Commerce Framework, Evolution of e-Commerce: History of e-Commerce, Advantages and Disadvantage of E-Commerce, Roadmap of e-Commerce in India.

Unit II **16Hrs**

Electronic Payment Systems: Electronic Payment Systems, Electronic Cash, Smart Cards and Electronic Payment Systems, Credit Card Based Electronic Payment Systems, Risks and Electronic Payment Systems.

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

Unit III **16Hrs**

Basics of internet: www, http, html, DNS, IP Address, electronic mail, web browsers, search engines, **Social Media**: Twitter, Facebook, Youtube, whatsapp, LinkedIn, advantages, disadvantages, privacy issues

Introduction to e-governance:e-governance, stages of e-governance, advantages, challenges, International Status, Indian status

Unit IV **16Hrs**

IT Act: IT Act 2000 salient features, digital signature, electronic signature, Cyber Appellate Tribunal, Adjudicator, offences, and penalties.

References:

1. Information Technology Amended Act, 2008, Ministry of Law and Justice, Government of India.
2. SrinivasBhogle, "E-Governance" Chapter III in Selected Readings on Information Technology Management : Contemporary Issues, Information Science reference, Hershey, New York, page no. 40-61.
3. Tom Huskerson. Social Media, the Good, Bad, and Ugly: Volume. 3. 2014
4. RitendraGoel. "e-commerce", New Age International Publishers, 2008
5. Dougals E Comer. Computer Network and Internet. Person, 2008

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M.Sc. III SEMESTER COMPUTER SCIENCE

(w.e.f 2018-19 and onwards)

GET3.1 : (b) WEB DESIGN USING HTML AND DREAMWEAVER

Teaching: 4 Hrs./ Week | **Max Marks: 80**

Credits: 04 :64 | **I.A.Marks: 20**

Unit I **16Hrs**

Basics in Web Design: Brief History of Internet ,What is World Wide Web, Why create a web site, Web Standards. Introduction to HTML, HTML Document, Basic structure of an HTML document , Creating an HTML document, Introduction HTML Elements, Tags, Text , Formatting Pre , Attributes, Font, Text Links, Comments, Lists .

Unit II **16Hrs**

HTML – Images, Image Links, image maps, Tables, Bgcolor, ColorCodes,Color Chart , Background, web Forms , Forms, Input , Text Fields ,Password , Reset ,Submit , Checkboxes ,Radio ,Select ,Hidden Fields , - Upload , Text area.Special Tags, Body , Meta ,Style

Unit III **16Hrs**

Creation of animated GIF. Sizing the pictures. Multimedia Objects Adding external images, video, and sound file including device independent (DVI) files. Add marquees of scrolling text. Frames Setting and releasing frames. Using one frame to index another. Creating floating frames, borderless frames and frames with borders.

Unit IV **16Hrs**

CSS: CSS Introduction ,CSS Syntax ,CSS Id & Class ,CSS How, CSS Styling, Styling ,Backgrounds, Styling Text, Styling Fonts, Styling Links ,Styling Lists ,Styling Tables ,CSS Box Model ,CSS Border, CSS Outline, CSS Margin, CSS Padding ,CSS Dimension , CSS Display, CSS Positioning, CSS Floating, CSS Navigation Bar, CSS Image Gallery, CSS Image Opacity , CSS Align

References:

References

1. HTML & XHTML: The Complete Reference (Osborne Complete Reference Series) 4th Editionby Thomas Powell.
2. Head First HTML and CSS by Elisabeth Robson and Eric Freeman
3. HTML5 and CSS3 All-in-One For Dummies by Andy Harris

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PRACTICALS
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Teaching: 8 Hrs./ Week Credits: 04		Max Marks: 80 I.A.Marks: 20
Practical 3.1	Java and C# .Net programming Lab	
Practical 3.2	(a) Computer Graphics Lab (b) Data Warehousing and Mining Lab	

Note: Practical based on syllabus

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SEMESTER-IV

M.Sc. IV SEMESTER COMPUTER SCIENCE

(w.e.f 2018-19 and onwards)

CCT 4.1 : WEB DESIGN USING JAVASCRIPT

Teaching: 4 Hrs./ Week | **Max Marks: 80**
Credits: 04 :64 | **I.A.Marks: 20**

Unit I **16Hrs**

Web Design Environment: HTML and XML Languages, Web Browsers, Coding for multiple screen resolutions, Bandwidth concerns. Web Site Design Principles: Design for the medium, Design the whole website, Design for the user, Design for the screen, Planning the Site, Planning site navigation, Creating page templates, web typography- type design principles, controlling typography with the <FONT> element and Cascading Style Sheets, styling with CSS, Graphics and Color, HTML frames, publishing and maintaining websites.

Unit II **16Hrs**

Basics of JavaScript: Overview of JavaScript, Object orientation and JavaScript, Syntactic characteristics, primitives, operations, and expressions, Screen output and keyboard input, Control statements, Object creation and modification, Arrays, Functions, Constructors, Pattern matching using regular expressions, errors in scripts, Examples.

Unit III **16Hrs**

JavaScript and HTML Documents: The JavaScript Execution Environment, The Document Object Model, Elements Access in Java Script, Events and Event Handling, Handling Events from Body Elements, Handling Events from Text Box and password Elements, The DOM2 Event Model, The navigator Object, Dom Tree Traversal and Modification.

Unit IV **16Hrs**

Dynamic Documents with JavaScript: Introduction, Positioning Elements, Moving Elements, Element Visibility, Changing Colours and Fonts, Dynamic Content, Stacking Elements, Locating the Mouse Cursor, Reacting to a Mouse Click, Slow Movement of Elements, Dragging and Dropping Elements. The Basics of Perl, Origins and uses of Perl, Scalars and their operations, Assignment statements and simple input and output, Control statements, Fundamentals of arrays, Hashes, References, Functions, Pattern matching, File input and output.

References:

1. 2.JoelSklar,. Principles of Web Design, Web Warrior series, Thomson Learning.
2. 3.Deitel, Deitel, and Nieto, Internet & World Wide Web-How to Program, PHI.
3. 4.DonGosselin, JavaScript, Web Warrior Series,3/e, Thomson Learning.
4. 5.Douglas E. Comer, Internetworking With TCP/IP, Vol. II: Design, Implementation, And Internals, 3/E, PHI.
5. 6.KateKalata, Internet Programming with VBScript and JavaScript, Thomson Learning.
6. Kenneth Rosonet al, Java Scripting: The Complete Reference, Osborne/McGraw Hill.
7. 8. SumitabhaDas,Java Scripting, , 4th Edition, Tata McGraw Hill.

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M.Sc. IV SEMESTER COMPUTER SCIENCE

(w.e.f 2018-19 and onwards)

CCT 4.2 : SOFTWARE ENGINEERING

Teaching: 4 Hrs./ Week | **Max Marks: 80**
Credits: 04 :64 | **I.A.Marks: 20**

Unit-I **16Hrs**

Software Engineering Paradigms: Software Characteristics, Software myths, Software Applications, Software Engineering Definitions, Software Process Models, Process iteration, Process activities, Computer-aided software engineering (CASE) and CASE Tools. Software Project Management: Management activities, Project planning, Project scheduling, Risk management and activities.

Unit-II **16Hrs**

Software Requirements Engineering: Requirements Engineering Processes, Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. Software Requirements, Functional and non-functional requirements, User requirements, System requirements, Interface specification, Software requirement specification document. Specificationlanguages. Software Metrics and Measures Process Metrics, Project metrics, Software Project Estimation

Unit-III **16Hrs**

Software Design: Software Design Process, Principles of s/w design, Design Strategies, Levels of s/w design, Interface Design, Coding, Software Reuse, Computer Aided Software Engineering (CASE), CASE tools. Software Testing, Software Reliability, Software Safety, Defect testing, Debugging Tools.

Unit-IV **16Hrs**

Software Maintenance: Software Maintenance and its types, S/w Configuration Management, S/w Reuse, Software Evolution, Software Quality Assurance – plans & activities, Software Documentation.

References:

1. Pressman: Software Engineering, TMH.
2. Gill N.S. : Software Engineering, Khanna Book Publishing Co.(P) Ltd, N. Delhi
3. Jalote, Pankaj: An Integrated Approach to Software Engineering, Narosa Publications.
4. Ghezzi, Carlo: Fundaments of Software Engineering, PHI.
5. Fairley, R.E.: Software Engineering Concepts,McGraw-Hill.
6. Lewis, T.G.: Software Engineering, McGraw-Hill..

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M.Sc. IV SEMESTER C (w.e.f 2018-19 and onwards)

OMPUTER SCIENCE

DSET 4.1 : (a) DIGITAL IMAGE PROCESSING

Teaching: 4 Hrs./ Week | Max Marks: 80
Credits: 04 :64 | I.A.Marks: 20

Unit I **16Hrs**

Digital Image Fundamentals: The origins of Digital Image Processing, Examples of Fields that Use Digital mage Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing ystems, Image Sampling and Quantization, Basic relationships between pixels.

Unit II **16Hrs**

mage Enhancement in the Spatial Domain: Basic Gray Level Transformations, Histogram Processing, nhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening patial Filters, Combining Spatial Enhancement Methods.

mage Enhancement in the Frequency Domain: Introduction to Fourier Transform and the frequency Domain, moothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.

Unit III **16Hrs**

olor Image Processing: Color models, pseudocolor image processing, color transformations, smoothening and harpening.**Image Restoration:** A model of The Image Degradation / Restoration Process, Noise Models, estoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain iltering, Linear Position-Invariant Degradations, Estimation of Degradation Function, Inverse filtering, Wiener ltering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

nit IV **16Hrs**

nage Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region riented Segmentation, Motion based segmentation.

orphological Processing: Some basic Morphological operations.

eferences:

. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, 3/e, Pearson Education.

. Anil K. Jain, Fundamentals of Digital Image Processing', Pearson .

. Kenneth R. Castleman, Digital Image Processing, Pearson. 4. Rafael C. Gonzalez, Richard E. Woods, teven Eddins,Digital Image Processing using MATL AB, Pearson Education, Inc..

5. William K. Pratt, , Digital Image Processing, John Wiley, New York,

6. Milan Sonka et al, Image Processing, Analysis And Machine Vision, Brookes/Cole, VikasPublishing ouse.

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DSET4.1 : (b) SOFTWARE TESTING

Teaching: 4 Hrs./ Week **Max Marks: 80**

Credits: 04 :64 **I.A.Marks: 20**

Unit I **16Hrs**

Testing Fundamentals: Introduction, Basic Definitions of Errors, Defects, Failures, Test Cases, Test, Test Oracle, Test Bed, Software Quality, Software Quality Assurance Group, Reviews and Software Testing Principles, Software Development Life cycle Models, The Tester's Role in a Software Development Organization. Introduction to Testing Design Strategies, Test Case Design Strategies, Using the Black Box Approach to Test Case Design, Equivalence Class Partitioning, Other Black Box Test Design Approaches Cause-and-Effect Graphing, State Transition Testing, Error Guessing, Black Box Testing and Commercial Off-the-Shelf Components (COTS).

Unit II **16Hrs**

The Need for Levels of Testing: Levels of Testing and Software Development Paradigms, Unit Test: Functions, Procedures, Classes, and Methods as Units, Unit Test: The Need for Preparation, Unit Test Planning, Testing and Debugging Goals and Policies, Test Planning, Test Plan Components, Test Plan Attachments.

Unit III **16Hrs**

Types of Testing: Integration tests, Designing integration tests, Integration test planning, Scenario testing, Defect Bash elimination system testing, Acceptance testing, Performance testing, Regression testing, Internationalization testing, Ad-hoc testing, Alpha, Beta tests, Testing Object Oriented Systems.

Unit IV **16Hrs**

Usability & Accessibility Testing, Configuration testing, Compatibility testing, Testing the Documentation, Website testing, and Automated testing & Test tools, Bug bashes & Beta testing, Career as a Software Tester.

References:

1. IlleneBurnstein, "Practical Software Testing", Springer Internal Edition.
2. SrinivasanDesikan and Gopalaswamy Ramesh, "Software Testing-Principles and Practices", Pearson Education, 2006.
3. Ron Patton, "Software Testing", Sams Publishing, Pearson Education.
4. Roger S.Pressman, Software Engineering-A Practitioners Apporach, McGraw-Hill /7e
5. IanSommerville, Software engineering, Pearson education Asia, 9th edition.
6. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997
7. K.V.K. K. Prasad, "Software Testing Tools", Dreamtech Press.

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M.Sc. IVSEMESTER COMPUTER SCIENCE

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DSET4.1: (c) CLOUD COMPUTING

Teaching: 4 Hrs./ Week	**Max Marks: 80**
Credits: 04 :64	**I.A.Marks: 20**

Unit I **16Hrs**

ntroduction, Cloud Infrastructure: Cloud computing, Cloud computing delivery models and services, Ethical ssues, Cloud vulnerabilities, Cloud computing at Amazon, Cloud computing the Google perspective, Microsoft Windows Azure and online services, Open-source software platforms for private clouds, Cloud torage diversity and vendor lock-in, Energy use and ecological impact, Service level agreements, User xperience and software licensing.

Unit II **16Hrs**

Cloud Computing: Application Paradigms, Challenges of cloud computing, Architectural styles of cloud omputing, Workflows: Coordination of multiple activities, Coordination based on a state machine model: he Zookeeper, The Map Reduce programming model, A case study: The Grep, The Web application, loud for science and engineering, High-performance computing on a cloud, Cloud computing for Biology esearch, Social computing, digital content and cloud computing.

nit III **16Hrs**

loud Resource Virtualization: Virtualization, Layering and virtualization, Virtual machine monitors, Virtual achines, Performance and Security Isolation, Full virtualization and paravirtualization, Hardware support for rtualization, Case Study: Xen a VMM based paravirtualization, Optimization of network virtualization, Blades, Performance comparison of virtual machines, The dark side of virtualization.

nit IV **16Hrs**

oud Resource Management and Scheduling: Policies and mechanisms for resource management, pplication of control theory to task scheduling on a cloud, Stability of a two-level resource allocation chitecture, Feedback control based on dynamic thresholds, Coordination of specialized autonomic rformance managers, A utilitybased model for cloud-based Web services, Resourcing bundling: mbinatorial auctions for cloud resources, Scheduling algorithms for computing clouds, Fair queuing, art-time fair queuing, Borrowed virtual time, Cloud scheduling subject to deadlines, Scheduling pReduce applications subject to deadlines, Resource management and dynamic scaling.

ferences:

an C Marinescu: Cloud Computing Theory and Practice. Elsevier(MK) 2013.

RajkumarBuyya , James Broberg, AndrzejGoscinski: Cloud Computing Principles and Paradigms, Willey 14.

ohn W Rittinghouse, James F Ransome:Cloud Computing Implementation, Management and Security, C Press 2013

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DSET4.1 : (d) PROBLEM SOLVING USING PYTHON

Teaching: 4 Hrs./ Week **Max Marks: 80**

Credits: 04 :64 **I.A.Marks: 20**

nit I **16Hrs**

troduction: ,program structure, output function, variables, constants, data types, type operators and pressions, control structures, input function . Data structures – str, list, tuple, dict, set.

nit II **16Hrs**

st:dict, set and generator-comprehensions. User defined functions - variable number of arguments, default rameters, key value pairs as arguments, Data Storage, Data formatting.

nit III **16Hrs**

odules: Packages and Programs, Systems, Regular Expressions, File Handling, Errors and Exception ndling.

nit IV **16Hrs**

asses: Objects, Inheritance, Testing and debugging, GUI Programming, Relational databases, Web tangled, Concurrency and Networks.

eferences:

1. Bill Lubanovic, Introducing Python- Modern Computing in Simple Packages, O'ReillyPublication
2. Allen Downey, Jeffrey Elkner, Chris Meyers, How to Think Like a Scientist –Learning with Python, Green Tea Press, 2002, First Edition.
3. Charles Dierbach, Introduction to Computer Science Using Python, WileyPublication.
4. Magnus Lie Hetland, Beginning Python, From Novice to Professional, - Second Edition, APressPublication

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M.Sc. IV SEMESTER COMPUTER SCIENCE
PRACTICALS
(w.e.f 2018-19 and onwards)

Teaching: 8 Hrs./ Week Credits: 04		Max Marks: 80 I.A.Marks: 20
Practical 4.1	Web Designing Using JAVASCRIPT and SE Lab	
Practical 4.2	(a) DIGITAL IMAGE PROCESSING (b) SOFTWARE TESTING (c) CLOUD COMPUTING (d) PROBLEM SOLVING USING PYTHON	

Note: Practical based on syllabus

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CCPR 4.1: PROJECT

Practical: 6 Hrs./Week **Max Marks: 150**

Credits: 06 **I.A .MARKS:30**

CCPR4.1: Project (60 for Project Evaluation+ 20 for Presentation + 40 for Project Report and Viva-voce)

Total 120 + IA 30 = 150

Each student shall carry out an individual project in the Lab.

·The Guide shall be concerned teacher in the department.

·The Project topic should be chosen in consultation with the guide.

·Student shall carry out the analysis and design work for the chosen problem statement and develop the s/w in the Lab.

·The student shall submit two copies of the dissertation documenting the project work carried out by him/her to the Chairman/Head of the Department at the end of the semester term.

·Refer Annexure-I for Project documentation details.

ANNEXURE-I FORMAT OF THE PROJECT REPORT

1.Cover page as per format
2.Certificate of the project
3.Conference/Seminar/Workshop Attended Certificate
4.Acknowledgement
5.Index
6.Abstract of the project
7.Main Report
7.1Introduction
7.2Problem statement
7.3Literature survey
7.4System analysis & design
7.5Hardware & software Requirements
7.6ERD, DFD
7.7System Planning (Charts)
7.8Implementation
7.9Integration
7.10Testing
7.10.1Unit Testing
7.10.2Integration Testing
7.10.3Functional Testing
7.11Results & Discussion
7.12Advantages & Disadvantages
7.13Applications
7.14Future Scope
7.15Conclusion
7.16References
7.17Soft copy of the project on CD/DVD

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