SCHEME OF TEACHING AND EXAMINATIONS 2019-2020
MASTER OF SCIENCE IN COMPUTER SCIENCE

THIRD SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
Paper I	.Net Technology	3	2	-	4	100	50		150	40	30		70
Paper II	Software Engineering	3	2	-	4	100	50		150	40	30		70
Paper III	Open Source Software with Case Study of Linux	3	2	-	4	100	50		150	40	30		70
Paper IV	Computer Graphics	3	2	-	4	100	50		150	40	30		70
Paper V	Elective: i. Image Processing ii. Data Mining and Data Warehousing iii. Satellite & Mobile Communication	3	2	-	4	100	50		150	40	30		70
Practical I	Practical based on Paper-I			3x2	3		25	100	125		15	50	65
Practical II	Practical Based on Paper-III			3x2	3		25	100	125		15	50	65
TOTAL		15	10	12	26	500	300	200	**1000**	200	180	100	480

THIRD SEMESTER : M.Sc.(CS)

Paper I : .Net Technology

Max Marks : 100 **Min Marks : 40**

UNIT – I: Inside the .NET framework:

Overview of .net framework, Managed Execution process, CLR, common language specification, JIT Compilation , MSIL, Namespaces, Assemblies, metadata, Common Type System, cross language, interoperability, Garbage collection.

UNIT – II: Programming with .NET Framework

Windows form: working with Visual Studio IDE, creating a .NET solution, MDI application, components and controls, Data types, variables, Type conversions, Operators, Control **Structures**: conditional statements, loops, arrays, types of methods, method data, Introduction to exception handling-exception statements.

UNIT – III: XML, Windows process and File Handling

Types, structures, Enumerations, classes, Interfaces, Working with files-Files and directories, streams, Readers and writers, Reading and writing XML files, XML serialization, processing Transaction, Monitoring and Managing Windows Process, retrieving information about process.

UNIT – IV: Building .NET Framework Applications

Introduction to ASP .NET, Differentiate classic ASP and ASP .NET, Web application, Web forms, Form validations – Client side, Server side, controls in web forms, Events in Web form.

UNIT – V: Advanced concepts and Database Programming

Delegates, ADO .NET Architecture, .NET dtat provider, dataset components, creating database applications using Window forms and web forms (Database connectivity through ADO .NET), Introduction to web services, web services for Mobile application, Remote overview.

BOOKS RECOMMENDED

- **MSDN online – by Microsoft**
- **Visual Basic .NET Complete** - BPB Publications, New Delhi.
- **The Complete Reference VB .NET**, *Jeffery R. Shapiro*, Tata Mcgraw Hill.
- **Professional VB .NET 2003**, *Bill Evjen & others*, Wiley India (P) Ltd.

THIRD SEMESTER : M.Sc.(CS)

Paper II : Software Engineering

Max Marks : 100 **Min Marks : 40**

UNIT – I Software Engineering Fundamentals:

Introduction to Software Engineering; Software Engineering Principles(Layers); Software Process – Process Framework, Umbrella Activities, Process Adaptation; Software Crisis; Process Models-Waterfall Model, Prototype Model, Incremental Model, Spiral Model, RAD Model; Agile Process.

UNIT – II Software Analysis and Design:

Requirement Engineering; Analysis Model-Data Flow Diagram, Data Dictionary, E-R Diagram, Decision Table; Software Requirements Specification(SRS), Structure of SRS; Pseudo code; Software Design; Design Process; Design Concepts-Abstraction, Partitioning, Modularity, Information Hiding, Refinement, Refactoring; Function Oriented Design; Object Oriented Design; Cohesion and Coupling.

UNIT – III Software Quality and Case Tools:

Software Metrics, Categories of Metrics, Function Point Metric; Software Quality; McCall's Quality Factors; Software Maturity Model-CMM,CMMI; Software Quality Assurance; ISO Standards-9000, 9001 and 9126; Software Reliability; Case Tools and its Scope; Case Objectives; Architecture of Case Tools; Case Classification.

UNIT – IV Coding and Testing:

Programming Style; Structured Programming; Coding Standard; Internal Documentation; Software Testing-Verification and Validation; Alpha and Beta Testing; Levels of Testing-Unit, Integration and System Testing; Testing Techniques- White Box, Black Box; Cyclomatic Complexity; Test Plan; Debugging-Debugging Process, Debugging Strategies(Approaches).

UNIT – V Software Maintenance and Project Management:

Risk Management – Software Risk, Risk Identification; Introduction to Software Maintenance, Categories of Maintenance; Belady and Lehman Model; Boehm Model; Project Management Concept – People, Product, Process, Project; Software Team; Software Project Planning; Software Project Estimation; Cost Estimation Model(COCOMO, COCOMO II, Putnam-SLIM, Walston and Felix); Software Reengineering.

RECOMENDED BOOKS:

1. **Software Engineering: A Practitioner's Approach**, *Roger S. Pressman*, TMH
2. **An Integrated approach to Software Engineering**, *Pankaj Jalote*, Narosa Publications
3. **Software Engineering**, *Bharat Bhushan Agarwal.*

THIRD SEMESTER : M.Sc.(CS)

Paper III : Open Source Software with Case Study of Linux

Max Marks : 100 **Min Marks : 40**

UNIT – I Open Source Software: Introduction, History, Examples(Operating System GNU/Linux, Apache Web Server), Strengths and Advantages(Network effects, Lower cost, Availability, Maintainability), Challenges, System Structure, Kernel and its function. **File System :** Concept of i-node table, links, commonly used commands like who, pwd, cd, mkdir, rm, ls, mv, lp, chmod, cp, grep, sed, awk, make, etc. Getting started (login / logout), File system management, file operation, system calls, buffer cache. **Vi Editor :** command and edit mode, invoking vi, deleting and inserting line, deleting and replacing character, searching strings, yanking, running shell command, command macros, set windows, set auto indent, set number, intro to exrc file.

UNIT – II Shell Programming: Introduction to shell feature, wild card characters, i/out redirections, standard error redirection, system and user created shell variables, profile files, pipes/tee, background processing, command line arguments, command substitution, read statement, conditional execution of commands, special shell variables $ #, #?, $* etc. Shift commands, loops and decision making- for, while and until, choice making using case…esac, decision making if ….fi, using test, string comparison, numerical comparison, logical operation, using expr.

UNIT – III Introduction to Shell: Features, changing the login shell, cshrc, login, logout files, setting environment, variables, history and alias mechanism, command line arguments, redirection/appending safely, noclobber, noglob, ignore eof, directory stacks (pushd, popd). **Process Control:** Process management, process states and transition, regions and control of process, signals, system boot and init process, traps, setting process priorities.

UNIT – IV Inter-process Communication: I/O Sub system, terminal drives, disk drives, messages, shared memory, semaphores, memory management, swapping, demand paging. **System Calls and Unix -C Interface :** File handling calls like - open() & close() with algorithm, read() & write() with algorithm, create(), access (), fseek(), process control system calls like kill(), exec(), fork(), wait(), signal(), exit().

UNIT – V System Administration: Process and Scheduling, Security, Basic System Administration:- Adding a User, User Passwords, Delete of a User, Adding a Group, Deleting a Group, Super User, Startup and Shutdown. Advanced System Administration:-Managing Disk Space, Backup and Restore, Managing System Services.

BOOKS RECOMMENDED:

1. **Design of Unix Operating System;** *Maurice J. Bach*
2. **Advanced Unix,** *Stephan Pratta*
3. **Unix Concepts & Techniques,** *Sumitabha Das*
4. **The Unix Programming Environment,** *Kennighan and Pike*
5. **Unix Programmers Guide,** *P. P. Selvester*
6. **Introduction to Unix System,** *Rachell Morgan*

THIRD SEMESTER : M.Sc.(CS)

Paper IV : Computer Graphics

Max Marks : 100 **Min Marks : 40**

UNIT - I: Display Devices Refresh Cathode-Ray tubes, Random Scan and Raster Scan Display, Color CRT Monitors, Color display techniques: shadow masking and Beam penetration, Direct view storage tubes, Flat Panel display: plasma panel displays, LED & LCD devices. **Interactive Graphics** Physical Input devices, logical classification, input function, interactive picture construction techniques.

UNIT - II: Output Primitives Points and Lines, Line drawing Algorithms: DDA Algorithm and Bresenham's Line Algorithm, Antialiasing. Circle generating Algorithms: Bresenham's Circle Algorithms, Midpoint Circle Algorithm, Ellipse Generating Algorithm: Midpoint, Character generation and text display. Output command for various geometrical shapes, Filled Area Primitive: Scan line polygon fill algorithm, Boundary fill algorithm, Flood fill algorithm. Attribute of outputs primitives: line attribute, Area-fill Attribute, Text attribute, Bundled attributes, Area-Fill.

UNIT - III: Two Dimensional Transformation and Viewing Transformation: Translation, Scaling, Rotation, Reflection, Shearing. Matrix representations of Transformation and Homogenous Coordinates, Composite Transformations and Concatenation of transformation. **Two-Dimensional Viewing Coordinate system:** World/user coordinates, Device coordinate, Normalized device coordinates, Viewing pipeline: windows and viewports, Viewing transformation pipeling, Window-to-Viewport coordinate transformation, Clipping algorithm: point, line clipping algorithm: Cohen-Sutherland, Liang Barsky, Nicholl-Lee-Nicholl, Line Clipping, polygon clipping algorithm : Sutherland-Hodgman, Weiler-Atherton, text clipping.

UNIT - IV: 3-D Transformation Translation, Scaling, Rotation about standard and arbitrary axis, Other Transformation: Reflections and shears, Transformation commands. **Viewing:** Viewing Pipeline, Viewing Coordinates: transformation from world to viewing coordinates.

UNIT - V: 3-D Projection: Parallel Projection, Perspective Projection, Normalized view volume, viewport Clipping, Clipping in Homogeneous Coordinate. **Visible-Surface detection algorithms**: Back-Face removal, Depth Buffer method, Scan line method, Depth sorting method, Area subdivision and Octree method.

RECOMMENDED BOOKS:

1. **Computer Graphics**, *Hearn D. & Baker P.M.*
2. **Computer Graphics**: A Programming Approach, *Harrington S.*
3. **Procedural Elements for Computer Graphics**, *Rogers D.F.*

THIRD SEMESTER : M.Sc.(CS)

Paper V : Elective 1. Image Processing

Max Marks : 100 **Min Marks : 40**

UNIT - I

Digital Image fundaments: Introduction, An image model, sampling & quantization, basic relation ships between Pixels, imaging geometry.

UNIT - II

Image Transforms: Properties of 2 – D Fourier transform, FFT algorithm and other separable image transforms. Walsh transforms. Hadamard, Cosine, Haar, Slant transforms, KL transforms and their properties.

UNIT - III

Image Enhancement: Background, enhancement by point processing, histogram processing, spatial filtering and enhancement in frequency domain, color image processing.

Image filtering and restoration : degradation model, diagnolisation of circulant and block circulate matrices, Algebraic approach to restoration, inverse filtering, least mean squares and interactive restoration, geometric transformations.

UNIT - IV

Image compression: Fundamentals, image compression modes, error free compression, lossy compression, image compression standards.

Image segmentation: Detection of discontinuities, edge linking and boundary detection thresholding, region – oriented segmentation, use of motion in segmentation.

UNIT - V

Representation and description: Various schemes for representation, boundary descriptors, and regional descrip

Image reconstruction from Projections, Radon Transforms; Convolution/Filter back – Project Algorithms.

Reference:

1. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods
2. Fundamentals of Digital Image Processing - A. K. Jain, Prentice Hall

THIRD SEMESTER : M.Sc.(CS)

Paper V : Elective 2. Data Warehousing and Mining

Max Marks : 100 **Min Marks : 40**

UNIT – I

Introduction: KDD (Knowledge Discovery from Databases),Fundamentals of data mining, Data Mining Functionalities, Major issues in Data Mining, Data Warehouse and OLAP Technology, Multidimensional Data Model, Data Warehouse Architecture, OLAP operations, Warehouse schema.

UNIT – II

Data Preprocessing & Data Mining Languages: Need of Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation, Data Mining Primitives, Data Mining Query Languages, Architectures of Data Mining Systems, Concepts Description: Characterization and Comparison, Analytical Characterization.

UNIT – III

Association Rule Mining, Classification and Prediction: Association Rule Mining, Market Basket Analysis, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Apiori algorithm, FP-Tree growth algorithm, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation.

UNIT – IV

Cluster Analysis: Types of Data in Cluster Analysis, Outlier Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Heirarchical Methods, Density-Based Methods, Grid- Based Methods, Model-Based Clustering Methods.

UNIT – V

Mining Complex Types of Data: Web Mining, Text Mining, Multimedia Mining, Temporal and Spatial Data Mining, Trends in Data Mining, Data Mining Applications.

RECOMENDED BOOKS:

1. **Data Mining: Concepts and Techniques,** *Jiawei Han and Micheline Kamber*
3. **Data Mining Techniques**, *Arun K Pujari,*
4. **Data Mining Introductory and Advanced Topics,** *Margaret H Dunham*, Pearson

THIRD SEMESTER : M.Sc.(CS)

Paper V: Elective 3. Satellite &Mobile Communication

Max Marks: 100 **Min Marks: 40**

UNIT – I: Introduction.

Introduction to Mobile Communication, Short history of wireless communication, Applications, Vehicles, Emergency, Business, Replacement of wired network, Location dependent services, infotainment, Mobile and Wireless devices, A Simplified reference model, some open research topics in mobile communication.

UNIT – II: Satellite Systems

History of satellite system, Applications of satellite systems, Type of satellite systems, characteristics of satellite systems, satellite system infrastructure, satellite system architecture, Global Positioning system (GPS), Limitations of GPS. Beneficiaries of GPS, Applications of GPS

UNIT – III: Mobile Communication Systems

Introduction, Cellular System Infrastructure,, Registration, Handoff Parameters and Underlying support, Roaming Support Using System Backbone, to Mobile IP, Functions of Mobile IP, Mobile Node, Corresponding Node, Home Network, Foreign Network, Home Agent, Foreign Agent, Care-of Address, IP Packet Delivery, Agent Discovery, Agent Solicitation, Registration, Tunneling, Dynamic host configuration protocol.

UNIT – IV: Wireless LANs and PANs

Introduction to IEEE 802.11, Ricochet, Ricochet Wireless Modem, Services Provided by Ricochet , Home RF, Home RF Technology, Hiper LAN, Blue tooth , Advantages and disadvantages of Wireless LAN, Infra red vs radio transmission , introduction to MAC. Technologies influence WLANs / WPANs in future.

UNIT – V: Mobile Adhoc Network

Introduction to Mobile Adhoc Network(MANET), Characteristics of MANET, Applications of MANET, Routing, Need for Routing, Routing Classification, Table-Driven Routing Protocol – Destination Sequenced Distance Vector Routing Protocol, Cluster-Head Gateway Switch Routing, Wireless Routing Protocol. Source initiated On-demand Routing- Adhoc on Demand Distance Vector Routing, Dynamic Source Routing, Temporarily Ordered Routing Algorithms, Hybrib Protocol – Zone Routing Protocol.

RECOMMENDED BOOKS:

1. **Mobile Communication**: *Jochen H. Schiller*, Pearson Education Publication
2. **Introduction to Wireless and Mobile Systems**: *D.P. Agrawal, Qing-An Zing*, Vikas Publishing House