SYLLABUS

MANONMANIAM SUNDARANAR UNIVERISTY, TIRUNELVELI-12

PG - COURSES – AFFILIATED COLLEGES

Course Structure for

MASTER OF COMPUTER APPLICATIONS (MCA)

(Choice Based Credit System)

(with effect from the academic year 2021- 2022 onwards)

Semester-II				
Part	**Subject Status**	**Subject Title**	**Subject Code**	**Credit**
III	Core - 8	Financial and Management Accounting		4
	Core - 9	Machine Learning using Python		4
	Core - 10	Advanced Web Technology		4
	Core - 11	Advanced Data Base Management System		4
	Elective – 1 (Select any ONE)	distributed Operating System/ Cloud Computing /Soft Computing /Cyber Security		3
	Core - 12 Practical - 3	Machine Learning using Python - Lab		2
	Core - 13 Practical - 4	Advanced Web Technology - Lab		2

FINANCIAL AND MANAGEMENT ACCOUNTING

OBJECTIVES

- To understand the fundamental accounting concepts, the elements of financial statements, and basic accounting vocabulary.
- To explain the basic features of accounting and reporting by organizations, including the principles underlying the design, integrity, and effectiveness of information systems

OUTCOMES

- Perform the accounting analysis
- Explain the basic features and issues in accounting.

- Prepare the financial statements.

UNIT I

Principles, Accounting concepts, Methods of Accounting, Types of Accounting – Accounting Rules. Journal, Rules for Debit and Credit, Compound Journal entry, Advantages of Journal, Ledger, Ledger Account, Ledger Posting, Process of Posting, Balancing of an Account, Significance of Balances, Relation between Journal and Ledger-Subsidiary Books.

UNIT II

Trial Balance:

Objects, Methods of Preparing Trial balance, how to locate errors, hints for the preparation of trial balance & problems. Trading account – individual items posted to the debit of trading account – individual items credited to trading account – advantages of trading account – profit & loss account - advantages of profit & loss account - balance sheet- classification of assets & liabilities

UNIT III

Ratio analysis:

Meaning – classification of ratios – Liquidity ratios - Profitability ratios– Advantages – Limitations. Fund flow analysis: Meaning of the term fund – Working capital – statement of changes in working capital – preparation of fund flow statement.

UNIT IV

Cost accounting:

Meaning of costing – scope – importance – cost classification - Marginal costing – Nature – scope – importance Break-even-point – Break even chart – P/V ratio – Marginal costing and management decisions.

UNIT V

Standard costing and Variance analysis:

Nature, scope, advantages - Limitations, computation and analysis of variances with reference to material cost and Labour cost. Budget and Budgetary Control: Meaning – Budget – Budgetary control – Advantages – Limitations – classification of budgets - preparation of sales budget –Flexible budget.

Reference Books:

1. N.P.Srinivasan M.Sakthivel Murugan, - Accounting for Management – S.Chand & Sons, New Delhi.
2. SP Jain and KL Narang – Advanced Accounting - Kalyani Publishers, New Delhi.
3. S P Iyengar – Advanced Accounting - Sultan Chand & Sons, New Delhi.
4. S N Maheswari and C B Gupta - Financial management – Sultan Chand & Sons, New Delhi.
5. S. N. Maheswari and C B Gupta - Management Accounting – Sultan Chand & Sons, New Delhi.

MACHINE LEARNING USING PYTHON

OBJECTIVES

1. To Learn about Machine Intelligence and Machine Learning applications
2. To identify and apply the appropriate machine learning technique to classification, pattern recognition, optimization and decision problems.
3. To understand how to perform evaluation of learning algorithms and model selection.

OUTCOMES

1. Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
2. Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
3. Be able to design and implement various machine learning algorithms in a range of real-world applications.

UNIT I

Introduction - Why Machine Learning? - Problems Machine Learning Can Solve - Knowing Your Task and Knowing Your Data - Why Python? - scikit-learn - Installing scikit-learn - Essential Libraries and Tools - Supervised Learning - Classification and Regression - Generalization, Over fitting, and Under fitting - Supervised Machine Learning Algorithms.

UNIT II

Unsupervised Learning and Preprocessing - Types of Unsupervised Learning - Challenges in Unsupervised Learning - Preprocessing and Scaling - Dimensionality Reduction, Feature Extraction, and Manifold Learning – Clustering.

UNIT III

Representing Data and Engineering Features - Categorical Variables - Binning, Discretization, Linear Models, and Trees - Interactions and Polynomials - Univariate Nonlinear Transformations - Automatic Feature Selection – Utilizing Expert Knowledge.

UNIT IV

Model Evaluation and Improvement - Cross-Validation - Grid Search - Evaluation Metrics and Scoring.

UNIT V

Algorithm Chains and Pipelines - Parameter Selection with Preprocessing - Building Pipelines - Using Pipelines in Grid Searches - The General Pipeline Interface

- Grid-Searching Preprocessing Steps and Model Parameters -Grid-Searching Which Model To Use.

REFERENCE BOOKS:

1. Andreas C. Müller, Sarah Guido, "Introduction to Machine Learning with Python", O'Reilly Media, Inc, October 2016.
2. Jeremy Watt , Reza Borhani, Aggelos K. Katsaggelos, "Machine Learning Refined - Foundations, Algorithms, and Applications" , Second Edition, Cambridge University Press , 2020.
3. Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar, Foundations of Machine Learning, Second Edition, the MIT Press, 2018.
4. John Paul Mueller and Luca Massaron, Machine Learning (in Python and R) For Dummies, John Wiley & Sons, 2016.

ADVANCED WEB TECHNOLOGY

OBJECTIVES

- Explore the backbone of web page creation by developing .NET skill.
- Enrich knowledge about HTML control and web control classes
- Provide depth knowledge about ADO.NET
- Understand the need of usability, evaluation methods for web services

OUTCOMES

- Design a web page with Web form fundamentals and web control classes
- Recognize the importance of validation control, cookies and session
- Apply the knowledge of ASP.NET object, ADO.NET data access and SQL to develop a client server model.
- Recognize the difference between Data list and Data grid controls in accessing data.

UNIT – I OVERVIEW

OVERVIEW OF ASP.NET –

The .NET framework – Learning the .NET languages Data types – Declaring variables- Scope and AccessibilityVariable operations- Object Based manipulation- Conditional Structures- Loop Structures- Functions and Subroutines. Types, Objects and Namespaces : The Basics about Classes- Value types and Reference types- Advanced class programming- Understanding name spaces and assemblies. Setting Up ASP.NET and IIS

UNIT – II

APPLICATIONS

Developing ASP.NET Applications - ASP.NET Applications: ASP.NET applications– Code behind- The Global. asax application file Understanding ASP.NET Classes- ASP.NET Configuration. Web Form fundamentals: A simple page applet- Improving the currency converter- HTML control classes- The page class- Accessing HTML server controls. Web controls: Web Control Classes – Auto PostBack and Web Control events- Accessing web controls. Using Visual Studio.NET: Starting a Visual Studio.NET Project- Web form Designer Writing code- Visual studio.NET debugging. Validation and Rich Controls: Validation- A simple Validation example- Understanding regular expressions- A validated customer form. State management - Tracing, Logging, and Error Handling.

UNIT – III

WORKING WITH DATA

Working with Data - Overview of ADO.NET - ADO.NET and data management- Characteristics of ADO.NET-ADO.NET object model. ADO.NET data access : SQL basics– Select , Update, Insert, Delete statements- Accessing data- Creating a connection- Using a command with a DataReader - Accessing Disconnected data - Selecting multiple tables – Updating Disconnected data. Data

binding: Single value Data Binding- Repeated value data binding- Data binding with data bases. Data list – Data grid – Repeater – Files, Streams and Email – Using XML

UNIT – IV
WEB SERVICES

Web Services - Web services Architecture: Internet programming then and now- WSDL–SOAP- Communicating with a web service-Web service discovery and UDDI. Creating Web services: Web servicebasics- The StockQuote web service – Documenting the web service- Testing the web service- Web service Data types- ASP.NET intrinsic objects. Using web services: Consuming a web service- Using the proxy class- An example with TerraService.

UNIT – V
ADVANCED ASP.NET

Advanced ASP.NET - Component Based Programming: Creating a simple component – Properties and state- Database components- Using COM components. Custom controls: User Controls- Deriving Custom controls. Caching and Performance Tuning: Designing and scalability– Profiling- Catching- Output catching- Data catching. Implementing security: Determining security requirements- The ASP.NET security model- Forms authentication- Windows authentication.

REFERENCES

1. Mathew Mac Donald, "ASP.NET Complete Reference", TMH 2017.
2. Web Technologies HTML, Javascript, PHP, Java, JSP, ASP.NET, XML and AJAX Black Book By: Kogent Learning Solutions Inc.

ADVANCED DATA BASE MANAGEMENT SYSTEM

OBJECTIVES

- Acquire Knowledge of Database Models, Applications of Database Models and Emerging Trends.
- To enable the students to understand the concepts behind the relational database management system and its design.

OUTCOMES

- Know about the Various Data models and Works on Database Architecture
- Knowledge patterns, Object Oriented Databases are well equipped.
- Able to understand the database activities such as recovery, administration, backup, etc.

UNIT – I

Introduction:

Purpose of data base systems – Data Models – Data abstraction - Database Languages – Functional components of a Database System - System structure – DBA – Database Users. Relational Model: Structure of Relational databases - Database schema – Keys – Schema diagram - Relational Algebra –Integrity constraints.

UNIT - II

Data Normalization:

First, Second and Third normal forms – Boyce-Codd Normal Form – Fourth and fifth normal forms – Domain-Key normal form– Database Design.

E-R Model: Entity – Relationship - Attributes— mapping cardinalities – E-R Diagrams – Extended Entity Relationship Model.

Complex Data Types: Semi-structured data – objected-orientation – Textual data – Spatial data – Temporal data.

UNIT - III

SQL: Introduction to SQL – SQL Data Definition – SQL Queries – where, order by – Set operations – Null values – Aggregate Functions – Nested subqueries – Insert, update, delete – Join – views – SQL data types and schemas – Index – Authorization – Procedures – Functions – Triggers – Advanced aggregation features

UNIT - IV

Transactions:

Transaction Concept – A simple Transaction model – Storage Structure – Transaction Atomicity and Durability – Transaction Isolation – Serializability.

Concurrency Control: Lock based Protocols – Deadlock Handling – Multiple Granularity – Timestamp Based Protocols – Validation Based Protocols – Multiversion Schemes – Snapshot Isolation – Insert Operations, Delete Operations and Predicate Reads.

Recovery Systems: Failure Classification – Storage – Recovery and Atomicity – Recovery Algorithm – Buffer Management.

UNIT - V

Database System Architecture:

Centralized and Client Server Architectures – Server System Architectures – Parallel Systems – Distributed Systems. Parallel Databases: Introduction – I/O parallelism – Interquery parallelism – Intraquery parallelism – Intraoperation parallelism – Interoperation parallelism. Distributed Databases: Homogeneous and Heterogeneous Databases – Distributed Data Storage – Distributed Transactions.

Reference Books:

1. Abraham Silberschatz, Henry F. Korth, Sudarshan S: Database System Concepts, Seventh Edition, McGraw-Hill, 2019
2. Kevin Loney: Oracle Database 11g - The Complete Reference, McGraw-Hill, 2008.
1. MSU / 2021-22 / PG –Colleges / MCA/ Semester II / Ppr.no.11 / Core - 11
2. Mathews Leon and Alexis Leon: Database Management Systems, Vikas Publishing 2008.
3. Ramez Elmashree, Shamkant B.Navathe: Fundamentals of Database Systems, Pearson Education, 2011.
4. C. J. Date: Introduction to Database Systems, 8th Edition, Pearson Education, 2003
5. Rajesh Narang: Database Management Systems, 2nd Edition, PHI, 2012.

Elective 1:
DISTRIBUTED OPERATING SYSTEM

OBJECTIVES

- To study Distributed operating system concepts
- To understand hardware, software and communication in distributed OS
- Practices to learn concepts of OS and Program the principles of Operating Systems

OUTCOMES

- Clear understanding on several resource management techniques like distributed shared memory and other resources
- Able to design and implement algorithms of distributed shared memory and commit protocols
- Able to design and implement fault tolerant distributed systems

UNIT – I

Fundamentals:

What is Distributed Operating System? – Evolution of Distributed Computing System – Distributed Computing System Models – Why are Distributed Computing Systems gaining popularity? – What is a Distributed Computing System? – Issues in Designing Distributed Computing System – Introduction to Distributed Computing Environment (DCE). Computer Networks: Introduction– Network Types – LAN Technologies–WAN Technologies– Communication Protocols – Internetworking – ATM Technology.

UNIT - II

Message Passing: Introduction –Desirable features of Good Message Passing System – Issues in IPC Message Passing – Synchronization – Buffering – Multi datagram Messages – Encoding and Decoding of Message Data– Process Addressing – Failure Handling – Group Communication

UNIT - III

Remote Procedure Calls :

Introduction– The RPC Model – Transparency of RPC– Implementing RPC mechanism–Stub Generation–RPC Messages–Marshaling Arguments and Results– Server Management– Parameter Passing Semantic–Call Semantics–Communication Protocol for RPC's –Complicated RPC's –Client Server Binding–Exception Handling–Security–Some Special Types of RPC's –RPC in Heterogeneous Environments – Lightweight RPC. Distributed Shared Memory: Introduction – General Architecture of DSM Systems – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory – Consistency Models – Replacement Strategy – Thrashing–Other Approaches to DSM–Heterogeneous DSM –Advantages of DSM.

UNIT – IV

Synchronization:

Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithms. Process Management: Introduction-Process Migration– Threads.

UNIT – V

Distributed File System:

Introduction – Desirable features of a Good Distributed File System– File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles.

Reference Books:

1. Pradeep K Sinha,"Distributed Operating Systems", PHI Learning, 2012.
2. Andrew S Tanenbaum, "Distributed Operating Systems", First Edition, PHI 2002
3. George Coulouris, Gordon Blair, Jean Dollimore, Tim Kindberg, "Distributed Systems - Concepts and Design", Fifth Edition Pearson 2017.
4. Manish Varshney, Shanoo Agarwal, "Concepts of Distributed System", CBS Publisher and Distributors, 2016.
5. Abraham Silberchalz Peter B. Galvin, G.Gagne, "Operating Systems Concepts",Ninth edition, Addision Wesley Publishing Co., 2018.
6. Coulouris George, Dollimore Jean, Blair Gordon, "Distributed Systems-concepts and design", Pearson Education, 2017.

CLOUD COMPUTING

OBJECTIVES:

- To introduce the broad perceptive of cloud architecture and model
- To understand the concept of Virtualization and design of cloud Services
- To be familiar with the lead players in cloud.
- To learn to design the trusted cloud Computing system

OUTCOMES:

- Compare the strengths and limitations of cloud computing
- Identify the architecture, infrastructure and delivery models of cloud computing
- Address the core issues of cloud computing such as security, privacy and interoperability.

UNIT I
CLOUD INFRASTRUCTURE

Scalable Computing over the Internet –Technologies for Network based Systems -System Models for Distributed and Cloud Computing –Software Environments for Distributed Systems and Clouds-NIST Cloud Computing Reference Architecture-Cloud Computing and Services Model –Public, Private and Hybrid Clouds –Cloud Eco System -IaaS -PaaS –SaaS

UNIT II
VIRTUALIZATION STRUCTURES

Implementation Levels of Virtualization -Virtualization Structures –Tools and Mechanisms -Virtualization of CPU, Memory, I/O Devices -Virtual Clusters and Resource Management –Virtualization for Data-Center Automation

UNIT III
CLOUD SYSTEM MODEL

Architectural Design of Compute and Storage Clouds –Layered Cloud Architecture Development –Design Challenges -Public Cloud Platforms-GAE, AWS, and Azure-Inter Cloud Resource Management –VM Management -Resource Provisioning and Platform Deployment -Global Exchange of Cloud Resources -Cloud Security and Trust Management.

UNIT IV
CLOUD SECURITY -MIDDLEWARE AND TESTING

Parallel and Distributed Programming Paradigms –MapReduce , Twister and Iterative MapReduce –Hadoop Library from Apache –Mapping Applications -Programming Support -Google App Engine, Amazon AWS -Cloud Software Environments -Eucalyptus, Open Nebula,OpenStack. CloudSim –Architecture -Cloudlets –VM creation –Broker –VM allocation –Hosts –Data Center.

UNIT V

CLOUD APPLICATIONS AND CASE STUDIES

Cloud Computing Risk Issues –Cloud Computing Security Challenges –Cloud Computing Security Architecture –Trusted cloud Computing –Identity Management and Access Control –Autonomic Security. Using the Mobile Cloud-Dynamic Resource Allocation Using Virtual Machines for Cloud Computing Environment.

REFERENCES:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. Ronald L. Krutz, Russell Dean Vines, "Cloud Security –A comprehensive Guide to Secure Cloud Computing", Wiley –India, 2010
3. Barrie Sosinsky, "Cloud Computing Bible", Wiley Publishing Inc., 2011.
4. Ray.J.Rafaels, "Cloud Computing : From Beginning to End" Createspace Independent Publishing, 2015
5. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
6. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly, 2009
7. Zhen Xiao, Weijia Song, And Qi Chen, "Dynamic Resource Allocation Using Virtual Machines For Cloud Computing Environment", IEEE TRANSACTIONS ON PARALLEL AND DISTRIBUTED SYSTEMS, VOL. 24, NO. 6, JUNE 2013.
8. Rajkumar Buyya, Christian Vecchiola, S.Tamarai Selvi, "Mastering Cloud Computing", TMGH, 2013.
9. Rodrigo N.Calheiros, Rajiv Ranjan, Anton Beloglazov, César A. F. De Rose, and Rajkumar Buyya, "CloudSim: A Toolkit for Modeling and Simulation of Cloud Computing Environments and Evaluation of Resource Provisioning Algorithms ", Cloud Computing and Distributed Systems (CLOUDS) Laboratory.
10. http://www.buyya.com/papers/CloudSim2010.pdf

SOFT COMPUTING

OBJECTIVES

- Upon successful completion of the course, students will have an understanding of the basic areas of Soft Computing including Artificial Neural Networks, Fuzzy Logic and Genetic Algorithms.
- Provide the mathematical background for carrying out the optimization associated with neural network learning.

OUTCOMES

1. Learn about soft computing techniques and their applications
2. Analyze various neural network architectures Implement machine learning through neural networks
3. Understand perceptrons and counter propagation networks.
4. Understand fuzzy concepts and develop a fuzzy expert system to derive decisions
5. Analyze the genetic algorithms and their applications and able to write genetic algorithms to solve optimization problem.

UNIT – I
NEURAL NETWORKS FUNDAMENTALS

Artificial Neural Network : Basic Concepts of Neural networks - Evolution of Neural networks - Basic Models of Artificial neural network - Terminologies of ANN- McCulloch -Pitts Neuron - Linear separability - Hebb Network - Applications of Neural networks. Supervised learning Network: Introduction – Perceptron Networks – Adaptive Linear Neuron – Multiple Adaptive Linear Neurons – Back propagation Network.

UNIT – II
CATEGORIES OF NEURAL NETWORKS

Associative Memory Networks : Introduction – Training algorithms for pattern association –Auto associative Memory Network – Bidirectional Associative Memory – Hopfield Networks.Unsupervised Learning networks: Introduction – Fixed Weight Competitive Nets - Kohonen Self-Organizing Maps – Learning Vector Quantization – Adaptive Resonance Theory Network

UNIT – III
BASIC CONCEPTS OF FUZZY SET

Introduction to Classical Sets and Fuzzy Sets: Introduction - Classical sets - Fuzzy Sets. Classical Relation and Fuzzy Relations: - Introduction - Cartesian product of a relation -Classical Relation - Fuzzy Relations. Membership Functions: Introduction - Features of Membership Functions – Fuzzification - Methods of Membership Value Assignments. Defuzzification: Introduction - Lambda-Cuts for Fuzzy Sets - Lambda-Cuts for Fuzzy Relations - Defuzzification Methods.

UNIT – IV

FUZZY ARITHMETIC AND DECISION MAKING

Fuzzy Arithmetic and Fuzzy Measures: Introduction - Fuzzy Arithmetic - Extension principles – Fuzzy measures. Fuzzy Rule Base and Approximate Reasoning: Introduction-Truth values and Tables in fuzzy logic - Fuzzy properties - Formation of rules-Decomposition of rules - Aggregation of Fuzzy rules - Fuzzy reasoning - Fuzzy Inference Systems. Fuzzy Decision Making: Individual Decision Making - Multiperson Decision Making - Multiobjective Decision Making - Multiattribute Decision Making. Fuzzy Logic Control Systems: Introduction - Control System Design - Architecture and Operation of FLC System.

UNIT - V

GENETIC ALGORITHMS

Genetic Algorithms : Introduction - Basic Operators and Terminologies in GAs - Traditional Algorithm vs. Genetic Algorithm - Simple GA - General Genetic algorithm - The Schema Theorem - Classification of Genetic Algorithm - Applications of Genetic Algorithm. Applications of Soft Computing : Introduction - A Fusion approach of Multispectral Images with SAR Image for Flood area Analysis - Optimization of TSP using Genetic Algorithm Approach.

REFERENCES

1. Nirali Prakashan, “Soft Computing Techniques” Edition: 1st, 2016.
2. Charu C. Aggarwal, “Neural Networks and Deep Learning”, Springer, 2018.
3. Jang and Sun and Mizutani, “Neuro-Fuzzy and Soft Computing”, Pearson India, 2015.
4. Lee Spector, Leigh Sheneman,“Genetic Programming Theory and Practice XVI”, Springer, 2019.
5. Timothy J.Ross, “Fuzzy Sets and Fuzzy Logic with Engineering Applications”, Wiley, 2021.
6. Sean Moriarity, “Genetic Algorithms in Elixir: Solve Problems Using Evolution” The Pragmatic Programmers, N.Y., 2021

CYBER SECURITY

OBJECTIVES

- Exhibit knowledge to secure corrupted systems, protect personal data, and secure computer networks in an Organization.
- Understand principles of web security and to guarantee a secure network by monitoring and analyzing the nature of attacks through cyber/computer forensics software/tools

OUTCOMES

1. Analyze and evaluate the cyber security needs of an organization
2. Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation.
3. Measure the performance and troubleshoot cyber security systems

UNIT 1:

INTRODUCTION TO CYBER SECURITY

Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.

UNIT 2:

CYBER SECURITY VULNERABILITIES AND CYBER SECURITY SAFEGUARDS

Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management

UNIT 3:

INTRUSION DETECTION AND PREVENTION

Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation

UNIT 4:

CRYPTOGRAPHY AND NETWORK SECURITY

Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and

S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer- IPSec.

UNIT 5:
CYBERSPACE AND THE LAW

Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.

Reference Books:

1. "Cryptography and Network Security - Principles and Practice", William Stallings, Pearson Education, Seventh Edition 2017.
2. Cyber Security Paperback, Prof. Amit Grag, Dr.Krishan Kumar Goyal, First edition, 2019.
3. Cyber Security Paperback, Nina Godbole, Sunit Belapure,Wiley, 2011.
4. Cybersecurity for Dummies Paperback, Joseph Steinberg, 2020.
5. "Information and Cyber Security", Gupta Sarika, Khanna Publishing House, Delhi, 2019

MACHINE LEARNING USING PYTHON -LAB

1. Visualize the dataset using the Python packages
   (i) Matplotlib (ii) Seaborn
2. Implement binning operation for
   (i) Numerical data (ii) Categorical data
3. Implement the Linear Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
4. Implement the Logistic Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
5. Write a program to demonstrate the working of the Decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
6. Write a program to implement the Naïve Bayes classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
7. Write a program to implement the k-Nearest Neighbour classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets
8. Write a program to implement the Random Forest classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets
9. Write a program to implement the Neural Network classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets
10. Implement K- Means clustering algorithm for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets
11. Implement DBSCAN clustering algorithm for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets
12. Implement PCA for dimension reduction and study its impact in classification.
13. Demonstrate the use of cross validation in building a classifier. (use random forest, Naïve Bayes classifiers)
14. Demonstrate the Grid Search method for parameter selection in Random Forest and SVM classifier.

ADVANCED WEB TECHNOLOGY LAB

1. HTML
    I. Simple HTML
    II. Hyper Links
    III. Using Frames
    IV. Registration Form with Table
2. CSS
    I. Inline Style, Internal Style, and External Style Sheets
3. DHTML
    I. Use user defined function to get array of values and sort them in
    a. Ascending order
    II. Demonstrate String and Math Object's predefined methods
    III. Demonstrate Array Objects and Date Object's predefined methods
    IV. Exception Handling
    V. Calendar Creation: Display all month
    VI. Event Handling
4. ASP
    I. Create a welcome Cookie (Hit for a page) and display different image
    b. And text content each time when the user hit the page
    II. List a table of content and navigate within the pages
    III. Demonstrate Request and Response object using HTML Form
    IV. Database Connection to display all the values in the table
5. Java Servlets
    I. Simple Servlets
    II. Servlets with HTML form
    III. Cookie creation and retrieval using servlet
6. XML
    I. Create an any catalog
    II. Display the catalog created using CSS or XSL
7. PHP
    I. File operation
    II. Regular Expression, Array, Math, String, Date functions