

MACHINE LEARNING USING PYTHON

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COURSE OBJECTIVE:

- To understand the Machine Learning Basics and steps in developing ML applications.
- To understand the concept of KNN, Decision tree , plotting concepts with Matplotlib.
- To learn about the classification concepts with Naive Bayes, Logistic Regression and various classifiers in ML.

Course Outcomes:

- Upon completion of the course the student will be able to
- **CO1:** Describe the concepts of machine Learning
- **CO2:** Explain the fundamentals of Classification and probability theory
- **CO3:** Analyse the supervised learning techniques
- **CO4:** Analyse the un-supervised learning techniques
- **CO5:** Illustrate Big Data using machine learning
- **CO6:** Develop applications using Hadoop and Map Reduce

Course Outline:

UNIT I

Classification - Machine learning basics - Key terminology - Key tasks of machine learning - How to choose the right algorithm - Steps in developing a machine learning application - Getting started with the NumPy library - Classifying with k-Nearest Neighbors - Classifying with distance measurements - **Example:** a handwriting recognition system - **Splitting datasets one feature at a time:** decision trees - Tree construction - Plotting trees in Python with Matplotlib annotations - Testing and storing the classifier.

UNIT II

Classifying with probability theory: naïve Bayes - Classifying with Bayesian decision theory - Classifying with conditional probabilities - Document classification with naïve Bayes - Classifying text with Python - Logistic regression - Classification with logistic regression - Using optimization to find the best regression - Support vector machines - Separating data with the maximum margin - Finding the maximum margin - Efficient optimization with the SMO algorithm - Speeding up optimization with the full Platt SMO - Using kernels for more complex data - Improving classification with the AdaBoost meta-algorithm - Classifiers using multiple samples of the dataset - **Train:** improving the classifier by focusing on errors - Creating a weak learner with a decision stump - Implementing the full AdaBoost algorithm - **Test:** classifying with AdaBoost.

UNIT III

Forecasting numeric values with regression - Finding best-fit lines with linear regression - Locally weighted linear regression - Shrinking coefficients to understand our data - The bias/variance tradeoff - Tree-based regression - Locally modeling complex data - Building trees with continuous and discrete features - Using CART for regression - Tree pruning - Model trees - **Example:** comparing tree methods to standard regression - Using Tkinter to create a GUI in Python.

UNIT IV

Unsupervised learning - Grouping unlabeled items using k-means clustering - The k-means clustering algorithm - Improving cluster performance with post processing - Bisecting k-means - Association analysis with the Apriori algorithm - Association analysis - The Apriori principle - Finding frequent itemsets with the Apriori algorithm – Mining association rules from frequent item sets - Efficiently finding frequent itemsets with FP-growth - **FP-trees**: an efficient way to encode a dataset - Build an FP-tree - Mining frequent items from an FP-tree.

UNIT V

Using principal component analysis to simplify data - Dimensionality reduction techniques - Principal component analysis - Simplifying data with the singular value decomposition - Applications of the SVD - Matrix factorization - SVD in Python - Collaborative filtering-based recommendation - Big data and MapReduce - **MapReduce**: a framework for distributed computing - Hadoop Streaming - Running Hadoop jobs on Amazon Web Services - Machine learning in MapReduce - Using mrjob to automate MapReduce in Python - **Example**: the Pegasos algorithm for distributed SVMs.

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO3	H	PSO1	H	K1
CO2	PO3, PO6	H/M	PSO2, PSO6	H/M	K2
CO3	PO1, PO2, PO5	H/M/M	PSO4	M	K3
CO4	PO1, PO5	H/M	PSO5	H	K4
CO5	PO4, PO5	H/M	PSO4, PSO5	H/M	K5
CO6	PO5, PO6	H/M	PSO5, PSO6	H/M	K5

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

TEXT BOOK

Peter Harrington,” Machine Learning in Action”, Manning Publications Co., 2012..

REFERENCE BOOKS

1. WilliRichert, Luis Pedro Coelho, “Building Machine Learning Systems with Python”, Packt Publishing, 2013.
2. Andreas C. Müller, Sarah Guido, “Introduction to Machine Learning with Python: A Guide for Data Scientists”, O'Reilly Media, 2016.

WEB TECHNOLOGY

L T P C
5 0 0 4

COURSE OBJECTIVE:

- To provide the conceptual and technological developments in the field of Internet and web designing with the emphasis on comprehensive knowledge of Internet, Describe the basic concepts for network implementation.
- To learn the basic working scheme of the Internet and World Wide Web.
- Understand fundamental tools and technologies for web design.

COURSE OUTCOME (COs):

- Upon Completion of the course, the students should be able to:
- **CO1:** Employ fundamental computer theory to basic programming techniques.
- **CO2:** Use fundamental skills to maintain web server services required to host a website.
- **CO3:** Select and apply markup languages for processing, identifying, and presenting of information in web pages.
- **CO4:** Use scripting languages and web services to transfer data and add interactive components to web pages.

COURSE OUTLINE:

UNIT - 1 INTRODUCTION TO THE WEB

Understanding the Internet and World Wide Web – History of the Web – Protocols Governing the Web – Creating Websites for Individuals and the Corporate World – Web Applications – Writing Web projects – Identification of Objects – Target Users – Web Team – Planning and Process Development – Web Architecture – Internet Standards – TCP/IP Protocol Suite – IP Address – MIME – Cyber Laws. Hyper Text Transfer Protocol (HTTP): Introduction – Web servers and clients – Resources – URL and its Anatomy – Message Format. (14 L)

UNIT - 2 HYPER TEXT MARKUP LANGUAGE (HTML)

History of HTML and W3C – HTML and its Flavors – HTML Basics – Elements, Attributes, and Tags – Basic Tags – Advanced Tags – Frames. (12 L)

UNIT - 3 JAVA SCRIPT

Introduction – Variables – Literals – Operators – Control Structure – Conditional statements – Arrays – Functions – Objects. (10 L)

UNIT - 4 EXTENSIBLE MARKUP LANGUAGE (XML)

Common Usage – Role of XML – Prolog – Body – Elements – Attributes – Validation – Displaying XML – Namespace.XML DTD: XML Schema Languages– Validation – Introduction to DTD– Purpose of DTD – Using a DTD in an XML Document. (12 L)

UNIT - 5 COMMON GATEWAY INTERFACE (CGI)

Internet Programming Paradigm – Server – side Programming – Languages for CGI – Applications – Server Environment – Environment Variables – CGI Building Blocks – CGI Scripting Using C, Shell Script – Writing CGI programs – CGI Security – Alternatives and Enhancements to CGI. Servlet: Server – Side Java – Advantages Over Applets - Servlet Alternatives – Servlet Strength – Servlet Architecture – Servlet Life Cycle. (12 L)

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO3	H	PSO1	H	K1
CO2	PO3, PO6	H/M	PSO2, PSO6	H/M	K2
CO3	PO1, PO2, PO5	H/M/M	PSO4	M	K3
CO4	PO1, PO5	H/M	PSO5	H	K5

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

TEXT BOOK:

1. Web Technologies - Uttam K. Roy, Oxford University Press 2010.

REFERENCE BOOKS:

Web Technology and Design - C. Xavier, New Age International Publishers, 2005.

Web Technologies TCP/IP Architecture and Java Programming -Achyut S. Godbole&AtulKahate, Tata McGraw Hill, Second Edition, 2008.

Relational Database Management Systems

L T P C
6 0 0 4

COURSE OBJECTIVES:

- To understand relational database concepts and transaction management concepts in database system.
- To write PL/SQL programs that use: procedure, function, package, cursor and Exceptions.
- To Use current techniques and tools necessary for complex computing practices.

COURSE OUTCOMES:

- Master the basic concepts and appreciate the applications of database systems.
- Master the basics of SQL and construct queries using SQL.
- Be familiar with a commercial relational database system (Oracle) by writing SQL using the system.

Course Outline:

UNIT – 1 AN OVERVIEW

Personal database - Client server databases – Oracle 9i An introduction – The SQL*Plus Environment – SQL – SQL*PLUS commands – Sample Databases. Oracle Tables; Naming rules and conventions – Data types – Constraints – Creating an Oracle table – Displaying table information's – Altering and exiting table – Dropping a table – Renaming a table – Truncating a table. **(12 L)**

UNIT - 2 WORKING WITH TABLES

DML – Adding a new Rows/Records – Customized Prompts – Updating existing rows/records – Deleting existing rows/records – Retrieving data from a table - Arithmetic operations – Where clause – sorting. **(10 L)**

UNIT - 3 MULTIPLE TABLES

Joins–Set operators. Subqueries: Subquery–Top–NAnalysis. Advanced features:Views–Subsequences - Synonyms–Index. **(12L)**

UNIT - 4 PL/SQL: FUNDAMENTALS

PL/SQL: fundamentals – Block structure – Comments – Data types –Variable declaration – Anchored declaration – Assignment operation – Bind variables – Substitution Variables – Arithmetic operators. Control Structures: Control structures – Nested blocks – SQL in PL/SQL DML in PL/SQL – Transaction Control Statements. **(14 L)**

UNIT - 5 PL/SQL CURSORS & EXCEPTIONS

Cursors – Implicit cursors – Explicit cursor – Explicit cursor attributes – Implicit cursor attributes – cursor FOR loops – SELECT ... FOR UPDATE- WHERE CURRENT of clause – cursor with parameters – Exceptions – Exception types – Records, Tables: PL/SQL Records – PL/SQL Tables – PL/SQL Varrays. **(12L)**

(TOTAL – 60 HOURS)

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO3	H	PSO1	H	K1
CO2	PO3, PO6	H/M	PSO2, PSO6	H/M	K3
CO3	PO1, PO2, PO5	H/M/M	PSO4, PSO5	H	K5

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

TEXT BOOK:

Database System Using Oracle - Nilesh Shah, 2nd Edition, Pearson, 2016.

REFERENCE BOOK:

Oracle 9i Complete Reference - Loney, Koch, Tata McGraw Hill, 2005.

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RDBMS LAB

1. Create an employee database with tables department, employee details, address, pay details and project details. After the tables and add constraints relevant to the fields in the tables. Insert records into all the tables.
2. Create queries to retrieve relevant information from a table.
3. Create a table from the exiting tables. Create views from the tables.
4. Develop queries to retrieve information from more than one table. Develop summary queries to retrieve relevant information from the table
5. Create a partition table and query the records.
6. Create a PL / SQL Program to print multiplication table.
7. Create a PL / SQL Program to check whether a given string is palindrome or not.
8. Create a PL / SQL Program to print student details using report.
9. Create a PL/SQL Program to update using various triggers.
10. Create a PL/SQL Program to find factorial of numbers using function and procedure.

E – COMMERCE

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COURSE OBJECTIVES

- To provide adequate basic understanding about Management Education among the students.
- To prepare students to exploit opportunities being newly created in the Management Profession.
- To train the students in communication skills effectively.

COURSE OUTCOMES:

- Design and implement an e-commerce application with a shopping cart.
- Integrate the waterfall model in the development of e-commerce applications.
- Integrate user-centered design guidelines in developing user-friendly websites.

UNIT – 1 INTRODUCTION

What is Electronic Commerce? – Types of Electronic Commerce Technology

UNIT – 2 MODELS AND TYPES

Types of E-Business Models and Markets - Types of E-Commerce Providers and Vendors E- Commerce website Creation.

UNIT - 3 E-COM WEB DEVELOPMENT

Managing E-Commerce website Development – Building Shopping Cart Applications – Mobile Electronic Commerce.

UNIT - 4 E-COM DATABASES

Enhancing a web server with E-Commerce Application Development – Strategies, Techniques and tools – Implementing Merchandising Strategies – Implementing E-Commerce Databases.

UNIT - 5 E-COMMERCE APPLICATIONS

Applying and Managing E-Business Intelligence Tools for Application Development – Types of Security Technologies – protocols for the Public Transport of Private Information.

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO2	M	PS01,PS03	M	K2
CO2	PO1, PO4	M/M	PS05	M/H	K3
CO3	PO6	H	PS04	H	K5

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

TEXT BOOKS:

- Electronic Commerce - Pete Loshin and John Vacca, Fourth edition, Firewall Media, New Delhi, 2006.
- E-Business - ParagKulkarni, SunitaJahirabadkar, and PradipChande, Oxford University Press, 2013.

REFERENCE BOOKS:

- Electronic Commerce - Gary O.Schnelder James T.Perry, First edition, Thomson Learning 2000.
- Electronic Commerce - Elias M.Awad, Prentice Hall of India 2002.

DESIGN AND ANALYSIS OF ALGORITHMS

COURSE OBJECTIVES:

- To know the basics of various sorting methods.
- To provide a thorough knowledge of the most common algorithms and data structures.
- To understand the design of algorithms

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COURSE OUTCOMES:

- Argue the correctness of algorithms using inductive proofs and invariants.
- Analyse worst-case running times of algorithms using asymptotic analysis.
- Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it.
Recite algorithms that employ this paradigm.

UNIT – 1 INTRODUCTION

What is performance? – Space Complexity: Components of space complexity. Time Complexity: Components of time complexity – Operation counts – Best, worst Average counts – Step counts. Asymptotic Notations: Introduction – Big Oh Notation – Omega and Theta Notations – Complexity analysis examples

UNIT – 2 DIVIDE & CONQUER APPROACHES

The Method – Applications [Merge Sort, Quick Sort, Defective chessboard] – Solving recurrence equations – Lower bound complexity.

UNIT -3 GREEDY METHOD

Optimization problems – The Greedy Method – Applications [Container Loading, Topological sorting, Single Source Shortest Paths]

UNIT – 4 BACKTRACKING

Method – Applications [Max Clique, Travelling Salesperson, Board Permutation]

UNIT – 5 DYNAMIC PROGRAMMING

The Method – Applications [Matrix Multiplication chains – All pairs shortest path – Single source shortest path with negative costs]

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO1	M	PS01,PS03	M/H	K2
CO2	PO4	M	PS04	M	K3
CO3	PO5/ PO2	H/M	PS06	H	K5

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

TEXT BOOK

1. Data Structures, algorithms and applications in Java – Sartaj Sahni, Second Edition, University Press 2005

REFERENCE BOOKS

1. Algorithms - Dasgupta, Papadimitrou and Vazirani, McGraw-Hill Education, 2006.
2. Computer Algorithms - Horowitz, Sahni, and Rajasekaran, Silicon Press, 2007.

CYBER SECURITY

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COURSE OBJECTIVES

- To describe different classes of attacks.
- To describe new and emerging IT and IS technologies.
- To analyze threats and risks within context of the cyber security architecture.

COURSE OUTCOMES:

- Evaluate the computer network and information security needs of an organization.
- Assess cyber security risk management policies in order to adequately protect an organization's critical information and assets.
- Measure the performance of security systems within an enterprise-level information system.

Course Outline:

UNIT – 1 INTRODUCTION TO INFORMATION SECURITY

Introduction – The History of Information Security – What is Security – Critical Characteristics of Information – NSTISSC Security Model – Components of an Information System – Securing Components – Balancing Information Security and Access – Approaches to Information Security Implementation – The Systems Development Life Cycle – The Security Systems development life cycle – Security Professional and the Organization – Communities of Interest - Information Security – Is it an Art or a Science. **The Need for Security:** Introduction – Business Needs First – Threats – Attacks – Secure Software Development. **(12 L)**

UNIT – 2 RISK MANAGEMENT & PLANNING

Introduction – An overview of Risk Management – Risk Identification – Risk Assessment – Risk control Strategies – Selecting a Risk control Strategy – Quantitative versus qualitative risk control practices - Risk Management Discussion Points – Recommended Risk Control Practices. **Planning for Security:** Introduction – Information Security Policy, Standards and Practices – The Information Security Blueprint – Security Education, Training and Awareness Program – Continuity Strategies. **Security Technology:** Firewalls and VPNs: Introduction – Physical Design – Firewalls – Protecting Remote Connections. **(12 L)**

UNIT – 3 SECURITY TECHNOLOGY

Introduction – Intrusion Detection and Prevention System (IDS and IPSs) – Honey Pots, Honey Nets and Padded Cell Systems – Scanning and Analysis Tools – Access Control Devices. **Cryptography:** Introduction – Foundations of Cryptology – Cipher Methods – Cryptographic Algorithms – Cryptographic Tools. **(12 L)**

UNIT – 4 SECURITY IMPLEMENTATION

Physical Security: Introduction – Physical Access Controls – Fire Security and Safety – Failure of Supporting Utilities and Structural Collapse – Interception of Data – Mobile and Portable Systems – Special Considerations for Physical Security Threats. **Implementing Information Security:** Introduction – Information Security Project Management – Technical Topics of Implementation – Non technical Aspects of Implementation – Information Systems Security Certification and Accreditation. **(12L)**

UNIT – 5 SECURITY AND INFORMATION SECURITY

Security and Personnel: Introduction – Positioning & Staffing the Security Function – Credentials of Information Security Professionals – Employment Policies and Practices – Security Considerations for Nonemployees – Internal Control Strategies – Privacy and the Security of Personal Data. **Information Security Maintenance:** Introduction – Security Management Models – The Maintenance Model – Digital Forensics. (12 L)

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO3	H	PSO1	H	K4
CO2	PO4, PO6	H/M	PSO2, PSO6	H/M	K3
CO3	PO1, PO2, PO5	H/M/M	PSO3, PSO4	M/H	K5

(L – Low, M – Medium, H – High; K1 – Understand, K2 – Apply, K3 – Analyze, K4 – Evaluate, K5 Create)

TEXT BOOK:

1. Principles and Practices of Information Security – Dr Michael E. Whitman, CISM, CISSP Herbert J. Mattord, CISM, CISSP – Cengage Learning India Private Limited, Indian fourth edition Reprint , 2010.

MULTIMEDIA

COURSE OBJECTIVES:

- To define the principles, characteristics and forms of Visual Design in Multimedia Development.
- To define the role of Visual Reading Elements.
- To learn how to use multimedia software.

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COURSE OUTCOMES:

- Describe different realizations of multimedia tools and the way in which they are used.
- Analyse the structure of the tools in the light of low-level constraints imposed by the adoption of various QoS schemes (ie bottom up approach).
- Plan experiments to test user perception of multimedia tools.

UNIT - 1 MULTIMEDIA FUNDAMENTALS

Basic concepts - Multimedia applications Design consideration – Multimedia Application Goals & Objectives – Opportunities in multimedia production: Important in Multimedia development Application Design and production.

UNIT - 2 MULTIMEDIA APPLICATION

Structure and organization: Considering Interface design – Planning the production of your Application – Creating multimedia building blocks.

UNIT - 3 MULTIMEDIA PRESENTATION

Building blocks: Text - Graphics.

UNIT - 4 OTHER MULTIMEDIA TOOLS

Multimedia presentation building blocks: video capturing, Sound Capturing and Editing.

UNIT - 5 STRUCTURE AND FUNCTION OF AUTHORING SOFTWARE

Authoring software, selection of authoring program - Fundamentals of Macromedia Director 5.0

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO1	M	PS01,PS03	M	K2
CO2	PO2, PO4	M/M	PS04	M/H	K3
CO3	PO5	H	PS02	H	K5

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

TEXT BOOK:

1. Multimedia An Introduction- John Villain – Casanova- Louis Molina Prentice –Hall/Macmillan Computer Publishing, Reprint.

REFERENCE BOOK:

1. Multimedia: Making it works – Tay Vaughan, 6th Edition, TataMcGraw-Hill.

Cloud Computing

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a. Course Code:-----

b. Course Objectives:

- To study the basics of cloud computing and different Cloud Computing services
- To understand the key concepts of virtualization, Cloud Implementation, Programming and Mobile cloud computing

c. Course Prerequisites:

- Basic knowledge of programming, operating systems, databases and networking is recommended

d. Course Outcomes (COs):

Upon completion of the course, the students should be able to:

CO1: Understand the basics of Cloud Computing

CO2: Comprehend the concepts of Virtualization and the design of Cloud Services

CO3: Classify appropriate techniques and tools to develop Cloud applications

CO4: Apply the knowledge of Python for Cloud Services

CO5: Develop the security architecture for a Cloud environment

e.Course Outline:

UNIT I: CLOUD COMPUTING FOUNDATION Introduction to Cloud Computing - Cloud Computing Basics - History of Cloud Computing - Importance of Cloud Computing - Characteristics - Move to Cloud Computing: Pros and Cons of Cloud Computing - Nature of the Cloud - Technologies in Cloud Computing - Migrating into the Cloud - Seven-step Model. Types of Cloud - Cloud Infrastructure - Cloud Application Architecture. Working of Cloud Computing: Trends in Computing - Cloud Service Models - Cloud Deployment Models

Unit II: CLOUD COMPUTING ARCHITECTURE Cloud Computing Technology: Cloud Lifecycle Model - Role of Cloud Modeling and Architecture - Reference Model for Cloud Computing-Cloud Industry Standard. Cloud Architecture: Developing Holistic Cloud Computing Reference Model - Cloud System Architecture. Cloud Modelling and Design: Basic Principles - Model for Federated Cloud Computing- Cloud Eco System - Cloud Governance.

Unit III: VIRTUALIZATION Definition of Virtualization - Adopting Virtualization -Types of Virtualization - Virtualization Architecture and Software - Virtual Clustering - Introduction to Cluster - Virtualization Application - Pitfalls of Virtualization. Grid, Cloud and Virtualization: Virtualization in Grid - Virtualization in Cloud. Virtualization and Cloud Computing : Anatomy of Cloud Infrastructure - Anatomy of Cloud Computing - Virtual Infrastructures - CPU Virtualization - Network and Storage Virtualization

Unit IV: DATA STORAGE AND SECURITY Data Storage: Introduction to Enterprise Data Storage - Data Storage Management - File Systems - Cloud Data Stores - Using Grids for Data Storage. Cloud Storage: Overview of Cloud Storage - Data Management for Cloud Storage - Provisioning Cloud Storage - Data-intensive Technologies for Cloud Computing. Risks in Cloud Computing: Introduction - Risk Management - Cloud Impact - Enterprise Wide Risk Management - Types of Risks in Cloud Computing . Data Security in Cloud: Introduction - Current State - Homo Sapiens and Digital Information - Cloud, Digital Persona and Data Security - Content Level Security (CLS).

Unit V: CLOUD COMPUTING SERVICES Cloud Services: Cloud Types and Services - Software as a Service (SaaS) - Platform as a Service (PaaS)- Infrastructure as a Service (IaaS) - Other Clouds Services . Cloud Computing at Work: Cloud Service Development Tool - Management/Administrative Services. Tools and Technologies for Cloud - Parallel Computing -Cloud Computing Application Platform - Cloud Computing Platform - Tools for Building Cloud - Programming in Cloud. Cloud Tools: VMWare – Eucalyptus – CloudSim – OpenNebula – Nimbus - Microsoft Cloud Service: Windows Azure Platform - Google Cloud Applications - Amazon Cloud Services

f. Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K ₁ to K ₆
CO1	PO1, PO2, PO5	H/H/H	PSO1, PSO2, PSO5	H/M/M	K ₁
CO2	PO1, PO2, PO5	H/M/H	PSO1, PSO2, PSO4, PSO5	H/M/H/M	K ₃
CO3	PO1, PO2, PO3	H/M/M	PSO1, PSO2, PSO4, PSO5	M/H/H/M	K ₃
CO4	PO2, PO3, PO4	H/M/H	PSO2, PSO3, PSO4	H/H/M	K ₄
CO5	PO1, PO2, PO4, PO5	H/M/H/H	PSO1, PSO4, PSO5	H/M/H	K ₅

(L – Low, M – Medium, H – High; K₁ –Understand, K₂ –Apply, K₃ –Analyze, K₄ –Evaluate, K₅ Create.

g. Reference Books:

1. Srinivasan.A, J.Suresh , “Cloud Computing: A Practical Approach For Learning And Implementation”, Pearson Education India, 2014.
2. Barrie Sosinsky, “Cloud Computing Bible”, New Delhi: Wiley India Pvt. Ltd, 2012.
3. Buyya, Vecciola and Selvi, “Mastering Cloud Computing: Foundations and Applications Programming”, Tata McGraw Hill, 2013.

Data Communications and Networking

a.

Course Code:-----

b.

Objectives:

Course

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- Computer network.
- networking and internetworking devices.
- concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.

To understand the concept of

To impart knowledge about

To be familiar with the

c.

- connectivity and connectivity peripherals

Course Prerequisites:

basic knowledge on computer

d.

Course Outcomes (COs):

Upon completion of the course, the students should be able to:

- CO1:** Remember the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.
- CO2:** Understand Internet structure and can see how standard problems are solved
- CO3:** Apply knowledge of different techniques of error detection and correction
- CO4:** Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
- CO5:** Knowledge about different computer networks, reference models and the functions of each layer in the models

e. Course Outline:

UNIT - 1

Introduction: Data Communications, Networks, Protocols and Standards. Basic Concepts: Line Configuration, Topology, Transmission mode, Categories of Networks. OSI Model: Layered architecture, Functions of the layers, TCP/IP Protocol suite

UNIT – 2

Signals: Analog and digital, periodic and aperiodic signals, analog signals, Digital signals.

Transmission media: Guided media, unguided media.

Multiplexing: FDM, WDM, TDM, Multiplexing Application-The Telephone system. LAN: Project, Ethernet, Other Ethernet networks, Token bus, Token Ring, FDDI, Comparison

UNIT – 3

Switching: Circuit Switching, Packet Switching, Message Switching. **ISDN:** Services, ISDN Layers, Broadband ISDN. **Frame Relay:** Introduction, operation, Congestion control. **ATM:** ATM Layers applications. **SONET:** physical configuration, SONET layers, Applications

UNIT - 4

Networking and internetworking devices: Repeaters, Bridges, Routers, Gateways, other devices, Routing algorithms, Distance vector routing, link state routing. **Transport layer:** Duties, Connection TCP/IP Protocol suite: **Overview of TCP/IP:** Internet protocol, Addressing, Subnetting.

UNIT – 5

Other protocols in the network layer: ARP, RARP, ICMP, IGMP Transport layer: TCP UDP

TCP/IP Protocol suite: Application layer: Client server model, BOOTP, DHCP DNS, FTP, SMTP, WWW and HTTP.

f. Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K ₁ to K ₆
CO1	PO3,PO6,PO7	H/H/H	PSO1	H	K ₁
CO2	PO1, PO2, PO4, PO6	H/M/H/M	PSO2, PSO6	H/M	K ₂
CO3	PO1, PO2, PO5	H/M/M	PSO4	M	K ₃
CO4	PO1, PO5, PO6	H/M/H	PSO4	H	K ₄
CO5	PO1, PO3, PO7	H/M/H	PSO4, PSO5	H/M	K ₅

(L – Low, M – Medium, H – High; K₁ –Understand, K₂ –Apply, K₃ –Analyze, K₄ –Evaluate, K₅ Create.

g. Reference Books:

1. Data Communication & Networking - Behrouz A. Forouzan, 2nd Edition Tata McGraw-Hill Edition
2. Computer Networks A.S Tanenbaum, Pearson Education
3. Data and Computer communications Seventh edition William Stallings PHI

VB.Net**a. Course Code:-----****b.Course Objectives:**

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- * To understand the concept of Dot net programming.
- * To impart knowledge about given problem and design solutions using VB.NET.
- * Illustrate various Data base concepts using ADO dot Net.

c. Course Prerequisites:

*Basic knowledge of web application and any existing object-oriented programming languages like C++ or C# is recommended

d.Course Outcomes (COs):

Upon completion of the course, the students should be able to:

- CO1:** Understanding the basic concepts of visual programming
- CO2:** Able to Design simple applications using VB.Net
- CO3:** Apply knowledge and Work with GUI applications
- CO4:** Understand database applications
- CO5:** Develop creative windows applications

f.Course Outline:**UNIT I**

VB.NET 2005 Training: The .NET Framework Architecture Part 2-Introducing Windows Forms- Implementing Class Library Object in VB.NET 2005 -Introduction and Implementing Inheritance in VB.NET 2005- Visual Studio.NET Namespaces.

UNIT II

Windows Designing a Form using Forms Designer Window-Exploring the Forms Designer generated code-Using Application Class and Message Class-Setting and Adding Properties to a Windows Form - Event Handling In Visual Basic .NET 2005.

UNIT III

Building graphical interface elements-Adding Controls -Common Controls and Handling Control Events-Dialog Boxes in Visual Basic .NET 2005 -Common Windows Forms Controls Section-DomainUpDown and NumericUpDown -Creating Menu and Menu Items-Creating Multiple-Document Interface (MDI) Applications Validation-Exceptions.

UNIT IV

Creating and Managing Components Section-Creating and Managing .NET Assemblies-Simple Data Binding-Complex Data Binding-Using the Data Form Wizard-Access and Manipulate Data - The ADO .NET Object Model-Access and Manipulate Data - Using DataSets-Using XML Data.

UNIT V

Finding and Sorting Data in DataSets-Editing Data With ADO .NET-Web Services - SOAP, WSDL, Disco and UDDI-Instantiating - Invoking Web Services, Creating Proxy Classes with WSDL-Creating Web Service Project.

g.Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K ₁ to K ₆
CO1	PO1,PO4,PO5	H/H/H	PSO1	H	K ₁
CO2	PO1, PO2, PO3, PO5	H/M/H/M	PSO2, PSO6	H/M	K ₄
CO3	PO1, PO3	H/M	PSO3	M	K ₃
CO4	PO2, PO4	H/M	PSO4	H	K ₂
CO5	PO2, PO4, PO1, PO5	H/M/H/H	PSO4, PSO5	H/M	K ₅

(L – Low, M – Medium, H – High; K₁ –Understand, K₂ –Apply, K₃ –Analyze, K₄ –Evaluate, K₅ Create.

h.Reference Books:

1. Programming Visual Basic .NET, Dave Grundgeiger, 2008.
2. Beginning VB.Net, Richard Blaire, Jonathan Crossland, Mathew Renolds, 2nd Edition, 2008.
3. Programming VB.Net, Garry Cornell, Jonathan Morrison, APress Publications, 2007.

VB.Net LAB

L	T	P	C
0	0	4	2

Course Outline

1. Write a program to count number of times the click event occurs
2. Write a program using image lists
3. Write a program using rich textbox control
4. Write a program using Menus and Built-In Dialogs
5. Write a program using Exception Handling
6. Write a program using function
7. Write a program deploying Polymorphism using VB.NET
8. Write a program developing Inheritance using VB.NET
9. Create a Simple web application
10. Create a web application using Validation Controls
11. Write a program using Page Redirection Concept
12. Create Student Information System
13. Create a program using Data Grid control

COMPUTER GRAPHICS

Course Code: -----

L	T	P	C
4	0	0	4

COURSE OBJECTIVES:

- To study various graphical Input and Output devices.
- To study how to manipulate graphics object by applying different transformations.
- To study different algorithms for drawing lines, ellipse, circle parabola etc.

COURSE OUTCOMES:

- Understand the structure of modern computer graphics systems.
- Understand the basic principles of implementing computer graphics primitives.
- Develop design and problem-solving skills with application to compute graphics.

UNIT – 1 INPUT AND OUTPUT DEVICES

Introduction: Application and Operations of Computer Graphics - Graphics Packages – Requirements of a Graphical System – GUI. Common Input Devices – Graphical output Devices Raster Scan Video Principle - Raster Scan CRT Monitors – Color Raster Scan System – Plasma Display – LCD – Hard copy Raster Devices - Raster Scan System – Memory Tube Displays – Plotters – Graphics Accelerators – Coprocessors.

UNIT – 2 ALGORITHMS

Scan Conversion – Methods – Polynomial Method – DDA algorithms for line drawing Algorithm, Circle, Ellipse, Parabola – Bresenham's Line Drawing Algorithm – Bresenham's Circle Drawing Algorithm – Problem of Scan Conversion – Solid Areas – Odd Even Methods – Winding Number Method - Solid Area Filling – Algorithms – Boundary, Flood Fill Algorithm.

UNIT - 3 TRANSFORMATION

Two Dimension Transformations – Translation – Scaling – Rotation – Transformations of Points and Objects – Homogenous Coordinate System and Transformations – Reflection – Shearing – Three Dimension Transformations - Translation – Scaling – Rotation – Reflection – Shearing.

UNIT - 4 CLIPPING ALGORITHMS

2D Viewing and Clipping – Windows and View Ports – Viewing Transformations – Clipping of lines in 2D – Cohen Sutherland Clipping Algorithms – Visibility – Midpoint subdivision method – parametric Clipping – Polygon Clipping – Sutherland Hodgeman Algorithm – Clipping against Concave windows.

UNIT V HIDDEN SURFACE ALGORITHMS

Hidden Surface Elimination – Black Face Removable Algorithm Z buffer Algorithm.

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO1	H	PS01, PS05	H/H	K1
CO2	PO5	M	PS02, PS03	M/H	K6
CO3	PO4, PO3	H/H	PS07	H	K4

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create)

TEXT BOOK:

1. Computer Graphics Multimedia and Animation – Malay K. Pakira – PHI Learning 2008.

REFERENCE BOOK:

1. Computer Graphics – Apurva Desai – PHI – 2008.
2. Prabhat Andleigh, Kiran Thakrar – Multimedia system and Design – Prentice Hall 2000.

WEB SERVICES

Course Code: -----

COURSE OBJECTIVES

- To study XML Technologies & XML Applications.
- To study service-Oriented Architecture (SOA) and Application Integration.
- To study services such as. XML, SOAP

COURSE OUTCOMES:

- To create secured Web services.
- Develop Web services using a variety of advanced computer languages and applications.
- Create, develop, and test Web services including a mobile application.

UNIT– 1 INTRODUCTION TO WEBSERVICES

Industry standards, Technologies and Concepts underlying Web Services – their support to Web Services – Applications that consume Web Services.

UNIT - 2XML

XML – its choice for Web Services – Network protocols to backend databases – Technologies – SOAP, WSDL – exchange of information between applications in distributed environment – Locating remote Web Services – its access and usage, UDI specification –and Introduction.

UNIT – 3 WEBSERVICES

A brief outline of web services – conversation – static and interactive aspects of system interface and its implementation, work flow – Orchestration and refinement, Transactions , Security issues – the common attacks – security attacks facilitated within web services quality of services – Architecting of systems to meet users requirement with respect to latency, performance, reliability, QOS metrics, Mobile and wireless services – energy consumption, network band width utilization, portals and services management.

UNIT – 4 WEB APPLICATIONS

Building real world enterprise application using web services – sample source codes to develop web services – steps necessary to build and deploy web services and client applications to meet customer's requirement – Easier development, customization, maintenance, transactional requirements, seamless porting to multiple devices and platforms.

UNIT - 5 WEBDEVELOPMENT

Development of Web Services and applications onto tomcat application server and Axis SOAP server (both are free wares) - Web Services Platform as a set of enabling technologies for XML based distributed computing.

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO2	H	PS01	H	K2
CO2	PO4	M	PS02	M	K4
CO3	PO5,PO5	H/H	PS05	H	K5

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

REFERENCE BOOKS:

- Developing Enterprise Web Services: An Architects Guide – Sandeep Chatterjee, James Webber, Prentice Hall, 2003.
- NET web services, Architecture and Implementation with .Net - Keith Ballinger, Pearson Education, First Edition 2003.
- Developing Java Web Services: Architecting and developing secure web services using Java - Ramesh Nagappan, John Wiley and Sons, first edition, 2003.
- Executive Guide to Web Services - Eric A marks and Mark J Werrell, John Wiley and sons, 2003.
- Web Services: A managers Guide - Anne Thomas Manes, Addison Wesley, 2003
- Web Services – An Introduction – B.V.Kumar, S.V.Subrahmanya, Tata McGraw-Hill Publishing Company Limited, 2004.

SOFTWARE PROJECT MANAGEMENT

Course Code: -----

L	T	P	C
4	0	0	4

Course Objectives:

- To outline the need for Software Project Management.
- To highlight different technique for software cost estimation and activity planning.
- To know about what is Software Project Management.

Course Outcomes:

- Employ Analytical and Modern project development methodology for the process of project management in delivering successful Real time IT projects.
- Evaluate a project to develop the scope of work, provide accurate cost estimates, software development size, effort, and schedule and network diagram for new program proposals or enhancements to existing Software.
- Understanding and using the risk management analysis techniques that identify the factors that put a project at risk and to quantify the likely effect of risk on project timescales.
- Identifying the resources required for a project and to produce a work plan and resource Schedule.

UNIT - 1 CONVENTIONAL SOFTWARE MANAGEMENT

Waterfall Model - Conventional Software Management Performance – Evolution of Software economics - Software economics – Pragmatic software cost estimation – Improving software economics – Reducing software product size – Improving software process – Team effectiveness – Automation through software environments.

UNIT - 2 VARIOUS STAGES

Life cycle phases – Engineering and Production stages – Inception, Elaboration, Construction and Transition Phases – Artifacts of the process – The artifact sets – Management, Engineering and Pragmatic artifacts – Model based software architectures.

UNIT – 3 WORKFLOWS OF THE PROCESS

Workflows of the process – Software process Workflows – Iteration Workflows – Iterative process planning – work breakdown structures – Planning guidelines – cost & schedule estimation process – iteration planning process – pragmatic planning – Project Organizations & responsibilities.

UNIT – 4 VARIOUS PROCESSES

Process automation – Tools – The project environment – Project control and Process Instrumentation – The seven-core metrics – Management indicators – Quality indicators – Life cycle expectations – Pragmatic software metrics – Metrics automation – Tailoring the Process – Process discriminates.

UNIT - 5 MODERN PROJECT PROFILE

Continuous Integration – Early risk resolution – Evolutionary requirements – software management Principles Next generation software economics – Modern Process transitions.

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO1	H	PS06	M	K1
CO2	PO2, PO3	M/M	PS01,PS05	M/H	K5
CO3	PO4,PO5	H/M	PS02, PS07	H/M	K2
CO4	PO6	M	PS03	H	K6

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

TEXT BOOKS:

1. Software Project Management - Walker Royce, Pearson Education,2012.
2. Software Project Management - Bob Hughes and Mike Cotterell, Tata McGrawHill,2011.
3. Software Project Management in practice –Pankaj Jalote, Pearson Education,2012.

MSU/ 2021-22 / UG-Colleges / Part-III (B.C.A) / Semester – VI / Major Elective II

ARTIFICIAL INTELLIGENCE

Course Code: -----

L	T	P	C
4	0	0	4

Course Objectives:

- To introduce the basic principles, techniques, and applications of Artificial Intelligence.
- Emphasis will be placed on the teaching of these fundamentals, not on providing a mastery of specific software tools or programming environments.
- Assigned projects promote a 'hands-on' approach for understanding, as well as a challenging avenue for exploration and creativity.

Course Outcomes:

- Knowledge of what constitutes "Artificial" Intelligence and how to identify systems with Artificial Intelligence.
- Explain how Artificial Intelligence enables capabilities that are beyond conventional technology, for example, chess-playing computers, self-driving cars, robotic vacuum cleaners.
- Ability to apply Artificial Intelligence techniques for problem solving.

UNIT – 1 PROBLEM, PROBLEM SPACES AND SEARCH

What is AI? – AI Problems – What is an AI technique – Defining the problem as a state space search – Production system - Production system – Characteristics – Problem Characteristics.

UNIT – 2 HEURISTIC SEARCH TECHNIQUES

Generate and test – Hill Climbing – Best First Search – Problem Reduction – Constraints satisfaction – Means end analysis.

UNIT – 3 KNOWLEDGE REPRESENTATION

Representations and Mappings – Approaches to Knowledge Representation. Using predicate Logic: Representing simple facts in logic – Computable functions and prediction – Resolution – The basic of resolution – Resolution in Propositional Logic – The Unification algorithm – Resolution in Predicate Logic.

UNIT – 4 REPRESENTING KNOWLEDGE USING RULES

Procedural versus – Declarative Knowledge – logic Programming – Forward versus Backward Reasoning–Matching.

UNIT – 5 GAME PLAYING

The Minimax search procedure – Adding Alpha Beta cut offs – Addition Refinements – Waiting for Quiescence – Secondary Searches – Using Book moves.

Mapping of COs to POs and PSOs

Course Outcome	PO Addressed PO1 to PO7	Correlation Level L/M/H	PSO Addressed PSO1 to PSO7	Correlation Level L/ M/ H	Cognitive Level K1 to K6
CO1	PO5	H	PS03	H	K1
CO2	PO3, PO1	M/H	PS01, PS05	M/M	K3
CO3	PO4	H	PS07	H	K6

(L – Low, M – Medium, H – High; K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5–Evaluate, K6 – Create)

TEXT BOOKS:

1. Artificial Intelligence – Elaine Rich, Kevin Knight & Shiv shankar, Tata McGraw Hill, 2008.
2. Artificial Intelligence and Intelligent Systems –N.P.Padhy, 2005.

REFERENCE BOOKS:

1. Artificial Intelligence: A modern approach - Stuart Jonathan, Russell, Pearson, 2019
2. Introduction to Artificial Intelligence - Rajendra, Akerkar, PHI, 2014.