CORE COURSE I - J2EE TECHNOLOGIES

Semester : I **Max. Marks : 75**

Course Code : 22PCS1C1 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objectives: To impart knowledge on the various technologies in J2EE and their implementation.

UNIT I **(16 Hours)**

J2EE OVERVIEW: Distributed Multi-tiered Applications - J2EE Containers - Web Services Support –Packaging Applications – Development Roles – J2EE APIs – Sun Java System Application Server Platform Edition 8. UNDERSTANDING XML: Introduction to XML – Generating XML Data.

UNIT II **(20 Hours)**

GETTING STARTED WITH WEB APPLICATIONS: Web Application Life Cycle – Web modules – Web Application Examples. JAVA SERVLET TECHNOLOGY: What Is a Servlet? – Servlet Life Cycle – Sharing Information – Creating and Initializing a Servlet – Writing Service Methods – Filtering Requests and Responses – Invoking Other Web Resources – Accessing the Web Context.

UNIT III **(18 Hours)**

JAVASERVER PAGES TECHNOLOGY: What Is a JSP Page? - The Life Cycle of a JSP Page - Creating Static Content - Creating Dynamic Content - Expression Language - JavaBeans Components - Using Custom Tags - Reusing Content in JSP Pages - Transferring Control to Another Web Component - Including an Applet. JAVASERVER PAGES STANDARD TAG LIBRARY: Using JSTL.

UNIT IV **(19 Hours)**

ENTERPRISE BEANS: What Is an Enterprise Bean? - What Is a Session Bean? - What Is an Entity Bean? - What Is a Message-Driven Bean? - Defining Client Access with Interfaces -The Contents of an Enterprise Bean - Naming Conventions for Enterprise Beans - The Life Cycles of Enterprise Beans. GETTING STARTED WITH ENTERPRISE BEANS: Creating the J2EE Application.

UNIT V **(17 Hours)**

SECURITY: Understanding Login Authentication - HTTP basic authentication - Form-based login authentication - Client certificate authentication - Mutual authentication - Digest authentication. THE JAVA MESSAGESERVICE API: Overview - Basic JMS API concepts - The JMS API programming model. HTTP OVERVIEW: HTTP Requests – HTTP

Responses.

UNIT VI CURRENT CONTOURS (for CIA only)

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. The J2EE 1.4 Tutorial for Sun Java System Application Server Platform Edition8.2‖, Eric Armstrong; Jennifer Ball; Stephanie Bodoff; Debbie Bode Carson; Ian Evans; Dale Green; Kim Haase Eric Jendrock, Sun Microsystem, 2006.

REFERENCE BOOK:

1. J2EE: The Complete Reference - Jim Keogh, McGraw Hill Education (India) Private Limited, 2002 Edition.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn the graphics and animation on the web pages using Java Applets	**K3**
CO2	Learn Java Data Base Connectivity (JDBC) so as to retrieve and manipulate the information on any relational database through Java programs	**K3**
CO3	Learn the Server-Side Programming using Servlet and JSP	**K4**
CO4	Learn Java Bean so as to make the reusable software components	**K5**
CO5	Learn the invocation of the remote methods in an application using RMI	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**M**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE COURSE II – OOAD & UML

Semester : I **Max. Marks : 75**

Course Code : 22PCS1C2 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objectives: To impart knowledge on object-oriented analysis and design and also unified modeling language.

UNIT I **(18 Hours)**

Introduction - Use case Modelling.

UNIT II **(18 Hours)**

Static Modelling Using Class diagrams – Interaction Diagrams.

UNIT III **(18 Hours)**

Dynamic Modelling Using State and Activity diagram – The unified process of Software Development – Architectural Modelling.

UNIT IV **(20 Hours)**

Design Patterns: Creational – Structural – Behavioral Patterns. Pragmatics: Management and Planning – Staffing – Release Management – Reuse – Quality Assurance and Metrics – Documentation – Tools – The benefits and Risks of Object – Oriented Development.

UNIT V **(16 Hours)**

Object Oriented Programming Languages - Case Studies: Weather Monitoring Station - Inventory Tracking – Traffic Management.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Mahesh P. Matha, Object – Oriented Analysis and Design Using UML , PHI

REFERENCE BOOKS:

1. Grady Booch, Object Oriented Analysis and Design , Pearson Edn.
2. Martin Fowler, Kendall Scott, UML Distilled, A Brief Guide to the Standard Object Modeling Languages , 2nd ed, Pearson Education.
3. James Rumbaugh et al, Object Oriented Modeling and Design , Pearson Education

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the importance of modeling in the software development life cycle	**K3**
CO2	Become familiar with the Unified modeling Language	**K3**
CO3	Understand the object-oriented approach to analyzing and designing systems and software solutions	**K4**
CO4	Employ the Unified modeling Language notations to create effective and efficient system designs	**K5**
CO5	Understand the difference between writing programs for the software and doing analysis and design	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**M**	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE COURSE III – DISTRIBUTED OPERATING SYSTEM

Semester : I	**Max. Marks : 75**
Course Code : 22PCS1C3	**Credit : 5**
Total Periods : 90	**Exam Hrs. : 3**

Objectives: To impart knowledge on Distributed Operating System.

UNIT I **(16 Hours)**

Introduction - Operating System Concepts - System Calls - OS Structure - Process and Threads: Process - Threads - Inter Process Communication - Scheduling - Classical IPC Problems.

UNIT II **(20 Hours)**

Memory Management - Memory abstraction - Virtual Memory - Page Replacement Algorithm - Design Issues for Paging Systems - Implementation Issues - Segmentation. File Systems: Files - Directories - File System Implementation - File System Management and Optimization.

UNIT III **(20 Hours)**

Input/Output: Principles of I/O Hardware - Principles of I/O Software - I/O Software Layers - Disks - Clocks - User Interface - Thin Clients - Power Management. Deadlocks: Resources - Introduction - The Ostrich Algorithm - Deadlock Avoidance - Deadlock Prevention - Other Issues.

UNIT IV **(20 Hours)**

Multimedia Operating System: Introduction - Multimedia Files - Video & Audio Compression - Multimedia Process Scheduling - Multimedia File System Paradigms - File Placement - Caching - Disk Scheduling for Multimedia - Multiple Processor System: Multiprocessor - Multicomputer - Virtualization - Distributed Systems.

UNIT V **(14 Hours)**

Security - Security Environment - Basics of Cryptography - Protection Mechanisms - Authentication - Insider Attacks - Exploiting Code Bugs - Malware – Defenses - Case Study: LINUX.

UNIT VI CURRENT CONTOURS (for CIA only)

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Andrew S. Tanenbaum - Modern Operating System - Prentice Hall of India Pvt Limited, 2001

REFERENCE BOOK:

1. Pradeep K. Sinha. - Distributed Operating Systems Concepts and Design - Prentice Hall of India Pvt Limited, 2008

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To provide hardware and software issues in modern distributed systems	**K3**
CO2	To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems	**K4**
CO3	To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed	**K4**
CO4	To know about Shared Memory Techniques	**K5**
CO5	Have sufficient knowledge about File Access, Synchronization and Deadlock	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**S**	**S**	**S**
CO3	**M**	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**M**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE PRACTICAL - IV - J2EE LAB

Semester : I **Max. Marks: 60**

Course Code: 22PCS1C4P **Credit : 4**

Total Periods: 90 **Exam Hrs. : 3**

Objectives: To impart knowledge on developing web applications using J2EE technologies.

1. Tomcat server installation and creating the work environment.	**(6 Periods)**
2. (i) Welcome Servlet Programs	**(5 Periods)**
(ii) Servlet with Parameters	**(5 Periods)**
3. Session Tracking in Servlet	
(i) Using cookies	**(3 Periods)**
(ii) Using HTTP Session	**(3 Periods)**
(iii) URL rewriting	**(5 Periods)**
4. (i) Hello World Jsp program	**(3 Periods)**
(ii) JSP: declarations, expression and scriplets	**(5 Periods)**
(iii) JSP with Parameter passing	**(5 Periods)**
5. Session tracking in JSP	
(i) Using cookies	**(4 Periods)**
(ii) Using HTTP Session	**(5 Periods)**
(iii) URL rewriting	**(5 Periods)**
6. Online Exam using JSP (jdbc)	**(6 Periods)**
7. Job Portal using JSP (jdbc)	**(6 Periods)**
8. Entity Bean	**(6 Periods)**
9. Session Bean	**(6 Periods)**
10. Message Driven Bean	**(6 Periods)**
11. Simple web service using JSP.	**(6 Periods)**

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand and analyze the concept of HTML in the working of web and web applications	**K3**
CO2	Apply CSS in web applications	**K4**
CO3	Understand XML and Javascript in web applications.	**K5**
CO4	Create and communicate between client and serverusing Java and create a good, effective and dynamic website	**K6**
CO5	Create a dynamic website using HTML, XML and Javascript.	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**M**	**S**	**S**
CO3	**S**	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**M**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE ELECTIVE COURSE I - SOFT COMPUTING

Semester : I	**Max. Marks : 75**
Course Code :22PCS1E1A	**Credit : 3**
Total Periods : 90	**Exam Hrs. : 3**

Objective : To impart knowledge on SoftComputing.

UNIT I **(18 Periods)**

Fundamentals of Neural Networks: Basic Concepts of Neural Network-Model of an Artificial Neuron-Neural Network Architectures-Characteristics of Neural Networks-Learning Methods – Taxonomy-History of Neural Network-Early Neural Network Architectures.

UNIT II **(18 Periods)**

Back propagation Networks: Architecture of Back propagation Network-Back propagation Learning – Illustrations – Applications-Effect of Tuning Parameters of the Back propagation Neural Network-Selection of Various Parameters in Back propagation Neural Network-Variations of Standard Back propagation Algorithms.

UNIT III **(18 Periods)**

Adaptive Resonance Theory (ART): Introduction- ART1- ART2-Applications

UNIT IV **(20 Periods)**

Fuzzy Sets and Systems: Fuzzy Sets-Fuzzy Relations-Fuzzy Logic-Fuzzy Rule Based System-Defuzzification Methods-Applications.

UNIT V **(16 Periods)**

Fuzzy Back propagation Networks: LR-Type Fuzzy Numbers-Fuzzy Neuron-Fuzzy Back propagation Architecture- Learning in Fuzzy Back Propagation-Inference in Fuzzy Back Propagation-Applications.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Rajasekaran. S and VijayalakshmiPai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI, 2008 (Chapters: 2.1, 2.3-2.9, 3.1-3.7, 5.1-5.4, 6.3, 6.5, 7.3-7.6, 12.1-12.6)

REFERENCE BOOKS:

1. Fakhreddine O. Karray, Clarence De Silva, Soft Computing and Intelligent Systems Design, Pearson, 2009.
2. Sivanandam. S. N and Deepa S. N, Principles of Soft Computing, Wiley India, 2008

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn about soft computing technique and its applications	**K2**
CO2	Analyze various neural network architectures	**K3**
CO3	Understand propagation networks and algorithms	**K4**
CO4	Define the fuzzy systems	**K5**
CO5	Analyze the genetic algorithm and its applications	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**M**	**S**	**S**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE ELECTIVE COURSE I – DIGITAL IMAGE PROCESSING

Semester : I	**Max. Marks : 75**
Course Code :22PCS1E1B	**Credit :3**
Total Periods : 90	**Exam Hrs. : 3**

Objective : To acquire the knowledge on Digital Image Processing methods and its implementation techniques.

UNIT I **(18 Periods)**

Digital Image Fundamentals: Elements of Visual Perception – Light and the Electromagnetic Spectrum – Image Sensing and Acquisition – Image Sampling and Quantization – Some Basic Relationships between Pixels – Introduction to the Basic Mathematical Tools Used in Digital Image Processing – Color Image Processing.

UNIT II **(18 Periods)**

Intensity Transformations and Spatial Filtering: Background – Some Basic Intensity Transformation Functions – Histogram Processing – Fundamentals of Spatial Filtering – Smoothing Spatial Filters – Sharpening Spatial Filters – Highpass, Bandreject, and Bandpass Filters from Lowpass Filters – Combining Spatial Enhancement Methods.

UNIT III **(20 Periods)**

Filtering in Frequency Domain: Background – Preliminary Concepts – Sampling and Fourier Transform of Sampled – Functions – The Discrete Fourier Transform of One Variable – Extensions to Functions of Two Variables – Some Properties of the 2-D DFT and IDFT – The Basics of Filtering in the Frequency Domain – Filters – Image Sharpening Using Highpass Filters – Selective Filtering – The Fast Fourier Transform. Wavelet and Other Image Transforms: Basic Images – Fourier-Related Transforms – Walsh-Hadamard Transforms – Slant Transforms – Haar Transforms – Wavelet Transforms.

UNIT IV **(18 Periods)**

Image Compression and Watermarking: Fundamentals – Huffman Coding – Golomb Coding – Arithmetic Coding – LZW Coding – Run-Length Coding – Symbol-Based Coding – Bit-Plane Coding – Block Transform Coding – Predictive Coding – Wavelet Coding – Digital Image Watermarking.

UNIT V **(16 Periods)**

Image Segmentation: Fundamentals – Point, Line and Edge Detection – Thresholding – Segmentation by Region Growing and by Region Splitting and Merging – Region Segmentation Using Clustering and Superpixels – Region Segmentation Using Graph Cuts – Segmentation Using Morphological Watersheds – The Use of Motion in Segmentation.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing" 4th Edition, Pearson Education Limited, 2018.

REFERENCE BOOKS:

1. A.K. Jain, "Fundamentals of Image Processing", Second Edition, PHI, New Delhi, 2015.
2. Todd R.Reed, "Digital Image Sequence Processing, Compression and Analysis", CRC Press, 2015.

COURSE OUTCOMES:

On Completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of digital image fundamentals and tools	**K3**
CO2	Illustrate various methods used in digital processing	**K3**
CO3	Evaluate the Frequency domain	**K4**
CO4	Understand the concept of compression and watermarking	**K5**
CO5	Understand the concept of segmentation	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**S**	**M**
CO3	**S**	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**M**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; **M – Medium;** **L – Low**

VALUE ADDED COURSE – MOBILE COMMUNICATION

Semester : I **Max. Marks : 75**

Course Code : 22PCS1V1 **Credit : 2**

Total Periods : - **Exam Hrs. : 3**

Objectives: To impart knowledge on Wireless networks and WAP Architecture.

UNIT I

Introduction: Applications-Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission –Multiplexing – Spread Spectrum and Cellular Systems – Medium Access Control – Comparisons.

UNIT II

Telecommunications System: Telecommunication System– GSM – Architecture – Protocols – Handover-Security – UMTS and IMT 2000 –UMTS System Architecture-UTRAN-Core Network- Handover-Satellite System.

UNIT III

Wireless LAN : IEEE S02.11 –System Architecture- Protocol Architecture-Medium Access Control Layer-MAC Frame-MAC Management—Roaming-Bluetooth: Architecture-Link Manager Protocol- Security and Link Management.

UNIT IV

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

UNIT V

WIRELESS APPLICATION PROTOCOL: Wireless Application Protocol (WAP) – Architecture – XML – WML Script – Applications.

TEXT BOOK:

1. J.Schiller, Mobile Communication, Addison Wesley, 2000.

REFERENCE BOOKS:

1. William C.Y.Lee, Mobile Communication Design Fundamentals, JohnWiley, 1993.
2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003.
3. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Discuss cellular radio concepts	**K2**
CO2	Identify various propagation effects	**K3**
CO3	To have knowledge of the Telecommunication Architecture	**K3**
CO4	Classify multiple access techniques in mobile communication	**K5**
CO5	Enhance the knowledge on WAP & XML	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**M**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE COURSE V - CLOUD COMPUTING

Semester : II **Max. Marks : 75**

Course Code: 22PCS2C5 **Credit : 5**

Total Periods : 75 **Exam Hrs. : 3**

Objectives: To impart knowledge on Cloud Computing basics and the various Cloud Computing Architectures, infrastructure models and the Fundamental Concepts cloud services.

UNIT I **(14 Periods)**

DEFINING CLOUD COMPUTING- Cloud Types - The NIST Model - The Cloud Cube Model - Deployment Models - Service Models - Examining the Characteristics of Cloud Computing - Paradigm Shift - Benefits of Cloud Computing - Disadvantages of Cloud Computing - Assessing the Role of Open Standards. ASSESSING THE VALUE PROPOSITION: Early Adopters and New Applications - The Laws of Cloudonomics - Cloud Computing Obstacles - Behavioral Factors Relating to Cloud Adoption.

UNIT II **(16 Periods)**

UNDERSTANDING CLOUD ARCHITECTURE: Exploring the Cloud Computing Stack–Composability Infrastructure – Platforms - Virtual Appliances - Communication Protocols – Applications. UNDERSTANDING SERVICES AND APPLICATIONS BY TYPE: Defining Infrastructure as a Service (IaaS) - Defining Platform as a Service (PaaS) - Defining Software as a Service (SaaS) - SaaS characteristics - Open SaaS and SOA.

UNIT III **(15 Periods)**

UNDERSTANDING ABSTRACTION AND VIRTUALIZATION: Using Virtualization Technologies - Load Balancing and Virtualization - Advanced Load Balancing - The Google Cloud - Understanding Hypervisors - Virtual Machine Types - VMware vSphere - Understanding Machine Imaging - Porting Applications - The Simple Cloud API - AppZero Virtual Application Appliance. CAPACITY PLANNING - Load testing - Resource Ceilings - Server and Instance Types.

UNIT IV **(16 Periods)**

USING MICROSOFT CLOUD SERVICES: Administrating the Clouds - Management Responsibilities - Lifecycle Management - Emerging Cloud Management Standards. UNDERSTANDING CLOUD SECURITY: Securing the Cloud – Securing Data – Establishing Identity and Presence.

UNIT V **(14 Periods)**

USING THE MOBILE CLOUD: Working with Mobile Devices – Defining the Mobile Market – Using Smartphones with the Cloud. WORKING WITH MOBILE WEB SERVICES: Understanding Service Types – Performing Service Discovery – Using SMS – Defining WAP and Other Protocols – Performing Synchronization.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Cloud Computing Bible - Barrie Sosinsky, Wiley Publishing Inc., 2011.

REFERENCE BOOKS:

1. Cloud Computing - Michael Miller, Pearson Education Inc., 7th Edition, 2012.
2. Cloud Computing Principles and Paradigms – RajkumarBuyya & Co., John Wiley & Sons Publications, 2011.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc	**K2**
CO2	Understand the core issues of cloud computing such as security, privacy, and interoperability	**K3**
CO3	Discuss the appropriate technologies, algorithms, and approaches for the related issues	**K4**
CO4	Identify problems, and explain, analyze, and evaluate various cloud computing solutions	**K6**
CO5	Understand the Mobile Web Services	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**M**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; **M – Medium;** **L – Low**

CORE COURSE VI – ADVANCED DATABASE MANAGEMENT SYSTEM

Semester : II **Max. Marks : 75**

Course Code : 22PCS2C6 **Credit :5**

Total Periods : 75 **Exam Hrs. : 3**

Objectives: To understand advanced DBMS techniques to construct tables and write effective queries, forms, and reports

UNIT I **(13 Periods)**

Overview of DBMS – Database design – Query processing. Data modeling – ER – EER – Object Oriented Databases – Object Relational Databases, Document oriented Databases – Background of NoSQL – XML document – Structure of XML Data – XML Document Schema – Querying and Transformation – API – Storage of XML Data – XML Applications.

UNIT II **(15 Periods)**

Information Retrieval Systems, Databases – Multidimensional Indexes – Data Cubes, Grid Files, R-trees.

UNIT III **(16 Periods)**

Distributed Databases – Data Distribution – Distributed Transactions, Parallel Databases – Performance measure – Parallel operations for relational operations, Information Integration – Federated Database – Data Warehouses – Mediators – Schema matching methods.

UNIT IV **(16 Periods)**

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols.

UNIT V **(15 Periods)**

Multidimensional Data Structures – Image Databases – Text / Document Databases – Video Databases – Audio Databases – Multimedia Database Design.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOKS:

1. Silberschatz, Korth and Sudarshan, "Database Concepts", Sixth Edition, Tata McGraw Hill, 2010.
2. Vijay Kumar, ―Mobile Database Systems, John Wiley & Sons, 2006.

REFERENCE BOOK:

1. R. Elmasri, S.B. Navathe, ―Fundamentals of Database Systems‖, Sixth Edition, Pearson Education/Addison Wesley, 2010.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Knowledge about basic concepts and terminology	**K3**
CO2	Create Relational Database Systems	**K4**
CO3	Compare Distributed and Parallel databases	**K4**
CO4	Analyze Multimedia, video and audio databases	**K5**
CO5	Create forms and Reports	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**M**	**S**	**S**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE COURSE VII – MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Semester : II **Max. Marks : 75**

Course Code :22PCS2C7 **Credit : 5**

Total Periods : 75 **Exam Hrs. : 3**

Objectives: To acquire skills in solving mathematical and logical problems that are used in most areas of Computer Science.

UNIT I **(15 Periods)**

The Foundation: Logic and Proofs: Propositional Logic – Applications of Propositional Logic – Propositional Equivalence – Predicates and Quantifiers – Nested Quantifiers – Rules of Inference – Introduction to Proofs – Proof Methods and Strategy.

UNIT II **(16 Periods)**

Basic Structure: Sets – Set Operations – Functions – Sequence and Summations – Cardinality of Sets – Matrices.

UNIT III **(16 Periods)**

Counting: The Basics of Counting – The Pigeonhole Principle – Permutations and combinations – Binomial Coefficients and Identities – Generalized Permutations and Combinations – Generating Permutation and Combinations. Discrete Probability: Introduction – Probability Theory – Bayes' Theorem – Expected Value and Variance.

UNIT IV **(14 Periods)**

Graphs: Graphs and Graphs Models – Graph Terminology and Special Types of Graphs – Representing Graphs and Graph Isomorphism – Connectivity – Euler and Hamilton Paths – Shortest Path Problems – Planar Graphs. Trees: Introduction – Application – Tree Traversal – Spanning Trees – Minimum Spanning Trees.

UNIT V **(14 Periods)**

Modeling Computation: Languages and Grammars – Finite State Machines with Output – Finite State Machines with No Output – Language Recognition - Turing Machines.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Kenneth H. Rosen, "Discrete Mathematics and Its Applications", 7th Edition, McGraw Hill, 2012.

REFERENCE BOOKS:

1. Kolman, Busby and Ross, "Discrete Mathematical Structures", 6th Edition, PHI, 2013.
2. Sheldon M. Ross,"Introduction to Probability and Statistics for Engineers and Scientists", 5th edition, Academic Press; 2014.

COURSE OUTCOMES:

On Completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand and evaluate mathematical arguments revolving around computation.	**K3**
CO2	Examine the applicability of Sets in Computers	**K3**
CO3	Understand the basics of Combinations and Probability.	**K4**
CO4	Apply the acquaintance on Graphs and Trees to real world applications.	**K5**
CO5	Determine the working of Grammars and Languages.	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**S**	**M**
CO3	**S**	**S**	**S**	**S**	**S**
CO4	**S**	**M**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE COURSE VII– NETWORK SECURITY

Semester : II	**Max. Marks : 75**
Course Code :22PCS2C8	**Credit : 5**
Total Periods : 75	**Exam Hrs. : 3**

Objectives: To impart knowledge on various protocols for network security to protect against the threats in the networks.

UNIT I **(14 Periods)**

Computer and Network Security Concepts: Computer Security Concepts – Security Architecture – Security Attacks – Security Services – Security Mechanisms – Fundamentals Security Design Principles – Network Security Models. Symmetric Ciphers: Classical Encryption Techniques: Symmetric Cipher Model – Substitution Techniques – Transposition Techniques – Rotor Machines – Steganography.

UNIT II **(16 Periods)**

Block Ciphers and Data Encryption Standard: Block Cipher Structure – The Data Encryption Standard – Example – The Strength of DES – Block Cipher Design Principles. Public Key Cryptography and RSA: Principles of Public-Key Crypto System – RSA Algorithm. Cryptographic Hash Functions: Applications – Two Sample Hash Functions – Requirements and Security – Cipher Block Chaining – Secure Hash Algorithms.

UNIT III **(16 Periods)**

User Authentication: Remote User – Authentication Principles – Remote User-Authentication Using Symmetric Encryption – Kerberos – Remote User-Authentication Asymmetric Encryption – Federated Identity Management – Personal Identity Verification – Electronic Mail Security.

UNIT IV **(15 Periods)**

Wireless Network Security: Wireless Security – Mobile Device Security – Wireless LAN Overview – Wireless LAN Security. IP Security: Overview – Policy – Encapsulating Security Payload – Combining Security Associations – Internet Key Exchange – Cryptographic Suites.

UNIT V **(14 Periods)**

Emerging Technologies: The Internet of Things – Economics – Electronic Voting – Cyber Warfare.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOKS:

1. William Stallings, "Cryptography and Network Security: Principles and Practices", 7th Edition, Pearson Education Limited, 2017.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger, Jonathan Margulies, "Security in Computing", 5th Edition, Pearson Education Limited, 2015.

REFERENCE BOOKS:

1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2015.
2. George K. Kostopoulous, "Cyber Space and Cyber Security", CRC Press, 2013.

COURSE OUTCOMES:

On Completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of network security and classify the symmetric encryption techniques	**K3**
CO2	Illustrate various algorithms used in asymmetric cipher and public key cryptography	**K3**
CO3	Evaluate the authentication and e-mail security	**K4**
CO4	Understand the concept of wireless security and IP security	**K5**
CO5	Able to understand privacy concepts and emerging technologies in cyber security	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**S**	**M**
CO3	**S**	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**M**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; **M – Medium;** **L – Low**

CORE PRACTICAL - IX – ADVANCED DABMS LAB

Semester : II **Max. Marks : 60**

Course Code :22PCS2C9P **Credit : 4**

Total Periods : 60 **Exam Hrs. : 3**

Objectives: To be able to understand and apply advanced concepts of PL/SQL like cursors, procedures and triggers.

1. SQL data types, Operators, Literals, Constraints **(6 Periods)**
2. DDL, DML, TCL, DCL Commands **(6 Periods)**
3. Queries: Select / From / Where/ Group By/Having Clause/ Order By Clause/ SQL Operators **(6 Periods)**
4. Functions: Aggregate / Numeric / String / Date & Time / Logical **(6 Periods)**
5. Unions / Intersection / Minus **(6 Periods)**
6. Subqueries or Nested Queries **(6 Periods)**

PL/SQL Block Structure

7. Conditional Statements **(6 Periods)**
8. Database Programming with record variables **(6 Periods)**
9. Cursors **(6 Periods)**
10. Procedures & Functions **(6 Periods)**

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Create SQL Queries	**K2**
CO2	Create DDL, DML, TCL, DCL Commands	**K3**
CO3	Knowledge about PL / SQL	**K4**
CO4	Create Iterations	**K5**
CO5	Create packages	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	M	S

S – Strong; **M – Medium;** **L – Low**

NME I – DESKTOP PUBLISHING

Semester : II **Max. Marks : 75**

Course Code :22PCS2N1A **Credit : 2**

Total Periods : 45 **Exam Hrs. : 3**

Objectives: To impart knowledge on Basics of computers.

UNTI I **(8 Periods)**

Introduction to Computers – History of Computers – Basic Anatomy of Computers – MS-DOS – What is MS-DOS? – What MS-Dos Does? – DOS Commands.

UNIT II **(10 Periods)**

Word Basics – Formatting Features – Menus, Commands, Toolbars and their Icons – Exercises – Mail Merge – Macros.

UNIT III **(9 Periods)**

Excel Basics – Introduction – Menus, Commands, Toolbars and their Icons – Exercises – Data Sort – Functions.

UNIT IV **(9 Periods)**

Powerpoint Basics – Introduction – Toolbar, their Icons & Commands – Navigating in Powerpoint – Working with Powerpoint – Exercises.

UNIT V **(9 Periods)**

Ms Access – Introduction – Toolbars & their Icons – Creating a Table - Creating Table through Design View – Relationship – Query – Forms – Reports.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Sanjay Saxena – A First Course in Computers – Vikas Publishing House Pvt., Ltd., 2008.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Able to understand Computer Basics	**K3**
CO2	Familiarize the tools in Msword	**K3**
CO3	Able to understand MsExcel	**K4**
CO4	Understand the MsPowerpoint	**K5**
CO5	Familiarize to design the table using MsAccess	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**M**	**S**
CO2	**S**	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**M**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

NME I – INTRODUCTION TO GRAPHIC DESIGN

Semester : II **Max. Marks : 75**

Course Code :22PCS2N1B **Credit : 2**

Total Periods : 45 **Exam Hrs. : 3**

Objectives: To develop basic skills using tools and theory used in Graphic Design.

UNIT I **(8 Periods)**

Understanding the Photoshop Workspace: Workspace Overview – Cruising the Main Menus – Understanding the Panel – Understanding the Tools in the Toolbox – Setting Preferences.

UNIT II **(9 Periods)**

Image Basics: Exploring File Types – Creating and Opening Images – Resizing Files and Adjusting Resolution – Cropping and Straightening Images.

UNIT III **(10 Periods)**

Understanding Colors, Histograms, Levels and Curves: Color Basics – Understanding Channels and Levels – Adjusting with Histograms – Working in Different Color Modes – Choosing Colors.

UNIT IV **(8 Periods)**

History and Actions: Using the History Panel – Creating and Using Automated Actions.

UNIT V **(10 Periods)**

Using Bridge to Organize and Process Photos: Working in Bridge Workspaces – Organizing Files in Bridge – Processing Images Using Bridge and Photoshop – Using the Min-Bridge Tool in Photoshop.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Lisa DaNae Dayley and Brad Day –Adobe Photoshop CS5 Bible, Wiley India Pvt. Ltd., 2010.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Familiar with the concepts of Photoshop and understand the tools.	**K2**
CO2	Familiar with the file types and image resolution	**K3**
CO3	Able to understand the colors and histograms	**K4**
CO4	Able to understand the panel	**K6**
CO5	Understand to organize the files using bridge and photoshop.	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**M**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

INDUSTRIAL BASED COURSE – PYTHON PROGRAMMING

Semester : II **Max. Marks : 75**

Course Code :22PCS2I1 **Credit : 3**

Total Periods : 45 **Exam Hrs. : 3**

Objectives: To impart knowledge on Python Programming.

UNIT I **(8 Periods)**

Python Language Basics, IPython and Jupyter Notebooks: The Python Interpreter – IPython Basics – Python Language Basics.

UNIT II **(9 Periods)**

Built-in Data Structures, Functions and Files: Data Structures and Sequences – Functions – Files and Operating System.

UNIT III **(10 Periods)**

NumPy Basics: Arrays and Vectorized Computation: The NumPy ndarray: A Multidimensional Array Object – Universal Functions – Array-Oriented Programming with Arrays – File Input and Output with Arrays – Linear Algebra – Pseudorandom Number Generation – Examples.

UNIT IV **(9 Periods)**

Getting Started with Pandas: Introduction to Panda Data Structures – Essential Functionality – Summarizing and Computing Descriptive Statistics.

UNIT V **(9 Periods)**

Plotting and Visualization: A Brief matplotlib API Primer – Plotting with Pandas and Seaborn – Other Python Visualization Tools.

UNIT VI **(for CIA only)**

Internship Training.

TEXT BOOK:

1. WesMcKinney – Python for Data Analysis-Data Wrangling with Pandas, NumPy and IPython – 2nd Edition – O'REILLY – 2017.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Familiar with the basic concepts of Python	**K2**
CO2	Ability to use conditional loops and list by Python	**K3**
CO3	Basic understanding of NumPy	**K4**
CO4	Able to understand the Pandas	**K6**
CO5	Learn to understand the visualization through vector-based computation	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**S**	**S**	**M**
CO4	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE COURSE X - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Semester : III	**Max. Marks : 75**
Course Code :22PCS3C10	**Credit : 5**
Total Periods : 90	**Exam Hrs. : 3**

Objectives: To Understand the concept of machine learning algorithms and also to develop web application using machine learning techniques.

UNIT I **(18 Periods)**

Introduction: AI Problems - Al Techniques - Criteria for Success. Problems, Problem Spaces, Search: State Space Search - Production Systems, Heuristic Search techniques: Generate and Test - Hill Climbing- Best-First - Means- End Analysis. Machine Learning: Introduction-Algorithm - Training Three different types of Machine Learning Algorithms-Predictions with supervised learning- Predicting with Class labels-Regression for predicting continuous outcomes-Introduction to basic terminology and notations used in Machine Learning.

UNIT II **(18 Periods)**

Building Machine Learning Systems: Preprocessing, Training, Selection and Evaluation of Model-Installing Python Package, Artificial Neurons: A glimpse into the early history of Machine Learning-Implementation of Perceptron learning algorithm in Python-Adaptive linear neurons and the Convergence of Learning-Implementation of Adaptive linear neuron in Python. Machine Learning Classifier: Training a perceptron via Scikit-Learn-Modeling class probabilities through logistic regression Support vector machine for maximum margin classification-Solving Non-Linear problems using a kernel SVM Learning Decision Tree-A Lazy learning Algorithms – K-Nearest Neighbors.

UNIT III **(18 Periods)**

Data Preprocessing: Dealing with missed and Categorical data-Data Preprocessing: Dealing with Data set Testing and Training-Selection of Meaningful features-Selection of meaningful sparse solutions with L1 regularization. Dimensionality Reduction and Model Evaluation : Unsupervised Dimensionality reduction using P.C.A [Principal Component Analysis]-Supervised data compression via Linear Discriminant analysis.

UNIT IV **(20 Periods)**

Using Kernel principal component analysis for N-L-M-Streamlining workflows with pipeline-Using K-Fold cross-validation to assets model performance Debugging algorithms with learning and validation-Different performance evaluation metrics-Implementing simple majority vote classifier-Tuning the ensemble classifier-Weak Learners Vs Adaptive Boosting. Cluster Analysis : Grouping objects by similarity using K-Means-Organizing Clusters as a hierarchical tree. -Training Artificial Neural Network for image recognition.

UNIT V **(16 Periods)**

Modeling Complex functions with Artificial Neural Network-Classifying Hand Written Digits Training an Artificial Neural Network-Developing initiation for Back Propagation-Debugging Neural Network with Gradient Checking-Convergence in Neural Network-Architecture of Neural Network. Embedding a Machine Learning Model into a Web Application : Serializing fitted Scikit-learn estimators-Setting up SQL-LITE database for data storage.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOKS:

1. Elaine Rich and Kevin Knight," Artificial Intelligence", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition
2. Sebastian Raschka, “Python Machine Learning”, First Edition, [PACKT] , 2015.

REFERENCE BOOKS:

1. Joel Grus, “Data Science from Scratch”, First Edition, O’Reilly,2015
2. Gavin hacekling, “Mastering machine learning with scikit-learn”, First Edition, [PACKT] , 2014

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Preprocess syntactic data and real data sets	**K3**
CO2	Create ML models for the target data sets	**K4**
CO3	Evaluate the performance of ML models	**K4**
CO4	Compare the performance of ML models	**K5**
CO5	Embed ML models into web application	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	M	S
CO3	S	S	M	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong; M – Medium; L – Low

CORE COURSE XI - DATA MINING AND WAREHOUSING

Semester : III **Max. Marks : 75**

Course Code :22PCS3C11 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objectives: To understand Data Mining and Data Warehousing Applications.

UNIT I **(18 Periods)**

Introduction to Data Mining – Association Rule Mining.

UNIT II **(18 Periods)**

Classification – Cluster Analysis.

UNIT III **(18 Periods)**

Web Data Mining – Search Engines.

UNIT IV (SELF STUDY) **(18 Periods)**

Data warehousing – Introduction – Operational Data Stores – Data Warehouses – Data Warehouse Design – Guidelines for Data Warehouse Implementation – Data Warehouse Metadata - Software for ODS and Data Warehousing.

UNIT V (SELF STUDY) **(18 Periods)**

Online Analytical Processing – Information Privacy.

UNIT VI CURRENT CONTOURS (for CIA only)

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. G.K. Gupta, Introduction to Data mining with case studies, Prentice Hall India , 2006 (ISBN 81-203-3053-6) [Unit-1 :(Chapters 1,2); Unit-2 :(Chapters 3,4); Unit-3 (Chapters 5,6); Unit-4 (Chapters 7), Unit-5(Chapters 8,9)].

REFERENCE BOOKS:

1. K.P.Soman & ShyamDiwakar and V. Ajay, Insight to Data Mining Theory and Practice,Prentice Hall of India, 2006. (ISBN -81-203- 2897-3)
2. Jiawei Han and Micheline amber, Data Mining Concepts and Techniques, Elsevier, Second Edition, 2007 (ISBN: 81-312-0535-5)

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the basic principles, concepts and applications of data warehousing and data mining	**K3**
CO2	Ability to do Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment	**K3**
CO3	Have a good knowledge of the fundamental concepts that provide the foundation of data mining	**K4**
CO4	Describe different methodologies used in data mining and data ware housing	**K5**
CO5	Compare different approaches of data ware housing and data mining with various technologies	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**M**	**S**	**S**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE COURSE XII – COMPILER DESIGN

Semester : III **Max. Marks : 75**

Course Code :22PCS3C12 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objectives: To impart knowledge on different Phases of Compiler and Needs of the Compiler.

UNIT I **(18 Periods)**

INTRODUCTION: Different Phases of Compiler - Finite State Automation and Lexical Analysis - A Simple Approach to the Design of Lexical Analyzers- Regular Expressions - A Language for Specifying Lexical Analyzers.

UNIT II **(19 Periods)**

SYNTAX SPECIFICATION: Context Free Grammars - Parsers – Derivation and Parse Trees- Shift Reduce Parsing - Operator Precedence Parsing - Top-Down Parsing – Predictive Parsers.

UNIT III **(17 Periods)**

CODE GENERATION: Intermediate Code Generation - Translation -Implementation of Syntax - Directed Translators - Intermediate Code – Postfix Notation - Parse Trees and Syntax Trees - Three Address Codes, Quadruples and Triples.

UNIT IV **(18 Periods)**

SYMBOL TABLES: Contents of a Symbol Table - Data Structures for Symbol Tables - Implementation of a Simple Stack Allocation Scheme -Implementation of Block Structured Languages - Storage Allocation in BlockStructured Languages - Errors - Lexical Phase Error.

UNIT V **(18 Periods)**

CODE OPTIMIZATION AND CODE GENERATION: Elementary Code Optimization technique - Loop Optimization - DAG Representation of Basic Blocks - Value Numbers and Algebraic Laws - Object Programs - Problems in Code Generation - A Machine Model - A Simple Code Generator.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Alfred V. Aho, Jeffery D.Ullman, ―Principles of Compiler Design‖, Narosa,New Delhi 2002. Ch:1.1-1.11,3.1-3.7,4.1,4.2,5.1-5.5,7.1-7.6,9.1,9.2 ,10.1,10.2,11.1, 11.2,12.1-12.4,15.1-15.4

REFERENCE BOOKS:

1. Dick Grune, Henri E. Bal, CerielJ.H.Jacobs, Koen G. Langondeon,―Modern Compiler Design‖, Wiley, Singapore, 2003.
2. Louden K., ―Compiler Construction, Principles and Practice‖, Thomson,New Delhi, 2003.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Design and develop a comprehensive Compiler for a given language	**K2**
CO2	Implement various parsing, conversion, optimization and code generation algorithms for the design of a compiler	**K3**
CO3	Understand the concept parsing techniques	**K5**
CO4	Able to understand the memory allocation	**K5**
CO5	Understand the Loop Optimization and DAG	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE PRACTICAL - XII - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING LAB

Semester : III	**Max. Marks : 60**
Course Code :22PCS3C10P	**Credit : 4**
Total Periods : 90	**Exam Hrs. : 3**

Objectives: To impart knowledge on Machine Learning Algorithms and solve Machine Learning real world problems using Scikit-Learn Library.

1. [Data preprocessing]: Create dataset in CSV file with 10 rows and 5 columns (name, age, height, eight, BP). Load the CSV file and do the following preprocessing to the data. **(10 Periods)**
2. [Linear Regression]: Generate random numbers for input features and target. Divide the data into training and testing set[100 iterations]. **(10 Periods)**
3. [Multiple Linear Regression]: Load the boston house price prediction dataset. Divide the data into training and testing set [500 iterations]. **(10 Periods)**
4. [Logistic Regression]: Load the Iris classification dataset. Divide the data into training and testing set. Print the training and testing data[500 iterations]. **(10 Periods)**
5. [Support Vector Machine]: Load the Digits classification dataset. Divide the data into training and testing set. Print the training and testing data. Create a Linear SVM model [500 iterations]. **(10 Periods)**
6. [Decision Tree Classifier]: Load the Wine classification dataset. Divide the data into training and testing set. Print the training and testing data. Create a Decision Tree model for the dataset and run the model for 500 iterations. **(10 Periods)**
7. [K-Means Clustering]: Populate clustering dataset with 2 features using sklearn built-in functions. Divide the data into training and testing set [500 iterations]. **(10 Periods)**
8. [Spectral Clustering]: Visualize the clustering results using 2D plots. Visually compare the results with plots of the K-means in terms of speed and clustering validity. **(10 Periods)**
9. [Simple Neural Networks]: Load the Digits classification dataset. Divide the data into training and testing set. Print the training and testing data. Create a Neural Network with 2 layers and 100 nodes each for the dataset and run the model for 500 iterations. Apply logistic regression, SVM, decision tree to the dataset and print the results. Print the evaluation results and learned model weights. Compare the results in terms of speed and accuracy. **(10 Periods)**

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Generate synthetic datasets	**K2**
CO2	Preprocess synthetic data and real use case data sets	**K3**
CO3	Create ML models for the target data sets	**K4**
CO4	Evaluate the performance of ML model	**K5**
CO5	Compare the performance of ML models	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

NME II – WEB DESIGNING

Semester : III **Max. Marks : 75**

Course Code : 22PCS3N2A **Credit : 2**

Total Periods : 45 **Exam Hrs. : 3**

Objectives: To impart knowledge on Web Designing.

UNIT I **(8 Periods)**

Fundamentals: A Brief Introduction to the Internet – The World Wide Web – Web Browser – Web Servers – Uniform Resource Locators – Multiple Internet Mail Extensions - The Hypertext Transfer Protocol – The Web Programmers Tool Box.

UNIT II **(10 Periods)**

Introduction to HTML: Designing a Home Page – HTML Document – Anchor Tag – Hyperlinks – Head and Body Sections – Header Section – Title – Prologue – Links – Colorful Pages – Comments – Body Section – Heading – Horizontal Ruler – Paragraph – Tabs – Images and Pictures – Lists and their Types – Nested Lists – Table Handling.

UNIT III **(8 Periods)**

Frames: Frameset Definition – Frame Definition – Nested Framesets – Forms : Forms and their Elements

UNIT IV **(9 Periods)**

DHTML and Style Sheets – Defining Styles – Elements of Styles – Linking a Style Sheet to a HTML Document – Inline Styles – External Style Sheets – Internal Style Sheets – Multiple Styles – Web Page Designing.

UNIT V **(10 Periods)**

Introduction to XML : Introduction – The Syntax of XML – XML Document Structure – Document Type Definitions – Namespaces – XML Schemas – Displaying Raw XML Documents – Displaying XML Documents with CSS – XML Processors.

UNIT VI CURRENT CONTOURS (for CIA only)

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Robert W. Sebesta - Programming the World Wide Web, Pearson Education, Third Edition, 2007. For Units I and Unit V.
2. C. Xavier - World Wide Web Designing, Tata McGraw Hill, 2000. For Units II, III and IV.

REFERENCE BOOK:

1. Web Design – A Beginners Guide, Wendy Willard, Tata McGraw Hill.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of internet and browser.	**K3**
CO2	Familiar with the HTML tag.	**K3**
CO3	Learn and implement the concept of frames and forms in HTML.	**K4**
CO4	Understand the concept of Style sheets.	**K5**
CO5	Able to understand the XML	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

NME II – E-COMMERCE

Semester : III **Max. Marks : 75**

Course Code :22PCS3N2B **Credit : 2**

Total Periods : 45 **Exam Hrs. : 3**

Objective: To impart knowledge on the concept of Web Applications and WAP Fundamentals.

UNIT I **(8 Periods)**

Introduction to E-Commerce: Introduction – What is E-commerce? – E-business – Categories of E-commerce Applications – Global Trading Environment & Adoption of E-commerce – Comparison between Traditional & E-commerce – Advantages & Disadvantages of E-commerce. Business Models of E-commerce: Introduction – Models – Business to Consumer.

UNIT II **(9 Periods)**

Business to Business – B2B E-commerce and EDI: Introduction – Need for B2B – Electronic Data Exchange – Paperless Transactions – EDI Standards – Data Standards Used in EDI – Cost of EDI – Reasons for Slow Acceptability of EDI for Trading – Electronic Funds Transfer – XML and its Application – Comparison of HTML and XML – Advantages of XML as a Technology – Design Goals of XML – Using DTD with XML Document – E-Marketing.

UNIT III **(10 Periods)**

Business Applications of E-Commerce: Introduction – Trade Cycle – Supply Chain – E-procurment – Implementation – Competitive Advantage – E-commerce Application in Manufacturing, Wholesale, Retail and Service Sector. E-Commerce Technology: Introduction – IT Infrastructure – Internet.

UNIT IV **(9 Periods)**

Middleware – Intranet – Extranet – VPN – Firewall – Cryptography – Digital Signature – Digital Envelope – Digital Certificates – Contents. Electronic Payment Systems: Introduction – Electronic Payment Mechanism – Types – Risks – Payment Gateway – issues of Electronic Payment Technology – Security of E-payment Systems – Internet Banking.

UNIT V **(9 Periods)**

Security Requirement of E-payment System – Secure Socket Layer – Biometrics. Security Issues in E-Commerce: Introduction – Issues – Risks – Protecting E-commerce System – Security Tools – Client Server Network Security – Data and Message Security.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Dr. U. S. Pandey, Er. Saurabh Shukla – E-Commerce and Mobile Commerce Technologies, S. Chand & Company Ltd., 2011.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of E-commerce.	**K2**
CO2	Able to understand the concept of EDI	**K3**
CO3	Familiar with the E-commerce applications	**K4**
CO4	Familiar with the concept of E-payment	**K5**
CO5	Understand the security issues in E-commerce	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**M**	**S**	**S**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**M**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; **M – Medium;** **L – Low**

CORE COURSE XIV–BIG DATA ANALYTICS

Semester : IV **Max. Marks : 75**

Course Code :22PCS4C14 **Credit : 5**

Total Periods : 90 **Exam Hrs. : 3**

Objective: To impart knowledge on Fundamentals, Big Data Analytics, Technologies and databases, Hadoop and Map Reduce Fundamentals

UNIT I **(18 Periods)**

Introduction to Big Data: Data, Characteristics of Data and Types of digital data: Unstructured - Semi-structured and Structure - Sources of Data - Working with Unstructured Data - Evolution and Definition of Big Data - Characteristics and Need of Big Data - Challenges of Big Data - Data Environment Versus Big Data Environment

UNIT II **(18 Periods)**

Big Data Analytics: Overview of Business Intelligence - Data Science and Analytics - Meaning and Characteristics of Big Data Analytics - Need of Big Data Analytics - Classification of Analytics - Challenges to Big Data Analytics - Importance of Big Data Analytics - Basic Terminologies in Big Data Environment

UNIT III **(18 Periods)**

Big Data Technologies and Databases: Introduction to NoSQL, Uses - Features and Types – Need – Advantages - Disadvantages and Application of NoSQL - Overview of NewSQL - Comparing SQL -NoSQL and NewSQL - Introduction to MongoDB and Its Needs - Characteristics of MongoDB - Introduction of Apache Cassandra and Its Needs - Characteristics of Cassandra.

UNIT IV **(18 Periods)**

Hadoop Foundation for Analytics: History – Needs – Features - Key Advantage and Versions of Hadoop - Essential of Hadoop Ecosystems - RDBMS versus Hadoop - Key Aspects and Components of Hadoop - Hadoop Architectures.

UNIT V **(18 Periods)**

Hadoop MapReduce and YARN Framework: Introduction to MapReduce - Processing Data with Hadoop Using MapReduce - Introduction to YARN, Components - Need and Challenges of YARN - Dissecting YARN, MapReduce Application - Data Serialization and Working with Common Serialization Formats - Big Data Serialization Formats

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOK:

1. Seema Acharya and Subhashini Chellappan, ―Big Data and Analytics‖, Wiley India Pvt. Ltd., 2016

REFERENCE BOOKS:

1. ―Big Data‖ by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014.
2. ―Hadoop: The definitive Guide‖, Tom White, O'Reilly Media, 2010.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept and challenge of big data and why existing technology is inadequate to analyze the Big Data	**K3**
CO2	Collect, manage, store, query, and analyze various form of Big Data	**K3**
CO3	Understand the impact of big data for business decisions and strategy	**K4**
CO4	Address the limitations and challenges of working in a Big Data environment and thus utilize the opportunities for commercial and/or social benefit	**K5**
CO5	Understand the workings of various tools using Big Data	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**M**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**M**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; **M – Medium;** **L – Low**

CORE ELECTIVE COURSE II – ADVANCED SOFTWARE ENGINEERING

Semester : IV **Max. Marks : 75**

Course Code :22PCS4E2A **Credit : 3**

Total Periods : 60 **Exam Hrs. : 3**

Objectives: To impart knowledge on Software Engineering.

UNTI I **(11 Periods)**

Introductions : Evolving Role of Software – Software Characteristics, Components and Its Applications – Generic View of Software Engineering – Software Process Models.

UNIT II **(13 Periods)**

Systems Analysis : Requirements Analysis – Analysis Principles – Prototyping Software Requirement Specification – Data Modeling, Functional Modeling And Behavioral Modeling.

UNIT III **(13 Periods)**

Design Concepts: Design and Software Quality, Design Concepts : Abstraction – Refinement - Modularity and Software Architecture Control Hierarchy - Structural Partitioning and Information Hiding - Effective Modular Design: Functional Independence - Cohesion and Coupling – Design Documentation.

UNIT IV **(12 Periods)**

Design Methods : Data Design – Architectural Design Process: Transform Mapping and Transaction Mapping – Interface Design – Procedural Design. Design for Real – Time Systems : System Considerations – Real Time Systems – Analysis and Simulation of Real Time Systems.

UNIT V **(11 Periods)**

Software Testing Methods: Software Testing Fundamentals. White Box Testing: Basis Path Testing and Control Structure Testing – Black Box Testing – Testing for Specialized Environments. Software Testing Strategies: A strategic Approach to Software Testing – Unit Testing – Integration Testing – Validation Testing – System Testing.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

TEXT BOOK :

1. R.S.Pressman "Software Engineering", (5th edition) Tata McGraw Hill, 1997

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Analyze the software life cycle models	**K3**
CO2	Identify the importance of the software development process	**K3**
CO3	Analyze the importance of CASE tools	**K4**
CO4	Design and develop correct and robust software products using advanced software engineering Techniques	**K5**
CO5	Able to understand the testing techniques	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**M**	**S**
CO2	**S**	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**M**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

CORE ELECTIVE COURSE II - PARALLEL COMPUTING

Semester : IV **Max. Marks : 75**

Course Code :22PCS4E2B **Credit : 3**

Total Periods : 60 **Exam Hrs. : 3**

Objectives: To impart knowledge on Parallel Computing.

UNIT I **(11 Periods)**

Introduction to Parallel Processing – Definition and Functions of Parallel Processing – Uni-Processor and Parallel Processing Systems – Parallel Computers – Pipeline Computers – Array Processor – Multiprocessor Systems – Performance of Parallel Computers – Application of Parallel Processor.

UNIT II **(13 Periods)**

Memory and Input/Output System – Memory System for Parallel Processor Computers – Hierarchical Memory Structures – Virtual Memory System – Paged System – Segmented System with Paged Segments – Memory Management Policies – Fixed Partitioning and Variable Partitioning – Cache Memories and Management – Characteristics of Cache Memories – Cache Memory Organization – Input/Output Subsystem.

UNIT III **(13 Periods)**

Pipeline Computers – Principles Of Linear Pipelining – Pipelined Structures of a Typical Central Processing Unit – Classification of Pipeline Processors – Interleaved Memory Organization – S Access Memory Organization – C Access Memory Organization – C & S Access Memory Organization – Static & Dynamic Pipelining – Principles of Designing Static Pipeline Processors – Instruction Prefetch and Branch Handling – Data Buffering and Busing Structures.

UNIT IV **(12 Periods)**

Array Processors – Single Instruction Stream – Multiple Data Stream – SIMD Processors – Types of SIMD Computer Organization – Array Process or Organization and Associative Processors – Array Processor Computer Organization – SIMD Interconnection Networks – Static and Dynamic Networks – Linear Array, Mesh, Ring, Star, Tree, Systolic,

Completely Connected, Chordal ring and Cube Networks – Parallel Algorithms for ArrayProcessors – SIMD Matrix Multiplication – Parallel Sorting on Array Processors.

UNIT V **(11 Periods)**

Multiprocessor ARCHITECTURE – Functional Structures of a Multiprocessor System Loosely and Tightly Coupled Multiprocessor – Processor Characteristics of Multiprocessing – Inter Processor Communication Mechanism – Instruction Set – Interconnection Networks – Time Shared or Common Bus – Cross Bar Switch and Multi Port Memories and Multistage Networks for Multiprocessor – Parallel Memory Organization – Interleaved Memory Configurations – Classification of Multiprocessor Operating System.

UNIT VI **CURRENT CONTOURS (for CIA only)**

Present-day changes related to the course during the semester concerned.

REFERENCE BOOK:

1. Kai Hwang, Faye A.Briggs, –Computer Architecture and Parallel Processing, Prentice Hall of India, 1985.

COURSE OUTCOMES:

On completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Familiar with the concepts of parallel processing and understand the particular problems arising in programming of parallel machines	**K2**
CO2	Familiar with the parallel computing models and the design of parallel algorithms	**K3**
CO3	Able to apply the basic algorithmic techniques and design algorithms in a shared memory as well as a distributed memory environment	**K4**
CO4	Able to understand the array processors	**K6**
CO5	Understand to apply basic parallel programming principles in a shared/ distributed memory environment	**K6**

MAPPING WITH PROGRAMME OUTCOMES:

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**M**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**

S – Strong; **M – Medium;** **L – Low**

PROJECT

Semester : IV	**Max. Marks :100**
Course Code : 22PCS4PW	**Credit :12**
Total Periods : 270	**Exam Hrs. : 3**

Students to do the Project. The objective of the Project is to enable the students to work in Latest Software.