| YEAR - I SEMESTER - I CORE - 2 | INTRODUCTION TO INFORMATION TECHNOLOGY | 18PIT12 HRS/WK - 5 CREDIT - 4 |
|---|---|---|

**Objective:**

To make the students to acquire the basic knowledge about Information technology.

**Course Outcomes (CO's):**
At the end of the Course the students should be able to exhibit

**CO1: Knowledge pertaining to basics of Computers**
**CO2: Proficiency in Computer Software and OS**
**CO3: Knowledge pertaining to Network Communication**
**CO4: Knowledge pertaining to Network Applications.**
**CO5: Expertise in Latest IT trends.**

| SEMESTER I | COURSE CODE: 18PIT12 | | | | | COURSE TITLE :INTRODUCTION TO INFORMATION TECHNOLOGY | | | | | HOURS:5 | CREDITS:4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COURSE OUTCOMES | PROGRAMME OUTCOMES(PO) | | | | | PROGRAMME SPECIFIC OUTCOMES(PSO) | | | | | MEAN SCORE OF CO'S | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | |
| CO1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4.70 | |
| CO2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| Mean Overall Score | | | | | | | | | | | 4.1 | |

**Result: The score of this course is 4.1 (Very High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Interval | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| Rating | Very Poor | Poor | Moderate | High | Very High |

This Course is having **VERY HIGH** association with Programme Outcomes and Programme Specific Outcomes.

**UNIT – I** [15 Hrs]

**Introduction to Computers:** Computer system concepts - characteristics of computer-generations and types of computer - components of computer system - Booting process-classification of digital computer system - organization of computers - Input and Output devices - Storage devices.

**UNIT – II** [15 Hrs]

**Computer Software:** System software - application software – firmware. **Programming languages classification:** machine language - assembly language and high-level language. **Evolution of programming languages:** first generation - second generation - third generation and fourth generation languages. **Language translator:** Compiler - Interpreter and Assembler. **Operating System:** Definition – Job - Objective and evolution of operating system - Types of operating systems.

**UNIT - III** [15 Hrs]

**Network Communication:** Definition – Criteria - advantages and limitations of computer networking - Communication process - Communication types - Types of computer network - Network topology - LAN and other network related protocols - OSI model - TCP/IP model - Networking Components.

**UNIT - IV** [15 Hrs]

**Network Applications:** Introduction about Internet - Internet basics - Internet protocols - Internet addressing - Browser –WWW - E-mail – telnet – ftp – application - benefits and limitation of internet - electronic conferencing -  teleconferencing.

**UNIT – V** [15 Hrs]

**Latest IT Trends:** E-Commerce - M-Commerce - Artificial Intelligence - Computational Intelligence - Geographic Information System (GIS) - Data Mining. **Role of IT in different Areas** : Education, Industry, Banking, Marketing, Public Services and others.

**TEXT BOOK:**

1.   V. Rajaraman, Computer Fundamentals, PHI.

**REFERENCE BOOKS:**

1. Dennis P. Curtin, Kim foley, KunalSen and Cathleen Morin, Information Technology - The Breaking Wave,  Tata-McGraw Hill Publications, 2005.
2. Leon and Leon, Fundamentals of IT,  Leon Tec World.
3. Alexis Lean and Mathews Leon, Fundamentals of Information Technology,  Vikas Publication House, Delhi.
4. Cyganski, Information Technology - inside and outside, Pearson Publication.
5. ITL ESL , Introduction to computer Science, Pearson Education.

| YEAR – I | WEB TECHNOLOGIES | PIT13 |
|---|---|---|
| SEMESTER - I | | HRS/WK - 5 |
| CORE - 3 | | CREDIT - 4 |

**Objective:**

To inculcate knowledge of web technological concepts and functioning of Internet.

**Course Outcomes(CO's):**
**At the end of the Course the students should be able to exhibit**

**CO1: Knowledge pertaining to HTML Fundamentals**
**CO2: Designing capabilities using CSS**
**CO3: Modular Programming using Scripts.**
**CO4: Web Site Development using ASP.Net.**
**CO5: Web Site Development with database support using ADO.Net.**

| SEMESTER I | COURSE CODE: PIT13 | | | | | COURSE TITLE : WEB TECHNOLOGIES | | | | | HOURS:5 | CREDITS:4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COURSE OUTCOMES | PROGRAMME OUTCOMES(PO) | | | | | PROGRAMME SPECIFIC OUTCOMES(PSO) | | | | | MEAN SCORE OF CO'S | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | |
| CO1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| CO2 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| CO3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4.5 | |
| CO4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4.5 | |
| CO5 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4.5 | |
| Mean Overall Score | | | | | | | | | | | 4.7 | |

**Result: The score of this course is 4.7 (Very High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Interval | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| Rating | Very Poor | Poor | Moderate | High | Very High |

This Course is having **VERY HIGH** association with Programme Outcomes and Programme Specific Outcomes.

## UNIT - I

**[15 Hrs]**

**Introduction to HTML:** What is HTML -HTML Documents - Basic structure of an HTML document -Creating an HTML document -Mark up Tags -Heading-Paragraphs - Line Breaks - Working with Text - Working with Lists, Tables and Frames -Working with Hyperlinks, Images and Multimedia -Working with Forms and controls.

## UNIT - II

**[15 Hrs]**

**CSS**: Introduction to CSS-CSS properties: Controlling text- text formatting- text pseudo code classes- selectors, links: background- lists- tables- outlines- positioning and layout with CSS, design issues: typography - navigation- tables – forms.

## UNIT – III

**[15 Hrs]**

**Java Script**: Java script basics- Placement of Java script file -Variables-Data Types-Operators-Control flow, Loops-Functions-Document Object Model (DOM)-Form validations.

## UNIT – IV

**[15 Hrs]**

ASP.NET: Introduction-Basic controls: Button-Text boxes - Check boxes and Radio Buttons-List-Hyperlink-Image-Validation controls-Master Page-Navigation controls-AdRotator control.

## UNIT – V                                                                 **[15 Hrs]**

**ADO.NET:** Architecture of ADO.NET-Connection Class-Command Class-Data Reader class. Working with Grid Control-Working with Crystal Report Viewer control.

**TEXT BOOKS:**

1. Jon Duckett, Beginning HTML, XHTML, CSS and JavaScript, Wiley Publishing Inc.
2. Harvey M. Deitel, Paul J. Deitel, C# Programmers, Second Edition, Pearson Education.

**REFERENCE BOOKS:**

1. E. Balaguruswamy, Programming with C#, Second Edition,Tata McGraw Hill Publications.
2. Laura Lemay, Rafe Colburn, Jennifer Kyrnin, Mastering HTML, CSS & Javascript, Web Publishing.
3. Matthew Macdonald, ASP.NET: The Complete Reference Paperback.

| YEAR – I | OBJECT ORIENTED PROGRAMMING USING JAVA | 18PIT21 |
|---|---|---|
| SEMESTER - II | | HRS/WK – 5 |
| CORE - 4 | | CREDIT – 4 |

**Objective:**

To Impart sound knowledge in Object Oriented Programming using JAVA.

**Course Outcomes (CO's):**
At the end of the Course the students should possess

CO1: Proficiency in Classes & Objects in Java.
CO2: Proficiency in Packages, Interfaces and Threads.
CO3: Knowledge pertaining to AWT.
CO4: Application developing skills using RMI.
CO5: Application developing skills using Servlets.

| SEMESTER II | COURSE CODE:18PIT21 | | | | | COURSE TITLE :OBJECT ORIENTED PROGRAMMING USING JAVA | | | | | HOURS:5 | CREDITS:4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COURSE OUTCOMES | PROGRAMME OUTCOMES(PO) | | | | | PROGRAMME SPECIFIC OUTCOMES(PSO) | | | | | MEAN SCORE OF CO'S | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | |
| CO1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| CO2 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| CO3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4.5 | |
| CO4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4.5 | |
| CO5 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4.5 | |
| Mean Overall Score | | | | | | | | | | | 4.7 | |

**Result: The score of this course is 4.7 (Very High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Interval | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| Rating | Very Poor | Poor | Moderate | High | Very High |

This Course is having **VERY HIGH** association with Programme Outcomes and Programme Specific Outcomes.

**UNIT - I** [15 Hrs]

**Introduction to Classes & Objects in Java:** Introduction to Java - Features of Java – Data types – Classes and Objects – Constructors – String Class - Using Super - Abstract class.

**UNIT - II** [15 Hrs]

**Packages, Interfaces and Threads:** Creating Packages – Importing Packages – Interfaces - Defining an Interface, Implementing Interfaces - Exception Handling (Try, Catch, Throw and Throws) –Thread – Multithreading.

**UNIT – III** [15 Hrs]

**Working with Windows using AWT Classes :AWT:** AWT Hierarchy (Components & Containers) – AWT Controls (Label, TextField, TextArea, CheckBox, Button) – Layouts - Sample Program using AWT Controls. **Applets:** Introduction to Applets – Life Cycle of Applets – Sample program using Applets.

**UNIT – IV** [15 Hrs]

**Networks &RMI :**Networks basics - Socket Programming - Proxy Servers - TCP/IP Sockets - INet Address - URL - Datagrams – Architecture of RMI – An example program using RMI.

**UNIT – V** [15 Hrs]

**Database & Java Servlets:**JDBC Overview – JDBC Drivers – Connection Class – Command Class – ResultSet Class. Servlet: Servlet Overview – Servlet Terminology – Servlet API – HTTP Servlet Class – Servlet Life cycle – Session Tracking in Servlets (Cookies, Hidden Form Field, URL Rewriting-HTTP Session) - Create a Servlet in NetBeans.

**TEXT BOOK :**

1.  H. Schildt, Java2 (The Complete Reference), Fourth Edition, TMH 1999.

**REFERENCE BOOKS :**

1. Wesley, K. Arnold and J. Gosling, The Java Programming Language, Third Edition, Addison–Wesley, 2000.
2. H. M. Dietel and P. J. Dietel, Java: How to Program, Pearson Education/PHI, Sixth Edition.
3. Iver Horton, Beginning in Java 2, Wrox Publications.
4. Naughton and H. Schildt, Java2 (The Complete Reference), Third Edition, 1999, Tata McGraw-Hill.
5. K. Moss, Java Servlets, Tata McGraw-Hill, 1999.
6. C. S. Horstmann, Gary Cornell, Core Java 2 Vol. I Fundamentals, Pearson Education.
7. C. S. Horstman, Gary Cornell, Core Java 2 Vol. I and Vol. II – 7th Edition. PHI, 2000.
8. D.R. Callaway, Inside Servlets, 1999, Pearson Education, Delhi.

| YEAR – I | RELATIONAL DATABASE MANAGEMENT SYSTEM | 18PIT22 |
|---|---|---|
| SEMESTER - II | | HRS/WK – 5 |
| CORE - 5 | | CREDIT – 4 |

**Objective:**

To enable the students to learn the various concepts in Relational Database Management system and to impart knowledge on SQL and PL/SQL statements.

**Course Outcomes (CO's):**
At the end of the Course the students should possess

**CO1: Proficiency in SQL Basics.**
**CO2: Proficiency in Advanced SQL Concepts.**
**CO3: Knowledge pertaining to SQL Loader.**
**CO4: Application developing skills using PL/SQL.**
**CO5: Application developing skills using Cursors and Triggers.**

| SEMESTER II | COURSE CODE:18PIT22 | | | | | COURSE TITLE :RELATIONAL DATABASE MANAGEMENT SYSTEM | | | | | HOURS:5 | CREDITS:4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COURSE OUTCOMES | PROGRAMME OUTCOMES(PO) | | | | | PROGRAMME SPECIFIC OUTCOMES(PSO) | | | | | MEAN SCORE OF CO'S | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | |
| CO1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| CO2 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4.5 | |
| CO3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4.5 | |
| CO4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4.5 | |
| CO5 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4.5 | |
| Mean Overall Score | | | | | | | | | | | 4.6 | |

**Result: The score of this course is 4.6 (Very High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Interval | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| Rating | Very Poor | Poor | Moderate | High | Very High |

This Course is having **VERY HIGH** association with Programme Outcomes and Programme Specific Outcomes.

**UNIT - I**                                                                                        **[15 Hrs]**
**SQL   Basics:** Introduction to RDBMS – **Normalization:** First Normal form-Second Normal form-Third Normal form-Creating a Table-Integrity Constraints- Creating, Modifying and Dropping -Select, from, where and Order by-Logic and Value: Single value tests-LIKE-NULL and NOT NULL-Simple tests against a list of values-Combining logic-Dropping tables-Altering a table: Adding or modifying a column-Changing Data: insert-multiple inserts-update-merge-delete-rollback-commit and Save point.

**UNIT - II**                                                                                       **[15 Hrs]**
**SQL   Concepts:** Data types-String functions-Single value functions-Aggregate functions-List functions-Findings Rows with MAX or MIN-Date functions-Conversion functions-Creating a view- Stability of a view-Order by views-Creating a read only view -Grouping Things Together: The use of group by and having-views of Groups-Sub queries-Advanced Sub queries-Outer joins-Natural and inner joins-Union, Intersect, and minus.

**UNIT - III**                                                                                      **[15 Hrs]**
**Advanced SQL Concepts**: Decode and Case: if, then, else-Decode and Case-Creating a table from a table-Using Partitioned Tables: Creating a Partitioned Table-Creating Sub partitions-Indexes-Clusters-Sequences.
**Users, Roles and Privileges**: Creating a user-Password Management-Standard Roles-Format for grant command-Revoking privileges-What users can Grant: Moving to another user –Create synonym-Create a role-Granting privileges to a role-Granting a role to another role-Adding password to a role-Removing password from a role –Enabling & Disabling roles-Revoking privileges from a role-Drop a role.

**UNIT - IV**                                                                                       **[15 Hrs]**
**Using SQL*Loader to load data**: The Control file-Loading Variable length data-Starting the load-Syntax-Managing the data loads-Tuning Data loads-Using External Tables: Access an external data-External table: Creation-Limitation-Benefits.
**Object–Relational Databases:** Implementing Types-Object Views- Methods-Collectors (Nested Tables and Varying Arrays)-Using Large Objects-Advanced Object –Oriented Concepts.

**UNIT - V**                                                                                        **[15 Hrs]**
**Introduction to PL/SQL:** Declarations section-Executable commands section-Exception handling section-Cursor Management-Procedures, Functions & Packages-Triggers: Syntax-Types of Triggers: Row level- Statement level-before & after-Instead of Schema-Database level triggers-Enabling & Disabling triggers.

**TEXT BOOK:**
1.   Kevin Lonely, ORACLE DATABASE 10g - The Complete Reference, Tata McGraw-Hill Publishing Company Ltd 2004.
**REFERENCE BOOKS:**
1. Michael Abhey, Mike Corey and Ian Abramson, Oracle 9i- A Beginner's Guide, Tata McGraw Hill Publishing Company Ltd.
2. Seyed M.M. (Saied) Tahaghoghi, Hugh Williams, Learning MySQL, O'Reilly Media.

| YEAR – I | CLOUD COMPUTING | 18EPIT24 |
|---|---|---|
| SEMESTER - II | | HRS/WK – 5 |
| ELECTIVE - II(1) | | CREDIT – 5 |

**Objective:**

To understand the concepts of cloud computing and to make the students to get in touch with the services provided by cloud computing.

**Course Outcomes (CO's):**

At the end of the Course the students should possess

**CO1: Proficiency in basics of Cloud Computing.**
**CO2: Proficiency in Developing Cloud Services.**
**CO3: Knowledge pertaining to Cloud Computing.**
**CO4: Application developing skills using Cloud Services.**
**CO5:Proficiency in Cloud Security and Challenges.**

| SEMESTER II | COURSE CODE:18EPIT24 | | | | | COURSE TITLE :CLOUD COMPUTING | | | | | HOURS:5 | CREDITS:5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COURSE OUTCOMES | PROGRAMME OUTCOMES(PO) | | | | | PROGRAMME SPECIFIC OUTCOMES(PSO) | | | | | MEAN SCORE OF CO'S | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | |
| CO1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| CO4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| CO5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| Mean Overall Score | | | | | | | | | | | 3.4 | |

**Result: The score of this course is 3.4 (High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Interval | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| Rating | Very Poor | Poor | Moderate | High | Very High |

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

**UNIT - I** [15 Hrs]
**Introduction to Cloud Computing :**Cloud Computing: Definition, Cloud Architecture, Cloud Storage, Advantages and Disadvantages of Cloud Computing, Companies in the Cloud Today, Cloud Services, **Cloud Types:** The NIST Model, The Cloud Cube Model, Deployment Models, Service Models Cloud **Computing, Service Models:** Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS).

**UNIT - II** [15 Hrs]
**Developing Cloud Services :**Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds.

**UNIT - III** [15 Hrs]
**Cloud Computing for Everyone :**Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation.

**UNIT - IV** [15 Hrs]
**Using Cloud Services :**Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files.
**UNIT - V** [15 Hrs]
**Cloud Security and Challenges : Cloud computing security architecture:** Architectural Considerations- General Issues, Trusted Cloudcomputing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control Identity management, Access control, Autonomic Security **Cloudcomputing security challenges:** Virtualization security management virtual threats, VM SecurityRecommendations, VM--Specific Security techniques, Secure Execution Environments and Communications in cloud.
**TEXT BOOKS:**

1. Barrie Sosinsky, Cloud Computing Bible, Wiley India publications.
2. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Pearson Publications.

**REFERENCE BOOKS:**

1. Kailash Jayaswal, Cloud Computing Black Book, Dream tech Press.
2. Thomas Erl, Ricardo Puttini, Zaigham Mahmood, Cloud Computing: Concepts, Technology, and Architecture, Pearson Education India.
3. Dinakar Sitaram, Moving to The Cloud, Elsevier, 2014.
4. Danc. Marinercus, Cloud Computing Theory And Practice, Elsevier, 2013.
5. Judith Hurwitz, Robin Bloor, Marcia Kaufman, and Dr. Fern Halper, Cloud Computing for Dummies, Wiley Publishing, 2010.

| YEAR – II | BIG DATA ANALYTICS | 18EPIT24A |
|---|---|---|
| SEMESTER - II | | HRS/WK – 5 |
| ELECTIVE - II(2) | | CREDIT – 5 |

**Objective:**

To impart knowledge about Big Data Analytics and Hadoop.

**Course Outcomes (CO's):**
**At the end of the Course the students should possess**

**CO1: Proficiency in basics of Big Data.**
**CO2: Proficiency in basics of Hadoop.**
**CO3: Knowledge pertaining to Hadoop architecture.**
**CO4: Proficiency in Hadoop Ecosystem and Yarn**
**CO5: Proficiency in Hive and HiveQL, HBASE.**

| SEMESTER II | COURSE CODE:18EPIT24A | | | | | COURSE TITLE :BIG DATA ANALYTICS | | | | | HOURS:5 | CREDITS:5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COURSE OUTCOMES** | **PROGRAMME OUTCOMES(PO)** | | | | | **PROGRAMME SPECIFIC OUTCOMES(PSO)** | | | | | **MEAN SCORE OF CO'S** | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | |
| CO1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| CO4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| **Mean Overall Score** | | | | | | | | | | | 3.4 | |

**Result: The score of this course is 3.4 (High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| **Scale** | 1 | 2 | 3 | 4 | 5 |
| **Interval** | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| **Rating** | Very Poor | Poor | Moderate | High | Very High |

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

**UNIT - I** [15 Hrs]

**INTRODUCTION TO BIG DATA:** Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

**UNIT - II** [15 Hrs]

**INTRODUCTION HADOOP :**Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

**UNIT - III** [15 Hrs]

**HADOOP ARCHITECTURE :** Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

**UNIT - IV** [15 Hrs]

**HADOOP ECOSYSTEM AND YARN :** Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New FeaturesNameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.

**UNIT - V** [15 Hrs]

**HIVE AND HIVEQL, HBASE :** Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries, HBase conceptsAdvanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

**TEXT BOOK:**

1.   Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, Professional Hadoop Solutions, Wiley, 2015.

**REFERENCE BOOKS:**

1. Chris Eaton, Dirk deroos et al. , Understanding Big data, McGraw Hill, 2012.
2. Tom White, HADOOP: The definitive Guide, O Reilly 2012. 6 IT2015 SRM(E&T) .
3. Vignesh Prajapati, Big Data Analytics with R and Haoop, Packet Publishing 2013.
4. Tom Plunkett, Brian Macdonald et al, Oracle Big Data Handbook, Oracle Press, 2014.
5. http://www.bigdatauniversity.com
6. Jy Liebowitz, Big Data and Business Analytics,CRC press, 2013.

| YEAR – II | | EPIT24B |
|---|---|---|
| SEMESTER - II | **DATA MINING** | HRS/WK – 5 |
| ELECTIVE - II(3) | | CREDIT – 5 |

**Objective:**

To enable the students to understand the importance of Data Mining and its techniques with recent trends and tools.

**Course Outcomes (CO's):**

**At the end of the Course the students should possess**

**CO1: To understand about the basics of Data Mining**

**CO2: To understand about the methods of Data Warehousing**

**CO3: To understand about the techniques of Data Mining**

**CO4: To understand about the importance of Cluster and outlier detection**

**CO5: To improve the student's knowledge with recent trends and tools**

| SEMESTER III | COURSE CODE: EPIT24B | | | | | COURSE TITLE :DATA MINING | | | | | HOURS:5 | CREDITS:5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COURSE OUTCOMES** | **PROGRAMME OUTCOMES(PO)** | | | | | **PROGRAMME SPECIFIC OUTCOMES(PSO)** | | | | | **MEAN SCORE OF CO'S** | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | |
| CO1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| **Mean Overall Score** | | | | | | | | | | | 4.2 | |

**Result: The score of this course is 4.2 (Very High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| **Scale** | 1 | 2 | 3 | 4 | 5 |
| **Interval** | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| **Rating** | Very Poor | Poor | Moderate | High | Very High |

This Course is having **VERY HIGH** association with Programme Outcomes and Programme Specific Outcomes.

## UNIT - I [15 Hrs]

**DATA MINING BASICS :**What is Data Mining– Kinds of Data – Kinds of patterns – Technologies used for Data Mining– Major Issues in Data Mining– Data –Data Objects and Attribute types– Data Visualization– Measuring Data Similarity and Dissimilarity–Data Preprocessing– overview– Data Cleaning– Data Integration– Data Reduction– Data Transformation and Data Discretization.

## UNIT - II [15 Hrs]

**DATA WAREHOUSING AND ONLINE ANALYTICAL PROCESSING** : Data Warehouse– Basic concepts–Data Warehouse Modelling: Data Cube and OLAP– Data Warehouse Design and Usage– Data Warehouse Implementation– Data Generalization by Attribute–Oriented Induction– Data Cube Technology– Data Cube Computation Methods– Exploring Cube Technology–Multidimensional Data Analysis in cube space.

## UNIT – III [15 Hrs]

**PATTERNS AND CLASSIFICATION :**Patterns– Basic concepts– Pattern Evaluation Methods–Pattern Mining: Pattern Mining in Multilevel– Multidimensional space–Constraint– Based Frequent Pattern Mining– Mining High Dimensional Data and Colossal patterns– Mining compressed or Approximate patterns– Pattern Exploration and Application. Classification– Decision tree Induction– Bayes Classification methods– Rule based Classification– Model Evaluation and selection– Techniques to Improve Classification Accuracy– Other Classification methods.

## UNIT – IV [15 Hrs]

**CLUSTERING AND OUTLIER DETECTION :**Cluster Analysis– Partitioning Methods – Hierarchical Methods – Density – Based Methods– Grid – Based Methods – Evaluation of Clustering.– Clustering High – Dimensional Data–Clustering Graph and Network Data – Clustering with Constraints – Web Mining – Spatial Mining. Outlier Detection – Outliers and Outliers Analysis – Outlier Detection Methods–Outlier Approaches – Statistical – Proximity– Based – Clustering–Based– Classification Based – High–Dimensional Data.

## UNIT – V [15 Hrs]

**RECENT TRENDS IN DATA MINING AND TOOLS :**Other Methodologies of Data Mining – Data Mining Applications – Data Mining Trends – Recent Data Mining Tools – Rapidminer – Orange – Weka–Knime–Sisense –Ssdt (SQL Server Data Tools) – Oracle – Rattle – Data melt – Apache Mahout.

**TEXT BOOKS:**

1. "Data Warehousing Fundamentals", PaulrajPonnaiah, Wiley Publishers, 2001.
2. "Data Mining: Concepts and Techniques", Jiawei Han, MichelineKamber, Morgan Kaufman Publishers, 2006.
3. "Introduction to Data mining with case studies", G.K. Gupta, PHI Private limited, New Delhi, 2008. 2nd Edition, PHI, 2011

**REFERENCE BOOKS:**

1. "Advances in Knowledge Discover and Data Mining", Usama M. Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth RamasamyUthurusamy, the M.I.T. Press, 2007.
2. "The Data Warehouse Toolkit", Ralph Kimball, Margy Ross, John Wiley and Sons Inc., 2002
3. "Building Data Mining Applications for CRM", Alex Berson, Stephen Smith, Kurt Thearling, Tata McGraw Hill, 2000.
4. "Data Mining: Introductory and Advanced Topics", Margaret Dunham, Prentice Hall, 2002.
5. "Discovering Knowledge in Data: An Introduction to Data Mining", Daniel T. Larose John Wiley & Sons, Hoboken, New Jersey, 2004

| YEAR – II | INTERNET OF THINGS | 19EPIT33 |
|---|---|---|
| SEMESTER - III | | HRS/WK – 5 |
| ELECTIVE - III(1) | | CREDIT – 5 |

**Objective:**

To make the students get acquainted with Internet of things.

**Course Outcomes (CO's):**
   **At the end of the Course the students should possess**

   **CO1: Knowledge pertaining to Basics of IoT**
   **CO2: Proficiency in IoT Market Perspectives.**
   **CO3: Proficiency in IoT Technology Fundamentals.**
   **CO4:Proficiency in IoT State of the Art Architecture.**
   **CO5: Knowledge pertaining to Commercial building automation in the future.**

| SEMESTER III | COURSE CODE:19EPIT33 | | | | | COURSE TITLE :INTERNET OF THINGS | | | | | HOURS:5 | CREDITS:5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COURSE OUTCOMES** | **PROGRAMME OUTCOMES(PO)** | | | | | **PROGRAMME SPECIFIC OUTCOMES(PSO)** | | | | | **MEAN SCORE OF CO'S** | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | |
| CO1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| CO5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| **Mean Overall Score** | | | | | | | | | | | 4.2 | |

**Result: The score of this course is 4.2(Very High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Interval | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| Rating | Very Poor | Poor | Moderate | High | Very High |

This Course is having **VERY HIGH** association with Programme Outcomes and Programme Specific Outcomes.

**Unit-I** [15 Hrs]

Basics of IoT – Overview – IoT – Key Features –IoT – Advantages – IoT – Disadvantages-Application of IoT.

**Unit-II** [15 Hrs]

IoT Hardware –IoT Sensors-Wearable Electronics – Standard Devices – IoT Software-IoT Technology and Protocols.

**Unit-III** [15 Hrs]

IoT Security  - IoT -Identity Protection- IoT Liability - IoT Common uses - IoT − Media, Marketing & Advertising – IoT − Environmental Monitoring.

**Unit-IV** [15 Hrs]

IoT Applications – Manufacturing Applications –IoT – Energy Applications – IoT −  Healthcare Applications  - IoT – Building / Housing Applications – IoT  Transportation Applications – IoT − Education Applications - IoT − Government Applications.

**Unit-V** [15 Hrs]

Python and Iot-Working with Python on Intel Galileo Gen 2.- Interacting with Digital Outputs with Python .- Retrieving Data from the Real World with Sensors.

**TEXT BOOK:**

1.   Internet of Things with Python, Gaston C. Hillar, Electronic bo,2019

**REFERENCE BOOKS:**

1. Vijay Madisetti and Arshdeep Bahga, Internet of Things (A Hands-on Approach), First Edition, VPT, 2014.
2. Francis daCosta, Rethinking the Internet of Things: A Scalable Approach to Connecting Everything, First Edition, Apress Publications, 2013.

| YEAR – II | ETHICAL HACKING | 18EPIT33A |
|---|---|---|
| SEMESTER - III | | HRS/WK – 5 |
| ELECTIVE-III(2) | | CREDIT – 5 |

**Objective:**
To make the students understand the basic principles, instrumentation and applications of Ethical Hacking.

**Course Outcomes (CO's):**
   **At the end of the Course the students should possess**

   **CO1: Knowledge pertaining to Basics of Information Security.**
   **CO2: Proficiencyin Hacking.**
   **CO3: Proficiency in Attacks in Information Highway.**
   **CO4:Proficiency in Security Defenses in Information Highway.**
   **CO5: Knowledge pertaining to Ethical Hacking.**

| SEMESTER III | COURSE CODE:18EPIT33A | | | | | COURSE TITLE :ETHICAL HACKING | | | | | HOURS:5 | CREDITS:5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COURSE OUTCOMES | PROGRAMME OUTCOMES(PO) | | | | | PROGRAMME SPECIFIC OUTCOMES(PSO) | | | | | MEAN SCORE OF CO'S | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | |
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| CO2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| CO4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| CO5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| Mean Overall Score | | | | | | | | | | | 3.2 | |

**Result: The score of this course is 3.2 (High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Interval | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| Rating | Very Poor | Poor | Moderate | High | Very High |

This Course is having**HIGH** association with Programme Outcomes and Programme Specific Outcomes.

**UNIT - I**                                                                    **[15 Hrs]**
**Introduction:** Data Theft in Organizations, Elements of Information Security, Authenticity and Non Repudiation, Security Challenges, Effects of Hacking, Hacker – Types of Hacker, Ethical Hacker, Hacktivism - Role of Security and Penetration Tester, Penetration Testing Methodology, Networking & Computer Attacks – Malicious Software (Malware), Protection Against Malware, Intruder Attacks on Networks and Computers, Addressing Physical Security – Key Loggers and Back Doors.

**UNIT - II**                                                                   **[15 Hrs]**
**Hacking:** Web Tools for Foot Printing, Conducting Competitive Intelligence, Google Hacking, Scanning, Enumeration, Trojans & Backdoors, Virus & Worms, Proxy & Packet Filtering, Denial of Service, Sniffer, Social Engineering – shoulder surfing, Dumpster Diving, Piggybacking.

**UNIT - III**                                                                  **[15 Hrs]**
**Attacks:** Physical Security – Attacks and Protection, Steganography – Methods, Attacks and Measures, Cryptography – Methods and Types of Attacks, Wireless Hacking, Windows Hacking, Linux Cryptography – Methods and Types of Attacks, Wireless Hacking, Windows Hacking, Linux Hacking

**UNIT - IV**                                                                   **[15 Hrs]**
**Security Defenses:** Routers, Firewall & Honeypots, IDS & IPS, Web Filtering, Vulnerability, Penetration Testing, Session Hijacking, Web Server, SQL Injection, Buffer Overflow, Reverse Engineering, Email Hacking, Incident Handling & Response, Bluetooth Hacking, Mobile Phone Hacking .

**UNIT - V**                                                                    **[15 Hrs]**
**Ethical Hacking - Terminologies:** Social Engineering, Host Reconnaissance, Session Hijacking, Hacking - Web Server, Database, Password Cracking, Network and Wireless, Trojan, Backdoor, UNIX, LINUX, Microsoft, Buffer Overflow, Denial of Service Attack.

**TEXT BOOK:**

1.   Patrick Engebretson, The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy, Syngress Basics Series–Elsevier, 2011.

**REFERENCE BOOKS:**

1. Michael T. Simpson, Kent Backman, James E. Corley, Hands On Ethical Hacking and Network Defense, Second Edition, CENGAGE Learning, 2010.
2. Abraham K. White, The Underground Guide to Computer Hacking, Including Wireless Networks, Security, Windows, Kali Linux and Penetration Testing, CreateSpace Independent Publishing Platform.

| YEAR – II | DIGITAL IMAGE PROCESSING | 18EPIT33B |
|---|---|---|
| SEMESTER - III | | HRS/WK – 5 |
| ELECTIVE-III(3) | | CREDIT – 5 |

**Objective:**

This course enables the student knowledge about various image processing concepts like enhancement, restoration, segmentation, compression and recognition.

**Course Outcomes (CO's):**

    **At the end of the Course the students should be able to develop**

    **CO1: To know the basics of Digital image and techniques.**
    **CO2: To understand various Image enhancement ideas.**
    **CO3: To understand Image restoration techniques.**
    **CO4: To understand degrees of image resolution and compression methods.**
    **CO5: To understand concepts of image representation and recognition.**

| SEMESTER III | COURSE CODE: 18EPIT33B | | | | | COURSE TITLE :DIGITAL IMAGE PROCESSING | | | | | HOURS:5 | CREDITS:5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COURSE OUTCOMES** | **PROGRAMME OUTCOMES(PO)** | | | | | **PROGRAMME SPECIFIC OUTCOMES(PSO)** | | | | | **MEAN SCORE OF CO'S** | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | |
| CO1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| CO2 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| CO3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4.5 | |
| CO4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4.5 | |
| CO5 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4.5 | |
| **Mean Overall Score** | | | | | | | | | | | 4.7 | |

                    **Result: The score of this course is 4.7(Very High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Interval | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| Rating | Very Poor | Poor | Moderate | High | Very High |

This Course is having **VERY HIGH** association with Programme Outcomes and Programme Specific Outcomes.

**UNIT – I**                                                          **[15 Hrs]**
**FUNDAMENTALS :**Introduction – Origin – Steps in Digital Image Processing – Components – Applications of DIP – Elements of Visual Perception – Light and Electro Magnetic Spectrum – Image Sensing and Acquisition – Image Sampling and Quantization – Images in Matlab– Pixels – Color models – Digital Image Processing in Multimedia.

**UNIT – II**                                                         **[15 Hrs]**
**IMAGE ENHANCEMENT :** Spatial Domain – Gray level transformations – Histogram Quantization – Histogram matching and processing – Basics of Spatial Filtering – Smoothing and Sharpening Spatial Filtering – Introduction to Fourier Series – Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal – Butterworth and Gaussian filters.

**UNIT – III**                                                        **[15 Hrs]**
**IMAGE RESTORATION AND SEGMENTATION :**Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering Segmentation: Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation– Active Contour Models – Snakes – Fuzzy Connectivity – Morphological processing– erosion and dilation.

**UNIT – IV**                                                         **[15 Hrs]**
**WAVELETS AND IMAGE COMPRESSION :**Wavelets – Subband coding – Multi resolution expansions – Compression: Fundamentals – Image Compression models – Error Free Compression – Predictive Compression Methods – Vector Quantization – Variable Length Coding – Bit–Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards

**UNIT – V**                                                          **[15 Hrs]**
**IMAGE REPRESENTATION AND RECOGNITION** : Knowledge Representation – Statistical Pattern Recognition – Neural Nets – Fuzzy Systems – Chain Code – Polygonal approximation, signature, boundary segments – Shape number – Fourier Descriptor moments – Regional Descriptors – Topological feature, Texture – Patterns and Pattern classes – Recognition based on matching.

**TEXT BOOKS:**

1. "Digital Image Processing," Rafael C. Gonzalez, Richard E.Woods, Prentice Hall, Third Edition, 2008.
2. "Digital Image Processing and Computer Vision," Sonka, Hlavac, Boyle, Cengage Learning, 2009
3. "Fundamentals of Digital Image Processing", Anil Jain K, PHI Learning Pvt. Ltd., 2011.

**REFERENCE BOOKS:**

1. "Digital Image Processing", S. Sridhar, Oxford University Press; Second edition, 2016.
2. "Digital Image Processing", Gonzalez &woods, Pearson Education India, 2016.

| YEAR – II | DISTRIBUTED OPERATING SYSTEMS | 18EPIT34 |
|---|---|---|
| SEMESTER - III | | HRS/WK – 5 |
| ELECTIVE – IV(1) | | CREDIT – 5 |

**Objective:**
To make the students get acquainted with fundamental principles of distributed operating systems.

**Course Outcomes (CO's):**
    **At the end of the Course the students should possess**

    **CO1: Knowledge pertaining to Basics of Distributed Systems.**
    **CO2: Proficiency in Inter-Process Communication.**
    **CO3: Proficiency in Synchronization in Distributed Systems.**
    **CO4:Proficiency in Processor allocation and Real Time Systems.**
    **CO5: Knowledge pertaining to File system and Shared memory.**

| SEMESTER III | COURSE CODE:18EPIT34 | | | | | COURSE TITLE :DISTRIBUTED OPERATING SYSTEMS | | | | | HOURS:5 | CREDITS:5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COURSE OUTCOMES** | **PROGRAMME OUTCOMES(PO)** | | | | | **PROGRAMME SPECIFIC OUTCOMES(PSO)** | | | | | **MEAN SCORE OF CO'S** | |
| | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PSO1** | **PSO2** | **PSO3** | **PSO4** | **PSO5** | | |
| **CO1** | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2.90 | |
| **CO2** | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2.90 | |
| **CO3** | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3.10 | |
| **CO4** | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2.90 | |
| **CO5** | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 3.80 | |
| **Mean Overall Score** | | | | | | | | | | | 3.1 | |

        **Result: The score of this course is 3.1(High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| **Scale** | 1 | 2 | 3 | 4 | 5 |
| **Interval** | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| **Rating** | Very Poor | Poor | Moderate | High | Very High |

This Course is having**HIGH** association with Programme Outcomes and Programme Specific Outcomes.

**UNIT - I** [15 Hrs]

**Introduction:** Introduction to Distributed Systems, What is a Distributed System?, Hard ware concepts, Software concepts, Design issues.

**UNIT - II** [15 Hrs]

**Inter-Process Communication:** Communication in Distributed Systems, Lay red Protocols, ATM networks, The Client – server model, Remote Procedure call, Group communication.

**UNIT - III** [15 Hrs]

**Synchronization :** Synchronization in Distributed System, Clock Synchronization, Mutual Exclusion, Election algorithms, Atomic transactions, Deadlocks in Distributed Systems.

**UNIT - IV** [15 Hrs]

**Processor allocation and Real Time Systems:** Process and processors in Distributed System threads, System Models, Processors allocation, Scheduling in Distributed System, Fault tolerance, Real time Distributed System.

**UNIT - V** [15 Hrs]

**File system and Shared memory:** Distributed File Systems, Distributed File System Design, Distributed File System implementation, Trends in Distributed File System. Distributed Shared Memory.

**TEXT BOOK:**

1. Andrew S. Tanenbanm, Distributed Operating Systems, Prentice Hall.

**REFERENCE BOOKS:**

1. Mukesh Singhal, Niranjan Shivaratri, Advanced Concepts in Operating Systems, McGraw Hill Education.
2. Pradeep K. Sinha, Distributed Operating Systems: Concepts and Design, Wiley-IEEE Press.

| YEAR - II | ARTIFICIAL INTELLIGENCE | 18EPIT34A |
|---|---|---|
| SEMESTER -III | | HRS/WK - 5 |
| ELECTIVE – IV(2) | | CREDIT - 5 |

**Objective:**
To Study the concepts of Artificial Intelligence and methods of solving problems using Artificial Intelligence.

**Course Outcomes (CO's):**
    **At the end of the Course the students should possess**

    **CO1: Knowledge pertaining to Basics of Artificial Intelligence.**
    **CO2: Proficiency in Heuristic Search Techniques.**
    **CO3: Proficiency in Using Predicate logic.**
    **CO4:Proficiency in Natural Language Processing.**
    **CO5: Knowledge pertaining to Perception and Action.**

| SEMESTER III | COURSE CODE:18EPIT34A | | | | | COURSE TITLE :ARTIFICIAL INTELLIGENCE | | | | | HOURS:5 | CREDITS:5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COURSE OUTCOMES** | **PROGRAMME OUTCOMES(PO)** | | | | | **PROGRAMME SPECIFIC OUTCOMES(PSO)** | | | | | **MEAN SCORE OF CO'S** | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | |
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2.90 | |
| CO2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2.90 | |
| CO3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3.10 | |
| CO4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2.90 | |
| CO5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 3.80 | |
| **Mean Overall Score** | | | | | | | | | | | 3.1 | |

**Result: The score of this course is 3.1 (High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Interval | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| Rating | Very Poor | Poor | Moderate | High | Very High |

This Course is having**HIGH** association with Programme Outcomes and Programme Specific Outcomes

**UNIT - I** [15 Hrs]

**Introduction to Artificial Intelligence:** The AI problems – The underlying Assumption – What is an AI technique? – The level of the model – Criteria for success – Problems, Problem spaces and Search: Defining the problem as a state space search – production systems – problem characteristics – production system characteristics – Issues in the design of search programs.

**UNIT - II** [15 Hrs]

**Heuristic Search Techniques:** Generate and test – Hill Climbing – Best First Search (A* Search) – Problem Reduction (AO * Algorithm) – Constraint Satisfaction – Means-Ends Analysis – Knowledge Representation Issues: Representation and Mappings – Approaches to Knowledge Representation – Issues in Knowledge Representation.

**UNIT - III** [15 Hrs]

**Using Predicate logic:** Representing simple facts in logic – Representing Instance and ISA Relationships – Computable functions and Predicates – Resolution – Natural Deduction - Representing knowledge using Rules: Procedural versus Declarative knowledge – Logic programming – Forward versus Backward Reasoning.

**UNIT - IV** [15 Hrs]

**Natural Language Processing:** Introduction – Syntactic processing – Semantic Analysis – Learning : What is Learning? – Rote Learning – Learning from Examples: Induction – Explanation based Learning – Discovery – Analogy – Formal Learning theory – Neural net learning and Genetic learning.

**UNIT - V** [15 Hrs]

**Perception and Action:** Real time search – Perception – Action – Robot Architectures – Case study on Robot Architecture.

**TEXT BOOK:**

1.  Elaine Rich, Kevin Knight, Artificial Intelligence, Tata McGraw Hill, Second Edition.

**REFERENCE BOOKS:**

1.  M.Tim Jones, ”Artificial Intelligence: A systems approach (Computer Science)”, Jones and Bartlett Publishers, Inc.; First Edition, 2008.
2.  Patrick Henry Winston, Artificial Intelligence, Third Edition, Addison-Wesley.

| YEAR - II | MACHINE LEARNING | 18EPIT34B |
|---|---|---|
| SEMESTER -III | | HRS/WK - 5 |
| ELECTIVE – IV(3) | | CREDIT - 5 |

**Objective:**

To be able to formulate machine learning problems corresponding to different applications

**Course Outcomes (CO's):**

   **At the end of the Course the students should be able to exhibit**

   **CO1: To Learn about Machine Intelligence and Machine Learning applications.**
   **CO2: To implement and apply machine learning algorithms to real-world applications.**
   **CO3: Have an understanding of the strengths and weaknesses of many popular machine learning approaches.**
   **CO4:**
   **AppreciatetheunderlyingmathematicalrelationshipswithinandacrossMachineLearningalgorithmsandthe paradigms of supervised and un- supervised learning.**
   **CO5: Be able to design and implement various machine learning algorithms in a range**

| SEMESTER I | COURSE CODE: 18EPIT34B | | | | COURSE TITLE :MACHINELEARNING | | | | | HOURS:5 | CREDITS: 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| COURSE OUTCOMES | PROGRAMME OUTCOMES(PO) | | | | | PROGRAMME SPECIFIC OUTCOMES(PSO) | | | | MEAN SCORE OF CO'S | |
| | PO 1 | PO 2 | PO3 | PO 4 | PO 5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | |
| CO1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| CO2 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| CO3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4.5 |
| CO4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4.5 |
| CO5 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4.5 |
| Mean Overall Score | | | | | | | | | | | 4.7 |

**Result: The score of this course is 4.7(Very High)**

| Association | 1%-20% | 21%-40% | 41%-60% | 61%-80% | 81%-100% |
|---|---|---|---|---|---|
| Scale | 1 | 2 | 3 | 4 | 5 |
| Interval | 0<=rating<=1 | 1.1<=rating<=2 | 2.1<=rating<=3 | 3.1<=rating<=4 | 4.1<=rating<=5 |
| Rating | Very Poor | Poor | Moderate | High | Very High |

This Course is having **VERY HIGH** association with Programme Outcomes and Programme Specific Outcomes.

**Unit - I**                                                                 **[15 Hrs]**

**Introduction :**Learning Problems – Perspectives and Issues – Concept Learning – Version Spacesand Candidate Eliminations – Inductive bias – Decision Tree learning –Representation – Algorithm – Heuristic Space Search.

**Unit - II**                                                                **[15 Hrs]**

**Neural Networks and Genetic Algorithms :**Neural Network Representation – Problems – Perceptrons – Multilayer Networks andBack Propagation Algorithms – Advanced Topics – Genetic Algorithms – HypothesisSpace Search – Genetic Programming – Models of Evaluation and Learning.

**Unit - III**                                                               **[15 Hrs]**

**Bayesian and Computational Learning :**Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum DescriptionLength Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve BayesClassifier – Bayesian Belief Network – EM Algorithm – Probability Learning – SampleComplexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

**Unit - IV**                                                                **[15 Hrs]**

 **Instant based Learning :**K- Nearest Neighbour Learning – Locally weighted Regression – Radial BasisFunctions – Case Based Learning.

**Unit - V**                                                                 **[15 Hrs]**

**Advanced Learning Hours :**Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – FirstOrder Rules – Sets of First Order Rules – Induction on Inverted Deduction – InvertingResolution – Analytical Learning – Perfect Domain Theories – Explanation BaseLearning – FOCL Algorithm – Reinforcement Learning Task – Q- Learning –Temporal Difference Learning.


**TEXT BOOK:**

1.  Tom M. Mitchell, ―Machine Learning, McGraw-Hill Education (India) PrivateLimited, 2013.

**REFERENCE BOOKS:**

1.  Ian      Good      fellow,      Yoshua      Bengio,      Aaron      Courville,      Francis

Bach&quot;DeepLearning&quot;,2017.
2. Bishop Christopher M,&quot;Pattern Recognition and Machine Learning&quot;,2010.
3. EthemAlpaydin, ―Introduction to Machine Learning (Adaptive Computation andMachine Learning), The MIT Press 2004.
4. Stephen Marsland, ―Machine Learning: An Algorithmic Perspective, CRC Press, 2009.
5. Michael Affenzeller, Stephan Winkler, Stefan Wagner, Andreas Beham, "Genetic Algorithms and Genetic Programming", CRC Press Taylor and Francis Group.