# MASTER OF COMPUTER APPLICATIONS

# SYLLABUS

(Under Choice Based Credit System)
Applicable for the students admitted
from 2021 – 2022 onwards



# PG DEPARTMENT OF COMPUTER APPLICATIONS

# Bishop Heber College (Autonomous)
(Nationally Reaccredited at the A+ Level by NAAC)
(Recognized by UGC as "College with Potential for Excellence")
## Tiruchirappalli-620 017

Name of the Department : PG Department of Computer Applications
Name of the Programme: Master of Computer Applications (MCA)

**MCA OUTCOME BASED EDUCATION**
**2021 -2022 ONWARDS BISHOP HEBER COLLEGE**

## VISION

Develop next generation software professionals of high calibre to cater to the various needs of the IT Industry through effective teaching and learning process and to involve in advanced research by imbibing ethical values in order to provide solutions to the problems of our society.

## MISSION

1. Enrich the students with a deep insight on the latest technologies by providing  globally competant curriculum.

2. Develop, evaluate, synthesize and apply the acquired computing knowledge to cater to the needs of the society by collobarating with industries and corporate sectors.

3. Enable the students to become experts, researchers, academicians, entrepreneurs in the field of computer applications with a commitment to lifelong learning.

## PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

1. Graduates shall become a successful professional in the field of computer applications and in various multi-disciplinary industries either as an employee or an entrepreneur.

    Related to M1 & M2

2. Graduates shall become effective researchers and academicians, leading or participating in efforts to address social, technical and business challenges in an ethical manner.

    Related to M2 & M3

3. Graduates shall be engaged in lifelong learning and professional development through self study and by updating new technologies.

     Related to M1,M2 &M3

## PROGRAMME OUTCOMES (POs)

On completion of Masters in Computer Applications, students would have acquired the following competencies to

- **PO1**: **Computational Knowledge:** Apply the knowledge of computer applications to design, develop, test and maintain the software using the latest technologies.

- **PO2: Problem Analysis**:  Identify and analyze complex problems and formulate appropriate solutions.

- **PO3: Design and Development of Solutions:** Design and develop customized frameworks for small to large enterprises.

- **PO4: Conduct Investigations of Complex Computing problems:** Utilize the research-based knowledge and research methods for the analysis and interpretation of data to provide valid conclusions in real-time applications.

- **PO5: Modern Tool Usage**: Identify and apply the appropriate techniques necessary for innovative software solutions, resources and modern computing tools to perform complex computing activities.

- **PO6: Project Management and Finance:** Manage multidisciplinary projects and assess societal, environmental, health, safety, legal and cultural issues.

- **PO7: Professional Ethics:** Function efficiently both as a member and team leader exhibiting professional skills with human values and ethics.

- **PO8: Communication Efficacy:** Communicate effectively with the computing community Covered and the society to enhance documentations, presentations and to use appropriate opportunity Covered according to their intelligence.

- **PO9: Life-long Learning:** Engage in independent and continuous learning as a computing professional and able to upgrade the skill sets for the lifelong betterment of the individual and society at large.


## PROGRAMME SPECIFIC OUTCOMES (PSOs)

On successful completion of the program learners would have acquired the following competencies:

- **PSO1**: Apply the acquired knowledge to design Graphical User Interfaces, develop websites, design new operating systems and manage databases.

- **PSO2**: Analyze the real-time data and predict the future outcome by using Machine Learning, Deep learning and Analytical tools.

- **PSO3**: Exhibit the programming skills to provide solutions to meet the needs of the industry.

- **PSO4**: Use the managerial skills and financial knowledge to become a successful entrepreneur and provide employability to the needed community Covered.

# MCA COURSE STRUCTURE 2021 – 2022

(For the candidates admitted from the academic year 2021-2022 onwards)

**Eligibility:**

Passed BCA/ Bachelor Degree in Computer Science Engineering or equivalent Degree OR passed B.Sc./ B.Com./ B.A. with Mathematics at l0+2 Level or at Graduation Level (with additional bridge Courses as per the norms of the concerned University). Obtained at least 50% marks (45% marks in case of candidates belonging to reserved category) in the qualifying Examination.

**(Applicable to candidates admitted from the academic year 2021-2022 onwards)**

**Computer Science Stream**

| Sem | Course | Course Title | Course Code | Hours / Week | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CIA | ESE | Total |
| **I** | Core I | Programming in .NET Technology | P20CA101 | 4 | 3 | 25 | 75 | 100 |
| | Core II | Operating Systems | P20CA102 | 4 | 3 | 25 | 75 | 100 |
| | Core III | Resource Management Techniques | P20CA103 | 4 | 3 | 25 | 75 | 100 |
| | Core IV | Accounting and Financial Management | P20CA104 | 4 | 3 | 25 | 75 | 100 |
| | Elective I | Software Engineering/ Microprocessor and Micro Controllers/ Computer Graphics | P20CA1:1/ P20CA1:2/ P20CA1:3 | 4 | 3 | 25 | 75 | 100 |
| | Core Practical I | Programming in .NET Technology Lab | P20CA1P1 | 4 | 3 | 40 | 60 | 100 |
| | Core Practical II | Operating System Programming Lab | P20CA1P2 | 4 | 3 | 40 | 60 | 100 |
| | SBC | Communication Life Skill | P20CAPS1 | 2 | 1 | --- | --- | 100 |
| **II** | Core V | Programming in Java | P20CA205 | 4 | 3 | 25 | 75 | 100 |
| | Core VI | Database Management Systems | P20CA206 | 4 | 4 | 25 | 75 | 100 |
| | Core VII | Data Structures and Algorithms | P20CA207 | 4 | 4 | 25 | 75 | 100 |
| | Elective II | Soft Computing Data Warehousing and Data Mining Artificial Intelligence | P20CA2:1 P20CA2:2 P20CA2:3 | 4 | 3 | 25 | 75 | 100 |
| | Elective III | Customer Relationship Management Enterprise Resource Planning Management Information Systems | P20CA2:4 P20CA2:5 P20CA2:6 | 4 | 3 | 25 | 75 | 100 |
| | Core Practical III | Programming in Java Lab | P20CA2P3 | 4 | 3 | 40 | 60 | 100 |
| | Core Practical IV | Database Management Systems Lab | P20CA2P4 | 4 | 3 | 40 | 60 | 100 |
| | Core Project I | Summer Project | P20CA2PJ | --- | 2 | --- | --- | 100 |
| | VLO | RI/MI | P17VL2:1/ P17VL2:2 | 2 | 2 | 25 | 75 | 100 |
| **III** | Core VIII | Smart Devices Programming | P20CA308 | 4 | 3 | 25 | 75 | 100 |
| | Core IX | Programming in Python | P20CA309 | 5 | 3 | 25 | 75 | 100 |
| | Core X | Computer Network and Network Security | P20CA310 | 5 | 4 | 25 | 75 | 100 |
| | Elective IV | Organizational Behavior Business Intelligence Human Resource Management | P20CA3:1 P20CA3:2 P20CA3:3 | 4 | 3 | 25 | 75 | 100 |
| | Elective V | Big Data and Cloud Computing Block Chain and Crypto-Currencies Parallel Computing | P20CA3:4 P20CA3:5 P20CA3:6 | 4 | 3 | 25 | 75 | 100 |
| | Core Practical V | Smart Devices Programming Lab | P20CA3P5 | 4 | 3 | 40 | 60 | 100 |
| | Core Practical VI | Programming in Python Lab | P20CA3P6 | 4 | 3 | 40 | 60 | 100 |
| **IV** | Core XI | Machine Learning for Data Science | P20CA411 | 4 | 3 | 25 | 75 | 100 |
| | Core XII | Internet of Things | P20CA412 | 4 | 3 | 25 | 75 | 100 |
| | Core Practical VII | Data Science Lab | P20CA4P7 | 4 | 3 | 40 | 60 | 100 |
| | Core Project II | Project – II | P20CA4PJ | 18 | 10 | --- | --- | 100 |
| | | | **Total Credits** | | **90** | **930** | **1770** | **2770** |

## Non-Computer Science Stream

| Sem | Course | Course Title | Course Code | Hours/ Week | Credits | Marks CIA | Marks ESE | Marks Total |
|-----|--------|--------------|-------------|-------------|---------|-----|-----|-------|
| I | Core I | Programming in .NET Technology | P20CA101 | 4 | 3 | 25 | 75 | 100 |
| | Core II | Operating Systems | P20CA102 | 4 | 3 | 25 | 75 | 100 |
| | Core III | Resource Management Techniques | P20CA103 | 4 | 3 | 25 | 75 | 100 |
| | Core IV | Accounting and Financial Management | P20CA104 | 4 | 3 | 25 | 75 | 100 |
| | Elective I | Software Engineering/ Microprocessor and Micro Controllers/ Computer Graphics | P20CA1:1/ P20CA1:2/ P20CA1:3 | 4 | 3 | 25 | 75 | 100 |
| | Core Practical I | Programming in .NET Technology Lab | P20CA1P1 | 4 | 3 | 40 | 60 | 100 |
| | Core Practical II | Operating System Programming Lab | P20CA1P2 | 4 | 3 | 40 | 60 | 100 |
| | SBC | Communication Life Skill | P20CAPS1 | 2 | 1 | --- | --- | 100 |
| | Bridge Course I | Object Oriented Programming | PB20CA11 | --- | 4 | 25 | 75 | 100 |
| | Bridge Course II | Information Technology | PB20CA12 | --- | 4 | 25 | 75 | 100 |
| | Bridge Course III | Object Oriented Programming Lab | PB20CA1P | --- | 2 | 40 | 60 | 100 |
| II | Core V | Programming in Java | P20CA205 | 4 | 3 | 25 | 75 | 100 |
| | Core VI | Database Management Systems | P20CA206 | 4 | 4 | 25 | 75 | 100 |
| | Core VII | Data Structures and Algorithms | P20CA207 | 4 | 4 | 25 | 75 | 100 |
| | Elective II | Soft Computing Data Warehousing and Data Mining Artificial Intelligence | P20CA2:1 P20CA2:2 P20CA2:3 | 4 | 3 | 25 | 75 | 100 |
| | Elective III | Customer Relationship Management Enterprise Resource Planning Management Information Systems | P20CA2:4 P20CA2:5 P20CA2:6 | 4 | 3 | 25 | 75 | 100 |
| | Core Practical III | Programming in Java Lab | P20CA2P3 | 4 | 3 | 40 | 60 | 100 |
| | Core Practical IV | Database Management Systems Lab | P20CA2P4 | 4 | 3 | 40 | 60 | 100 |
| | Core Project I | Summer Project | P20CA2PJ | --- | 2 | --- | --- | 100 |
| | Bridge Course IV | Internet Programming | PB20CA24 | --- | 4 | 25 | 75 | 100 |
| | Bridge Course V | Linux Programming | PB20CA25 | --- | 4 | 25 | 75 | 100 |
| | Bridge Course VI | Internet Programming Lab | PB20CA2P | --- | 2 | 40 | 60 | 100 |
| | VLO | RI/MI | P17VL2:1/ P17VL2:2 | 2 | 2 | 25 | 75 | 100 |
| III | Core VIII | Smart Devices Programming | P20CA308 | 4 | 3 | 25 | 75 | 100 |
| | Core IX | Programming in Python | P20CA309 | 5 | 3 | 25 | 75 | 100 |
| | Core X | Computer Network and Network Security | P20CA310 | 5 | 4 | 25 | 75 | 100 |
| | Elective IV | Organizational Behavior Business Intelligence Human Resource Management | P20CA3:1 P20CA3:2 P20CA3:3 | 4 | 3 | 25 | 75 | 100 |
| | Elective V | Big Data and Cloud Computing Block Chain and Crypto-Currencies Parallel Computing | P20CA3:4 P20CA3:5 P20CA3:6 | 4 | 3 | 25 | 75 | 100 |
| | Core Practical V | Smart Devices Programming Lab | P20CA3P5 | 4 | 3 | 40 | 60 | 100 |
| | Core Practical VI | Programming in Python Lab | P20CA3P6 | 4 | 3 | 40 | 60 | 100 |
| | Bridge Course VII | Digital Computer Fundamentals and Architecture | PB20CA37 | --- | 4 | 25 | 75 | 100 |
| | Bridge Course VIII | PHP and MySQL | PB20CA38 | --- | 4 | 25 | 75 | 100 |
| | Bridge Course IX | PHP and MySQL Lab | PB20CA3P | --- | 2 | 40 | 60 | 100 |
| IV | Core XI | Machine Learning for Data Science | P20CA411 | 4 | 3 | 25 | 75 | 100 |
| | Core XII | Internet of Things | P20CA412 | 4 | 3 | 25 | 75 | 100 |
| | Core Practical VII | Machine Learning for Data Science Lab | P20CA4P7 | 4 | 3 | 40 | 60 | 100 |
| | Core Project II | Project – II | P20CA4PJ | 18 | 10 | --- | --- | 100 |
| | | TOTAL | | | 120 | 1125 | 2175 | 3370 |

| S.No. | Courses | No. of Courses |
|---|---|---|
| 1 | Core Courses | 12 |
| 2 | Core Practical Courses | 7 |
| 3 | Elective | 5 |
| 4 | Skill Based Courses | 1 |
| 5 | Value Education | 1 |
| 6 | Bridge Course | 6 |
| 7 | Core Project | 2 |
| | **Total** | **34** |

# COURSES

## PROGRAMME ARTICULATION MATRIX

| S.No. | COURSE CODE | COURSE TITLE | CORRELATION WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
| 1 | P20CA101 | Programming in .NET Technology | H | - | H | H | H | H | H | H | H | H | - | H | H |
| 2 | P20CA102 | Operating Systems | H | H | M | H | H | H | M | H | H | H | H | M | M |
| 3 | P20CA103 | Resource Management Techniques | H | H | H | M | L | L | M | H | M | L | H | H | M |
| 4 | P20CA104 | Accounting and Financial Management | M | H | M | L | M | H | - | L | M | M | L | H | H |
| 5 | P20CA1:1/ | Software Engineering | H | H | H | M | H | M | M | M | M | H | M | M | H |
| 6 | P20CA1:2/ | Microprocessor and Micro Controllers | H | H | M | H | H | M | M | H | H | H | H | M | M |
| 7 | P20CA1:3 | Computer Graphics | H | H | M | M | H | M | M | M | M | H | M | M | H |
| 8 | P20CA1P1 | Programming in .NET Technology Lab | H | H | H | M | H | H | H | H | H | H | H | H | H |
| 9 | P20CA1P2 | Operating System Programming Lab | H | H | H | M | H | H | H | H | H | H | H | H | H |
| 10 | P20CAPS1 | Communication Life Skill | L | H | - | L | L | M | H | H | M | - | - | - | H |
| 11 | PB20CA11 | Object Oriented Programming | H | M | H | M | M | L | L | L | M | H | M | L | M |
| 12 | PB20CA12 | Information Technology | H | M | L | L | H | M | L | - | L | H | M | M | M |
| 13 | PB20CA1P | Object Oriented Programming Lab | H | H | H | M | H | H | H | H | H | H | H | H | H |
| 14 | P20CA205 | Programming in Java | H | M | H | M | M | L | L | L | M | H | M | L | - |
| 15 | P20CA206 | Database Management Systems | H | H | L | M | H | H | M | H | H | H | H | M | M |
| 16 | P20CA207 | Data Structures and Algorithms | H | H | - | H | H | - | M | H | H | - | H | H | - |
| 17 | P20CA2:1 | Soft Computing | H | H | M | H | H | H | M | H | H | H | H | M | M |
| 18 | P20CA2:2 | Data Warehousing and Data Mining | H | M | H | M | M | M | M | M | L | H | M | M | H |
| 19 | P20CA2:3 | Artificial Intelligence | H | H | H | M | H | H | M | M | H | H | H | M | H |
| 20 | P20CA2:4 | Customer Relationship Management | M | M | M | M | H | H | H | M | H | M | M | H | H |
| 21 | P20CA2:5 | Enterprise Resource Planning | H | H | M | L | L | H | M | L | M | H | M | L | H |
| 22 | P20CA2:6 | Management Information Systems | M | M | M | M | M | L | L | M | M | M | M | M | L |
| 23 | P20CA2P3 | Programming in Java Lab | H | H | H | M | H | H | H | H | H | H | H | H | H |
| 24 | P20CA2P4 | Database Management Systems Lab | H | M | M | M | H | H | H | H | H | H | H | H | H |

| S.No. | COURSE CODE | COURSE TITLE | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CORRELATION WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES |
| 25 | P20CA2PJ | Summer Project | H | H | H | H | H | H | H | H | H | H | H | H | H |
| 26 | PB20CA24 | Internet Programming | H | M | H | M | M | L | M | M | L | H | L | H | M |
| 27 | PB20CA25 | Linux Programming | H | H | M | H | M | H | M | M | H | H | M | M | M |
| 28 | PB20CA2P | Internet Programming Lab | H | H | H | L | H | M | H | L | M | H | H | H | H |
| 29 | P20CA308 | Smart Devices Programming | H | H | M | M | H | - | - | L | L | H | H | M | L |
| 30 | P20CA309 | Programming in Python | H | H | H | M | M | L | L | L | M | H | M | L | L |
| 31 | P20CA310 | Computer Network and Network Security | H | H | M | H | H | L | L | L | M | L | L | M | M |
| 32 | P20CA3:1 | Organizational Behavior | L | M | M | L | L | M | H | M | M | L | L | M | H |
| 33 | P20CA3:2 | Business Intelligence | H | H | H | H | H | L | H | M | M | L | L | M | M |
| 34 | P20CA3:3 | Human Resource Management | L | L | M | - | L | H | M | M | L | L | M | H | H |
| 35 | P20CA3:4 | Big Data and Cloud Computing | H | H | H | H | H | H | M | H | H | H | H | M | M |
| 36 | P20CA3:5 | Block Chain and Crypto-Currencies | H | H | M | H | H | H | M | H | H | H | H | H | H |
| 37 | P20CA3:6 | Parallel Computing | M | M | H | M | M | L | L | M | M | L | M | M | L |
| 38 | P20CA3P5 | Smart Devices Programming Lab | H | H | H | M | H | H | H | H | H | H | H | H | H |
| 39 | P20CA3P6 | Programming in Python Lab | H | H | H | M | M | L | L | L | M | H | M | L | L |
| 40 | PB20CA37 | Digital Computer Fundamentals and Architecture | H | H | M | H | H | M | M | H | H | H | H | M | M |
| 41 | PB20CA38 | PHP and MySQL | H | M | M | H | H | H | H | M | M | M | H | H | M |
| 42 | PB20CA3P | PHP and MySQL Lab | H | H | M | H | M | M | H | M | H | H | L | H | M |
| 43 | P20CA411 | Machine Learning for Data Science | H | H | M | H | M | L | L | L | M | H | H | H | L |
| 44 | P20CA412 | Internet of Things | H | H | M | H | M | H | M | H | L | H | H | M | L |
| 45 | P20CA4P7 | Machine Learning for Data Science Lab | H | H | M | H | M | L | L | L | M | H | H | M | L |
| 46 | P20CA4PJ | Project - II | H | H | H | H | H | H | H | H | H | H | H | H | H |

# Core I : PROGRAMMING IN .NET TECHNOLOGY

**SEMESTER : I**  **CODE:P20CA101**
**CREDITS:3**  **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES
After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Create web applications using HTML controls and server controls | K6 | I |
| CO2 | Design web applications using MVC pattern and demonstrate CRUD application | K6 | II |
| CO3 | Combine Models with Views using model binding | K6 | III |
| CO4 | Design a web application with improved Ajax controls | K6 | IV |
| CO5 | Construct Web API and avail the existing Web API's whenever needed. (K6) | K6 | V |
| CO6 | Develop an API for CRUD operations | K6 | V |

## 2 A. Syllabus

**UNIT I - Web Technologies**  **12 Hours**
The Anatomy of an ASP.NET Application – Introducing Server Controls– Improving the Currency Converter– A Deeper Look at HTML Control Classes– The Page Class– Application Events– Stepping Up to Web Controls– Web Control Classes– List Controls– Table Controls– Web Control Events and AutoPostBack–A Simple Web Page.

**UNIT II - Controllers and Views**  **12 Hours**
Introduction of different Web Technology-Quick introduction to ASP.NET MVC-Role of Model, View, and Controller-How ASP.NET MVC Works-Benefits of using ASP.NET MVC-Installing MVC 5 and Creating Applications**.**

**UNIT III - Models**  **12 Hours**
**Controllers**– The Controller's Role-A sample Application: The MVC Music Store-Controller Basics. **Views-**The purpose of Views-View Basics-The Razor View Engine-Specifying a partial view.

**UNIT IV - AJAX and Nuget**  **12 Hours**
**Models**-Modeling the Music store-Scaffolding a store manager-Editing an Album-Model Binding-**Data annotations and Validation-**Annotating orders for validation-Custom validation logic-Display and edit annotations.

**UNIT V - ASP.NET -API and single page applications with AngularJS**  **12 Hours**
**AJAX:** JQuery-Ajax helpers-Client validation-Beyond helpers-Improving Ajax performance. **Nuget –** Introduction to Nuget-Adding a library as a package. **Asp.Net Web API-** Defining Asp.net web API-Writing an API controller-Configuring web API.

**B. TOPICS FOR SELF-STUDY**

| S.No. | Topics | Web Links |
|-------|--------|-----------|
| 1 | External Authentication Services with Web API (C#) | **https://docs.microsoft.com/en-us/aspnet/web-api/overview/security/external-authentication-services** |
| 2 | ASP.NET MVC Integration with GitHub | **https://www.c-sharpcorner.com/article/asp-net-mvc-project-integration-with-github/** |
| 3 | ASP.NET WebHooks | **https://docs.microsoft.com/en-us/aspnet/webhooks/** |
| 4 | ASP.NET Core | **https://docs.microsoft.com/en-us/aspnet/core/blazor/?view=aspnetcore-5.0** |

**C. Text Books:**
1. Mathew MacDonald, "Beginning ASP.NET 4 in C# 2010: From Novice to   Professional", Apress Publications, Second Edition, 2012.
2. Jon Galloway, Brad Wilson, K.Scott Allen, David Matson, "Professional ASP.NET MVC 5", John Wiley & sons Inc.

**D. Reference Books:**
1. 1. Mathew MacDonald, "Beginning ASP.NET 3.5 in C# 2008: From Novice to   Professional", Apress Publications, Second Edition, 2008.
2. Mahesh Chand, "Programming C# 5.0, C# Corner Publications, 2014.
3. Freeman, Adam, "ProASP.NET MVC 5", Apress, 2013.

**E. Web links:**
1. **https://docs.microsoft.com/en-us/aspnet/mvc/overview/getting-started/introduction/getting-started**
2. **https://www.tutorialsteacher.com/mvc/asp.net-mvc-tutorials**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|-----------------------|----------------|-------------------|-----------------------------------------------|
| I | **Web Technologies** | | |
| 1.1 | Introduction of different Web Technology | Illustrate web technologies | K2 |
| 1.2 | Quick introduction to  ASP.NET MVC | Identify the roles of Model, View and Controller | K3 |
| 1.3 | Role of Model, View, and Controller | Apply MVC with previous technologies | K3 |
| 1.4 | How ASP.NET MVC Works | Develop web applications using MVC pattern | K6 |
| 1.5 | Benefits of using ASP.NET MVC | Compare MVC with other web technologies | K5 |
| 1.6 | Installing MVC 5 and Creating Applications. | Build a web application in Visual Studio | K6 |
| II | **Controllers And Views** | | |
| 2.1 | The Controller's Role | Decide the role of controller in web applications | K5 |
| 2.2 | A sample Application | Develop  " Music Store" app using MVC | K6 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.3 | Controller Basics | Interpret the basics of controller into applications | K5 |
| 2.4 | Views-The purpose of Views | Design applications with views | K6 |
| 2.5 | View Basics | Illustrate the use of view in web applications | K2 |
| 2.6 | The Razor View Engine | Design registration page with Razor view | K6 |
| **III** | **Models** | | |
| 3.1 | Modeling the Music store | Compose models for Music Store application | K6 |
| 3.2 | Scaffolding a store manager | Improve UI with scaffolding | K6 |
| 3.3 | Editing an Album | Change the UI by adding/deleting fields | K6 |
| 3.4 | Model Binding | Combine models with views using model binding | K6 |
| 3.5 | Data annotations and Validation | Recommend validations in web applications | K5 |
| 3.6 | Annotating orders for validation | Improve applications with annotations | K6 |
| 3.7 | Custom validation logic | Create a custom validation logic for strong password | K6 |
| 3.8 | Display and edit annotations. | Make use of annotations in applications | K3 |
| **IV** | **AJAX and Nuget** | | |
| 4.1 | Jquery | Combine Jquery in developing web applications | K6 |
| 4.2 | Ajax helpers | Modify designing of web pages with ajax helpers | K6 |
| 4.3 | Client validation | Prioritize validations in applications | K5 |
| 4.4 | Beyond helpers | Examine helpers | K4 |
| 4.5 | Improving Ajax performance | Design web applications with improved Ajax controls | K6 |
| 4.6 | Introduction to Nuget | Make use of Nuget package manager | K3 |
| 4.7 | Adding a library as a package | Choose suitable libraries in developing applications | K6 |
| **V** | **ASP.NET API and single page applications with AngularJS** | | |
| 5.1 | Defining Asp.net web API | Improve web application with API | K6 |
| 5.2 | Getting started with web API | Choose APIs for music store application | K6 |
| 5.3 | Writing an API controller, Configuring web API | Develop APIs for CRUD operations | K6 |
| 5.4 | Understanding and Setting up AngularJS | Build applications using AngularJS | K6 |
| 5.5 | Building the web API | Construct applications with APIs | K6 |
| 5.6 | Building applications and modules | Build web applications with appropriate modules | K6 |
| 5.7 | Defining Asp.net web API | Improve web applications with API | K6 |

## 4. MAPPING (CO, PO, PSO)

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | H | - | - | - | L | - | L | H | H | L | - | H | - |
| CO2 | H | - | - | - | M | L | H | H | H | H | - | H | - |
| CO3 | H | - | M | - | H | H | H | M | H | H | - | H | - |
| CO4 | H | - | H | - | H | H | H | H | H | H | - | H | H |
| CO5 | H | - | H | M | H | H | H | H | H | L | - | H | H |
| CO6 | H | - | H | H | H | H | H | H | H | H | - | H | H |

**L-Low**          **M-Moderate**          **H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Assignment, Group Discussion, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
   A.  SANDANASAMY                              Dr.R.THAMARAI SELVI
                              ***************

# Core II: OPERATING SYSTEMS

**SEMESTER : I**                                           **CODE: P20CA102**
**CREDITS:3**                                              **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES
After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Summarize the basic concepts and functionalities of operating systems | K2 | I |
| CO2 | Determine the situations that lead to deadlock and starvation by recognizing the state of the process | K5 | II |
| CO3 | Analyze and apply effective memory management techniques | K4 | III |
| CO4 | Compare the various scheduling algorithms for uniprocessors and multiprocessors | K5 | IV |
| CO5 | Make use of the various I/O management and disk scheduling techniques | K3 | V |
| CO6 | Discuss secondary storage and file management techniques | K6 | V |

## 2 A. Syllabus

**UNIT I - Operating System Overview**                                    **12 Hours**
        Operating System Objectives and Functions – The Evolution of Operating Systems – Major Achievements – Developments Leading to Modern Operating Systems – Virtual Machines – OS Design Considerations for Multiprocessor and Multicore – Microsoft Windows Overview – Traditional UNIX Systems – Modern UNIX Systems.

**UNIT II - Process & Threads**                                           **12 Hours**
        **Process Descriptions & Control:** What is a Process? Process States – Process Description – Process Control – Execution of the Operating System. **Threads:** Processes and Threads – Types of Threads – Multicore and Multithreading. **Concurrency: Mutual Exclusion and Synchronization** – **Concurrency: Deadlock and Starvation.**

**UNIT III - Memory Management**                                          **12 Hours**
        **Memory: Memory Management:** Memory Management Requirements – Memory Partitioning – Paging – Segmentation – Security Issues. **Virtual Memory:** Hardware and Control Structures – Operating System Software.

**UNIT IV - Uniprocessor, Multiprocessor and Real Time Scheduling**       **12 Hours**
        **Scheduling: Uniprocessor Scheduling:** Types of Scheduling – Scheduling Algorithms. **Multiprocessor and Real Time Scheduling:** Multiprocessor Scheduling – Real time scheduling – Linux Scheduling – Windows Scheduling.

**UNIT V - Input/ Output and File Management**                            **12 Hours**
        **Input/Output and Files: I/O Management and Disk Scheduling**: I/O Devices – Organization of the I/O Function – Operating System Design Issues – I/O Buffering – Disk Scheduling – RAID – Disk Cache – Linux I/O – Windows  I/O. **File Management**: Overview – File Organization and Access – File Directories – File Sharing – Record Blocking – Secondary Storage Management – File System Security – Linux Virtual File Management – Windows  File System.

## B. TOPICS FOR SELF-STUDY

| S.No. | Topics | Web Links |
|-------|--------|-----------|
| 1 | Virtualization | https://opensource.com/resources/virtualization#:~:text=Virtualization%20is%20the%20process%20of,on%20a%20computer%20system%20simultaneously |
| 2 | The design and implementation of a Log – Structured File System | ftp://ftp.cs.berkeley.edu/ucb/sprite/papers/lfsSOSP91.ps |
| 3 | The HPAutoRAID Hierarchical Storage System | ftp://ftp.hpl.hp.com/wilkes/AutoRAID.TOCS.ps.Z |
| 4 | Serverless Network File System | ftp://ftp.cs.berkeley.edu/ucb/sprite/papers/lfsSOSP91.ps |

## C. Text Book:
1. Willam Stallings, Operating Systems, Pearson Education, Seventh Edition, 2003.

## D. Reference Books:
1. Deital H.M, An Introduction to Operating Systems, Addison Wesley Publishing Co., 1984.
2. Silberschartz A, Peterson J.L., Galvin P, Operating System Concepts, Addison Wesley publishing co., 1998.

## E. Web links:
1. https://swayam.gov.in/nd1_noc19_cs51
2. https://nptel.ac.in/courses/106106144

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered / Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| **I** | **Operating System Overview** | | |
| 1.1 | Objectives and Functions | Recall the basic concepts of Operating Systems. | K1 |
| 1.2 | Evolution of OS | Summarize the evolution of OS | K2 |
| 1.3 | Major Achievements | Discuss the major achievements of Operating Systems. | K6 |
| 1.4 | Developments Leading to Modern Operating Systems | Outline the developments in the modern Operating Systems | K2 |
| | **Design Considerations for Multiprocessor and Multicore** | | |
| 1.5 | Windows Overview | Explain about Windows | K2 |
| 1.6 | Traditional UNIX Systems | Illustrate traditional UNIX Systems | K2 |
| 1.7 | Modern UNIX Systems | Elaborate on modern UNIX Systems | K6 |
| **II** | **Process Description and Control** | | |
| 2.1 | Process States | Identify the state of a process | K3 |
| 2.2 | Process Description | Explain process description | K2 |
| 2.3 | Process Control | Build a Process Control block | K6 |
| | **Threads** | | |
| 2.4 | Processes and Threads | Discuss processes and threads | K6 |
| 2.5 | Types of Threads | List the types of threads | K1 |
| 2.6 | Multicore and multithreading | Discuss multicore and multithreading. | K6 |
| 2.7 | Parallel algorithm models | Compare the parallel models | K4 |

| Unit Covered / Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| **Concurrency: Mutual Exclusion and Synchronization** | | | |
| 2.8 | Principles of Concurrency | Explain the principles of concurrency | K2 |
| 2.9 | Deadlock and Starvation | Deduct the conditions that lead to deadlock and starvation. | K5 |
| **III** | **Memory** | | |
| 3.1 | Memory Management Requirements | List out the requirements for memory management | K1 |
| 3.2 | Partitioning | Construct memory partitioning | K6 |
| 3.3 | Paging | Develop paging | K6 |
| 3.4 | Segmentation | Construct segmentation | K6 |
| **Virtual Memory** | | | |
| 3.5 | Hardware and control structures | Inspect hardware and control structures | K4 |
| 3.6 | Operating System Software | Develop Operating System software | K3 |
| **IV** | **Uniprocessor Scheduling** | | |
| 4.1 | Types of Processor Scheduling | Choose the type of scheduling algorithm. | K5 |
| 4.2 | Scheduling Algorithms | Compare the scheduling algorithms. | K5 |
| **Multiprocessor and Real Time Scheduling** | | | |
| 4.3 | Multiprocessor Scheduling | Design multiprocessor scheduling | K6 |
| 4.4 | Real time Scheduling | Formulate Real time scheduling | K6 |
| 4.5 | Linux Scheduling | Apply Linux scheduling | K3 |
| 4.6 | Windows Scheduling | Design Windows scheduling | K6 |
| **V** | **I/O Management and Disk Scheduling** | | |
| 5.1 | I/O Devices | Categorize I/O devices | K4 |
| 5.2 | Organization of the I/O Function | Summarize I/O functions | K2 |
| 5.3 | Operating System Design Issues | List out the design issues in Operating Systems | K1 |
| 5.4 | I/O Buffering | Discuss the approaches of I/O buffering | K6 |
| 5.5 | Disk Scheduling | Compare disk scheduling | K4 |
| 5.6 | RAID | Categorize RAID | K4 |
| 5.7 | Disk Cache | Summarize cache memory | K2 |
| **File Management** | | | |
| 5.8 | File Organization and Access | Choose the organization of file | K5 |
| 5.9 | File Directories | Explain file directories | K5 |
| 5.10 | File Sharing | Importance of secondary storage management | K5 |
| 5.11 | Record Blocking | Classify blocking techniques | K4 |
| 5.12 | Secondary Storage Management | Choose the appropriate file management technique | K5 |
| 5.13 | File System Security | Explain about security in file system | K5 |
| 5.14 | Linux Virtual File System | Design Linux File Management | K6 |
| 5.15 | Windows File System | Propose the features of the file system | K6 |

## 4. MAPPING (CO, PO, PSO)

|      | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1  | M   | -   | L   | -   | -   | -   | M   | H   | L   | M    | -    | -    | M    |
| CO2  | H   | H   | M   | H   | M   | H   | M   | L   | H   | H    | H    | M    | -    |
| CO3  | H   | H   | M   | H   | H   | H   | H   | M   | H   | H    | L    | L    | L    |
| CO4  | H   | H   | H   | H   | H   | M   | M   | H   | H   | H    | H    | M    | M    |
| CO5  | H   | H   | M   | H   | M   | H   | M   | L   | H   | M    | M    | L    | L    |
| CO6  | H   | H   | H   | H   | H   | M   | H   | M   | M   | H    | H    | H    | H    |

**L-Low          M-Moderate          H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written)
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Mrs.J.JASMINE CHRISTINA MAGDALENE          Dr.R.THAMARAI SELVI

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**SEMESTER : I**                                              **CODE: P20CA103**
**CREDITS:3**                                                **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES
After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Explain linear programming problems | K2 | I |
| CO2 | Solve the Transportation problem and assignment problem | K3 | II |
| CO3 | Construct Queuing models for real life problems | K3 | III |
| CO4 | Analyze the various queuing models | K4 | III |
| CO5 | Analyze the various Inventory models and solve Inventory control Problems | K4 | IV |
| CO6 | Develop network scheduling by PERT and CPM | K6 | V |

## 2A. Syllabus

**UNIT I - The Linear Programming Problem**                              **12 Hours**
        **The Linear Programming Problem** – Mathematical Formulation of the Problem –Graphical Solution Method – **The Simplex  Method – Artificial Variable Techniques – Dual Simplex method**.

**UNIT II - The Transportation Problem**                                **12 Hours**
        **The Transportation Problem** – Matrix Form – The Transportation Table – The Initial Basic Feasible Solution – Degeneracy in Transportation Problems – Optimum Solution – The Assignment and Routing Problems.

**UNIT III - Queueing Theory**                                          **12 Hours**
        **Queueing Theory** – Queueing System – Characteristics of Queueing System – Poisson Process and Exponential Distribution – Classification of Queues – Transient and  Steady States – Poisson Queues – Non – Poisson Queueing  Systems – Non – Markovian Queues – Probabilistic models.

**UNIT IV - Inventory Control**                                         **12 Hours**
        **Inventory Control** – ABC Analysis – Economic Lot Size Problems – EOQ with Shortage – Multi– Item Deterministic Problem – Uncertain Demand – Inventory Control with Price Breaks. Replacement Problem – Replacement of Items that Deteriorate with time – Replacement of Items that Fail Completely – other Replacement Problems.

**UNIT V - Network Scheduling by PERT/CPM**                             **12 Hours**
**Network Scheduling by PERT/CPM** – Basic Concepts – Constraints in Network – Construction of the Network – Time Calculations in Networks – Critical Path Method (CPM) – PERT – PERT Calculations.

## B. TOPICS FOR SELF-STUDY:

| S.No. | Topics | Web Links |
|-------|--------|-----------|
| 1 | Methods of solving a Linear Programming Problem | 1.https://courses.lumenlearning.com/sanjacinto-finitemath1/chapter/reading-meeting-demands-with-linear-programming/ |

| 1 | | 2.https://courses.lumenlearning.com/sanjacinto-finitemath1/chapter/reading-solving-standard-maximization-problems-using-the-simplex-method/ 3.https://courses.lumenlearning.com/sanjacinto-finitemath1/chapter/reading-standard-minimization-with-the-dual/ |
|---|---|---|
| 2 | The Transportation Problem | https://www.geeksforgeeks.org/transportation-problem-set-1-introduction/ |
| 3 | Queueing Theory | https://www.geeksforgeeks.org/packet-queuing-and-dropping-in-routers/ |
| 4 | Inventory Control | 1. https://www.wisdomjobs.com/e-university/production-and-operations-management-tutorial-295/inventory-control-or-management-9599.html 2. https://www.unleashedsoftware.com/inventory-management-guide |
| 5 | Network | https://www.interventions.org/pertcpm/ |

**C. Text Book:**
1. Kanti Swarup, P.K. Gupta and Man Mohan,"Operations Research", Sultan Chand and Sons, 1992.

**D. Reference Books:**
1. Hamdy A Taha, "Operations Research – An Introduction", Macmillan Publishing Company, 1982.
2. Don.T. Phillips, A.Ravindran, James.J.Solberg, "Operations Research – Principles and Practice",John Wiley & Sons, 1976.

**E. Web links:**
1. https://swayam.gov.in/explorer?searchText=operations%20research
2. https://nptel.ac.in/courses/111/107/111107128/

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| **I** | **The Linear Programming Problem** | | |
| 1.1 | The Linear Programming Problem | Explain and discuss about aLinear Programming Problem | K2 |
| 1.2 | Mathematical Formulation of the Problem | Describe the mathematical formulation of aLinear Programming Problem | K2 |
| 1.3 | Graphical Solution Method | Estimate the solution of aLinear Programming Problem by Graphical solution method | K2 |
| 1.4 | The Simplex Method | Determine the solution of a Linear Programming Problem by using Simplex method | K2 |

| | | | |
|---|---|---|---|
| 1.5 | Artificial Variable Techniques | Apply Artificial Variables to find a solution for a Linear Programming Problem | K3 |
| 1.6 | Dual Simplex method | Examine the solution of a Linear Programming Problem by using Simplex method | K3 |
| **II** | **The Transportation Problem** | | |
| 2.1 | The Transportation Problem | Describe Transportation Problem | K1 |
| 2.2 | Matrix form of Transportation Table | Describe matrix form of transportation problem | K1 |
| 2.3 | The Initial Basic Feasible Solution | Estimates the Initial Basic Feasible Solution | K2 |
| 2.4 | Degeneracy in Transportation Problems | Identify the degeneracy in transportation problem | K4 |
| 2.5 | Optimum Solution | Computes optimum solution of a transportation problem | K3 |
| 2.6 | The Assignment | Describe the assignment problem and computes the optimum solution | K3 |
| 2.7 | Routing Problems | Solve the routing problems | K3 |
| **III** | **Queueing Theory** | | |
| 3.1 | Queueing Theory | Illustrate Queueing theory | K3 |
| 3.2 | Queueing System | Explain the Queueing system. | K4 |
| 3.3 | 3.3 Characteristics of Queueing System | Construct the queueing system. | K5 |
| 3.4 | Poisson Process and Exponential Distribution | Solve the queueing problem. | K3 |
| 3.5 | Classification of Queues | Compare the properties of Queueing models. | K4 |
| 3.6 | Transient and Steady States | Distinguish the state of a queueing system. | K4 |
| 3.7 | Poisson Queues | Identify the Poisson queue. | K4 |
| 3.8 | Non – Poisson Queueing Systems | Examine the solution of Non-Poisson Queueing system. | K4 |
| 3.9 | Non – Markovian Queues | Describe a Non-Markovian Queue. | K1 |
| **IV** | **Inventory control** | | |
| 4.1 | Inventory control | Discuss in details about inventories and their types | K6 |
| 4.2 | ABC Analysis | Explain about ABC analysis | K6 |
| 4.3 | Economic Lot Size problems | Discuss in detailabout Economic Lot size | K6 |
| | | Solve corresponding problems | K4 |
| 4.4 | EOQ with shortage | Discuss in detail about EOQ with shortage | K6 |
| | | Solving problems | K4 |
| 4.5 | Multi-Item deterministic Problem | Solving Multi-Item deterministic Problems | K4 |
| 4.6 | Uncertain Demand | Discuss in detail about Uncertain Demand | K6 |

| | | Solving corresponding problems | K4 |
|---|---|---|---|
| 4.7 | Inventory Control with Price Breaks | Recalling price breaks | K1 |
| | | Solving corresponding problems | K4 |
| 4.8 | Replacement Problems | Discuss in detail about Replacement problems | K6 |
| | | Apply it on a solving problems | K3 |
| 4.9 | Replacement of Items that Deteriorate with time | Discuss in detail about Replacement of Items that Deteriorate with time | K6 |
| 4.10 | Replacement of Items that Fail Completely | Discuss in detail Replacement of Items that Fail Completely | K6 |
| 4.11 | Other Replacement Problems | Evaluate other replacement problems | K4 |
| **V** | **Network Scheduling by PERT/CPM** | | |
| 5.1 | Introduction | Use network scheduling and utilize network pre-determined schedule PERT and CPM | K3 |
| 5.2 | Network and basic components | Discuss basic components of networks Activity and Event . | K6 |
| 5.3 | Logical Sequencing | Illustrate Looping and Dangling. | K3 |
| 5.4 | Rules of network Construction | Identify rules for drawing network. | K4 |
| 5.5 | Concurrent activities | Discuss activity in discrete nature | K6 |
| 5.6 | Critical Path Analysis | Determine Forward and backward pass calculation. | K6 |
| | | Discuss different kinds of floats namely total float and free float and independent float. | K6 |
| | | Determine total float and free float and independent float. | K6 |
| 5.7 | Probability considerations in PERT | Discuss optimistic time and pessimistic time and most likely time. | K6 |
| | | Determine optimistic time and pessimistic time and most likely time. | K6 |
| | | Determine Probability of meeting the schedule time. | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | M | H | M | M | L | L | - | - | - | M | M | H | -- |
| **CO2** | M | H | M | L | L | - | - | - | - | L | M | H | -- |
| **CO3** | L | H | H | M | - | M | H | H | M | - | M | H | M |
| **CO4** | - | H | H | - | M | M | M | H | H | - | H | H | M |
| **CO5** | H | H | M | - | - | L | M | L | M | L | H | M | M |
| **CO6** | H | - | H | H | H | L | - | H | M | H | H | H | - |

**L-Low**          **M-Moderate**          **H- High**

**5. COURSE ASSESSMENT METHODS**

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                              **HEAD OF THE DEPARTMENT**
Dr.J.RAMEEZ BANU                                              Dr.R.THAMARAI SELVI

<p style="text-align:center">**Core IV: ACOUNTING AND FINANCIAL MANAGEMENT**</p>

**SEMESTER: I**                                       **CODE:  P20CA104**
**CREDITS: 3**                                     **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES
After the successful completion of this course, the students will be able to

| S.No | Course Outcomes | Level | Unit Covered |
|------|-----------------|-------|--------------|
| CO1 | Examine the basic concepts of accounting and its principles | K4 | I |
| CO2 | Construct the financial statements with suitable standards | K5 | I |
| CO3 | Identify the major elements of long-term and short-term ratio analysis | K3 | II |
| CO4 | Estimate cost per Unit Covered on various technique | K5 | III |
| CO5 | Distinguish shares and debentures of a company | K4 | IV |
| CO6 | Predict the marketing strategies to understand the consumer behavior and buying motives | K6 | V |

**2A. Syllabus**

**UNIT I - Basic Accounting Concepts and Methods**                **12 Hours**

      **Financial Statements:** Accounting Concepts and Conventions - System of Book Keeping – Journal - Ledger - Trail Balance - Preparation of Trading A/c, Profit and Loss A/c and Balance Sheet without Adjustments.

**UNIT II - Ratio Analysis**                              **12 Hours**

      **Ratio analysis ratios** Introduction - Significance - Limitations - Classification According to Statement: Short-Term Solvency - Current Ratio - Liquidity Ratio - Classification According to Function: Long-Term Solvency - Debt-Equity Ratio - Proprietary Ratio - Profitability Ratio - Gross-Profit Ratio - Net-Profit Ratio - Operating Ratio.

**UNITIII - Cost Management**                            **12Hours**

      **Cost Concepts and cost classifications:** Cost concepts and various types of cost classifications - Determination of costs -Marginal costing -Break Even Analysis - Contribution approach - Direct costing

**UNIT IV - Company Accounts –Shares Capital**                **12Hours**
      **Company Accounts** - Introduction to company accounts - Types of shares - Issue of shares at par,
at

      premium, at discount

**UNITV - Marketing**                                  **12 Hours**

      **Introduction to Marketing**: Meaning – Objectives - Classification of markets -Recent trends in marketing - Customer relationship Marketing - E-Marketing - Online Marketing - Tele Marketing

**B. TOPICS FOR SELF-STUDY**

| S.No | Topics | Web Links |
|------|--------|-----------|
| 1 | Depreciation Accounting | **https://www.tutorialspoint.com/accounting_basics/financial_accounting_depreciation.htm** |
| 2 | Subsidiary Books | **https://www.wisdomjobs.com/e-university/accounting-basics-tutorial-2266/financial-accounting-subsidiary-books-25196.html** |
| 3 | Budgeting and Planning Control | **https://i.investopedia.com/inv/pdf/tutorials/budgeting-basics.pdf** |
| 4 | Advance Digital Marketing | **https://www.edureka.co/blog/digital-marketing-tutorial/** |

**C. Text Book(s):**
1. T.S. Reddy and A. Murthy, "Financial Accounting", 6th revised edition, Margam Publications, 2016.
2. M.Sheik Mohamed, E.Mubarak Ali and M.AbdulHakkem, "Management Accounting", Raja Publications, 2012.
3. R.Ramachandran, R.Srinivasan, "Financial Management", 12th Edition, Sriram Publications, 2012.
4. R.S.N Pillai, Bagavathi and S.Kala, "Marketing Management", S.Chand& Co Publications, 1st Edition, 2010.

**D. Reference Books:**
1. R.L. Gupta and V.K. Gupta, "Principles and practice of Accountancy", Eleventh Edition, 2005, Sultan Chand Sons, New Delhi.
2. N. Vinayagam& B. Charumathi, "Financial Accounting", Second Revised Edition, 2008, S.Chand& Company Ltd, New Delhi

**E. Web links:**
1. **https://www.tutorialspoint.com/accounting_basics/index.htm**
2. **https://www.guru99.com/accounting.html**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Accounting Concepts and Conventions** | | |
| 1.1 | Definition and Objective of Accounting | Illustrate the concepts and principles of accounting rules | K2 |
| 1.2 | Advantages of Book Keeping | Outline the uses of Book-Keeping | K2 |
| 1.3 | Basic terms used in Accountancy | List out the terms in Accountancy | K1 |
| 1.4 | Methods and Types of Accounts | Classify accounting strategies | K4 |
| | **Journal &Ledger** | | |
| 1.5 | Double Entry Book Keeping | Explain the method of double entry system | K2 |
| 1.6 | Journal-Meaning-Rules | Make use of the Golden rules for journal | K3 |
| 1.7 | Posting into Ledger | Examine the journal to post into ledger | K4 |
| | **Final Accounts-Trading and Profit and Loss Account** | | |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1.8 | Preparing Trading and P&LA/c and Balance sheet | Estimate the financial position of a concern | K6 |
| **II** | **Ratio Analysis** | | |
| 2.1 | Significance of ratio analysis | Identify the efficiency of firm's management | K3 |
| 2.2 | Limitations of ratio analysis | Interpret the challenges in ratio analysis | K2 |
| 2.3 | Classification According to statement/Function | Distinguish between function and statement | K4 |
| | **Short-term Solvency** | | |
| 2.4 | Current Ratio | Asses the current ratio of a firm | K5 |
| 2.5 | Liquidity Ratio | Evaluate the Liquidity ratio of a firm | K5 |
| | **Long-term Solvency** | | |
| 2.6 | Debt Equity Ratio | Estimate the Equity ratio of share holders | K5 |
| 2.7 | Proprietary Ratio/Profitability Ratio | Determine the profitability ratio | K5 |
| 2.8 | Gross profit and Net Profit Ratio | Compare the gross and net profit ratio | K5 |
| 2.9 | Operating Ratio | Evaluate the operating ratio | K5 |
| **III** | **Cost Accountancy** | | |
| 3.1 | Definition | Explain the cost account | K1 |
| 3.2 | Various types of cost classification | Identify the specifics of different costing methods | K6 |
| 3.3 | Illustration-Calculate Direct, Indirect and Variable cost | Analyze cost-volume-profit techniques to determine optimal managerial decisions. | K4 |
| 3.4 | Determination of Marginal cost | Estimate of schedule costs per Unit Covered of production | K5 |
| | **Break Even Analysis** | | |
| 3.5 | Determination of Marginal cost | Explain the breakeven sales and cost-volume analysis | K2 |
| 3.6 | Contribution approach-Problems | Interpret the impact of the selected costs method | K5 |
| **IV** | **Company Accounts** | | |
| 4.1 | Introduction to Company Accounts | Explain about the meaning of companies and working style of companies. | K2 |
| 4.2 | Types of Shares | Explain the relationship between company and debenture holders | K2 |
| | **Issues of Shares-Journal Entries** | | |
| 4.3 | Shares issued at Par | Apply journal for issue of share at par | K3 |
| 4.4 | Shares issued at premium | Apply journal for issue of share at premium | K3 |
| 4.5 | Shares issued at discount | Apply journal for issue of share at discount | K3 |
| **V** | **Marketing** | | |
| 5.1 | Meaning and Objectives | Explain the fundamental of marketing | K2 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.2 | Classification of markets | Classify different methods of sales promotion | K2 |
| 5.3 | Recent Trends in marketing | Identify the trends in marketing | K3 |
| 5.4 | Customer relationship marketing | Build effective relationship with customers | K3 |
| 5.5 | E-Business | Demonstrate legal issues and privacy in E-Commerce | K2 |
| 5.6 | Tele marketing/Online marketing | Assess the effect of changing technology on traditional business models and strategy | K5 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | H | M | L | M | H | L | L | M | - | L | M | H |
| CO2 | M | H | L | M | H | H | - | M | M | - | L | - | H |
| CO3 | M | M | H | - | H | M | - | - | L | - | - | - | M |
| CO4 | M | H | M | - | M | L | - | L | L | - | M | H | H |
| CO5 | - | M | - | - | L | M | - | L | - | - | L | - | M |
| CO6 | H | M | M | L | M | H | - | H | M | M | L | - | H |

L-Low        M-Moderate        H- High

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book

2. Open Book Test.

3. Assignment, Group Presentation, Group Discussion, Presentation, Seminar, Quiz (written).

4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                     **HEAD OF THE DEPARTMENT**
Dr. M. LOVELIN PONN FELCIAH                  Dr.R.THAMARAI SELVI

**SEMESTER : I**                                   **CODE: P20CA1:1**
**CREDITS:3**                                    **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES

After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Summarize the basic concepts and the functionalities of Software Engineering | K2 | I |
| CO2 | Identify the various software requirements in designing processes | K3 | II |
| CO3 | Examine the quality of the software | K4 | III |
| CO4 | Apply the various software management techniques to maintain the software | K3 | IV |
| CO5 | Assess the software using metric techniques | K5 | V |
| CO6 | Develop software and apply strategies of project management | K6 | V |

## 2 A. Syllabus

**UNIT I - Software Process Model**                                 **12 Hours**
       **The Nature of Software:** The Nature of Software – The Changing Nature of Software – **Software Engineering**: The Software Process – Software Engineering Practice – Software Development Myths. **The Software Process: Software Process Structure:** A Generic Process Model – Process Assessment and Improvement – **Process Models:** Prescriptive Process Models – Specialized Process Models – The Unified Process.

**UNIT II - Requirements Modeling**                                 **12 Hours**
       **Modeling: Principles that Guide Practice:** Software Engineering Knowledge - Core Principles – Principles That Guide Each Framework Activity. **Understanding Requirements:** Requirements Engineering – Establishing the Groundwork – Eliciting Requirements – Developing UseCases – Building the Analysis Model – Negotiating Requirements – Validating Requirements. **Requirements Modeling: Scenarios based methods:**Requirements Analysis – Scenario–Based Modeling – UML Models That Supplement the Use Case- **Requirements Modeling: Class-based Methods:** Class–Based Modeling-Identifying Analysis Classes- Specifying Attributes- Defining Operations-Class Responsibility Collaborator Modeling

**UNIT III - Software Design**                                     **12 Hours**
       **Design Concepts:** Design within the Context of Software Engineering - The Design Process - Design Concepts - The Design Model. **Architectural Design:** Software Architecture – Architectural Genres – Architectural Styles – Architectural Design - **User Interface Design:** The Golden Rules–Interface Design Steps - **Quality Management: Quality Concepts:** Software Quality – The Software Quality Dilemma – Achieving Software Quality.

**UNIT IV - Software Quality Assurance and Testing**                      **12 Hours**
       **Software Quality Assurance:** Background Issues – Elements of Software Quality Assurance – SQA Tasks, Goals and Metrics – Formal Approaches to SQA – Statistical Software Quality Assurance - **Software Testing Strategies:** AStrategic Approach to Software Testing –Strategic Issues – Test Strategies for Conventional Software – Validation Testing – System Testing – The Art of Debugging. **Testing Conventional Applications:** Software Testing Fundamentals –Internal and External Views of Testing – White Box Testing – Basis Path Testing – Control Structure Testing – Black Box Testing.

**UNIT V - Software Project and Risk Management** **12 Hours**

**Managing Software Projects: Project Management Concepts:** The Management Spectrum – People – The Product – The Process – The Project. **Estimation For Software Projects:** Software Project Estimation – Decomposition Techniques – Empirical Estimation Models. **Project Scheduling:** Basic Concepts – Project Scheduling – Scheduling **- Risk Management:** Software Risks – Risk Identification – Risk Projection – Risk Refinement – Risk Mitigation, Monitoring and Management.

## B. TOPICS FOR SELF-STUDY:

| S.No. | Topics | Web Links |
|-------|--------|-----------|
| 1 | The Capability Maturity Model Integration (CMMI) | **http://dthomas-software.co.uk/resources/frequently-asked-questions/what-is-cmmi-2** |
| 2 | Business process reengineering | **https://www.geeksforgeeks.org/introduction-to-business-process-re-engineering** |
| 3 | Reverse engineering | **https://www.youtube.com/watch?v=eB4o0feXw7Q** |
| 4 | Component Based Software Engineering | **https://www.geeksforgeeks.org/component-based-software-engineering/** |

## C. Text Book:

1. Roger S. Pressman, "Software Engineering - A Practitioner's Approach", McGraw Hill, Eighth Edition, 2019.

## D. Reference Books:

1. Ian Sommerville, "Software Engineering", Pearson Education Asia, Tenth Edition, 2016.
2. James F Peters and Witold Pedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2010.

## E. Web links:

1. **https://swayam.gov.in/**
2. **https://nptel.ac.in/**

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|-----------------------|----------------|-------------------|------------------------------------------------|
| **I** | **Software and Software Engineering** | | |
| 1.1 | The Nature of Software | Recall the basic concepts of software engineering | K1 |
| 1.2 | The Unique Nature of Web Apps | Identify the nature of web apps | K3 |
| 1.3 | Software Engineering | Recall the characteristics of software engineering | K1 |
| 1.4 | The Software Process | Illustrate software process | K2 |
| 1.5 | Software Engineering Practice | Discuss the practices in software engineering | K6 |
| 1.6 | Software Myths | Analyze the software myths | K4 |
| | **The Software Process: Process Models** | | |
| 1.7 | A Generic Process Model | Illustrate generic process model | K2 |
| 1.8 | Process Assessment and Improvement | Assess a process and improve it | K5 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1.9 | Prescriptive Process Models | Build prescriptive process models | K6 |
| 1.10 | Specialized Process Models | Construct specialized process models | K6 |
| 1.11 | The Unified Process. | Design unified process model | K6 |
| **II** | **Modeling: Principles that Guide Practice** | | |
| 2.1 | Software Engineering Knowledge | Discuss about software engineering | K6 |
| 2.2 | Core Principles | Explain the core principles in software engineering | K2 |
| 2.3 | Principles That Guide Each Framework Activity | Illustrate the framework activity | K2 |
| | **Understanding Requirements** | | |
| 2.4 | Requirements Engineering | Discuss requirements engineering | K6 |
| 2.5 | Establishing the Groundwork | Illustrate ground work activities | K2 |
| 2.6 | Eliciting Requirements | Explain the requirements | K2 |
| 2.7 | Developing Use Cases | Apply use case model in software process | K3 |
| 2.8 | Building the Requirements Model | Discuss the concepts for building the requirement model | K6 |
| 2.9 | Negotiating Requirements | Take part in negotiating requirements | K4 |
| 2.10 | Validating Requirements | Utilize the validating techniques based on requirements | K3 |
| | **Requirements Modeling Scenarios, Information and Analysis Classes** | | |
| 2.11 | Requirements Analysis | Identify the elements of requirement models | K3 |
| 2.12 | Scenario–Based Modeling | Explain scenario–based modeling | K2 |
| 2.13 | UML Models That Supplement the Use Case | Develop a use case model for safe home security system | K6 |
| 2.14 | Class–Based Modeling | Elaborate on class-based modeling | K6 |
| **III** | **Design Concepts** | | |
| 3.1 | Design within the Context of Software Engineering | Discuss the design concepts | K6 |
| 3.2 | The Design Process | Outline the principles of design model | K2 |
| 3.3 | Design Concepts | Apply the concepts in designing | K3 |
| 3.4 | The Design Model | Construct a model | K6 |
| | **Architectural Design** | | |
| 3.5 | Software Architecture | Develop software | K6 |
| 3.6 | Architectural Genres | Illustrate architectural genres | K2 |
| 3.7 | Architectural Styles | List out the styles in architecture | K4 |
| 3.8 | Architectural Design | Discuss the architectural design | K6 |
| | **User Interface Design** | | |
| 3.9 | The Golden Rules | Identify the golden rules for user interface | K3 |
| 3.10 | Interface Design Steps | List out the steps involved in designing an interface | K4 |
| | **Quality Management: Quality Concepts** | | |
| 3.11 | Software Quality | Recall software quality | K1 |
| 3.12 | The Software Quality Dilemma | Classify the software quality dilemma | K4 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 3.13 | Achieving Software Quality | Assess the quality of software | K5 |
| **IV** | **Software Quality Assurance** | | |
| 4.1 | Background Issues | Recall background issues | K1 |
| 4.2 | Elements of Software Quality Assurance | Classify the various elements insoftware quality assurance | K2 |
| 4.3 | SQA Tasks, Goals and Metrics | Elaborate on SQA tasks, goals and metrics | K6 |
| 4.4 | Formal Approaches to SQA | Summarize the formal approaches to SQA | K2 |
| 4.5 | Statistical Software Quality Assurance | Elaborate the statistical software quality assurance | K6 |
| 4.6 | Software Reliability | Define software reliability | K1 |
| 4.7 | The ISO 9000 Quality Standards | Explain the ISO 9000 quality standards | K2 |
| 4.8 | The SQA Plan | List out the SQA plan | K1 |
| | **Software Testing Strategies** | | |
| 4.9 | Strategic Approach to Software Testing | Categorize strategic approach to software testing | K4 |
| 4.10 | Strategic Issues | List out the strategic issues | K1 |
| 4.11 | Test Strategies for Conventional Software | Applytest strategies for conventional software | K3 |
| 4.12 | Test strategies for Object–Oriented Software | Identify test strategies for object–oriented software | K3 |
| 4.13 | Test Strategies for WebApps | Recall test strategies for WebApps | K1 |
| 4.14 | Validation Testing | Test the software for validation | K6 |
| 4.15 | System Testing | Categorize system testing | K4 |
| 4.16 | The Art of Debugging | Illustrate the process of debugging | K2 |
| | **Testing Conventional Applications** | | |
| 4.17 | Software Testing Fundamentals | Recall testing fundamentals | K1 |
| 4.18 | Internal and External Views of Testing | Distinguish internal and external views of testing | K4 |
| 4.19 | White Box Testing | Test the software using White Box testing | K6 |
| 4.20 | Basis Path Testing | Apply basis path testing | K3 |
| 4.21 | Control Structure Testing | Develop control structure testing | K3 |
| 4.22 | Black Box Testing | Apply Black Box testing | K3 |
| 4.23 | Model Based Testing | Elaborate on model based testing | K6 |
| **V** | **Managing Software Projects: Project Management Concepts** | | |
| 5.1 | The Management Spectrum | Analyze the project management spectrum | K4 |
| | **Estimation For Software Projects** | | |
| 5.2 | Software Project Estimation | Assess project estimation | K5 |
| 5.3 | Decomposition Techniques | Make use of decomposition techniques | K3 |
| 5.4 | Empirical Estimation Models | Analyze empirical estimation models | K4 |
| | **Project Scheduling** | | |
| 5.5 | Basic Concepts | Outlinethe basic concepts in project scheduling | K2 |
| 5.6 | Project Scheduling | Explain project scheduling | K5 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.7 | Scheduling | Utilize scheduling techniques | K3 |
| | **Risk Management** | | |
| 5.8 | Software Risks | List out the types of risks | K1 |
| 5.9 | Risk Identification | Identify the risks | K3 |
| 5.10 | Risk Projection | Explain risk projection | K2 |
| 5.11 | Risk Refinement | Discuss risk refinement | K6 |
| 5.12 | Risk Mitigation, Monitoring and Management | Illustrate risk mitigation, monitoring and management | K4 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | M | - | L | - | - | M | M | M | L | H | M | M | - |
| **CO2** | M | H | M | M | L | L | M | L | M | H | H | M | L |
| **CO3** | H | H | M | M | H | M | H | M | H | H | M | H | M |
| **CO4** | H | M | M | M | M | M | M | M | M | M | M | M | M |
| **CO5** | H | H | M | M | H | L | H | H | H | M | H | M | H |
| **CO6** | H | H | H | H | H | M | M | M | M | H | M | M | H |

**L-Low**     **M-Moderate**     **H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:
1. Course end survey (Feedback)


**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr. L. JAYASIMMAN                          Dr.R.THAMARAI SELVI

# Elective I: MICROPROCESSOR AND MICRO CONTROLLERS

| | |
|---|---|
| **SEMESTER : I** | **CODE: P20CA1:2** |
| **CREDITS: 3** | **HOURS/WEEK: 4** |

## 1. COURSE OUTCOMES
After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|---|---|---|---|
| CO1 | Outline Architecture of Different Microprocessor | K2 | I |
| CO2 | Apply Addressing modes in Program | K3 | I |
| CO3 | Develop Assembly Language Program 8086 | K6 | II |
| CO4 | Outline Architecture of Pentium Microprocessor | K2 | III |
| CO5 | Adapt Peripherals Interface in Real time application | K6 | IV |
| CO6 | Develop program using 8051 instructions | K6 | V |

## 2 A Syllabus

**UNIT I - Introduction:**                                                  **9 Hours**

Evolution of Microprocessor – Intel 8085 Architecture – Instruction Set – Instruction and Data Formats – Addressing Modes – Status Flags – Intel 8085 Instructions – Simple 8085 Programs.

**UNIT II - 8086 Microprocessor:**                                         **9 Hours**

Architecture of Intel 8086 Microprocessor – Addressing Modes–Instruction Set - Assembly Language Programming.

**UNIT III**                                                               **9 Hours**

Salient Features of 80286– Internal Architecture of 80286– Signal Description of 80286 – Salient Feature of 80386 DX Architecture and Signal Description of 80386 – Register Organization of 80386– Addressing Modes – Data Types of 80386 – Salient Feature of 80586 (Pentium)– Few Relevant Concepts of Computer Architecture – System Architecture.

**UNIT IV - Interfacing Concepts:**                                        **9 Hours**

Programmable Peripherals Interface (PPI) – Programmable Communication Interface (PCI) – DMA Controller– Interrupt Controller.

**UNIT V**                                                                 **9 Hours**

Architecture of 8051–Signal Descriptions of 8051–Register Set of 8051–Important Operational Features of 8051–Memory and I/O Addressing by 8051–Interrupts of 8051–Instruction Set of 8051–Design of a Micro Controller 8051 Based Length Measurement System for Continuously Rolling Cloth or Paper.

## B. TOPICS FOR SELF-STUDY:

| S.No. | Topics | Web Links |
|---|---|---|
| 1 | Assembly programming in 8086 | **https://www.tutorialspoint.com/assembly_programming/index.htm** |
| 2 | Architecture of Pentium III | **https://www.techopedia.com/definition/24424/pentium-iii** |

| 3 | Programmable keyboard interface | **https://www.wisdomjobs.com/e-university/microprocessor-tutorial-2391/8279-programmable-keyboard-25914.html** |
|---|---|---|
| 4 | Function of TMOD and TCON Registers | **https://www.elprocus.com/8051-microcontroller-8-16-bit-timers-and-counters/** |

**C. Text Books:**
1. Badriram, Fundamentals of Microprocessor and Microcomputers, Dhanpat Rai and Sons, Fourth Edition 1993.
2. Liu and Gibson, Microcomputer System The 8086/8088 Family, Prentice Hall of India Pvt. Ltd, 1991.
3. A.K.Ray and K.M.Bhurchandi, Advanced Microprocessors and Peripherals TMH 2000.

**D. Reference Books:**
1. Douglas.V.Hall Microprocessor and Interfacing– Programming and Hardware McGraw Hill, 1986.
2. R.S.Goankar, Microprocessor Architecture, Programming and Applications 8080/8085 A, Wiley Eastern Ltd, New Delhi, 1991.

**E. Web links:**

1. **https://www.tutorialspoint.com/microprocessor/index.htm**
2. **https://www.javatpoint.com/microprocessor-tutorial**
3. **https://www.geeksforgeeks.org/microprocessor-tutorials/**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| **I** | **Architecture of 8085** | | |
| 1.1 | Evolution of Microprocessor | Classify the various Microprocessor | K4 |
| 1.2 | Intel 8085 Architecture | Illustrate Architecture of 8085 | K2 |
| 1.3 | Instruction Set | Illustrate Instruction Set with example | K2 |
| 1.4 | Instruction and Data Formats | Elaborate instruction and data Format | K6 |
| 1.5 | Addressing Modes | Discuss four Addressing Modes | K6 |
| 1.6 | Status Flags | Explain about status flag | K2 |
| 1.7 | Intel 8085 Instructions | Classify the various instructions | K4 |
| 1.8 | Simple 8085 Programs | Develop 8085 programs | K6 |
| **II** | **Architecture of 8086** | | |
| 2.1 | Architecture of Intel 8086 Microprocessor | Illustrate Architecture of 8086 | K2 |
| 2.2 | Addressing Modes | Discuss Addressing Modes of 8086 | K6 |
| 2,3 | Instruction Set | Illustrate Instruction Set with example | K2 |
| 2.4 | Assembly Language Programming | Develop Assembly Language Programm | K6 |
| **III** | **Architecture of 80286 and 80386** | | |
| 3..1 | Salient Features of 80286 | Elaborate Salient Features of 80286 | K6 |
| 3.2 | Internal Architecture of 80286 | Illustrate Architecture of 80286 | K2 |
| 3.3 | Signal Description of 80286 | Explain Signal Description of 80286 | K2 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 3.4 | Salient Feature of 80386 DX Architecture | Elaborate Salient Features of 80386 | K6 |
| 3.5 | Signal Description of 80386 | Explain Signal Description of 80386 | K2 |
| 3.6 | Register Organization of 80386 | Explain Register Organization of 80386 | K2 |
| 3.7 | Addressing Modes | Discuss about Addressing Modes | K6 |
| 3.8 | Salient Feature of 80586 (Pentium) | Elaborate Salient Features of 80586 | K6 |
| 3.9 | Few Relevant Concepts of Computer Architecture | Explain about Computer Architecture | K2 |
| IV | **Interfacing Concepts** | | |
| 4.1 | Programmable Peripherals Interface (PPI) | Elaborate function of PPI | K6 |
| 4.2 | Programmable Communication Interface (PCI) | Explain Programmable Communication Interface (PCI) | K2 |
| 4.3 | DMA Controller | Illustrate Function of DMA controller | K2 |
| 4.4 | Interrupt Controller | Illustrate Function of PIC | K2 |
| V | **Architecture of 8051** | | |
| 5.1 | Architecture of 8051 | Illustrate Architecture of 8051 | K2 |
| 5.2 | Signal Descriptions of 8051 | Explain Signal Description of 8051 | K2 |
| 5.3 | Register Set of 8051 | Elaborate Register Set of 8051 | K6 |
| 5.4 | Operational Features of 8051 | Elaborate Operational Features of 8051 | K6 |
| 5.5 | Memory and I/O Addressing by 8051 | Illustrate Memory and I/O Addressing | K2 |
| 5.6 | Interrupts of 8051 | Discuss about Interrupts of 8051 | K6 |
| 5..7 | Instruction Set of 8051 | Illustrate Instruction Set with example | K2 |
| 5.8 | Design of a Micro Controller 8051 Based Length Measurement System for Continuously Rolling Cloth or Paper | Elaborate Length Measurement System | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | L | L | - | - | M | H | L | M | H | - | M |
| CO2 | H | H | M | H | M | H | M | L | H | H | H | M | M |
| CO3 | H | H | M | H | H | M | H | M | H | H | L | L | L |
| CO4 | H | H | H | M | H | M | M | H | H | L | L | M | M |
| CO5 | H | H | M | H | M | H | M | L | H | M | M | L | L |
| CO6 | H | H | H | H | H | M | H | M | M | H | M | H | H |

**L-Low          M-Moderate          H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:
1. Course end survey (Feedback)


**COURSE COORDINATOR**                                **HEAD OF THE DEPARTMENT**
Dr.K.MOHAMED AMANULLAH                          Dr.R.THAMARAI SELVI

<h1 align="center">Elective I: COMPUTER GRAPHICS</h1>

**SEMESTER : II**  **CODE: P20CA1:3**
**CREDITS : 3**  **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES:
After the completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|---|---|---|---|
| CO1 | Summarize the basic concepts and features and mathematical applications of Computer Graphics | K2 | 1 |
| CO2 | Analyze the fundamentals of 2D and 3D Computer Graphics | K3 | II |
| CO3 | Apply the various concepts of viewing and interactive techniques | K4 | III |
| CO4 | Examine the three-dimensional techniques in Computer Graphics Application | K3 | IV |
| CO5 | Build the knowledge of Visible–Surface Detection Methods | K5 | V |
| CO6 | Develop the application using computer animation | K6 | V |

## 2 A. Syllabus

**UNIT I**  **10 Hours**
**Overview of Graphics Systems**: Video Display Devices – Input Devices – Hard Copy Devices – Graphics Software – Introduction to OpenGL. **Graphics Output Primitives:** Line–Drawing Algorithms – Line Equations – DDA Algorithm – Bresenham's Algorithm – Circle – Generating Algorithms.

**UNIT II**  **10 Hours**
**Attributes of Graphics Primitives:** Color and Gray Scale – Line Attributes – Fill–Area Attributes – Character Attributes – Antialiasing. – OpenGL Color Functions. **Geometric Transformations:** Basic Two Dimensional Geometric Transformations – Matrix Representations and Homogeneous Coordinates.

**UNIT III**  **10 Hours**
**Two–Dimensional Viewing:** The Clipping Window – Clipping Algorithms – Two Dimensional Line Clipping – Polygon Fill – Area Clipping – Curve Clipping – Text Clipping. **Interactive Input Methods and Graphical User Interfaces:** Logical Classification of Input Devices – Interactive Picture Construction Techniques.

**UNIT IV**  **10 Hours**
**Three Dimensional Viewing:**Three–Dimensional Viewing Pipeline – Three–Dimensional Viewing – Coordinate Parameters Transformation from World to Viewing Coordinates – Projection Transformations – Perspective Projections– OpenGL Three Dimensional Viewing Functions.

**UNIT V**  **10 Hours**
**Visible–Surface Detection Methods:** Classification of Visible–Surface Detection Algorithms – Comparison of visibility – Detection Methods – Curved Surfaces – Wire–Frame Visibility Methods. **Computer Animation:** Design of Animation Sequences – Traditional Animation Techniques – General Computer–Animation Functions – Computer Animation Languages – Key-Frame Systems – Motion Specifications.

**UNIT VI**  **10 Hours**
**Hierarchical Modeling:** Basic modeling concepts- System Representation Symbol Hierarchies- Modeling Package- **Graphics File Formats:** Image file configuration-Color Reduction Methods- Uniform Color Reduction-Popularity Color Reduction- Median cut Color Reduction

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**B. TOPICS FOR SELF STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Hidden Surface Removal | **https://www.javatpoint.com/computer-graphics-hidden-surface-removal** |
| 2 | Pointing and Positioning Techniques | **https://www.javatpoint.com/computer-graphics-pointing-and-positioning-techniques** |
| 3 | Pointing and Positioning Techniques | **https://www.tutorialspoint.com/computer_graphics/computer_graphics_fractals.htm** |
| 4 | Data Explorer | **http://www.phys.ocean.dal.ca/docs/DX_tutorial.html** |

**C. Text Book:**

1. Donald Hearn, M. Pauline Baker, "*Computer Graphics with Open GL",* Pearson Education, Third Edition, 2009.

**D. Reference Books:**

1. Newman William M., Sproull Robert F., "*Principles of Interactive Computer Graphics",* McGraw Hill, 2010.

**E. Web links:**

1. **https://www.youtube.com/watch?v=AaPq489I8Y8**
2. **https://www.youtube.com/watch?v=jGYFRPoiDBg**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| I | **Overview of Graphics Systems** | | |
| 1.1 | Video Display Devices | Recall the basic concepts of Video Display Devices | K1 |
| 1.2 | Input Devices | Summarize the Input Devices | K2 |
| 1.3 | Hard Copy Devices | Explain Hard Copy Devices | K2 |
| 1.4 | Graphics Software | Discuss Graphics Software | K6 |
| 1.5 | Introduction to OpenGL | Illustrate OpenGL | K2 |
| | **Graphics Output Primitives** | | |
| 1.6 | Line Drawing Algorithms | Explain Line Drawing Algorithms | K2 |
| 1.7 | Line Equations | Define Line Equations | K1 |
| 1.8 | DDA Algorithm | Outline DDA Algorithm | K2 |
| 1.9 | Bresenham's Algorithm | Develop Bresenham's Algorithm | K3 |
| 1.10 | Circle – Generating Algorithms. | Illustrate Circle – Generating Algorithms. | K2 |
| II | **Attributes of Graphics Primitives** | | |
| 2.1 | Color and Gray Scale | Identify the basic concepts of Color and Gray Scale | K3 |
| 2.2 | Line Attributes | Explain Line Attributes | K2 |

| Unit Covered/Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.3 | Fill–Area Attributes | Demonstrate Fill–Area Attributes | K2 |
| 2.4 | Antialiasing | Discuss Antialiasing | K6 |
| 2.5 | OpenGL Color Functions | Build OpenGL Color Functions | K3 |
| | **Geometric Transformations:** | | |
| 2.6 | Basic Two Dimensional Geometric Transformations | Discuss Basic Two Dimensional Geometric Transformations | K6 |
| 2.7 | Matrix Representations and Homogeneous Coordinates. | Identify Matrix Representations and Homogeneous Coordinates. | K3 |
| III | **Two–Dimensional Viewing** | | |
| 3.1 | The Clipping Window | Define Clipping Window | K1 |
| 3.2 | Clipping Algorithms | Discuss Clipping Algorithms | K6 |
| 3.3 | Two Dimensional Line Clipping | Develop Two Dimensional Line Clipping | K3 |
| 3.4 | Polygon Fill | Illustrate Polygon Fill | K2 |
| 3.5 | Area Clipping | Elaborate Area Clipping | K6 |
| 3.6 | Curve Clipping | Examine Curve Clipping | K4 |
| 3.7 | Text Clipping | Demonstrate Text Clipping | K2 |
| | **Interactive Input Methods and Graphical User Interfaces** | | |
| 3.8 | Logical Classification of Input Devices | Classify Input Devices | K2 |
| 3.9 | Interactive Picture Construction Techniques | Demonstrate Interactive Picture Construction Techniques | K2 |
| IV | **Three Dimensional Viewing** | | |
| 4.1 | The Three–Dimensional Viewing Pipeline | Discuss Three–Dimensional Viewing Pipeline | K6 |
| 4.2 | Three–Dimensional Viewing | Explain Three–Dimensional Viewing | K2 |
| 4.3 | Coordinate Parameters Transformation from World to Viewing Coordinates | Demonstrate Coordinate Parameters Transformation from World to Viewing Coordinates | K2 |
| 4.4 | Projection Transformations | Illustrate Projection Transformations | K2 |
| 4.5 | Perspective Projections | Identify Perspective Projections | K3 |
| 4.6 | OpenGL Three Dimensional Viewing Functions. | Develop OpenGL Three Dimensional Viewing Functions. | K3 |
| V | **Visible–Surface Detection Methods:** | | |
| 5.1 | Classification of Visible – Surface Detection Algorithms | Classify Visible–Surface Detection Algorithms | K2 |
| 5.2 | Comparison of visibility | Explain Comparison of visibility | K2 |

| Unit Covered/Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.2 | Detection Methods | Discuss Detection Methods | K6 |
| 5.4 | Curved Surfaces | Evaluate Curved Surfaces | K5 |
| 5.5 | Wire – Frame Visibility Methods. | Formulate Wire–Frame Visibility Methods. | K6 |
| | **Computer Animation** | | |
| 5.6 | Design of Animation Sequences | Discuss the Design of Animation Sequences | K6 |
| 5.7 | Traditional Animation Techniques | Examine Traditional Animation Techniques | K4 |
| 5.8 | General Computer | Explain General Computer | K2 |
| 5.9 | Animation Functions | Demonstrate Animation Functions | K2 |
| 5.10 | Computer Animation Languages | Apply Computer Animation Languages | K3 |
| 5.11 | Key-Frame Systems | Illustrate Key-Frame Systems | K2 |
| 5.12 | Motion Specifications | Explain Motion Specifications | K2 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | - | L | - | - | H | M | M | L | H | M | M | - |
| CO2 | M | H | M | M | L | L | M | L | M | H | H | M | L |
| CO3 | H | H | M | M | H | M | H | M | H | H | M | H | M |
| CO4 | H | M | M | M | M | L | M | M | M | M | M | M | M |
| CO5 | H | H | M | M | H | M | H | H | H | M | H | M | H |
| CO6 | H | H | H | H | H | M | M | M | M | H | M | M | H |

L-Low          M-Moderate          H- High

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book

2. Open Book Test.

3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Seminar, Quiz (written).

4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

2.

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr. L. JAYASIMMAN                              Dr.R.THAMARAI SELVI

**SEMESTER : I**                                                    **CODE: P20CA1P1**
**CREDITS:3**                                                      **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES
After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Exercise |
|-------|-----------------|-------|----------|
| CO1 | Design web applications using ASP.NET controls | K6 | 1 |
| CO2 | Create application using MVC Bootstrap | K6 | 2,3 |
| CO3 | Develop ASP .NET MVC Dashboard applications | K6 | 4 |
| CO4 | Create application using model class in ASP .NET MVC framework | K6 | 5,6 |
| CO5 | Design web applications with database connectivity | K6 | 7 |
| CO6 | Justify Code First methodology | K5 | 8 |

| Ex.No. | Exercise |
|--------|----------|
| 1 | Design an ASP.NET web form using HTML Server Controls. Use at least 5 different controls. |
| 2 | Design a website using web controls to create an interactive website. |
| 3 | Create a Movie database application with ASP.NET MVC. |
| 4 | Design a MVCand Razor with database connection for CRUD |
| 5 | Create an ASP.NET MVC with Bootstrap |
| 6 | Design a Web based application for Event management system |
| 7 | Write an application for Restaurant table booking application. |
| 8 | Create an Online quiz application with Dashboard. |

## 2. TOPICS FOR SELF STUDY:

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Timesheet Project | https://www.c-sharpcorner.com/article/timesheet-project-process-using-mvc-5/ |
| 2 | Healthcare Portal | https://dzone.com/articles/clinic-project-using-aspnet-mvc5 |
| 3 | Template download | https://themeforest.net/ |
| 4 | Pharm Assistant | https://www.youtube.com/watch?v=cG5tzgAkRBc |

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Ex.No. | Lab Exercises | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1 | HTML Server Controls | Develop a web page using HTML Server Controls | K6 |
| 2 | Web Controls | Design an interactive website using web controls | K6 |
| 3 | Movie Database Application | Create an application for movie database using MVC | K6 |
| 4 | MVC and Razor with Database Connection for CRUD | Develop a web application for CRUD operations with Razor pages | K6 |
| 5 | MVC with Bootstrap | Design a responsive web application using MVC Bootstap | K6 |
| 6 | Event Management System | Design a web application for event management system | K6 |
| 7 | Restaurant Table Booking Application | Build an application for restaurant table booking | K6 |
| 8 | Online Quiz Application with Dashboard | Design an online quiz application with dashboard | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H | M | H | M | H | H | H | H | H | M | L | L | M |
| CO2 | H | M | M | M | H | H | H | M | H | L | L | L | M |
| CO3 | H | H | H | M | H | H | H | H | H | H | H | H | H |
| CO4 | H | H | H | M | H | H | H | H | H | H | H | H | H |
| CO5 | H | H | H | M | H | M | H | H | H | H | H | H | H |
| CO6 | H | H | H | M | H | H | H | H | H | H | H | H | H |

**L-Low        M-Moderate        H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2. Cooperative Learning Report, Assignment, Group Discussion, Project Report, Seminar.
3. Pre/Post Test, Viva, Report for each Exercise.
4. Lab Model Examination & End Semester Practical Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Mr. A.SANDANASAMY                              Dr.R.THAMARAI SELVI

**\*\*\*\*\*\*\*\*\*\***

## Core Practical II: OPERATING SYSTEM PROGRAMMING LAB

**SEMESTER : I**                                                      **CODE: P20CA1P2**
**CREDITS:3**                                                         **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES

After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Exercise |
|-------|-----------------|-------|----------|
| CO1 | Compare the various CPU scheduling algorithms | K5 | 1 |
| CO2 | Compare the file allocation strategies | K5 | 2,6 |
| CO3 | Implement various memory management techniques | K6 | 3,4,5 |
| CO4 | Determine the situations that lead to deadlock | K3 | 7 |
| CO5 | Make use of disk scheduling algorithms | K5 | 8 |
| CO6 | Make use of page replacement algorithms | K5 | 9,10 |

| Ex. No. | Exercise |
|---------|----------|
| 1 | Write a C program to simulate the following non-preemptive CPU scheduling algorithms to find turnaround time and waiting time. <br> a)FCFS   b)SJF    c) Round Robin    d)Priority |
| 2 | Write a C program to simulate the following file allocation strategies. <br> a)Sequential   b)Indexed    c)Linked |
| 3 | Write a C program to simulate the MVT and MFT memory management techniques. |
| 4 | Write a C program to simulate the following contiguous memory allocation techniques <br> a)Worst-fit    b)Best-fit     c)First-fit |
| 5 | Write a C program to simulate paging technique of memory management. |
| 6 | Write a C program to simulate the following file organization techniques <br> a) Single level directory                              b) Two level directory <br> c)Hierarchical |
| 7 | Write a C program to simulate Bankers algorithm for the purpose of deadlock avoidance. |
| 8 | Write a C program to simulate disk scheduling algorithms <br> a)FCFS           b)SCAN      c)C-SCAN |
| 9 | Write a C program to simulate page replacement algorithms <br> a)FIFO     b)LRU  c)LFU |
| 10 | Write a C program to simulate page replacement algorithms <br> a) Optimal |

## 2. TOPICS FOR SELF STUDY:

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Simulate Optimal Page Replacement Algorithms | **https://www.iare.ac.in/sites/default/files/lab2/OS%20LAB%20MANUAL_0.pdf** |
| 2 | Simulate product-consumer problem using semaphores | **https://www.iare.ac.in/sites/default/files/lab2/OS%20LAB%20MANUAL_0.pdf** |
| 3 | Simulate Dining Philosophers problem | **https://www.iare.ac.in/sites/default/files/lab2/OS%20LAB%20MANUAL_0.pdf** |
| 4 | Deadlock Prevention | **criteriaiiwithevidencelinkfinal.zip** |

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Ex.No. | Lab Exercises | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|--------|--------------|-------------------|------------------------------------------------|
| 1 | CPU Scheduling Algorithms | Develop a C program to find the turnaround time and waiting time | K6 |
| 2 | File Allocation Strategies | Develop a C program to simulate file allocation strategies | K6 |
| 3 | Memory Management Techniques | Create a C program to simulate the MVT and MFT memory management techniques. | K6 |
| 4 | Memory Allocation Techniques | Design a C program for contiguous memory allocation techniques | K6 |
| 5 | Paging technique of Memory Management | Develop a C program to use paging technique for memory management. | K6 |
| 6 | File Organization Techniques | Create a C program to use the file organization techniques | K6 |
| 7 | Bankers Algorithm for Deadlock Avoidance | Design a C program to simulate Bankers algorithm for the purpose of deadlock avoidance. | K6 |
| 8 | Disk Scheduling Algorithms | Create a C program for disk scheduling algorithms | K6 |
| 9 | Page Replacement Algorithms | Develop a C program to utilize replacement algorithms | K6 |
| 10 | Page Replacement Algorithms | Create a C program to make use of page replacement algorithms | K6 |

## 4. MAPPING (CO, PO, PSO)

|      | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1  | H   | M   | H   | L   | H   | H   | H   | H   | H   | L    | L    | L    | -    |
| CO2  | H   | M   | M   | M   | H   | H   | H   | M   | H   | L    | L    | L    | -    |
| CO3  | H   | H   | H   | M   | H   | H   | H   | H   | H   | H    | H    | H    | H    |
| CO4  | H   | H   | H   | M   | H   | H   | H   | H   | H   | H    | H    | H    | H    |
| CO5  | H   | H   | H   | M   | H   | M   | H   | H   | H   | H    | H    | H    | H    |
| CO6  | H   | H   | H   | M   | H   | H   | H   | H   | H   | H    | H    | H    | H    |

**L-Low          M-Moderate          H- High**

## 5. COURSE ASSESSMENT METHODS

### DIRECT:

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2. Cooperative Learning Report, Assignment, Group Discussion, project Report, Seminar.
3. Pre/Post Test, Viva, Report for each Exercise.
4. Lab Model Examination & End Semester Practical Examination

### INDIRECT:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                     **HEAD OF THE DEPARTMENT**
Mrs.J.JASMINE CHRISTINA MAGDALENE            Dr.R.THAMARAI SELVI

## SBC: COMMUNICATION LIFE SKILL

**SEMESTER : I**                                                      **CODE: P20CAPS1**
**CREDIT:1**                                                          **HOURS/WEEK: 2**

### 1. COURSE OUTCOMES

After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Summarize the importance of Listening, Speaking, Reading and Writing | K2 | I |
| CO2 | Construct effective reports and contents for writing | K6 | II |
| CO3 | Build leadership and problem-solving skills | K6 | III |
| CO4 | Develop good interaction skills | K6 | IV |
| CO5 | Compose a good resume and cover letters | K6 | V |
| CO6 | Improve their presentation skills for facing interviews | K6 | V |

### 2A. Syllabus

**UNIT I - Language Skills**                                          **6 Hours**

Active Listening Skills- Effective Speaking skills- Reading Skills- Techniques for Improving Comprehension- Elements of Effective Writing Skills.

**UNIT II - Employability Skills**                                    **6 Hours**

Writing Reports: Importance of Report- Meeting Minutes-Writing Cover Letter: -Academic and Business-Resume Writing.

**UNIT III - Creative Skills**                                        **6 Hours**

Social Media writing: E mail and Blog-Preparing Presentation Graphics-PPT-Content writing (Paraphrasing, Summarizing and Story writing)-Describing products and services-describing processes-persuading people-giving opinions-presenting arguments-explaining-proposing-presenting a product.

**UNIT IV - Presentational Skills**                                   **6 Hours**

Presentation Strategies - Process of Preparing and Delivering Presentation - Planning the Introduction and the Conclusion - Answering Questions after Presentation - Group Discussion.

**UNIT V - Conversational Skills**                                    **6 Hours**

Face to face interaction in formal and informal situations - greetings-replying to greetings-introducing others-welcoming-bidding farewell-appearing in an interview-talking about oneself - Telephonic interactions: taking messages-making appointments-making enquiries regarding travel/hotel bookings-apologizing-complaining-giving information.

**B. TOPICS FOR SELF-STUDY:**

| S.No. | Topics | Web Links |
|-------|--------|-----------|
| 1 | Essential Grammar | **https://www.englishclub.com/grammar/** |
| 2 | Phonetic | **https://www.youtube.com/watch?v=7mahm MmnSx4** |
| 3 | Idioms and Phrases | **https://www.youtube.com/watch?v=Hm-n-_uqCvQ** |
| 4 | Figurative Language | **https://www.youtube.com/watch?v=OZZkO Ojlcgc** |

**C. Text Books:**

1. Raman, Meenakshi, and Sangeeta Sharma. Technical Communication. 3rd ed., Oxford University Press, 2015.
2. Santhi Jeya. V, R. Selvam. Advanced Skills for Communication in English Book - I. New Century Book House (P) Ltd, 2011.

**D. Reference Books:**

1. Raman, Meenakshi, and Sangeeta Sharma. Technical Communication for Gujarat Technological University. 2nd ed., Oxford University Press, 2017.
2. Raman, Meenakshi, and Sangeeta Sharma. Professional English. 1st ed., Oxford University Press, 2019.
3. MacKenzie, Andrea et al. NET Working Workplace Communication in the English Classroom. Curriculum Development Institute Education Bureau Hong Kong (SAR), 2009.

**E. Web links:**

1. **https://www.youtube.com/watch?v=kBOccKc5yxY**
2. **https://www.youtube.com/watch?v=IKjl7Kdq-VQ&t=2554s**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|-----------------------|----------------|-------------------|-----------------------------------------------|
| **I** | **Language Skills** | | |
| 1.1 | Active Listening Skills | List out the importance of being an active listener. | K4 |
| 1.2 | Effective Speaking skills | Categorize ways to improvise the fluency in English | K4 |
| 1.3 | Reading Skills | Appraise and develop the strategies for reading | K5 |
| 1.4 | Improving Comprehension | Discover various ways on comprehending reading | K4 |
| 1.5 | Effective Writing Skills | Improve writing skills for language proficiency and employment | K6 |
| **II** | **Employability Skills** | | |

| Unit Covered/ Section | Course Content | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.1 | Writing Reports | Explain techniques and analyze various components of writing a good Report. | K4 |
| 2.2 | Writing Minutes | Inspect methods involved in conducting meetings and writing minutes | K4 |
| 2.3 | Academic Cover Letter | Compose a Cover Letter in line with the resume | K6 |
| 2.4 | Business Cover Letter | Outline different parts of academic and business letters | K2 |
| 2.5 | Resume Writing | Understanding the significance of a good resume for a job. Design a formal Resume | K2 |
| **III** | **Creative Skills** | | |
| 3.1 | Writing Social Media | Compile a write up for Specific Audience in Social Media | K6 |
| 3.2 | Create Presentation Graphics | Determine the significance of preparing infographics. | K5 |
| 3.3 | Description of Events | Construct an essay for a given topic | K6 |
| 3.4 | Paraphrasing | Evaluate on the effective construction of word order and sentence | K5 |
| 3.5 | Story Writing | Create and develop a story using hints | K6 |
| **IV** | **Presentational Skills** | | |
| 4.1 | Presentation Strategies | Outline and Structure the presentation | K2 |
| 4.2 | Delivering Presentation | List out the significant skills pertinent to delivering a presentation | K4 |
| 4.3 | Body Language | Build the etiquette and Body Language | K6 |
| 4.4 | Answering Queries | Model the correct expressions for answering questions | K3 |
| 4.5 | Group Discussion | Demonstrate on the techniques of Group Discussion | K2 |
| **V** | **Conversational Skills** | | |
| 5.1 | 5.1. Face to face interaction | Define the significance of nonverbal communication | K1 |
| 5.2 | 5.2. Greetings and Reply | List out the basic types of greetings | K4 |
| 5.3 | 5.3. Introducing and bidding farewell | List out the formal and informal methods of introducing people and opportUnit Coveredies | K4 |
| 5.4 | 5.4. Telephonic Interaction | What are the formal preparation needed before telephonic interview | K1 |
| 5.5 | 5.5. Enquiries and Giving Information | List out the various ways of gathering information | K4 |

## 4. MAPPING (CO, PO, PSO)

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | L | H | - | L | L | L | H | H | H | - | - | - | H |
| CO2 | - | - | - | - | - | - | - | H | M | - | - | - | - |
| CO3 | - | H | - | - | - | M | H | H | M | - | - | - | H |
| CO4 | L | L | - | - | - | M | L | H | M | - | - | - | M |
| CO5 | M | - | - | - | - | - | - | H | - | - | - | - | - |
| CO6 | L | L | - | L | - | - | M | H | M | - | - | - | M |

**L-Low          M-Moderate          H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, Project Report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:
1. Course end survey (Feedback)


**COURSE COORDINATOR**                     **HEAD OF THE DEPARTMENT**
Mrs.J.JASMINE CHRISTINA MAGDALENE          Dr.R.THAMARAI SELVI


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# BRIDGE COURSE I: OBJECT ORIENTED PROGRAMMING

**SEMESTER : I**                                               **CODE: PB20CA11**
**CREDITS:4**

## 1. COURSE OUTCOMES

After the completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Recall about evolution and features of C++ and OOPs basics | K1 | I |
| CO2 | Construct applications using the concept of Function Overloading | K6 | II |
| CO3 | Developing C++ programs using Class and Objects | K6 | III |
| CO4 | Apply Friend Function in real time applications | K6 | III |
| CO5 | Develop Programs using Operator Overloading | K6 | IV |
| CO6 | Develop programs using Virtual functions | K6 | V |

## 2A. Syllabus

**UNIT I - Introduction to C++ and OOP:**
Evolution of C++- The Object-Oriented Technology- Disadvantage of Conventional Programming- Programming Paradigms - Key Concepts of Object-Oriented Programming Advantage of OOP- Object-Oriented Languages – Usage of OOP – Usage of C++.

**UNIT II - I/O in C++:**
Streams in C++ – Formatted and Unformatted Console I/O Operations - Manipulators – Custom built I/O Objects - **C++ Declarations:** Keyword – Identifiers – Data Types in C++ - Type modifiers – Type Casting – Constants – Operators in C++. **C++ Functions:** Parts of Functions - Passing Arguments – Returning Values – Default Arguments – Inline Function – Function Overloading – Library Functions.

**UNIT III - Classes and Objects:**
Declaring Objects – Defining member functions - Data hiding and Encapsulation – Classes, Objects and Memory – Static Member Variable and Functions –Array of Objects - Object and Function Arguments – Friend functions – Recursive Member Function – Local Classes – Empty, Static and Const Classes – Member and Non-Member Functions –Overloading Member Functions –

**UNIT IV - Constructors and Destructors:**
Characteristics – Applications – Overloading Constructors – Copy Constructors - Destructors – Calling Constructors and Destructors – Private Constructors and Destructors. **Operator Overloading:** The Keyword Operator –Overloading Unary & Binary Operators – Type Conversion – Rules for Overloading Operators. **Inheritance:** Access Specifiers and Simple Inheritance –Types of Inheritance –Virtual Base Classes –Object as a Class member - Abstract Classes -Arrays of classes –

**UNIT V - Binding, Polymorphism and Virtual Functions:**
Binding in C++ -Pointer to derived class Objects –Virtual Functions - Array of Pointers – Abstract Classes – Virtual Functions in Derived Classes . **Exception Handling:** Principles –Exception Handling Mechanism –Catching Multiple Exceptions - Rethrowing and Specifying Exceptions - Exceptions in Constructors and Destructors - Controlling Uncaught Exception.

**B. TOPICS FOR SELF-STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | C++ file concept | **https://www.w3schools.com/CPP/cpp_files.asp** |
| 2 | Polymorphism concept | **https://www.w3schools.com/CPP/cpp_polymorphism.asp** |
| 3 | Storage classes in | **https://www.tutorialspoint.com/cplusplus/cpp_storage_classes.htm** |
| 4 | Dynamic memory | **https://www.tutorialspoint.com/cplusplus/cpp_dynamic_memory.htm** |

**C. Text Book:**

1. Ashok N. Kamathane, "Object-Oriented Programming with ANSI and Turbo C++", Pearson Education Pvt. Ltd., New Delhi, 2005**.**

**D. Reference Book:**

2. Balagurusamy E., "Object-Oriented Programming with C++", 3rd edition TMH Publishing company Ltd., New Delhi, 2006.

**E. Web links:**

1. **www.W3school.com**
2. **www.tutorialspoint.com**
3. **www.javapoint.com**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Introduction to C++ and OOP** | | |
| 1.1 | The Object-Oriented Technology- - Programming Paradigms | Recall the History of C++ programming | K1 |
| 1.2 | Disadvantage of Conventional Programming | Outline the importance of Conventional Programming | K6 |
| 1.3 | Programming Paradigms | Explain the basic of Programming Paradigms | K6 |
| 1.4 | Key Concepts of Object-Oriented Programming - – | Recall the basics of Object-Oriented Programming | K1 |
| 1.5 | Advantage of OOP | Illustrate Advantage of OOP | K2 |
| 1.6 | Object-Oriented Languages | Explain about Object-Oriented Languages | K6 |
| 1.7 | Usage of C++ | Outline the Usage of C++ | K6 |
| **II** | **I/O in C++** | | |
| 2.1 | Streams in C++ - – | Illustrate use of stream | K2 |
| 2.2 | Formatted and Unformatted Console I/O Operations | Illustrate the I/O Operation | K2 |
| 2.3 | Manipulators | Create programs using Manipulators | K6 |
| 2.4 | Custom built I/O Objects - **C++** | Illustrate I/O objects | K2 |
| | **Declarations** | | |

| 2.5 | Keyword – Identifiers – | Illustrate Keywords and Identifiers | K2 |
|---|---|---|---|
| 2.6 | Data Types in C++ | Recall the basics of Data types | K1 |
| 2.7 | Constants | Illustrate the constant | K2 |
| 2.8 | Operators in C++ | Outline the use of operators | K6 |
| | **C++ Functions:** | | |
| 2.9 | Parts of Functions - | Create programs with functions. | K6 |
| 2.10 | Passing Arguments – Returning Values | Illustrate function arguments | K2 |
| 2.11 | Function Overloading | Develop programs using Function overloading | K6 |
| **III** | **Classes and Objects** | | |
| 3.1 | Declaring Objects –Array of Objects | Illustrate Array of Objects | K2 |
| 3.2 | Defining member functions | Recall the basics of member function | K1 |
| 3.3 | Classes, Objects | Recall the basics of class and object | K1 |
| 3.4 | Static Member Variable and Functions | Illustrate static variable | K2 |
| 3.5 | Friend functions | Develop program using Friend functions | K6 |
| 3.6 | Member and Non-Member Functions | Illustrate member function | K2 |
| 3.7 | Overloading Member Functions | Create program using overloading | K6 |
| **IV** | **Constructors and Destructors** | | |
| 4.1 | Characteristics – Applications – | Outline application of constructors | K6 |
| 4.2 | Overloading Constructors | Illustrate Overloading Constructors | K2 |
| 4.3 | Copy Constructors - | Create program using Copy Constructors | K6 |
| 4.4 | Destructors | Illustrate Destructors | K2 |
| 4.5 | Overloading Unary & Binary Operators – | Create program using Unary & Binary Operators | K6 |
| 4.6 | Rules for Overloading Operators | Outline Rules for Overloading Operators | K6 |
| | | Inheritance | |
| 4.7 | Simple Inheritance –-- | Recall the basics of Inheritance | K1 |
| 4.8 | Types of Inheritance | Illustrate Types of Inheritance | K2 |
| 4.9 | Virtual Base Classes | Create program using Virtual Base Classes | K6 |
| | | **Abstract Classes** | |
| 5.1 | Pointer to derived class Objects | **Illustrate** Pointer to derived class Objects | K2 |
| 5.2 | Virtual Functions - | Outline use of Virtual Functions | K6 |
| 5.3 | Array of Pointers – | Develop program using Array of Pointers | K6 |
| 5.4 | Abstract Classes – | Illustrate Abstract Classes | K2 |
| | | **Exception Handling** | |
| 5.5 | Exception Handling Mechanism - | Create program using Exception Handling | K6 |
| 5.6 | Catching Multiple Exceptions | illustrate Multiple Exceptions | K2 |
| 5.7 | Re throwing and Specifying Exceptions | Develop program using Re throwing Exception | K6 |
| 5.8 | Controlling Uncaught Exception | Illustrate Controlling Uncaught Exception | K2 |

## 4. MAPPING (CO, PO, PSO)

|      | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | H | H | H | M | M | H | M | L | M | H | M | L | -L |
| CO2 | H | H | H | M | M | L | L | L | M | H | M | L | -L |
| CO3 | H | M | H | M | M | L | L | L | M | H | M | L | M- |
| CO4 | H | M | H | M | M | L | L | L | M | H | M | L | M- |
| CO5 | H | M | H | H | L | L | L | L | L | H | L | L | H- |
| CO6 | H | M | H | M | L | M | L | L | L | H | M | L | M - |

**L-Low**         **M-Moderate**         **H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book

2. Open Book Test.

3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).

4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr. R. THAMARAI SELVI                          Dr.R.THAMARAI SELVI

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**SEMESTER : I**                                                    **CODE: PB20CA12**
**CREDITS: 4**

## 1. COURSE OUTCOMES

After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Unit |
|-------|-----------------|-------|------|
| CO1 | Explain the applications of information technology | K5 | I |
| CO2 | Distinguish system software and application software | K4 | II |
| CO3 | Classify the network topologies | K4 | III |
| CO4 | Explain LAN,WAN,MAN | K2 | III |
| CO5 | Explain IP Addressing | K2 | IV |
| CO6 | Classify the operating system | K4 | V |

**2A. Syllabus**

**UNIT I - Basics of Information Technology**:
        Definition - Information Technology for Business - Technological Trends in IT - Applications of Information Technology - Information technology law **- Introduction to Computers**: Definition - Characteristics of a Computer - Classification of Computers - Basic Anatomy of the Computer - Applications / Uses of Computers in different fields

**UNIT II - Input and Output Devices**:
        Input Devices **-** Output Devices - Data Representation - Programming Languages / Computer Languages - **Software**: System Software - Application Software - Difference between System Software and Application Software - Device Drivers - Computer Viruses, Bombs, Worms - Types of Viruses

**UNIT III - Data Communication and Computer Networks:**
        Data Communication - Computer Network - The Uses of a Network - Types of Networks: LAN, MAN, WAN - -Intranet and Extranet - Network Topologies- Transmission Media: Guided Transmission Media - Wireless Transmission

**UNIT IV - Internet and its Applications:**
        History of Internet - Uses of Internet / Application of Internet-Advantages of Internet - ISP - Internet Services - IP Address - Web Browser - URL - DNS - Internet Explorer - Types of internet connections - E-mail - Search Engine

**UNIT V - Operating System:**
        Evolution of operating systems - Function of Operating System - Classification of Operating – System - Example of Operating System – DOS –Windows – UNIX - Linux - Difference between Windows and DOS- Difference between Linux and Windows

**B. TOPICS FOR SELF-STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| **1** | Installing OS | **https://docs.oracle.com/cd/E19121-01/sf.x2100m2/819-6592-13/Chap1.html** |

| 2 | Subnetting | **https://www.cisco.com/c/en/us/support/docs/ip/routing-information-protocol-rip/13788-3.html** |
|---|---|---|
| 3 | Ubuntu OS | **https://ubuntu.com/tutorials/command-line-for-beginners#1-overview** |
| 4 | Home Wireless Networking | **https://stevessmarthomeguide.com/home-wireless-networking/** |

### C. Text Books:

1.  Introduction to Information Technology Pelin Aksoy, Laura DeNardis, Cengage Learning India Private Limited, 2008.
2.  Alexis Leon and Mathews Leon, "Fundamentals of Information Technology", Vikas Publishing House Pvt. Ltd. 2009
3.  Dr.P.Rizwan Ahmed, Introduction to Information Technology, Second Edition, Margham Publications, Chennai,2016.

### D. Web links:

1.  **https://www.ibm.com/cloud/learn/networking-a-complete-guide**
2.  **https://www.sophia.org/tutorials/basic-introduction-to-information-technology**

### 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered /Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| **I** | **Basics of Information Technology** | | |
| 1.1 | Information Technology for Business | List the uses of information technology in business. | K1 |
| 1.2 | Technological Trends in IT | Summarize the technological trends in IT. | K2 |
| 1.3 | Applications of Information Technology | Explain the applications of Information Technology. | K5 |
| 1.4 | Information technology law | Outline the information technology Law | K2 |
| 1.5 | **Introduction to Computers**: Definition | Define computer. | K1 |
| 1.6 | Characteristics of a Computer | Examine the characteristics of computer | K4 |
| 1.7 | Classification of Computers | Classify the types of computers | K4 |
| 1.8 | Basic Anatomy of the Computer | Explain the anatomy of computer | K2 |
| 1.9 | Applications / Uses of Computers in different fields | List the uses of computers in different fields | K1 |
| **II** | **Input and Output Devices** | | |
| 2.1 | Input Devices | List the input devices | K1 |
| 2.2 | Output Devices | List the output devices | K1 |
| 2.3 | Data Representation | Outline the representation of data. | K2 |
| 2.4 | Programming Languages / Computer Languages | Classify the types of computer languages. | K4 |
| 2.5 | **Software**: System Software | Define system software | K1 |
| 2.6 | Application Software | Recall application software | K1 |

| Unit Covered /Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.7 | Difference between System Software and Application Software. | Distinguish system software and application software | K4 |
| 2.8 | Device Drivers | Summarize the functions of device drivers | K2 |
| 2.9 | Computer Viruses, Bombs, Worms | Summarize the types of viruses, bombs worms. | K2 |
| 2.10 | Types of Viruses | Categorize the types of viruses | K4 |
| **III** | **Data Communication and Computer Networks** | | |
| 3.1 | Data Communication | Define data communication | K1 |
| 3.2 | Computer Network | Recall computer network | K1 |
| 3.3 | The Uses of a Network | Summarize the uses of network | K2 |
| 3.4 | Types of Networks: LAN, MAN, WAN | Explain LAN,MAN,WAN. | K2 |
| 3.5 | Intranet and Extranet | Explain Intranet | K5 |
| 3.6 | Network Topologies | Classify the network topologies | K4 |
| 3.7 | Transmission Media: Guided Transmission Media | Illustrate guided transmission media | K2 |
| 3.8 | Wireless Transmission | Summarize wireless transmission media | K2 |
| **IV** | **Internet and its Applications** | | |
| 4.1 | History of Internet | Outline the history of internet | K2 |
| 4.2 | Uses of Internet / Application of Internet | List the uses of internet | K1 |
| 4.3 | Advantages of Internet | Summarize the advantages of internet | K2 |
| 4.4 | ISP - Internet Services | Explain ISP | K5 |
| 4.5 | IP Address | Explain IP Addressing. | K2 |
| 4.6 | Web Browser | Summarize the functions of web browser. | K2 |
| 4.7 | URL | Outline URL format | K2 |
| 4.8 | DNS | Elaborate the functioning of DNS | K6 |
| 4.9 | Internet Explorer | List the features of IE | K1 |
| 4.10 | Types of internet connections | Summarize the types of internet connections | K2 |
| 4.11 | E-mail | Explain E-mail protocols | K5 |
| 4.22 | Search Engine | Summarize the functions of search engine | K2 |
| **V** | **Operating System** | | |
| 5.1 | Evolution of operating systems | Outline the evolution of operating system | K2 |
| 5.2 | Function of Operating System | Elaborate the functions of operating system | K6 |
| 5.3 | Classification of Operating System | Classify the operating system | K4 |
| 5.4 | Example of Operating System: DOS –Windows – UNIX - Linux | Explain various types of operating system. | K2 |
| 5.5 | Difference between Windows and DOS | Distinguish windows and DOS | K4 |
| 5.6 | Difference between Linux and Windows | Distinguish Linux and windows | K4 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO 3 | PSO4 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-------|------|
| CO1 | H | - | H | L | - | L | L | - | L | H | M | L | M |
| CO2 | H | M | H | - | - | L | - | - | - | H | M | M | M |
| CO3 | H | M | L | L | - | - | - | - | - | H | H | L | L |
| CO4 | H | - | M | M | L | L | | - | L | M | M | - | L |
| CO5 | L | - | L | L | H | - | - | - | L | H | M | M | M |
| CO6 | H | - | L | L | H | - | - | - | H | M | L | M | M |

**L-Low**          **M-Moderate**          **H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1 (Theory ): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                                **HEAD OF THE DEPARTMENT**
Mr. A.SANDANASAMY                                            Dr.R.THAMARAI SELVI

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# BRIDGE COURSE III:OBJECT ORIENTED PROGRAMMING LAB

**SEMESTER : I**                                             **CODE: PB20CA1P**
**CREDITS:2**

## 1. COURSE OUTCOMES
After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Exercise |
|-------|-----------------|-------|----------|
| CO1 | Demonstrate the concept of class and Object | K2 | 1,2,3,5 |
| CO2 | Demonstrate Function Overloading | K6 | 4 |
| CO3 | Develop a C++ program using Constructor and Destructor | K6 | 7 |
| CO4 | Make use of Operator overloading | K2 | 8 |
| CO5 | Apply Inheritance in C++ programming | K3 | 9 |
| CO6 | Develop a C++ program using virtual functions | K6 | 10 |

## 2A. Syllabus

1. **Default Arguments**
   (a) Write a C++ program to find out the Sum of the given Numbers using Default Argument.

2. **Reference Arguments**
   (a) Write a C++ program to Swap Two Numbers using Reference Arguments.

3. **Inline Functions**
   (a) Write a C++ program to Add and Multiply Two integer Numbers using Inline Functions.

4. **Function overloading**
   (a) Write a C++ program using Function Overloading.

5. **Class and objects**
   (a) Process student details using class and objects.
   (b) Create a class to process employee payroll.

6. **Friend Function**
   (a)Write a C++ program to demonstrate the Friend Function.

7. **Constructor & Destructor**
   (a) Write a C++ program to initialize the Complex Number with zero, to initialize with the given values and to read the value.

8. **Operator Overloading**
   (a) Write a C++ program to Overload Unary Operators.
   (b) Write a C++ Program to Add Two Complex Numbers using Binary Operators.

9. **Inheritance**
   (a) Prepare Pay Roll of an Employee using Single Inheritance.
   (b) Prepare Student Mark List using Multilevel Inheritance.

### 10. Virtual Function

(a) Demonstrate the use of Virtual Function (run time polymorphism) to find the Area of the Given Object.

Base class : shape
Subclass : circle, square, rectangle, triangle.

## B. TOPICS FOR SELF-STUDY:

| S.No. | Topics | Web Links |
|---|---|---|
| 1 | C++ file concept | **https://www.w3schools.com/CPP/cpp_files.asp** |
| 2 | Polymorphism concept | **https://www.w3schools.com/CPP/cpp_polymorphism.asp** |
| 3 | Storage classes | **https://www.tutorialspoint.com/cplusplus/cpp_storage_classes.htm** |
| 4 | Dynamic memory | **https://www.tutorialspoint.com/cplusplus/cpp_dynamic_memory.htm** |

## C. Text Book:

1. Ashok N. Kamathane, "Object-Oriented Programming with ANSI and Turbo C++", Pearson Education Pvt. Ltd., New Delhi, 2005**.**

## D. Reference Book:

1. Balagurusamy E., "Object-Oriented Programming with C++", 3rd edition TMH Publishing company Ltd., New Delhi, 2006.

## E. Web links:

1. **https://github.com**
2. **https://swayam.gov.in/NPTEL**

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Ex.No. | Lab Exercises | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1 | Find out the Sum of the given Numbers | Develop a C++ Program using Default Argument | K6 |
| 2 | Swap Two Numbers using Reference Arguments | Create a C++ program using Reference Arguments | K6 |
| 3 | Add and Multiply Two integer Numbers using Inline Functions | Build a C++ program implementing Inline Functions | K6 |
| 4 | . Program using Function Overloading | Develop a C++ program using Function Overloading | K6 |
| 5 | Process student details using class and objects. Create a class to process employee payroll | Create a C++ program to .Class and object | K6 |
| 6 | Demonstrate the Friend Function | Develop a C++ program using Friend function | K6 |
| 7 | Initialize the Complex Number with zero, to initialize with the given values and to read the value | Build a C++ program using Constructor and destructor | K6 |
| 8 | Overload Unary Operators. Add Two Complex Numbers using Binary Operators | Create a C++ program to .Operator over loading | K6 |
| 9 | Pay Roll of an Employee using Single Inheritance | Develop a C++ program using Inheritance | K6 |

| Ex.No. | Lab Exercises | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|--------|---------------|-------------------|------------------------------------------------|
|  | Prepare Student Mark List using Multilevel Inheritance |  |  |
| 10 | Use of Virtual Function (run time polymorphism) to find the Area of the Given Objec | Build a C++ program using Virtual function | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H | M | H | L | H | H | H | H | H | M | M | M | M |
| CO2 | H | M | M | M | H | H | H | M | H | H | M | H | H |
| CO3 | H | H | H | M | H | H | H | H | H | H | H | H | H |
| CO4 | H | H | H | M | H | H | H | H | H | H | H | H | H |
| CO5 | H | H | H | M | H | M | H | H | H | H | H | H | H |
| CO6 | H | H | H | M | H | H | H | H | H | H | H | H | H |

**L-Low          M-Moderate          H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2. Cooperative Learning Report, Assignment, Group Discussion, Project Report, Seminar.
3. Pre/Post Test, Viva, Report for each Exercise.
4. Lab Model Examination & End Semester Practical Examination

**INDIRECT:**

1. Course end survey (Feedback)

**COURSE COORDINATOR**          **HEAD OF THE DEPARTMENT**
Dr.R.THAMARAI SELVI                    Dr.R.THAMARAI SELVI

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<h1 style="text-align:center">Core V : PROGRAMMING IN JAVA</h1>

**SEMESTER : II**                                          **CODE: P20CA205**
**CREDITS:3**                                              **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES

After the completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|---|---|---|---|
| CO1 | Summarize Object Oriented Programming concepts | K1 | I |
| CO2 | Create programs using inheritance, interfaces and multithreading | K6 | II |
| CO3 | Construct Java applications using I/O Streams | K6 | III |
| CO4 | Build interactive applications using AWT and swing components | K6 | III |
| CO5 | Design applications to remotely invoke services using RMI | K6 | IV |
| CO6 | Plan the flow of web pages to develop web applications using servlets | K6 | V |

## 2A. Syllabus

**UNIT I - Evolution and overview of Java**                               **12 Hours**

The History and Evolution of Java: The Creation of Java – The Byte Code – The Java Buzzwords. An Overview of Java- Introducing Classes - Methods and Classes – Inheritance.

**UNIT II - Exceptions and Multi-Thread Programming**                     **12 Hours**

Packages and Interfaces – Exception Handling – Multi-Threaded Programming- String Handling.

**UNIT III- Collections and Input / Output**                             **12 Hours**

The Collections Framework: Collections Overview – The Collection Interfaces – The Collection Classes (ArrayList, LinkedList, HasSet, TreeSet ) – Accessing a Collection via an Iterator – utility classes:StringTokenizer, Date, Scanner. Input/Output: File- the Stream classes- Byte Streams- the Character Streams

**UNIT IV - Applet and AWT**                                             **12 Hours**

The Applet class – Event Handling- AWT: Working with windows, Graphics and Text – using AWT controls, Layout Managers and Menus.

**UNIT V - Swing and JDBC**                                             **12 Hours**

Introducing Swing - Exploring Swing - Java Database Connectivity – Java Remote Method Invocation (RMI) – Servlets

## B. TOPICS FOR SELF-STUDY:

| S. No | Topics | Web Link |
|---|---|---|
| 1 | Frameworks | **https://www.javatpoint.com/what-is-framework-in-java** |
| 2 | Spring | **https://www.tutorialspoint.com/spring/index.htm** |
| 3 | Hibernate | **https://www.javatpoint.com/hibernate-tutorial** |
| 4 | Struts | **https://www.tutorialspoint.com/struts_2/index.htm** |

## C. Text Books:

1. Herbert Schildt,, "JAVA$^{TM}$ : Complete Reference", Eleventh Edition, McGraw Hill, 2019.
2. Ivan Bayross, "Web Enabled Commercial Application Development using Java 2", BPB Publications, 2013. (Unit Covered-V : Java Database Connectivity)

## D. Reference Books:

1. Ken Arnold, James Gosling, David Holmes, "Java™ Programming Language", Fourth Edition, Addison Wesley Profession, 2005.
2. Paul J. Deitel, Harvey M. Deitel, "Java™ for Programmers",Second Edition*,* PHI Publications, 2011.

## E. Web links:

1. **www.geeksforgeeks.org**
2. **www.codeproject.com**
3. **www.stackoverflow.com**

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| **I** | **The History and Evolution of Java** | | |
| 1.1 | The Creation of Java | Recall the History of Java programming | K1 |
| 1.2 | The Byte Code | Outline the importance of Byte Code | K6 |
| 1.3 | Java Buzzwords | List out the Java Buzzwords | K2 |
| | **An Overview of Java** | | |
| 1.4 | Overview of Java | Recall the basics of Java Programming | K1 |
| | **Introducing Classes** | | |
| 1.5 | Classes | Create a Class and access the members of the class using objects | K6 |
| 1.6 | Methods | Construct Programs using Methods | K6 |
| | **Inheritance** | | |
| 1.7 | Inheritance and its types | Evaluate inheritance and its types | K4 |
| **II** | **Packages** | | |
| 2.1 | Packages | Create packages and import them | K6 |
| | **Interfaces** | | |
| 2.2 | Interfaces | Illustrate the mechanisms in interfaces | K2 |
| | **Exception Handling** | | |
| 2.3 | Exception Handling | Create exceptions and handle the same with catch | K6 |
| 2.4 | User Defined Exceptions | Illustrate User defined exceptions | K2 |
| | **Multi-Threaded Programming** | | |
| 2.5 | By Extending a Thread Class | Construct programs by extending a thread class | K6 |
| 2.6 | By implementing Runnable Interface | Construct programs by implementing runnable interfaces | K6 |
| | **String Handling** | | |
| 2.7 | Strings | Create programs with string handling functions. | K6 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| III | **The Collections Framework** | | |
| 3.1 | Collections Overview | Construct programs using functions and do recursion | K6 |
| 3.2 | The Collection Interfaces | Apply string handling functions | K3 |
| 3.3 | Collection Classes | Compare Collection classes such as ArrayList, LinkedList, HasSet and TreeSet | K5 |
| 3.4 | Accessing a Collection via an Iterator | Illustrate accessing collection with an iterator | K2 |
| | **Utility classes** | | |
| 3.5 | StringTokenizer | Create Class and invoke class members | K6 |
| 3.6 | Date | Create a Class and access the members of the class using objects | K6 |
| 3.7 | Scanner | Compare the types of inheritance | K5 |
| | **Input/output** | | |
| 3.8 | File | Illustrate reading and writing operations on files | K2 |
| 3.9 | The Stream classes | Apply Stream classes | K3 |
| 3.10 | Byte Streams | Apply Byte Streams in Programs | K3 |
| 3.11 | The Character Streams | Illustrate with Character Streams | K2 |
| 3.12 | NIO | Apply NIO in programs | K6 |
| IV | **The Applet class** | | |
| 4.1 | Creating Applets | Create applets and the run them using applet viewer | K6 |
| 4.2 | Applet Life Cycle | Illustrate applet life cycle | K2 |
| 4.3 | Passing Parameters with Applets | Construct applet programs by passing parameters | K6 |
| | **Event Handling** | | |
| 4.4 | AWT | Apply modules and Python packages | K3 |
| 4.5 | Working with Windows | Illustrate various programs for word count and copy file | K2 |
| 4.6 | Graphics and Text | Recall the basics of Graphics and Text | K3 |
| 4.7 | Using AWT controls | Construct programs using different AWT controls | K6 |
| | **Layout Managers and Menus** | | |
| 4.8 | Layouts | Recall the basics of layouts | K3 |
| 4.9 | Types of Layouts | Create java programs using different layouts | K6 |
| 4.10 | Menus | Apply menus in java programs | K3 |
| V | **Introducing Swing** | | |
| 5.1 | Exploring Swing | Compare the working procedure of Swings with AWT controls | K4 |
| | **Java Database Connectivity** | | |
| 5.2 | Database Operations | Create a Java program to insert, delete and update into a database | K6 |
| | **Java Remote Method Invocation (RMI)** | | |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.3 | RMI | Develop programs by invoking remote methods | K6 |
| | **Servlets** | | |
| 5.4 | Servlets | Construct servlet programs | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | H | H | H | M | M | H | M | L | M | H | M | L | - |
| **CO2** | H | H | H | M | M | L | L | L | M | H | M | L | - |
| **CO3** | H | M | H | M | M | L | L | L | M | H | M | L | - |
| **CO4** | H | M | H | M | M | L | L | L | M | H | M | L | - |
| **CO5** | H | M | H | H | L | L | L | L | L | H | L | L | - |
| **CO6** | H | M | H | M | L | M | L | L | L | H | M | L | - |

**L-Low**          **M-Moderate**          **H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book

2. Open Book Test.

3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).

4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                          **HEAD OF THE DEPARTMENT**
Dr.P.THANGARAJU                                    Dr.R.THAMARAI SELVI

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**SEMESTER: II**                                                     **CODE: P20CA206**
**CREDITS: 4**                                                       **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES

After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Analyze the concepts in database management systems | K4 | I |
| CO2 | Design ER model to represent database application scenarios | K6 | II |
| CO3 | Improve the database design by normalization | K6 | II |
| CO4 | Examine the use of indexing and hashing technique used in database design | K4 | III |
| CO5 | Explain the concepts of transaction management. | K5 | IV |
| CO6 | Create a database using SQL and PL/SQL | K6 | V |

## 2A. Syllabus

**UNIT I - Introduction to Database**                                          **12 Hours**
     Introduction: Database System Applications – Database Systems vs File Systems – View of data – Data Models – Database Languages – Database Users and Administrators – Transaction Management – Database System Structure – Application Architectures. Entity – Relationship model: Basic Concepts – Constraints – Keys – Entity – Relationship Diagram – Weak entity Sets – Extended E–R Features. Relational Model: Structure of Relational Database – Relational Algebra–Extended Relational Algebra Operations.

**UNIT II - Relational Database Design and Integrity**                          **12 Hours**
     **Integrity and security:** Domain Constraints Referential Integrity – Assertions – Security and Authorization – Authorization in SQL – Encryption and Authentication. **Relational Database Design:** First Normal Form – Pitfalls in Relational Database Design – Functional Dependencies – Decomposition – Desirable Properties of Decomposition – Boyce Codd Normal Form – Third Normal Form – Fourth Normal Form – More normal Forms.

**UNIT III - File Structure and Indexing**                                      **12 Hours**
     **Storage and File Structure:** RAID – File Organization – Organization of Records in Files – Dictionary Storage.  **Indexing and Hashing**: Basic Concepts – Ordered Indices – B+ – Tree Index Files – Static Hashing – Dynamic Hashing.

**UNIT IV - Transaction Management and Concurrency control**                    **12 Hours**
     **Transaction Management:** Transactions Concept – Transaction state – Implementation of Atomicity and Durability – Concurrent Executions– Serializability –**Concurrency control:** Lock Based Protocols – Timestamp Based Protocols – Validation Based Protocols – **Recovery system:** Failure classification – Storage Structure – Recovery and Atomicity – Log Based Recovery–Shadow Paging.

**UNIT V - Oracle  and PL/SQL**                                                **12 Hours**
**Introduction to Oracle:** Classification of SQL Commands – Data Types – Operators – Built in functions – Sorting – Joins – Special Operators: Set Operators. **Indexing:** Removing Index – Creating Index on Multiple Columns. **Views:** Creating and Accessing – Classification of Views. **PL/SQL:** Introduction – Advantages of PL/SQL – Structure of PL/SQL Block – Conditional Statement – Stored Functions: Structure

of Function – Compiling a Function – Calling a Function. **Stored Procedures:** Advantages of Procedures – Why Called "Stored Procedures"? – Differences between Procedures and Functions – Compiling a Procedure – Executing a Procedure. **Cursors:** What is Cursor? – Purpose of Cursors – Classification of Cursors.**Database Triggers:** Components of Trigger–Types of Triggers.

## B. TOPICS FOR SELF STUDY:

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Object Oriented Database | **www.tutorialspoint.com** |
| 2 | Client-Server Architecture | **www.geeksforgeeks.org** |
| 3 | Data Warehouse | **www.talend.com** |
| 4 | Distributed database | **www.geeksforgeeks.org** |

## C. Text Books:

1. Abraham Silberchatz, Henry F. Korth and S. Sudharshan, "Data Base System concepts" Mc Graw Hill, Fifth Edition, 2006.
2. Satish Asnani, "Oracle Database 11g –Hands–on SQL and PL/SQL", PHI Learning, 2010.

## D. Reference Books:

1. C.J. Date, A. Kannan, S.Swamynathan, "Introduction to Database Systems", Pearson Education, Eighth Edition 2006.
2. RamezElmasri, "Fundamentals of Database Systems", Pearson Education, 2008.

## E. Web links:

1. **https://swayam.gov.in/nd1_noc19_cs51/**
2. **https://nptel.ac.in/courses/106106144/**

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Database Systems Overview** | | |
| 1.1 | Database Systems | Recall the basic concepts of database systems | K1 |
| 1.2 | Database System Applications | Summarize the applications of database system | K2 |
| 1.3 | Data Models | Classify data models | K4 |
| 1.4 | Database Languages | Categorize database languages | K4 |
| 1.5 | Database System Structure | Discuss the structure of a database system | K6 |
| | **Design of E-R Diagram** | | |
| 1.6 | Transaction Management | Explain transaction management | K2 |
| 1.7 | E- R model | Identify the purpose of E-R model | K3 |
| 1.8 | Constraints and keys | Make use of constraints & keys | K3 |
| 1.9 | E- R Diagram | Construct E- R diagram model | K6 |
| 1.10 | Relational Algebra | Solve relational algebra. | K3 |
| **II** | **Integrity and Security** | | |
| 2.1 | Domain Constraints | Utilize domain constraints | K3 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.2 | Referential integrity | Apply referential integrity in tables | K3 |
| 2.3 | Security and Authorization | Outline security and authorization in SQL | K2 |
| 2.4 | Encryption and Authentication. | Test encryption and authentication in SQL | K6 |
| **Types of Normal Form** | | | |
| 2.5 | First Normal Form | Apply first normal form in tables | K3 |
| 2.6 | Functional dependencies | Utilize functional dependencies In relational | K3 |
| 2.7 | Decomposition | Make use of decomposition concepts | K3 |
| 2.8 | BCNF | Compare BCNF and 4NF | K4 |
| 2.9 | Third Normal Form | Examine third normal form in tables | K4 |
| 2.10 | Fourth Normal Form | Evaluate fourth normal form in tables | K5 |
| **III** | **Storage and File Structure** | | |
| 3.1 | File Organization | Summarize file organization | K2 |
| 3.2 | RAID | Compare the levels in RAID | K5 |
| 3.3 | Organization of Records | Plan the organization of records | K3 |
| 3.4 | Dictionary Storage | Make use of dictionary storage | K3 |
| **Indexing and Hashing** | | | |
| 3.5 | Basic Concepts | Recall the basic concepts of indexing | K1 |
| 3.6 | Ordered Indices | Outline ordered Indices | K2 |
| 3.7 | B+ Tree Index Files | Construct B+ tree index files | K6 |
| **IV** | **Transaction Management** | | |
| 4.1 | Transactions Concept | Outline the concepts in transactions | K2 |
| 4.2 | Transaction state | Summarize the states of a transaction | K2 |
| 4.3 | Concurrent Executions | List the advantages of concurrent execution | K1 |
| 4.4 | Serializability | Interpret serializability | K2 |
| **Concurrency Control and Recovery** | | | |
| 4.5 | Lock based protocols | Apply lock-based protocols | K3 |
| 4.6 | Timestamp Based Protocols | Predict the timestamp | K6 |
| 4.7 | Failure classification | Classify the types of failures | K4 |
| 4.8 | Recovery and Atomicity | Recall the definition of recovery and atomicity | K1 |
| 4.9 | Log Based Recovery | Apply log-based recovery for retrieving the database | K3 |
| **V** | **Introduction to Oracle** | | |
| 5.1 | Classification of SQL commands | Categorize SQL commands | K4 |
| 5.2 | Data Types and Operators | Utilize data types and operators in SQL | K3 |
| 5.3 | Built-in functions | Analyze the built-in functions in SQL | K4 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.4 | Sorting and Joins | Examine sorting and join methods | K3 |
| 5.5 | Set operators | Experiment with set operations | K3 |
| **Indexing and Views** | | | |
| 5.6 | Create &Remove Index | Create Indices | K6 |
| 5.7 | Create Views | Create views in a table | K6 |
| 5.8 | Classification of Views | Classify the different types of views | K4 |
| **PL/SQL and Stored Procedure** | | | |
| 5.9 | Structure of PL/SQL Block | Illustrate the structure of PL/SQL Block | K2 |
| 5.10 | Conditional Statement | Make use of conditional statement | K3 |
| 5.11 | Structure of Function | Explain the structure of function | K2 |
| 5.12 | Advantages of Procedures | List the advantages of procedures | K1 |
| 5.13 | Executing a Procedure | Test the execution of a procedure | K6 |
| **Cursors and Triggers** | | | |
| 5.14 | Purpose of Cursors | Summarize the uses of cursors. | K2 |
| 5.15 | Classification of Cursors | Classify cursors. | K4 |
| 5.16 | Components of Trigger | Utilize the components of triggers | K3 |
| 5.17 | Types of Triggers. | Compare the types of triggers | K4 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | - | L | L | - | - | M | H | L | M | - | | M |
| CO2 | H | H | L | M | M | H | M | L | H | H | H | M | - |
| CO3 | H | H | H | M | H | H | H | M | H | H | L | L | L |
| CO4 | H | H | H | H | H | M | M | H | H | H | H | M | M |
| CO5 | H | H | L | M | M | H | M | L | H | M | M | L | L |
| CO6 | H | H | M | H | H | M | H | M | M | H | H | H | H |

**L-Low          M-Moderate          H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Assignment, Group Presentation, Group Discussion, project Report, Presentation, Seminar.
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:
1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr.M.S.MYTHILI                              Dr.R.THAMARAI SELVI


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## Core VII: DATA STRUCTURES AND ALGORITHMS

**SEMESTER : II**
**CREDITS:4**

**CODE: P20CA207**
**HOURS/WEEK: 4**

## 1. COURSE OUTCOMES
After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Summarize the basic concepts of data structures | K2 | I |
| CO2 | Distinguish the applications of various binary tree | K4 | II |
| CO3 | Decide the applications that can make use of graph structures | K5 | III |
| CO4 | Test various algorithms for sorting | K6 | IV |
| CO5 | Solve shortest path problems | K6 | V |
| CO6 | Construct applications by applying graph coloring | K6 | V |

**2A. Syllabus**

**UNITI - Introduction to Data structure**         **12 Hours**
  **Introduction and Overview:** Definitions – Concept of Data Structures – Overview of Data Structures – Implementation of Data Structures. **Linked Lists:** Definition – Single Linked List – Circular Linked List – Double Linked List – Circular Double Linked List – Application of Linked Lists. **Stacks:** Introduction – Definition – Representation of Stack – Operations on Stacks – Application of Stacks. **Queues:** Introduction – Definition – Representation of Queues – Various Queue Structures– Application of Queues.

**UNIT II - Tree and Binary Tree**           **12 Hours**
  **Trees :** Basic Terminologies – Definition and Concepts – Representation of Binary Tree – Operations on Binary Tree – Types of Binary Trees – Trees and Forests – B Trees .

**UNIT - III - Graphs and Algorithm Analysis**       **12 Hours**
  **Graphs:** Introduction – Graph Terminologies – Representation of Graphs – Operations on Graphs – Applications of Graph Structures – BDD and its Applications. **Introduction:** What is an Algorithm? – Algorithm Specification – Performance Analysis**.**

**UNIT IV - Divide–and–Conquer and Greedy Method**     **12 Hours**
  **Divide–and–Conquer:** General Method – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort – Selection. **The Greedy Method:** The General Method –Minimum Cost Spanning Trees – Single–Source Shortest Paths.

**UNIT V - Dynamic Programming and Backtracking**      **12 Hours**
  **Dynamic Programming:** The General Method – Multistage Graphs – All Pairs Shortest Paths – Single Source Shortest Paths. **Backtracking:** The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring.

**B. TOPICS FOR SELF-STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Graph Traversal | **www.tutorialspoint.com** |
| 2 | AVL Tree | **www.geeksforgeeks.com** |
| 3 | Tree Traversal | **www.geeksforgeeks.com** |
| 4 | Heap | **www.tutorialspoint.com** |

B. **Text Books:**

1. Samanta D, "Classic Data Structures", Prentice Hall of India, 2006.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", Galgotia Publications, Second Edition, 1998.

**D. Reference Books:**

1. V. Aho, J. E. Hopcroft, and J. D. Ullman, " and Algorithms", Pearson Education, 2008.
2. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Pearson Education 2003.

**E. Web links:**

1. **https://swayam.gov.in/nd1_noc19_cs51**
2. **https://nptel.ac.in/courses/106106144**

3. **SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|--------|--------|--------|
| **I** | **Basics of Data Structures** | | |
| 1.1 | Data Structure Basics | Recall the basic concepts of data structures | K1 |
| 1.2 | Outline the operations on data structure | Demonstrate the operations on data structure | K2 |
| 1.3 | Single Linked List | Choose single linked list for suitable applications | K6 |
| 1.4 | Doubly Linked List. | Decide the applications for using doubly linked list. | K5 |
| | **Stacks and Queue** | | |
| 1.5 | Operations on Stack | Explain the operations on stack | K2 |
| 1.6 | Application of Stack | Outline the applications of stack | K2 |
| 1.7 | Representation of Queues | Explain the representation of queues | K2 |
| 1.8 | Application of Queue | Discuss about applications of queue | K6 |
| **II** | **Tree and Binary Tree Concepts** | | |
| 2.1 | Tree Basics | Recall the basic concepts of tree | K1 |
| 2.2 | Binary Tree | Define binary tree | K1 |
| 2.3 | Representation of binary tree | Explain the representation of binary tree | K2 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.4 | Operation on binary tree | Demonstrate operations on binary tree | K2 |
| 2.5 | Types of binary trees | Compare various types of binary trees | K4 |
| 2.6 | B Tree | Discuss about B Tree | K6 |
| 2.7 | Forest | Define forest | K1 |
| **III** | **Graphs and Algorithm** | | |
| 3.1 | Graph Basics | Make use of graph structures | K3 |
| 3.2 | Representation of Graphs | Decide application types that can use graph representations | K5 |
| 3.3 | Applications of Graphs | Apply graph structures for various applications | K3 |
| | | **Algorithm** | |
| 3.4 | Algorithm Basics | Define algorithm | K1 |
| 3.5 | Performance analysis | Test for the performance analysis on an algorithm | K4 |
| **IV** | **Divide and Conquer** | | |
| 4.1 | Divide and Conquer algorithms | Solve problems using divide and conquer algorithm | K6 |
| 4.2 | Binary search algorithm. | Examine binary search algorithm | K4 |
| 4.3 | Merge Sort | Test the use of merge sort | K6 |
| 4.4 | Quick Sort | Utilize quick sort algorithm for sorting | K3 |
| 4.5 | Selection Sort | Apply selection sort algorithm | K3 |
| | | **Greedy Method** | |
| 4.6 | Greedy algorithms | Select greedy algorithms for problem solving | K5 |
| 4.7 | Shortest path algorithm | Evaluate shortest path algorithms | K5 |
| 4.8 | Minimum cost Spanning Tree | Build minimum cost spanning trees for shortest path finding problems | K6 |
| **V** | **Dynamic Programming and Backtracking** | | |
| 5.1 | Dynamic Programming | Determine the uses of dynamic programming | K5 |
| 5.2 | Multistage Graphs | Construct multi stage graphs for problem solving | K6 |
| 5.3 | All Pairs Shortest Paths | Test all pairs shortest path algorithms | K6 |
| 5.4 | Backtracking | Formulate problem solving with backtracking algorithms | K6 |
| 5.5 | The 8-Queens Problem | Solve 8-queens problem | K6 |
| 5.6 | Graph Coloring | Build applications using graph coloring algorithms | K6 |

**4. MAPPING (CO, PO, PSO)**

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | -   | -   | -   | -   | -   | -   | -   | -   | -   | -    | -    | L    | -    |
| CO2 | -   | L   | -   | L   | -   | -   | -   | M   | -   | -    | -    | L    | -    |
| CO3 | -   | M   | -   | H   | -   | -   | -   | H   | M   | -    | M    | M    | -    |
| CO4 | -   | -   | -   | -   | L   | -   | L   | L   | M   | -    | L    | M    | -    |
| CO5 | H   | H   | -   | H   | M   | -   | M   | H   | H   | -    | H    | H    | -    |
| CO6 | H   | H   | -   | H   | H   | -   | M   | H   | H   | -    | H    | H    | -    |

L-Low          M-Moderate          H- High

**5. COURSE ASSESSMENT METHODS**

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book

2. Open Book Test.

3. Assignment, Group Presentation, Group Discussion, Seminar, Quiz (written).

4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**          **HEAD OF THE DEPARTMENT**
Dr.T.CYNTHIA                              Dr.R.THAMARAI SELVI

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# Elective II : SOFT COMPUTING

**SEMESTER: II**
**CREDITS:3**

**CODE: P20CA2:1**
**HOURS/WEEK: 4**

## 1. COURSE OUTCOMES

After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Summarize the Soft Computing techniques, their development and features | K2 | I |
| CO2 | Analyze the basic concept of Artificial Neural Network and its models | K4 | II |
| CO3 | Explain the importance of various supervised learning techniques | K5 | III |
| CO4 | Discuss the various types of defuzzification methods. | K6 | IV |
| CO5 | Formulate the formation of Fuzzy rules and reasoning based on Fuzzy rules | K5 | IV |
| CO6 | Make use of the knowledge in Genetic algorithms to solve optimization problem | K3 | V |

## 2A. Syllabus

### UNIT I - Introduction to Soft Computing                    12 Hours

Introduction: Artificial Neural Network– Advantages of Neural Networks– Fuzzy Logic– Genetic Algorithms–Hybrid Systems– Neuro Fuzzy Hybrid Systems – Neuro Genetic Hybrid Systems– Fuzzy Genetic Hybrid Systems.

### UNIT II - Artificial Neural Networks                    12 Hours

Artificial Neural Networks– Fundamental Concept– Evolution of Neural Networks– Basic Models of Artificial Neural Network– Terminologies of ANNs– McCulloch-Pitts Neuron– Linear Separability – Hebb Network.

### UNIT III - Supervised Learning Network                    12 Hours

Supervised Learning Network– Perceptron Networks–Adaptive Linear Neuron (Adaline) – Multiple Adaptive Linear Neurons–Back Propagation Network–Radial Basis Function Network.

### UNIT IV - Introduction to Fuzzy Logic                    12 Hours

Introduction to Fuzzy Logic – Classical Sets–Operations on Classical Sets – Fuzzy Sets, –Fuzzy Relations–Membership Functions–Defuzzification–Fuzzy Arithmetic and Fuzzy Measures– Fuzzy Rule base and Approximate Reasoning– Fuzzy Decision Making– Fuzzy Logic Control System.

### UNIT V - Genetic Algorithms                    12 Hours

Genetic Algorithms – Introduction– Traditional Optimization and Search Techniques –Genetic Algorithm and Search Space– Genetic Algorithms vs. Traditional Algorithms– Basic Terminologies in Genetic Algorithm– Simple GA– General Genetic Algorithm– The Schema Theorem–Classification of Genetic Algorithm–Holland Classifier System–Genetic Programming– Applications of GA.

## 3. TOPICS FOR SELF-STUDY:

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Fuzzy Graph Theory | https://www.mdpi.com/2227-7390/7/1/63/html |
| 2 | Artificial Intelligent Methods for Handling Spatial Data | https://www.bokus.com/bok/9783030002374/artificial-intelligent-methods-for-handling-spatial-data/ |
| 3 | Fuzzy Measures and Integrals | https://hal.archives-ouvertes.fr/hal-01477514/document |
| 4 | Hybrid Soft Computing Models to Graph Theory | https://www.knygos.lt/lt/elektronines-knygos/hybrid-soft-computing-models-applied-to-graph-theory-19pso/ |

### C. Text Book:

1.Dr.S.N. Sivananda, Dr.S.N. Deepa, Principles of Soft Computing, Wiley India Edition, 2011.

### D. Reference Books:

1. F.O. Karray& C.D. Silva Soft Computing and Intelligent Systems Design – theory, tools and applications, Pearson Education, 2009

2. J.S.R. Jang, C.T. Sun & E. MizutaniNeuro-Fuzzy and Soft Computing – A computational approach to learning and machine intelligence, Pearson Education, 2004.

### E. Web links:

1. www.tutorialspoint.com
2. www.geeksforgeeks.org
3. www.javatpoint.com

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Introduction** | | |
| 1.1 | Artificial Neural Network:Definition | Define Artificial Neural Network | K1 |
| 1.2 | Advantages of Neural Networks | Summarize the advantages of Neural Networks | K2 |
| 1.3 | Fuzzy Logic | Outline Fuzzy Logic | K2 |
| 1.4 | Genetic Algorithms | Explain Genetic Algorithm | K2 |
| | **Hybrid Systems** | | |
| 1.5 | Neuro Fuzzy Hybrid Systems | Combine Fuzzy and Neural Networks | K6 |
| 1.6 | Neuro Genetic Hybrid Systems | Apply Genetic algorithm and Neural Networks for problem solving | K3 |
| 1.7 | Fuzzy Genetic Hybrid Systems | Make use of Fuzzyand Genetic algorithms | K3 |
| **II** | **Artificial Neural Networks** | | |
| 2.1 | Fundamental Concepts of ANN | Explain the Fundamentals of Artificial Neural Network | K2 |
| 2.2 | Evolution of Neural Networks | Outline the development of Neural Networks | K1 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.3 | Basic Models of Artificial Neural Network | Construct the models of ANN | K3 |
| 2.4 | Terminologies of ANNs | Make use of the terminologies of ANN | K3 |
| 2.5 | McCulloch-Pitts Neuron | Design the McCulloch-Pitts Neuron model | K4 |
| 2.6 | Linear Separability | Discuss the concept of linear separability | K6 |
| 2.7 | Hebb Network | Analyze Hebb network | K2 |
| **III** | **Supervised Learning Network** | | |
| 3.1 | Perceptron Networks | Discuss the Perceptron Networks. | K6 |
| 3.2 | Adaptive Linear Neuron (Adaline) | Build the Adaline model | K6 |
| 3.3 | Multiple Adaptive Linear Neurons | Design the multiple adaptive linear neurons | K6 |
| 3.4 | Back Propagation Network | Propose the various learning factors | K6 |
| 3.5 | Radial Basis Function Network. | Create radial basis function network | K3 |
| **IV** | **Introduction to Fuzzy Logic** | | |
| 4.1 | Classical Sets | Define the classical sets | K1 |
| 4.2 | Operations on Classical Sets | List various operations on classical sets | K1 |
| 4.3 | Fuzzy Sets | Examine the properties of Fuzzy Sets | K4 |
| 4.4 | Fuzzy Relations | Importance of Fuzzy Relations | K5 |
| 4.5 | Membership Functions | Discuss the Membership Function | K6 |
| 4.6 | Defuzzification | Make use of Defuzzification | K3 |
| 4.7 | Fuzzy Arithmetic and Fuzzy Measures | Summarize the concepts involved in Fuzzy Arithmetic | K2 |
| 4.8 | Fuzzy Rule base and Approximate Reasoning | Apply Fuzzy Rule for reasoning | K3 |
| 4.9 | Fuzzy Decision Making | Discuss the types of Fuzzy Decision Making | K6 |
| 4.10 | Fuzzy Logic Control System. | Design a general Fuzzy Logic Control System | K6 |
| **V** | **Genetic Algorithms** | | |
| 5.1 | Introduction to Genetic Algorithms | Explain the natural evolution | K2 |
| 5.2 | Traditional Optimization and Search Techniques | Discuss the different types of optimization method | K2 |
| 5.3 | Genetic Algorithm and Search Space | Solve problemsusingsearch space | K6 |
| 5.4 | Genetic Algorithms vs. Traditional Algorithms | Compare traditional algorithm and GA | K4 |
| 5.5 | Basic Terminologies in Genetic Algorithm | List out the terminologies in Genetic Algorithm | K1 |
| 5.6 | Simple GA | Explain the operational flow of simple GA | K2 |
| 5.7 | General Genetic Algorithm | Make use of the General Genetic Algorithm | K3 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.8 | The Schema Theorem | Prove the result on the behavior of GA | K5 |
| 5.9 | Classification of Genetic Algorithm | Classify Genetic Algorithms | K2 |
| 5.10 | Holland Classifier System | Adapt the concepts involved in Holland Classifier System | K6 |
| 5.11 | Genetic Programming | Examine the features properties of Genetic Program | K4 |
| 5.12 | Applications of GA | Discuss the applications of GA | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO8 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | - | L | - | - | - | M | H | L | M | - | - | M |
| CO2 | H | H | M | H | M | H | M | L | H | H | H | M | - |
| CO3 | H | H | M | H | H | H | H | M | H | H | L | L | L |
| CO4 | H | H | H | H | H | M | M | H | H | H | H | M | M |
| CO5 | H | H | M | H | M | H | M | L | H | M | M | L | L |
| CO6 | H | H | H | H | H | M | H | M | M | H | H | H | H |

**L-Low      M-Moderate      H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Assignment, Group Presentation, Group Discussion, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                          **HEAD OF THE DEPARTMENT**
  Dr.M.S.MYTHILI                                            Dr.R.THAMARAI SELVI


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# ELECTIVE II :DATAWAREHOUSING AND DATA MINING

**SEMESTER : II**                                                                                           **CODE: P20CA2:2**
**CREDITS:3**                                                                                               **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES
After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|----------------|-------|--------------|
| CO1 | Summarize the basic concepts in data mining and the techniques in knowledge mining | K2 | I |
| CO2 | Analyze the fundamentals of Data Preprocessing | K4 | II |
| CO3 | Apply the various concepts of Data Warehousing and Online Analytical Processing for forecasting | K3 | II |
| CO4 | Elaborate the techniques in classification | K6 | III |
| CO5 | Analyze the cluster algorithms | K4 | IV |
| CO6 | Estimate the knowledge of Outlier Detection, Data Mining Trends and Research Frontiers | K6 | V |

## 2A. Syllabus

**UNIT I - Data Mining Introduction and Preprocessing**                                                     **12 Hours**
         **Introduction:** Why Data Mining? – What is Data Mining? – What Kinds of Patterns can be Mined? – Which Technologies Are Used? – Which Kinds of Applications Are Targeted? – Major issues in Data Mining. **Data Preprocessing**: **Data Preprocessing:** An Overview – Data Clearing – Data Integration – Data Reduction – Data Transformation and Data Discretization.

**UNIT II - Data Warehousing Concepts**                                                                     **12 Hours**
         **Data Warehousing and Online Analytical Processing:** Data Warehouse: Basic Concepts – Data Warehouse Modeling: Data Cube and OLAP – Data Warehouse Design and Usage – Data Warehouse Implementation – Data Generalization by Attribute – Oriented Induction.

**UNIT III - Patterns and Classification Techniques**                                                       **12 Hours**
         **Mining Frequent Patterns, Associations, and Correlations: Basics Concepts and Methods:** Basic Concepts – Frequent Itemset Mining Methods. **Classification: Basic Concepts:** Basic Concepts – Decision Tree Induction – Rule Based Classification – Lazy Learners.

**UNIT IV - Cluster Analysis Concepts and Techniques**                                                      **12 Hours**
         **Cluster Analysis: Basic Concepts and Methods:** Cluster Analysis – Partitioning Methods – Hierarchical Methods – Density Based Methods – Grid Based Methods.

**UNIT V - Outlier Detection Techniques**                                                                   **12 Hours**
**Outlier Detection:** Outliers and Outlier Analysis–Outlier Detection Methods – Statistical Approaches – Proximity based Approaches – Clustering based Approaches – Classification based Approaches. **Data Mining Trends and Research Frontiers:** Data Mining Applications.

**B. TOPICS FOR SELF STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Baye's Theorem | **https://www.tutorialspoint.com/data_mining/dm_bayesian_classification.htm** |
| 2 | Backpropagation | **https://towardsdatascience.com/understanding-backpropagation-algorithm** |
| 3 | Rule-based classification | **https://www.tutorialspoint.com/data_mining/dm_rbc.htm** |
| 4 | Clustering Evaluation Measuring Clustering Quality | **https://www.coursera.org/lecture/cluster-analysis/6-2-clustering-evaluation-measuring-clustering-quality-RJJfM** |

**C. Text Book:**
1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Third Edition, rgan Kaufmann, 2012.

**D. Reference Books:**
1. Margaret H.Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education, 2003.
2. Arun K.Pujari, "Data Mining Techniques", University Press, 2001.

**E. Web links:**
1. **https://swayam.gov.in/**
2. **https://nptel.ac.in/**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| I | **Introduction** | | |
| 1.1 | Why Data Mining? | Recall the basic concepts of Data Mining. | K1 |
| 1.2 | What is Data Mining? | Illustrate the applications of Data Mining. | K2 |
| 1.3 | What Kinds of Patterns can be Mined? | Discuss about the kinds of patterns. | K6 |
| 1.4 | Which Technologies Are Used? | Identify the technologies used in data mining | K2 |
| 1.5 | Which Kinds of Applications Are Targeted? | Discuss about kinds of mining applications. | K6 |
| 1.6 | Major issues in Data Mining | List out themajor issues in data mining | K4 |
| | **Data Preprocessing: Data Preprocessing** | | |
| 1.7 | An Overview | Discuss about preprocessing techniques | K6 |
| 1.8 | Data Clearing | Illustrate data cleaning | K2 |
| 1.9 | Data Integration | Elaborate data integration | K6 |
| 1.10 | Data Reduction | Explain data reduction | K2 |
| 1.11 | Data Transformation and Data Discretization | Compare data transformation and data discretization | K5 |
| II | **Data Warehousing and Online Analytical Processing** | | |
| 2.1 | Data Warehouse | Discuss data warehouse | K6 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.2 | Basic Concepts | Explain basic concept of data warehousing | K2 |
| 2.3 | Data Warehouse Modeling | Build a data warehouse model | K6 |
| 2.4 | Data Cube and OLAP | Compare Cube and OLAP | K5 |
| 2.5 | Data Warehouse Design and Usage | Discuss data warehouse design and usage | K6 |
| 2.6 | Data Warehouse Implementation | Explain data warehouse implementation | K2 |
| 2.7 | Data Generalization by Attribute | List data generalization by attribute | K1 |
| 2.8 | Oriented Induction | Illustrate oriented induction | K2 |
| III | **Mining Frequent Patterns, Associations, and Correlations: Basics Concepts and Methods** | | |
| 3.1 | Basic Concepts | Illustrate the basic concepts of mining | K2 |
| 3.2 | Frequent Itemset Mining Methods | Discuss frequent itemset mining methods | K6 |
| | **Classification: Basic Concepts:** | | |
| 3.3 | Basic Concepts | Explain basic concepts the classification | K2 |
| 3.4 | Decision Tree Induction | Builddecision tree induction | K3 |
| 3.5 | Rule Based Classification | Discuss rule-based classification | K6 |
| 3.6 | Lazy Learners | Develop lazy learners | K3 |
| IV | **Cluster Analysis: Basic Concepts and Methods** | | |
| 4.1 | Cluster Analysis | Explain cluster analysis | K2 |
| 4.2 | Partitioning Methods | Illustrate partitioning methods | K2 |
| 4.3 | Hierarchical Methods | Discuss hierarchical methods | K6 |
| 4.4 | Density Based Methods | Analyze density-based methods | K4 |
| 4.5 | Grid Based Methods | Outline grid-based methods | K2 |
| V | **Outlier Detection** | | |
| 5.1 | Outliers and Outlier Analysis | Compare outliers and outlier analysis | K4 |
| 5.2 | Outlier Detection Methods | Explain outlier detection methods | K2 |
| 5.3 | Statistical Approaches | List statistical approaches | K1 |
| 5.4 | Proximity based Approaches | Discuss the proximity-based approaches | K6 |
| 5.5 | Clustering based Approaches | Analyze clustering-based approaches | K4 |
| 5.6 | Classification based Approaches | Construct classification-basedapproaches | K3 |
| | **Data Mining Trends and Research Frontiers** | | |
| 5.7 | Data Mining Applications | Build data mining applications | K6 |

## 4. MAPPING (CO, PO, PSO)

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | H | M | L | M | M | L | M | M | L | H | M | M | M |
| CO2 | M | H | M | L | M | L | M | M | M | H | M | M | L |
| CO3 | M | M | M | L | M | M | L | M | L | H | M | H | M |
| CO4 | M | M | L | M | M | M | M | L | M | M | M | M | H |
| CO5 | H | M | H | M | H | M | H | H | H | M | H | M | H |
| CO6 | H | H | H | H | H | M | M | M | L | M | M | M | H |

**L-Low**          **M-Moderate**          **H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book

2. Open Book Test.

3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).

4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr.L.JAYASIMMAN                              Dr.R.THAMARAI SELVI

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# ELECTIVE II: ARTIFICIAL INTELLIGENCE

**SEMESTER: II**  **CODE: P20CA2:3**
**CREDITS: 3**  **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES:
After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Apply the fundamentals of Artificial Intelligence (AI) and its foundations for solving AI problems | K3 | I |
| CO2 | Solve real life problems using AI techniques like searching and game playing in a state space representation | K6 | II |
| CO3 | Propose solutions using knowledge representation,logic and heuristic search for AI problems | K6 | III |
| CO4 | Compare the different types of intelligent agents,ExpertSystems,Artificial Neural Networks and other Machine Learning Models | K5 | IV |
| CO5 | Develop applications using Artificial Intelligence techniques and Data Mining Tools | K6 | IV |
| CO6 | Discuss the concepts of Expert Systems and Machine Learning | K6 | V |

## 2A. Syllabus

### UNIT I - Introduction to Artificial Intelligence                                   12 Hours
What is Artificial Intelligence? The AI problems – What is an AI technique? - Criteria for success. Problems, Problem Spaces and Search: Defining the Problem as a State Space Search – Production Systems – Problem Characteristics.

### UNIT II - Searching Techniques                                   12 Hours
Heuristic Search Techniques: Generate and Test – Hill Climbing: Simple Hill Climbing, Steepest Ascent Hill Climbing – Best First Search: OR Graphs, The A* Algorithm – Problem Reduction: AND-OR Graphs, The AO* Algorithm – Constraint Satisfaction – Means Ends Analysis.

### UNIT III - Knowledge Representation                                   12 Hours
Knowledge Representation Issues: Representation and Mappings – Approaches to Knowledge Representation – Issues in Knowledge Representation: Important Attributes, Relationship among Attributes. Using Predicate Logic: Representing Simple Facts in Logic – Representing Instance and Isa Relationships – Computable Functions and Predicates – Resolution.

### UNIT IV - Representing Knowledge using Rules                                   12 Hours
Representing Knowledge Using Rules: Procedural versus Declarative Knowledge – Logic Programming – Forward versus Backward Reasoning – Matching – Control Knowledge.

### UNIT V - Expert Systems                                   12 Hours
Expert Systems: Representing and Using Domain Knowledge – Expert System Shells Explanation – Knowledge Acquisition. Perception and Action: Real-Time Search – Perception: Speech Recognition – Action – Robot Architectures.

**B. TOPICS FOR SELF STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Robotics | **www.tutorialspoint.com** |
| 2 | Natural Language Processing | **www.en.wikipedia.org** |
| 3 | Artificial Neural Network | **www.searchenterpriseai.techtarget.com** |
| 4 | Reinforcement Learning | **www.geeksforgeeks.org** |

**C. Text Book:**
1. Elaine Rich, Kevin Knight, "Artificial Intelligence", Second Edition, Tata McGraw Hill publications, 2008.

**D. Reference Books:**
1. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", Second Edition, Prentice Hall of India Publications, 2006.
2. Nils J. Nilsson, "Artificial Intelligence: A New Synthesis", Second Edition, Harcourt Asia Publications, 2000.
3. V.S. Janakiraman, K. Sarukesi, P. Gopalakrishnan, "Foundations of Artificial Intelligence and Expert Systems", McMillan India Publications, 2005.

**E. Web links:**
1. **www.tutorialspoint.com**
2. **www.geeksforgeeks.org**
3. **www.javatpoint.com**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Problems and Search-What is Artificial Intelligence** | | |
| 1.1 | The AI Problems | Explain the task domains of Artificial Intelligence | K5 |
| 1.2 | What is an AI Technique? | Construct problems using AI techniques | K3 |
| 1.3 | Criteria for Success | Summarize the goals for success | K2 |
| | **Problems, Problem Spaces and Search** | | |
| 1.4 | Defining the Problem as a State Space Search | Elaborate the production rules for the water jug problem | K6 |
| 1.5 | Production Systems | Develop algorithms using Breadth-First Search | K6 |
| 1.6 | Problem Characteristics | Explain the problem characteristics in detail | K5 |
| **II** | **Heuristic Search Techniques** | | |
| 2.1 | Generate and Test | Utilize the generate and test algorithm | K3 |
| 2.2 | Hill Climbing | Solve the problems using various Hill Climbing algorithms | K6 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.3 | Best-First Search | Discuss on the Best-First Search algorithms. | K6 |
| 2.4 | Problem Reduction | Elaborate the operations of problem reduction | K6 |
| 2.5 | Constraint Satisfaction | Solve Cryptarithmetic problems | K6 |
| 2.6 | Means Ends Analysis | Summarize the techniques of Means Ends Analysis | K2 |
| **III** | **Knowledge Representation- Knowledge Representation Issues** | | |
| 3.1 | Representation and Mappings | Classifyfacts and representations | K4 |
| 3.2 | Approaches to Knowledge Representation | Elaborate on the approaches of knowledge representation | K6 |
| 3.3 | Issues in Knowledge Representation | Discuss the issues in knowledge representation | K6 |
| | **Using Predicate Logic** | | |
| 3.4 | Representing Simple Facts in Logic | Determine the use of propositional logic | K5 |
| 3.5 | Representing Instance and Isa Relationships | Identify the three ways of representing class membership | K3 |
| 3.6 | Computable Functions and Predicates | Prove the computable functions and predicates using the set of facts | K5 |
| 3.7 | Resolution | Propose algorithm to convert a clause form | K6 |
| **IV** | **Representing Knowledge Using Rules** | | |
| 4.1 | Procedural versus Declarative Knowledge | Compare procedural and declarative knowledge | K4 |
| 4.2 | Logic Programming | Explain logic programming | K5 |
| 4.3 | Forward versus Backward Reasoning | Compare forward and backward reasoning | K5 |
| 4.4 | Matching | Develop matching between current state and preconditions of the rules | K6 |
| 4.5 | Control Knowledge | Outline control knowledge | K2 |
| **V** | **Expert Systems** | | |
| 5.1 | Representing and Using Domain Knowledge | Outline the usage of domain knowledge | K2 |
| 5.2 | Expert System Shells | Summarize on expert system shells | K2 |
| 5.3 | Explanation on Domain Knowledge | Explain domain knowledge | K1 |
| 5.4 | Knowledge Acquisition | Elaborate on knowledge acquisition | K6 |
| | **Perception and Action** | | |
| 5.5 | Real-Time Search | Propose algorithmsusing Real Time Search | K6 |
| 5.6 | Perception | Design systems for speech recognition | K6 |
| 5.7 | Action | Construct visibility graph | K6 |
| 5.8 | Robot Architectures | Summarize the architecture of robot | K6 |

## 4. MAPPING (CO, PO, PSO)

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | M | M | L | L | H | H | M | M | H | H | M | M | H |
| CO2 | H | H | M | M | H | H | M | M | H | H | M | M | M |
| CO3 | M | H | H | M | M | H | M | M | M | M | H | M | L |
| CO4 | M | M | L | M | L | M | M | M | H | M | H | M | M |
| CO5 | H | H | M | M | M | M | M | H | H | M | M | M | H |
| CO6 | H | H | H | H | H | M | H | H | H | H | H | H | H |

**L-Low      M-Moderate      H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Assignment, Group Presentation, Group Discussion,  Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                **HEAD OF THE DEPARTMENT**
Mrs. PEARLY CHARLES                        Dr.R.THAMARAI SELVI

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# Elective III - CUSTOMER RELATIONSHIP MANAGEMENT

**SEMESTER : II**                                                     **CODE: P20CA2:4**
**CREDITS:3**                                                         **HOURS/WEEK:4**

## 1. COURSE OUTCOMES
After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Evaluate customer lifetime values | K5 | I |
| CO2 | Plan ways for retaining a customer | K6 | II |
| CO3 | Summarize customer lifecycle and customer values | K2 | II |
| CO4 | Compare value in use and value in exchange | K4 | III |
| CO5 | Develop customer related database for knowledge management | K6 | IV |
| CO6 | Analyze structured and unstructured data | K4 | V |

## 2A. Syllabus

**UNIT I - Introduction to CRM**:                                              **12 Hours**
Introduction -Strategic CRM - Operational CRM - Analytical CRM - Where does social CRM fit? - Misunderstandings about CRM - Defining CRM - CRM constituencies - Commercial contexts of CRM - The not-for-profit context – the 'third sector' - Models of CRM -**Understanding relationships**: What is a relationship? Relationship quality - Why companies want relationships with customers - Customer lifetime value -  When might companies not want relationships with customers? - Why customers want relationships with suppliers - Customer satisfaction, loyalty and business performance  -Relationship management theories.

**UNIT II - Managing the customer lifecycle** – **customer acquisition:**                **13 Hours**
Introduction - What is a new customer? - Portfolio purchasing - Prospecting - Key performance indicators of customer acquisition programmes    - Making the right offer  - Operational CRM tools that help customer acquisition     Managing the customer lifecycle. **Customer retention and development**: Introduction What is customer retention? - Economics of customer retention - Which customers to retain? -Strategies for customer retention - Positive customer retention strategies - Context makes a difference - Key performance indicators of customer retention programmes - Strategies for customer development  - Strategies for terminating customer relationships

**UNIT III - Strategic CRM: Customer Portfolio Management**:                          **11 Hours**
What is a portfolio? - Who is the customer? - Customer portfolio models    - Strategically significant customers - The seven core customer management strategies - How to deliver customer-experienced value :introduction          Understanding value - When do customers experience value?- Modelling customer-perceived value -Sources of customer value - Customization   - Value through the marketing mix

**UNIT IV - Operational CRM : Sales Force Automation:**                              **12 Hours**
What is SFA? - The SFA eco-system SFA software functionality - SFA adoption - How SFA changes sales performance.  Marketing Automation : What is marketing automation? - Benefits of marketing automation -  Software applications for marketing.

**UNIT V - Analytical CRM** : **Developing and managing customer-related databases**:      **12 Hours**

Corporate customer-related data - Structured and unstructured data - Developing a customer-related database - Data integration - Data warehousing - Data marts - Knowledge management. **Using Customer-Related Data:** Introduction - Analytics for CRM strategy and tactics -  Analytics throughout the customer lifecycle - Analytics for structured and unstructured data - Big data analytics Analytics for structured data - Three ways to generate analytical insight

**B. TOPICS FOR SELF-STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Data Quality in CRM | **https://www.mycustomer.com/selling/crm/how-to-improve-data-quality-in-your-crm-system** |
| 2 | Service Automation | **https://www.simplecrm.com/crm/service-automation/** |
| 3 | CRM Implementation | **https://www.discovercrm.com/crm-implementation-process.html** |
| 4 | Data Science to CRM | **https://www.kaggle.com/general/5782** |

**C. Text Book:**

1. Francis Buttle and Stan Maklan, Customer Relationship Management: Concepts and Technologies, Routledge, 2015.

**D. Reference Books:**

1. Ed Peelan and  Rob Beltman., Customer Relationship Management., Pearson, 2013.
2. V. Kumar, Werner Reinartz, Customer Relationship Management, John Willey & Sons, 2006.

**E. Web links:**

1. **https://www.salesforcetutorial.com/**
2. **https://www.tutorialspoint.com/microsoft_crm/microsoft_crm_forms.htm**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Introduction to CRM** | | |
| 1.1 | Strategic CRM | Recall strategic CRM | K1 |
| 1.2 | Operational CRM | List the applications of operational CRM | K1 |
| 1.3 | Analytical CRM | Define analytical CRM | K1 |
| 1.4 | Where does social CRM fit? | Identify the ways of enhancing CRM using social media | K3 |
| 1.5 | Misunderstandings about CRM | Distinguish CRM and database marketing | K4 |
| 1.6 | Defining CRM | Define CRM | K1 |
| 1.7 | CRM constituencies | List the constituencies having an interest in CRM | K1 |
| 1.8 | Commercial contexts of CRM | Summarize commercial contexts, which present a range of different customer relationship management problems | K2 |
| 1.9 | The not for profit context | Classify for profit and not for profit context of CRM | K2 |
| 1.10 | Models of CRM | Explain various model of CRM | K5 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1.11 | Understanding relationships: What is a relationship? | Identify the five general phases through which customer–supplier relationships can evolve | K3 |
| 1.12 | Relationship quality | Define relationship quality | K1 |
| 1.13 | Why companies want relationships with customers | Examine why companies want relationship with customer | K4 |
| 1.14 | Customer lifetime value | Evaluate customer lifetime values | K5 |
| 1.15 | When might companies not want relationships with customers? | Examine why companies not want relationships with customers | K4 |
| 1.16 | Why customers want relationships with suppliers | Summarize why customers want relationships with suppliers | K2 |
| 1.17 | Customer satisfaction, loyalty and business performance | Recall customer loyalty | K1 |
| 1.18 | Relationship management theories | Apply relationship management theories to given scenario | K3 |
| **II** | **Managing the customer lifecycle** | | |
| 2.1 | Customer Acquisition: Introduction | List the issues need to be carefully considered and programmed into a properly resourced customer acquisition plan | K1 |
| 2.2 | What is a new customer? | Outline a new customer | K2 |
| 2.3 | Portfolio purchasing | outline conversion model | K2 |
| 2.4 | Prospecting | Explain Business to consumer lead generation | K5 |
| 2.5 | Key performance indicators of customer acquisition programmes | Categorize Key performance indicators of customer acquisition programmes | K4 |
| 2.6 | Making the right offer | What is the right offer? | K1 |
| 2.7 | Operational CRM tools that help customer acquisition   Managing the customer lifecycle. | Summarize operational tools that help in the customer acquisition process, including lead management, campaign management and event-based marketing | K2 |
| 2.8 | Customer retention and development: Introduction What is customer retention? | Define customer retention | K1 |
| 2.9 | Economics of customer retention | Examine the economics of customer retention | K4 |
| 2.10 | Which customers to retain? | List the types of customers to retain | K1 |
| 2.11 | Strategies for customer retention | Apply the strategies for customer retention in given scenario | K3 |
| 2.12 | Positive customer retention strategies | Summarize positive customer retention strategies | K2 |
| 2.13 | Context makes a difference | List contextual considerations impact on customer retention practices | K1 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.14 | Key performance indicators of customer retention programmes | Summarize key performance indicators of customer retention programmes | K2 |
| 2.15 | Strategies for customer development | Explain CRM technologies that are useful for customer development purposes | K2 |
| 2.16 | Strategies for terminating customer relationships | Apply the strategies for terminating customer relationships in given scenario | K4 |
| **III** | **Strategic CRM** | | |
| 3.1 | Customer Portfolio Management: What is a portfolio? | Define portfolio | K1 |
| 3.2 | Who is the customer? | Recall Customer | K1 |
| 3.3 | Customer portfolio models | Explain customer portfolio models | K2 |
| 3.4 | Strategically significant customers | Summarize the classes of strategically significant customers | K2 |
| 3.5 | The seven core customer management strategies | Explain the core customer management strategies | K2 |
| 3.6 | How to deliver customer experienced value: introduction , Understanding value | Define value | K1 |
| 3.7 | When do customers experience value? | Compare value in use and value in exchange | K4 |
| 3.8 | Modeling customer perceived value | Construct a customer perceived value model | K3 |
| 3.9 | Sources of customer value | List the sources of customer value | K1 |
| 3.10 | Customer Value through the marketing mix | Outline 7Ps of value propositions | K2 |
| **IV** | **Operational CRM** | | |
| 4.1 | Sales Force Automation: What is SFA? | Define Sales force automation | K1 |
| 4.2 | The SFA eco system | List the components of SFA | K1 |
| 4.3 | SFA software functionality | Summarize the functionality provided by SFA | K2 |
| 4.4 | SFA adoption | List the benefits from SFA | K2 |
| 4.5 | How SFA changes sales performance. | Summarize the condition of SFA having impact on sales performance | K2 |
| 4.6 | Marketing Automation : What is marketing automation? | Define marketing automation | K1 |
| 4.7 | Benefits of marketing automation | Outline the benefits of marketing automation | K2 |
| 4.8 | Software applications for marketing | Discuss the functionalities offered by marketing software | K6 |
| **V** | **Analytical CRM** | | |
| 5.1 | Developing and managing customer related databases: Corporate customer related data | Recall customer related data. | K1 |
| 5.2 | Structured and unstructured data | Summarize the types of databases | K2 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.3 | Developing a customer related database | Develop a customer related data | K2 |
| 5.4 | Data integration | Recall data integration | K1 |
| 5.5 | Data warehousing | Define data warehousing | K1 |
| 5.6 | Data marts | Recall Data mart | K1 |
| 5.7 | Knowledge management. | Define knowledge management (KM) from a CRM perspective | K1 |
| 5.8 | Using Customer Related Data: Introduction | Recall customer related data. | K1 |
| 5.9 | Analytics for CRM strategy and tactics | Apply forecasting technique to customer data | K2 |
| 5.10 | Analytics throughout the customer lifecycle | Apply forecasting technique to customer data | K3 |
| 5.11 | Analytics for structured and unstructured data | Analyze structured and unstructured CRM data | K4 |
| 5.12 | Big data analytics | Summarize three 3Vs of Big data | K2 |
| 5.13 | Analytics for structured data | Classify various types of data | K2 |
| 5.14 | Three ways to generate analytical insight | Develop OLAP report on CRM | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | - | - | L | - | H | H | M | H | - | - | M | H |
| CO2 | - | - | - | - | - | H | H | H | M | - | - | M | M |
| CO3 | - | - | L | L | - | M | M | M | L | - | - | L | L |
| CO4 | M | M | M | M | L | H | M | M | M | - | - | - | L |
| CO5 | M | M | M | M | H | M | M | M | H | M | M | H | M |
| CO6 | M | M | M | H | H | H | H | H | H | M | M | H | H |

**L-Low          M-Moderate          H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1 (Theory ): Closed Book
2. Open Book Test.
3. Assignment, Group Discussion, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                              **HEAD OF THE DEPARTMENT**
Mr. A.SANDANASAMY                                     Dr.R.THAMARAI SELVI


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**SEMESTER : II**                                                   **CODE: P20CA2:5**
**CREDITS: 3**                                                      **HOURS/WEEK:4**

## 1. COURSE OUTCOMES:

After the successful completion of this course, the students will be able to

| S. No. | Course Outcomes | Level | Unit Covered |
|--------|-----------------|-------|--------------|
| CO1 | Summarize the basic concepts of ERP systems | K2 | I |
| CO2 | Distinguish between MRP, MRP II and ERP systems | K4 | II |
| CO3 | Analyze the technologies related to ERP systems and major components | K4 | III |
| CO4 | Discover the knowledge of typical ERP systems | K4 | III |
| CO5 | Assess the advantages and limitations of implementing ERP systems | K5 | IV |
| CO6 | Relate the various processes in business using ERP concepts and techniques | K2 | V |

## 2A. Syllabus

**UNIT I - Introduction to ERP**                                    **12 Hours**

Introduction to ERP: Enterprise - ERP concepts - Justification for ERP investment – Risk involved in ERP implementation - Benefits of ERP - Important ERP Products (Software)

**UNIT II - ERP and related Technologies**                         **12 Hours**

ERP and related Technologies: Business Intelligence - E-Commerce & E-Business – Business Process Re-engineering - Data Warehousing and Data Mining - Online Analytical Process (OLAP) - Supply Chain Management - Customer Relationship Management

**UNIT III - Business Modules in ERP**                             **12 Hours**

Business Modules in ERP: Marketing – Finance - Material Management – Production - Quality Management - Sales Distribution – Plant Maintenance - Human Resource Management

**UNIT IV - ERP Implementation**                                   **14 Hours**

ERP Implementation: ERP Implementation Life Cycle - Requirement definition - Implementation methodologies - Process definition Vendors and Consultants - ERP Project Teams - Dealing with Employee Resistance - Training and Education Data Migration

**UNIT V - ERP Operation, Maintenance and Future Trends**          **10 Hours**

ERP Operation, Maintenance and Future Trends: Post implementation Activities - Operation and maintenance of ERP Systems - Performance Measurement of ERP Systems - Internet enabled ERP - Future trends in ERP

**B. TOPICS FOR SELF-STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | The Future of ERP Market | **www.deskera.com** |
| 2 | ERP vs. ERP II vs. ERP III | **www.iitrun.com** |
| 3 | Open-Source ERP Technologies | **www.thebalancesmb.com** |
| 4 | Deploying ERP Applications | **www.networkworld.com** |

**C. Text Book:**

1. Alexis Leon, "ERP Demystified", Tata McGraw-Hill Publications, 2008.

**D. Reference Book:**

1. Dr. Ashim Raj Singla, "Enterprise Resource Planning", 2nd Edition, Cengage Learning India Pvt., Ltd., 2016

**E. Web links:**

1. **www.ebooks.lpude.in/management**
2. **www.akwl.org/wp-content/uploads**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Introduction to ERP** | | |
| 1.1 | ERP concepts | Recall the concepts of Enterprise Resource Planning | K1 |
| 1.2 | Justification for ERP investment | List out the growth reasons of ERP | K1 |
| 1.3 | Risk involved in ERP Implementation | Analyze the risks factors in ERP implementation | K4 |
| 1.4 | Benefits of ERP | Explain the benefits of ERP | K2 |
| 1.5 | Important ERP Products (Software) | Discuss integrated data model and business modeling | K6 |
| | **ERP and related Technologies** | | |
| 2.1 | Business Intelligence | Apply the concepts of MIS, DSS and EIS in Business Intelligence | K3 |
| .2.2 | E-Commerce & E-Business | Outline the characteristics of BPR | K2 |
| 2.3 | Business Process Re-engineering | Compare the various needs for business process re-engineering | K4 |
| 2.4 | Data Warehousing and Data Mining | Discuss the concepts of data warehousing and data mining | K6 |
| 2.5 | Online Analytical Process (OLAP) | Summarize the concepts of OLAP | K2 |
| 2.6 | Supply Chain Management | Elaborate on supply chain business process integration | K6 |
| 2.7 | Customer Relationship Management | Explain the concept of Customer Relationship Management | K2 |
| **III** | **Business Modules in ERP** | | |
| 3.1 | Marketing | Discuss the business modules of ERP | K6 |
| 3.2 | Finance | Summarize the finance module | K2 |
| 3.3 | Material Management | Organize material management module of ERP | K3 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| .3.4 | Production and Quality Management | Recall the need for quality management | K1 |
| 3.5 | Sales Distribution | Compare sales distribution between delivery and creation of quality certificates | K5 |
| 3.6 | Plant Maintenance | Explain the plant maintenance module | K2 |
| 3.7 | Human Resource Management | Solve HRM problems by applying system approach | K6 |
| **IV** | **ERP Implementation** | | |
| 4.1 | ERP Implementation Life Cycle | Discuss the ERP implementation cycle | K6 |
| 4.2 | Requirement definition | Elaborate on gap analysis technique | K6 |
| 4.3 | Implementation methodologies | Design ERP packages using implementation methodologies | K6 |
| 4.4 | Process definition Vendors and Consultants | Outline the role of Vendors | K2 |
| 4.5 | ERP Project Teams | Categorize the pros and cons of In-house Implementation | K4 |
| 4.6 | Dealing with Employee Resistance | Explain the phases in project planning | K2 |
| 4.7 | Training and Education Data Migration | Identify the need for end user training | K3 |
| **V** | **ERP Operation, Maintenance and Future Trends** | | |
| 5.1 | Post implementation Activities | Discuss the faster implementation methodology | K6 |
| 5.2 | Operation and maintenance of ERP Systems | Distinguish between new markets and new channels | K4 |
| 5.3 | Performance Measurement of ERP Systems | Outline the challenges of ERP Systems | K2 |
| 5.4 | Internet enabled ERP | Summarize the concept of Internet enabling | K2 |
| 5.5 | Future trends in ERP | Predict new business segments | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | H | H | M | L | M | H | L | L | M | H | M | M | H |
| **CO2** | H | H | M | L | M | H | M | L | M | H | M | L | H |
| **CO3** | H | H | M | L | L | H | L | M | M | M | H | L | H |
| **CO4** | H | H | M | L | L | H | M | L | M | M | H | L | H |
| **CO5** | H | H | M | L | L | H | L | M | M | H | M | L | H |
| **CO6** | H | H | M | L | L | H | M | L | M | H | M | L | H |

**L-Low          M-Moderate          H- High**

**5. COURSE ASSESSMENT METHODS**

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**          **HEAD OF THE DEPARTMENT**
Dr.A. FLORENCE DEEPA          Dr.R.THAMARAI SELVI

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# Elective III: MANAGEMENT INFORMATION SYSTEMS

**SEMESTER : II**  **CODE : P20CA2:6**
**CREDITS  : 3**  **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES
After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Recall the role of information technology and information system in business | K1 | I |
| CO2 | Evaluate the role of information systems in supporting various levels of business strategy | K2 | II |
| CO3 | Analyze and synthesize business information and systems to facilitate evaluation of strategic alternatives | K3 | III |
| CO4 | Describe the role of information technology and decision support systems in business and record the current issues with those of the firm to solve business problems | K3 | IV |
| CO5 | Build a business case for IT, addressing key IT acquisition decisions such as make/buy; outsource/in source; project management | K5 | V |
| CO6 | Create the theoretical models used in database management systems to answer business questions | K6 | V |

## 2A. Syllabus

**UNIT I - Introduction to Information Systems**  **12 Hours**
**Introduction to Information Systems:** Why study Information System? – Why Business need Information Technology? – Fundamentals of Information Systems – Overview of Information Systems.

**UNIT II - Solving Business Problems with Information Systems**  **12 Hours**
**Solving Business Problems with Information Systems:** System Approach to Problem Solving – Developing Information System Solution. **Database Management:** Managing Data Resources – Technical Foundation of Database Management.

**UNIT III - Information Systems for Strategic Advantage**  **12 Hours**
**Information Systems for Strategic Advantage:** Fundamentals – Strategic Advantage – Strategic Applications and Issues in IT. **Managing:** Enterprise and Global Management.

**UNIT IV - Business Applications of Information Technology**  **12 Hours**
**Business Applications of Information Technology:** The Internet Electronic Commerce – Fundamentals of Electronic Commerce – Information System for Business Operations – Business Information System – Transaction Processing Systems.

**UNIT V - Information Systems for Managerial Decision Support**  **12 Hours**
**Information Systems for Managerial Decision Support:** Decision Support Systems – Artificial Intelligence Technology in Business – Management IT – Planning for Business Change with IT – Implementing Business Changes with IT – Security and Control Issues in I/S – Ethical and Societal Challenge of Information Technology.

## B. TOPICS FOR SELF-STUDY:

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Functional Information Systems | **https://ecomputernotes.com/mis/structure-and-classification/explain-briefly-the-different-functional-information-systems** |
| 2 | Enterprise Resource Planning | **https://solutionsreview.com/enterprise-resource-planning/understand-erp-by-watching-these-5-youtube-videos/** |
| 3 | Trends in MIS | **https://moonwelfarefoundation.blogspot.com/2018/11/trends-in-management-information-systems.html** |
| 4 | Enterprise Software Systems | **https://www.floridatechonline.com/blog/information-technology/types-of-enterprise-systems-and-their-applications/** |

## C. Text Book:

1. James A. O'Brien, "Management Information Systems", Fourth Edition, Galgotia Publications, 1999.

## D. Reference Book:

1. Gordon B. Davis, Margrethe H. Olson, "Management Information Systems", McGraw Hill, 2000.

## E. Web links:

1. **https://nptel.ac.in/courses/122/105/122105022/**
2. **https://www.youtube.com/watch?v=N8F7eOqgH8Q**

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|--------|--------|------|
| **I** | **Introduction to MIS** | | |
| 1.1 | Introduction to MIS | Recall the definition of MIS. | K1 |
| 1.2 | Fundamentals of Information Systems | Explain some of the essential features of the modern organisation | K2 |
| 1.3 | Overview of information system | Show the pyramid of information system in organization | K2 |
| **II** | **Solving Business Problems with Information Systems** | | |
| 2.1 | Definition of Information Systems | Define business problems using business solutions | K1 |
| 2.2 | System Approach to Problem Solving | Summarize the main purposes of information systems in organizations | K2 |
| 2.3 | Developing Information System Solution | Develop solutions for information system problems | K5 |
| | **Database Management** | | |
| 2.4 | Managing Data Resources | Identify the stages of transaction from a manual system to automated systems | K3 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.5 | Technical Foundation of Database Management | Summarize the need for database systems. | K2 |
| **III** | **Information Systems for Strategic Advantage** | | |
| 3.1 | Fundamentals | Outline the strategic roles of information systems | K2 |
| 3.2 | Strategic Advantage | Identify the stages in IT infrastructure evolution. | K3 |
| 3.3 | Strategic Applications and Issues in IT | Assess the strategic information system | K5 |
| | **Managing IT Infrastructure** | | |
| 3.4 | Enterprise and global management | Identify the challenges of managing IT infrastructure and management solutions | K3 |
| **IV** | **Business Applications of IT** | | |
| 4.1 | Definition of IT | Define IT infrastructure | K1 |
| 4.2 | The Internet Electronic Commerce | Classify e-commerce transactions | K4 |
| 4.3 | Fundamentals of Electronic Commerce | Construct the e-commerce support service diagram | K3 |
| | **Information System for Business Operations** | | |
| 4.4 | Business Information System | Compare E-enterprise business model with traditional business organization model | K5 |
| 4.5 | Transaction Processing System. | Summarize the characteristics of Transaction Processing System | K2 |
| **V** | **I/O Management and Disk Scheduling** | | |
| 5.1 | Decision Support Systems | Discuss the functionality of Decision Support System. | K6 |
| 5.2 | Artificial Intelligence Technology in Business | Evaluate how artificial intelligence can gain business intelligence through the implementation of a communication information system. | K5 |
| | **Management of IT** | | |
| 5.3 | Planning for Business Change with IT | Discuss the challenges faced by the CIO. | K4 |
| 5.4 | Implementing Business Changes with IT | Develop new concepts of management in technological companies using IT | K5 |
| 5.5 | Security and Control Issues in Information system. | Examine the various ethical & security issues in information system | K6 |

## 4. MAPPING (CO, PO, PSO)

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | H | M | M | _ | L | M | H | H | M | L | M | M | H |
| CO2 | M | M | _ | M | M | L | M | M | M | L | L | L | M |
| CO3 | M | M | H | M | M | L | _ | M | M | L | M | M | L |
| CO4 | M | H | H | M | L | _ | L | M | H | M | M | M | _ |
| CO5 | H | H | M | M | M | H | M | M | M | M | M | M | L |
| CO6 | M | M | M | M | H | _ | L | M | M | M | M | H | L |

**L-Low        M-Moderate        H- High**

## 5. COURSE ASSESSMENT METHODS

### DIRECT:

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

### INDIRECT:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                **HEAD OF THE DEPARTMENT**
Dr. H.B.VINCENTRAJ                         Dr.R.THAMARAI SELVI

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## Core Practical III: PROGRAMMING IN JAVA LAB

**SEMESTER : II**                                                    **CODE: P20CA2P3**
**CREDITS:3**                                                        **HOURS/WEEK: 4**

### 1. COURSE OUTCOMES
After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Exercise |
|-------|-----------------|-------|----------|
| CO1 | Demonstrate the concept of package, interface | K2 | 1,2,3,4 |
| CO2 | Demonstrate exception handling mechanism | K6 | 5 |
| CO3 | Develop a java program to handle multithreads | K3 | 6 |
| CO4 | Make use of collections and IO streams | K2 | 7,8 |
| CO5 | Apply event handling on AWT and Swing components | K3 | 9,10 |
| CO6 | Develop a Java program to manipulate database, using Java Data Base Connectivity (JDBC) | K6 | 11 |

| Ex.No. | Exercise |
|--------|----------|
| 1 | Classes and Objects. Create Student Class with the following data and methods. Member Data: regno, name, course, java_mark, dbms_mark, os_mark, total, average and result. Member Methods: readData(), processData(), display() Create 5 objects for students and display the mark sheet. |
| 2 | Inheritance. Create a class Employee with employee details such as Emp_Name, E_ID, Age, Sex, Date_of_Join etc., define a sub class Salary of Employee with details like LIC, HRA, DA and TA. Calculate salary of the employee by inheriting Employee details. |
| 3 | Interfaces. Define an interface Bank with a method rateofInterest() and implement the same with classes SBI, PNB and Axis. |
| 4 | Packages. Create packages like Pack and MyPack and import the same into some user defined classes. |
| 5 | Exceptions handling. Create a try block that is likely to generate three types of exception (handle ArithmeticException, ArrayIndexOutOfBoundsException, FileNotFoundException) using try and then incorporate necessary catch blocks to catch and handle them appropriately. Create an user defined Exception. |
| 6 | Multithreading. Create a class Parent by extending a Thread class and also create a class as Child and illustrate the concept of multithreading by applying thread class methods. |
| 7 | Collection Interfaces. Write a program to create a List(Books) using ArrayList and add items to the list and traverse the items through Iterator. |

| 8 | I/O Streams.<br>Create a class named InputStreamReaderExample and read the contents of the file using the methods FileInputStream() and InputStreamReader(). |
|---|---|
| 9 | Applying AWT concepts.<br>Design a Registration form with AWT Controls. |
| 10 | Applying swing concepts.<br>Develop a java swing Frame to retrieve the records form the Job Portal database table<br><br>Design a scientific Calculator using swing components. |
| 11 | JDBC<br>Design a web application for Student details with database operations insert, delete and update. |

## B. TOPICS FOR SELF-STUDY:

| S.No. | Topics | Web Links |
|-------|--------|-----------|
| 1 | Advanced Swing | **https://docs.oracle.com/javase/tutorial/uiswing/misc/index.html** |
| 2 | Security in Java | **https://www.javatpoint.com/java-security-package** |
| 3 | Java RMI | **https://docs.oracle.com/javase/8/docs/technotes/guides/rmi/hello/hello-world.html** |
| 4 | Java Network | **https://www.javatpoint.com/java-networking** |

## C. Text Books:
1. Herbert Schildt,, "JAVA$^{TM}$ : Complete Reference", Eleventh Edition, McGraw Hill, 2019.
2. Ivan Bayross, "Web Enabled Commercial Application Development using Java 2", BPB Publications, 2013. (Unit Covered-V : Java Database Connectivity)

## D. Reference Books:
1. Ken Arnold, James Gosling, David Holmes, "Java™ Programming Language", Fourth Edition, Addison Wesley Profession, 2005.
2. Paul J. Deitel, Harvey M. Deitel, "Java™ for Programmers",Second Edition, PHI Publications, 2011.

## E. Web links:
1. **https://beginnersbook.com/2013/03/inheritance-in-java/**
2. **https://www.programiz.com/java-programming/examples**

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Ex.No. | Lab Exercises | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|--------|---------------|-------------------|------------------------------------------------|
| 1 | Classes and Objects.<br>Create Student Class with the following data and methods.<br>Member Data : regno, name, course, java_mark, dbms_mark, os_mark, total, average and result. | Develop a Java Program with class and object. | K6 |

| Ex.No. | Lab Exercises | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| | Member Methods: readData(), processData(), display()<br>Create 5 objects for students and display the mark sheet. | | |
| 2 | Inheritance.<br>Create a class Employee with employee details such as Emp_Name, E_ID, Age, Sex, Date_of_Join etc., define a sub class Salary of Employee with details like LIC, HRA, DA and TA. Calculate salary of the employee by inheriting Employee details | Create a java program using inheritance. | K6 |
| 3 | Interfaces.<br>Define an interface Bank with a method rateofInterest() and implement the same with classes SBI, PNB and Axis. | Build a java program implementing interfaces. | K6 |
| 4 | Packages.<br>Create packages like Pack and MyPack and import the same into some user defined classes. | Develop a java program using packages. | K6 |
| 5 | Exceptions handling.<br>Create a try block that is likely to generate three types of exception (handle ArithmeticException, ArrayIndexOutOfBoundsException, FileNotFoundException) using try and then incorporate necessary catch blocks to catch and handle them appropriately. | Create a java program to handle exceptions. | K6 |
| 6 | Multithreading.<br>Create a class Parent by extending a Thread class and also create a class as Child and illustrate the concept of multithreading by applying thread class methods. | Design a Java program to handle multithreads. | K6 |
| 7 | Collection Interfaces. | Create a program to create a List(Books) using ArrayList and add items to the list and traverse the items through Iterator. | K6 |
| 8 | I/O Streams.<br>Create a class named InputStreamReaderExample and read the contents of the file using the methods FileInputStream() and InputStreamReader(). | Build a java program to read the contents of the file using IO Streams | K6 |
| 9 | Applying AWT concepts.<br>Design a Registration form with AWT Controls. | Design a registration from using AWT Controls. | K6 |
| 10 | Applying swing concepts.<br>Develop a java swing Frame to retrieve the records form the Job Portal database table | Develop a java program using Swing. | K6 |
| 11 | JDBC<br>Design a web application for Student details with database operations insert, delete and update. | Design a web application to manipulate student details | K6 |

## 4. MAPPING (CO, PO, PSO)

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | H | M | H | L | H | H | H | H | H | M | M | M | M |
| CO2 | H | M | M | M | H | H | H | M | H | H | M | H | H |
| CO3 | H | H | H | M | H | H | H | H | H | H | H | H | H |
| CO4 | H | H | H | M | H | H | H | H | H | H | H | H | H |
| CO5 | H | H | H | M | H | M | H | H | H | H | H | H | H |
| CO6 | H | H | H | M | H | H | H | H | H | H | H | H | H |

**L-Low      M-Moderate   H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book

2. Cooperative Learning Report, Assignment, Group Discussion, project Report, Seminar.

3. Pre/Post Test, Viva, Report for each Exercise.

4. Lab Model Examination & End Semester Practical Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr.P.THANGARAJU                                Dr.R.THAMARAI SELVI

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## Core Practical IV :  DATABASE MANAGEMENT SYSTEMS LAB

**SEMESTER : II**                                                                    **CODE: P20CA2P4**
**CREDITS: 3**                                                                       **HOURS/WEEK: 4**

### 1. COURSE OUTCOMES:
 After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Exercise |
|-------|-----------------|-------|----------|
| CO1 | Create tables and insert values | K6 | 1,2 |
| CO2 | Construct queries for table manipulation | K6 | 3,4 |
| CO3 | Compile sub queries for retrieving data from tables | K6 | 5 |
| CO4 | Develop queries using aggregate, string and date functions | K6 | 6 |
| CO5 | Create views on tables | K6 | 7 |
| CO6 | Develop PL/SQL programs using triggers, functions, cursors and exception | K6 | 8,9,10,11,12, 13 |

| Ex.No. | Exercise |
|--------|----------|
| 1 | Create an Employee table using the details employee name, Designation, Department date of joining, salary etc.. |
| 2 | Insert values into Employee table using the details employee name, Designation, Department, date of joining, salary etc. |
| 3 | Find out name of students those who are getting result as "Pass" using Where clause.<br>Find out List of students, whose name start with "B" using LIKE operator<br>Find out list of Employee   those who getting salary between 20000 and 40000 |
| 4 | Find out list of Employee   those who are working in Finance and HR department using Logical operator.<br>Sort the records in employee table in ascending order using name<br>Find out the number are staff working in each department using grouping<br>Apply Set operations like Union, Intersection, Difference   in employee table. |
| 5 | Find out name of student who score maximum marks using sub query<br>Apply Inner and Outer Join in employee table. |
| 6 | Use Aggregate function in student table to find MIN, MAX in total marks<br>Use String function, Date function in student table. |
| 7 | Create view by selecting employee those who are getting salary as more than Rs 40,000<br>Display records from newly created view |
| 8 | Develop a PL/SQL program using function to find out factorial of given number |
| 9 | Develop a PL/SQL program using Procedure to calculate result of student. |
| 10 | Develop a PL/SQL program using Cursors to process records in employee table |
| 11 | Develop a PL/SQL program using Triggers to process records in student table |
| 12 | Develop a PL/SQL progam using Exception. |
| 13 | Develop a PL/SQL program using function to Prepare pay bill for employee |

**B. TOPICS FOR SELF STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Oracle PL/SQL Exception Handling | **https://www.guru99.com/exception-handling-pl-sql.html** |
| 2 | Develop application using Oracle Forms | **https://docs.oracle.com/cd/E21764_01/web.1111/e10240/intro.htm#FSDEP108** |
| 3 | Create trigger | **https://docs.oracle.com/cd/B19306_01/server.102/b14200/statements_7004.htm** |
| 4 | Access Control List | **http://www.brainkart.com/article/DBMS---Advanced-Topics_11388** |

**2. SPECIFIC LEARNING OUTCOMES (SLO)**

| Exercise | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|----------|----------------|-------------------|-----------------------------------------------|
| 1 | Creating an Employee Table | Create an employee table using SQL commands | K6 |
| 2 | Inserting values into an Employee Table | Construct a table by inserting the values | K6 |
| 3 | Using Where Clause | Make use of Where Clause to retrieve the required information | K3 |
| 4 | Using Logical Operators and Set Operations | Apply logical and set operators in the table | K3 |
| 5 | Using Sub Queries and Apply Join Operations in a Table | Apply the sub queries for retrieving data | K3 |
| 6 | Using Aggregate, String and Date Functions | Construct queries using aggregate, string and date functions | K6 |
| 7 | Create Views | Create views on tables | K6 |
| 8 | PL/SQL Program Using Function | Develop a PL/SQL program using function | K6 |
| 9 | PL/SQL Program Using Procedure | Build a PL/SQL program using procedure | K6 |
| 10 | PL/SQL Program Using Cursors | Create a PL/SQL program using cursors | K6 |
| 11 | PL/SQL Program Using Triggers | Develop a PL/SQL program using triggers | K6 |
| 12 | PL/SQL Program Using Exception | Build a PL/SQL program using exception | K6 |
| 13 | PL/SQL Program for Preparing Paybill | Create a PL/SQL program for preparing the paybill | K6 |

**3. MAPPING (CO, PO, PSO)**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | H | M | H | L | H | H | H | H | H | L | L | L | - |
| CO2 | H | M | M | M | H | H | H | M | H | L | L | L | - |
| CO3 | H | H | M | M | H | H | H | M | H | H | H | H | H |
| CO4 | H | M | H | M | H | H | H | H | H | H | H | H | H |
| CO5 | H | M | M | M | H | M | H | H | H | H | H | H | H |
| CO6 | H | M | M | M | H | H | H | H | H | H | H | H | H |

L-Low          M-Moderate          H- High

**4. COURSE ASSESSMENT METHODS**

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book

2. Assignment, Group Discussion, project Report, Seminar.

3. Pre/Post Test, Viva, Report for each Exercise.

4. Lab Model Examination & End Semester Practical Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr.M.S.MYTHILI                                        Dr.R.THAMARAI SELVI

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## BRIDGE COURSE – IV: INTERNET PROGRAMMING

**SEMESTER: II**                                                                          **CODE: PB20CA24**
**CREDITS: 4**

### 1. COURSE OUTCOMES
After the completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Define the basics of HTML5 tags with semantic elements | K1 | I |
| CO2 | Outline the web applications using tables and multimedia | K2 | II |
| CO3 | Build an appropriate primitives and operations in JavaScript | K3 | III |
| CO4 | Distinguish the web pages to interact by using JavaScript and DOM concepts | K4 | IV |
| CO5 | Adapt events and event handlers for Dynamic web application | K6 | V |
| CO6 | Design a web application with secure and user-friendly with angular web framework | K6 | V |

### 2A. Syllabus

**UNIT I - Overview of Basic Html Tags**                                                     **10 Hours**
Getting Started with HTML – Formatting Text by using Tags – using Lists and Backgrounds – Creating Hyperlinks and Anchors – Introduction to Style Sheets – Formatting Text by using Style Sheets – Formatting Paragraphs by using Style Sheets.

**UNIT II - Multimedia Tags and Overview of Java script**                                    **10 Hours**
Displaying Graphics – Creating Division Based Layouts – Creating Tables – Formatting Tables – Creating User Forms – Incorporating Sound and Video – Canvas. **The Basics of Java Script:** Overview of Java Script – Object Oriented and Java Script – General Syntactic Characteristics – Primitives, Operations, and Expressions – Screen Output and Keyboard Input – Control Statements – Object Creation and Modification.

**UNIT III - Arrays, Functions and Event Handling**                                          **10 Hours**
Arrays – Functions – An Example – Constructors – Pattern Matching Using Regular Expressions – Another Example – Errors in Scripts. **Java Script and XHTML Documents:** The Java Script Execution Environment – The Document Object Model –Element Access in Java Script. **Events and Event Handling**: Handling Events from Body Elements – Handling Events from Button Elements – Handling Events from Text Box and Password Elements – The DOM 2 Event Model – The Navigator Object – DOM Tree Traversal and Modification.

**UNIT IV - Dynamic Html**                                                                   **10 Hours**
**Dynamic Documents with Java Script:** Introduction – Positioning Elements – Moving Elements – Element Visibility – Changing Colors and Fonts – Dynamic Content – Stacking Elements – Locating the Mouse Cursor – Reacting to a Mouse Click – Slow Movement of Elements – Dragging and Dropping Elements.

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## UNIT V - Angular JS an Overview                                    10 Hours

**Introduction to AngularJS:** Introduction – Understanding Directives – Creating Controllers – Working with AngularJS Expression – Making Use of AngularJS Filters – Understanding AngularJS Modules – Exploring AngularJS Services – Learning AngularJS Views

### B. TOPICS FOR SELF-STUDY:

| S.No. | Topics | Web Links |
|-------|--------|-----------|
| 1 | **Classical Inheritance In JavaScript** | https://www.crockford.com/javascript/inheritance.html#:~:text=JavaScript%20is%20a%20class%2Dfree,inheritance%20instead%20of%20classical%20inheritance.&text=Little%20type%2Dsafety%20is%20obtained,explicit%20casting%20of%20object%20references. |
| 2 | HTTP/HTTPS/1 And 2, web sockets | https://www.grotto-networking.com/WebDevTopics.html#httphttps1-and-2-websockets |
| 3 | Angular is Animations | https://docs.angularjs.org/guide/animations |
| 4 | Working with Remote Web Services | https://www.youtube.com/watch?v=oTzNRv6X51o |

### C. Text Books:

1. Faithe Wempen, "HTML5 Step by Step", First edition, Microsoft Press, 2011.
2. Robert W. Sebesta, "Programming the World Wide Web", Pearson Education, Seventh Edition, 2014.
3. Felix Alvaro, "ANGULARJS: Easy AngularJS for Beginners", Kindle Edition, 2016.

### D. Reference Book:
1. Joel Skylar, "Principles of Web Design: The Web Technologies Series," Fifth Edition, 2011.

### E. Web links:
1. https://www.javatpoint.com/html5-tutorial
2. https://angular.io/start

### 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Overview of Basic Html Tags** | | |
| 1.1 | Getting Started with HTML | Recall the basic HTML tags | K1 |
| 1.2 | Formatting Text by using Tags | Compare html tag with html5 | K2 |
| 1.3 | Using Lists and Backgrounds | Make use of lists and backgrounds | K3 |
| 1.4 | Creating Hyperlinks and Anchors | Apply hyperlinks in web page | K3 |
| | **Designing web using Style Sheets** | | |
| 1.5 | Introduction to Style Sheets | Recall various styles in designing | K1 |
| 1.6 | Formatting Text by using Style Sheets | Apply the style sheet to use different styles for text and background | K3 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1.7 | Formatting Paragraphs by using Style Sheets. | Create paragraph to organize the content | K6 |
| **II** | **Multimedia Tags and Overview of Java script** | | |
| 2.1 | Displaying Graphics | Build web page using graphics | K3 |
| 2.2 | Creating Division Based Layouts | Categorize content using division layouts | K4 |
| 2.3 | Creating Tables – Formatting Tables Creating User Forms | Build table and forms using various elements | K6 |
| 2.4 | Incorporating Sound and Video | Construct web page for video and audio content | K6 |
| 2.5 | Canvas | Construct geometric shapes using canvas | K6 |
| | **Basics of Java Script** | | |
| 2.6 | Overview of Java Script | Relate java script in html5 | K2 |
| 2.7 | Object Oriented and Java Script | Apply object oriented in java script | K3 |
| 2.8 | General Syntactic Characteristics | Identify the basic scripts and general syntactic | K3 |
| 2.9 | Primitives, Operations, and Expressions | List out the types of operations and expressions | K4 |
| 2.10 | Screen Output and Keyboard Input | Choose the screen output and keyboard input | K5 |
| 2.11 | Control Statements – Object Creation and Modification | Examine the control statements | K4 |
| **III** | **Arrays, Functions and Event Handling** | | |
| 3.1 | Arrays | Experiment with arrays in JS | K3 |
| 3.2 | Functions | Examine functions in JS | K4 |
| 3.3 | Constructors | Apply constructors | K3 |
| 3.4 | Pattern Matching Using Regular Expressions | Illustrate the pattern matching | K2 |
| | **Java Script and XHTML Documents** | | |
| 3.5 | The Document Object Model | Explain the DOM concept | K2 |
| 3.6 | Element Access in Java Script | List out the elements in java script | K4 |
| | **Events and Event Handling** | | |
| 3.7 | Handling Events from Body/Button Elements | Categorize events for button and body elements | K4 |
| 3.8 | Handling Events from Text Box and Password Elements | Evaluate text and password event handling for validation | K5 |
| 3.9 | The DOM 2 Event Model | Analyze DOM2 event model | K4 |
| 3.10 | The Navigator Object/ DOM Tree Traversal and Modification | Adapt tree traversal for DOM | K6 |
| **IV** | **Dynamic Html** | | |
| 4.1 | Introduction to Java Script | Explain script in web design | K2 |
| 4.2 | Positioning Elements | Utilize cursor to position elements | K3 |
| 4.3 | Moving Elements | Make use of cursor to move elements | K3 |
| 4.4 | Changing Colors and Fonts | Change the web page color and fonts | K6 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 4.5 | Dynamic Contents – Stacking Element | Determine the stack elements for dynamic operation | K5 |
| 4.6 | Mouse Click Event | Build web page for mouse click event | K6 |
| 4.7 | Dragging and Dropping Elements | Adapt mouse event to drag and drop element | K6 |
| **V** | **Angular JS an Overview** | | |
| 5.1 | Introduction to AngularJS | Define angular JS in web design | K1 |
| 5.2 | Understanding Directives | Illustrate directives in angularJS | K2 |
| 5.3 | Creating Controllers | Analyze various controllers | K4 |
| 5.4 | Working with AngularJS Expression | Apply expression to operate data | K3 |
| 5.5 | Making Use of AngularJS Filters | Choose filter to format data | K5 |
| 5.6 | Understanding AngularJS Modules | Adapt modules to define application | K6 |
| 5.7 | Exploring AngularJS Services – Learning AngularJS Views | Discuss the advance trends in angular js | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | H | M | H | - | M | L | M | H | M | H | L | H | M |
| **CO2** | H | - | H | - | H | L | L | M | L | L | L | H | M |
| **CO3** | H | L | H | - | L | M | M | M | L | H | H | H | L |
| **CO4** | H | M | L | - | M | L | M | L | M | H | M | H | M |
| **CO5** | H | M | H | - | H | L | L | M | L | H | M | H | M |
| **CO6** | H | M | H | M | M | L | H | L | L | M | L | H | M |

<div align="center">

**L-Low**          **M-Moderate**          **H- High**

</div>

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination
5. 

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**               **HEAD OF THE DEPARTMENT**
Dr. M. LOVELIN PONN FELCIAH           Dr.R.THAMARAI SELVI

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**SEMESTER : II**                                          **CODE： PB20CA25**
**CREDITS:4**

## 1. COURSE OUTCOMES:

After the completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit covered |
|-------|-----------------|-------|--------------|
| CO1 | Create and work with Linux Shell programming techniques and files | K6 | I |
| CO2 | Assess the information in the files and terminals | K5 | II |
| CO3 | Apply various data management techniques, tools with other debugging functions. | K3 | III |
| CO4 | Design and apply various functionalities of process and signals | K6 | IV |
| CO5 | Develop GNOME programming using GTK+. | K6 | V |
| CO6 | Construct programming with KDE using Qt | K6 | V |

**2A. Syllabus**

**UNITI - Shell Programming and Files**                                          **12 Hours**
        **Getting Started:** An Introduction to UNIX, Linux and GNU -Programming Linux:. **Shell Programming:** why program with a shell? a bit of philosophy-what is a shell?-pipes and redirection-the shell as a programming language-shell syntax-going graphical the dialog utility-putting it all together. **Working with Files:** linux file structure-system calls and device drivers-library functions-low-level file access-the standard I/O library-Formatted input and output-file and directory maintenance-scanning directories-errors-the/proc file system-advanced topics.

**UNIT II - The Linux Environment and Terminals**                                          **12 Hours**
        **The Linux Environment:** program arguments-environment variables-time and date-temporary files-user information-host information-logging-resources and limits**. Terminals:** Reading from and Writing to the terminal-talking to the terminal-the terminal driver and the general terminal interface-the termios structure-terminal output-detecting keystrokes. **Managing Text-Based Screens with curses:** compiling with curses-curses terminology and concepts-the screen-the keyboard-windows-sub windows-the keypad-using color-pads-the CD collection application,

**UNIT III - Data Management and Tools with Debugging**                                          **12 Hours**
**Data Management:** managing memory-file locking-databases-the CD application. **Development Tools:** problems of multiple source files-the make command and make files-source code control-writing a manual page-distributing software-RPM packages-other package formats-development environments. **Debugging:** types of errors-general debugging techniques-debugging with gdb-more debugging tools-assertions-memory debugging.

**UNIT IV - Process Signals, POSIX .Pipes and Semaphores**                                          **12 Hours**
        **Processes and Signals:** what is a process:-process structure-starting new processes-signals, POSIX **Threads:** what is a thread?-advantages and drawbacks of threads-a first threads program-simultaneous execution-synchronization-thread attributes-cancelling a thread-threads in abundance. **Inter-Process Communication: Pipes:** what is a pipe?-process pipes-sending output to popen-the pipe call-parent and child processes-named pipes: FIFOs-the CD database application. **Semaphores, Shared memory and Message Queues:** semaphores-shared memory-message queues-the CD database application-IPC status commands.

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**UNIT V - Sockets, Programming with GNOME and KDE using GTK+ and Qt        12 Hours**

**Sockets:** what is a socket?-socket connections-network information-multiple clients-datagrams. **Programming GNOME using GTK+:** introducing X-introducing GTK+ -Events, signals and widgets-GTK+ widgets-GNOME widgets- GNOME menus-dialogs-CD database application .**Programming KDE Using Qt :**introducing KDE and Qt-installing Qt-signals and slots-Qt widgets-dialogs-menus and toolbars with KDE-CD database application using KDE/Qt.

**B. TOPICS FOR SELF-STUDY:**

| S.No | Topics | Web Links |
|------|--------|-----------|
| 1 | Shell Generalities | **https://www.math.uh.edu/~torok/math_6298/unix/commands.html** |
| 2 | Interactive Shell Script | **https://www.shellscript.sh/interactive.html** |
| 3 | The sed stream Editor | **https://www.tutorialspoint.com/sed/sed_quick_guide.htm** |
| 4 | The awk Programming Language | **https://www.linode.com/docs/guides/introduction-to-awk/** |

**C. Text Books:**

1. Neil Matthew,Richard Stones,"Beginning  Linux Programming", Fourth Edition,Wiley Publishing Inc,2008.

**D. Reference Books:**

1. Paul Cobbaut,"Linux Fundamentals" version 1.3,published by Free Software Foundation on 24 may 2015.
2. Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, "Linux in a Nutshell", 6th Edition, O'Reilly Media, 2009.
3. Neil Matthew, Richard Stones, Alan Cox, "Beginning Linux Programming", 3rd Edition, 2004.
4. Robert Love, "Linux System Programming" ,O'Reilly Media, 2ndEd., 2007.
5. William Shotts,"The Linux Command Line"version 16.07,3rd internet edition, published by No Starch press on  July 28,2016.

**E. Web Links:**
1.**https://www.javatpoint.com/linux-tutorial**
2.**https://www.whoishostingthis.com/resources/linux-programming/**
3.**https://medium.com/better-programming/linux-survival-guide-for-beginners-c18bfd982036**
4 **https://www.tuxcademy.org/download/en/grd2/grd2-en-manual.pdf**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit covered / Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------------------------|----------------|-------------------|------------------------------------------------|
| **I** | **Getting Started** | | |
| 1.1 | An Introduction for UNIX and Linux | Distinguish between Unix and Linux. | K4 |
| 1.2 | The GNU Project | Explain the GNU project | K2 |
| 1.3 | Linux Distributions | Discuss on linux distributions. | K6 |

| Unit covered / Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1.4 | Programming Unix - Linux Programs | Show the working of alinux shell program. | K1 |
| 1.5 | Text Editors | Summarize on various text editors. | K2 |
| 1.6 | The C Compiler | Explain the C Compiler | K5 |
| 1.7 | Development System Roadmap | Discuss on the system roadmap | K6 |
| 1.8 | Shell program , A bit of philosophy | Summarize on shell program. | K2 |
| 1.9 | Pipes and Redirection | Explain the different types of redirection. | K5 |
| 1.10 | The Shell as a Programming Language | Outline the shell as a programming language | K2 |
| 1.11 | Shell Syntax | Show the syntax for a shell. | K1 |
| 1.12 | Variables | Explain variables in detail. | K5 |
| 1.13 | Condition control structures | Develop programs using condition control structures. | K6 |
| 1.14 | Shell Syntax – Functions | Explain functions in detail | K5 |
| 1.15 | Commands | Make use of the different types of shell commands | K3 |
| 1.16 | Command Execution | Discuss on command execution of the program. | K6 |
| 1.17 | Shell Syntax -documents | Recall the shell documents | K1 |
| 1.18 | Debugging Scripts | Elaborate the debugging scripts. | K6 |
| 1.19 | Graphical | Outline the concept of graphical structure. | K2 |
| 1.20 | Linux File Structure | Summarize the process of linux file structure. | K2 |
| 1.21 | System Calls | Explain system calls | K5 |
| 1.22 | Device Drivers | Illustrate the device drivers | K2 |
| 1.23 | Library Functions | Elaborate on library functions | K6 |
| 1.24 | Lowlevel File Access | Discuss the importance of low level file access. | K6 |
| 1.25 | The Standard I/O Library | Illustrate the standard i/o library functions | K6 |
| 1.26 | Formatted Input and Output | Determine the concept of formatted input and output functions | K5 |
| 1.27 | File and Directory Maintenance | Discuss on directory maintenance | K6 |
| 1.28 | Scanning Directories | Explain about scanning directories | K5 |
| 1.29 | Errors, The /proc File System | Recall on /proc file system | K1 |
| **II** | **The Linux Environment** | | |
| 2.1 | Program Arguments | Explain program arguments | K5 |
| 2.2 | Environment Variables | Outline on environment variables | K1 |
| 2.3 | Time and Date | Explain Time and Date variables | K5 |
| 2.4 | Temporary Files | Discuss temporary files in detail | K6 |
| 2.5 | User Information | Elaborate the importance of user information | K5 |
| 2.6 | Host Information | Illustrate on host information | K2 |

| Unit covered / Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.7 | Logging | Recall logging | K1 |
| 2.8 | Resources and Limits | Summarize the concept of resources and limits | K2 |
| **Terminals** | | | |
| 2.9 | Reading from and writing to the terminal | Explain reading from and writing to the terminal | K5 |
| 2.10 | Talking to the terminal | Outline the concept of talking to the terminal | K2 |
| 2.11 | The terminal driver and the general terminal interface | Discuss the terminal driver and general terminal interface | K6 |
| 2.12 | The termios structure | Elaborate the termios structure | K6 |
| 2.13 | Terminal output | Summarize on terminal output | K2 |
| 2.14 | Detecting keystrokes | Recall the detecting keystrokes | K1 |
| **Managing Text-Based Screens with curses** | | | |
| 3.7 | Compiling with curses | Explain the concept of compiling with curses | K5 |
| 3.8 | Curses terminology and concepts | Elaborate on the concept of curses terminology | K6 |
| 3.9 | The screen-the keyboard-windows-subwindows-the keypad-using color-pads-the | Outline the concepts of screen, keyboard and windows. | K2 |
| III | Data Management | | |
| 3.1 | Managing memory | Explain memory management | K5 |
| 3.2 | File locking and databases | Discuss file locking | K6 |
| **Development Tools** | | | |
| 3.3 | Problems of multiple source files | Recall the problem of multiple source files | K1 |
| 3.4 | The make command and make files | Explain make command and make files | K5 |
| 3.5 | Source code control | Outline on source code control | K2 |
| 3.6 | Writing a manual page | Illustrate on writing a manual page | K2 |
| 3.7 | Distributing software | Summarize on distributing a software | K2 |
| 3.8 | RPM packages | Explain RPM package | K5 |
| 3.9 | Other package formats and development environments | Illustrate the package formats | K2 |
| **Debugging** | | | |
| 3.10 | Types of errors | Explain the types of errors | K5 |
| 3.11 | General debugging techniques | Summarize on general debugging techniques | K2 |
| 3.12 | Debugging with gdb | Elaborate debugging with gdb | K6 |
| 3.13 | More debugging tools | Discuss the debugging tools in detail | K6 |
| 3.14 | Assertions, and memory debugging | Recall assertion | K1 |
| IV | Processes and Signals | | |
| 4.1 | Process structure | Explain process structure | K5 |
| 4.2 | Starting new processes | Illustrate on starting a new process | K2 |

| Unit covered / Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 4.3 | Signals | Discuss the concept of signals | K6 |
| | | **POSIX Threads** | |
| 4.4 | Advantages and drawbacks of threads | List the advantages and disadvantages of threads | K1 |
| 4.5 | A first threads program | Create a thread program. | K6 |
| 4.6 | Simultaneous execution | Explain simultaneous execution | K5 |
| 4.7 | Synchronization | Discuss synchronization | K6 |
| 4.8 | Thread attributes | Outline thread attributes in detail | K2 |
| 4.9 | Cancelling a thread | Illustrate cancelling a thread | K2 |
| 4.10 | Threads in abundance | Elaborate the concept of thread in abundance | K5 |
| | | **Inter-Process Communication: Pipes** | |
| 4.11 | Process pipes | Discuss process pipes | K6 |
| 4.12 | Sending output to popen | Explain the process of sending output to popen | K5 |
| 4.13 | The pipe call | Summarize the importance of pipe call | K2 |
| 4.14 | Parent and child processes | Explain the parent and child processes. | K2 |
| 4.15 | Named pipes: FIFOs | Elaborate the concept of FIFO. | K6 |
| | | **Semaphores, Shared memory and Message Queues** | |
| 4.16 | Semaphores | Explain semaphores | K5 |
| 4.17 | Shared memory | Discuss shared memory in detail | K6 |
| 4.18 | Message queue | Recall message queues | K1 |
| V | | **Sockets** | |
| 5.1 | Socket connections and network information | Explain socket connections and network in detail | K5 |
| 5.2 | Multiple clients | Elaborate on multiple clients | K6 |
| 5.3 | Datagrams | Summarize on datagrams | K2 |
| | | **Programming GNOME using GTK+** | |
| 5.4 | Introducing X-introducing GTK+ | Recall the concept of GTK+ | K1 |
| 5.5 | Events | Summarize on events | K2 |
| 5.6 | Signals and widgets-GTK+ widgets-GNOME widgets | Discuss on signals and widgets | K6 |
| 5.7 | GNOME menus and dialogs | Outline on GNOME menus and dialogues | K2 |
| | | **Programming KDE Using Qt** | |
| 5.8 | Introducing KDE and Qt | Explain KDE | K5 |
| 5.9 | Installing Qt | Elaborate on the Installation process of Qt | K6 |
| 5.10 | Signals and slots | Discuss the concepts of signals and slots | K6 |
| 5.11 | Qt widgets | Outline the importance ofQt widget | K2 |
| 5.12 | Dialogs and menus | Summarize the dialogues and menus in KDE | K2 |
| 5.13 | Toolbars with KDE | Recall the toolbars in KDE | K1 |

**4. MAPPING (CO, PO, PSO)**

|      | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1  | M   | M   | L   | L   | -   | M   | M   | H   | L   | M    | M    | -    | M    |
| CO2  | H   | H   | M   | H   | M   | H   | M   | L   | H   | H    | H    | M    | -    |
| CO3  | H   | H   | M   | H   | H   | H   | H   | M   | H   | H    | L    | L    | L    |
| CO4  | H   | H   | M   | H   | M   | M   | M   | H   | H   | H    | H    | M    | M    |
| CO5  | M   | H   | M   | H   | M   | H   | M   | L   | H   | M    | M    | L    | M    |
| CO6  | H   | H   | H   | H   | H   | M   | H   | M   | M   | H    | H    | H    | H    |

L-Low          M-Moderate          H- High

**5. COURSE ASSESSMENT METHODS**

**DIRECT:**

1.  Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book

2.  Open Book Test.

3.  Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).

4.  Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1.  Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Mrs. PEARLY CHARLES                              Dr.R.THAMARAI SELVI


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# BRIDGE COURSE – VI:    INTERNET PROGRAMMING LAB

**SEMESTER:  II**                                                                **CODE:  PB20CA2P**
**CREDITS: 2**

## 1. COURSE OUTCOMES
After the completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Exercise Covered |
|-------|-----------------|-------|------------------|
| CO1 | Summarize the basic tags to develop web pages design using Html | K2 | 1,3,4 |
| CO2 | Construct the web page using image mapping and link the pages using hyperlinks | K6 | 2 |
| CO3 | Create the tabular content in web page using tables, form and canvas | K6 | 5,6,8,13 |
| CO4 | Develop a web page with multimedia and display the new articles using semantic elements | K6 | 7,9 |
| CO5 | Design a web page for various event and event handlers | K6 | 10,11,12 |
| CO6 | Design a web site to interact with users AngularJS | K6 | 14,15 |

## 2A. Syllabus

1. Create a sample web site for the college and courses offered using various formatting text tags and hyperlink

2. Create a web page contain world map which link various parts of the map using
    i.    To embed an image map concept in web page
    ii.   To locate hotspot in an image map

3. Write a program to design a website of your home town with the following
    i.    Cascading Style Sheet
    ii.   External style Sheet
    iii.  Inline Style Sheet
4. Create a web site for a restaurant that links pages using list and hyperlinks
5. Design a web page to display the class time table using tables
6. Create a web page to display various geometric transformations.
7. Write a program to play a video and audio clip of your department activities using multimedia content in a web page
8. Create a web page for a bio-data to enter the personal information using various input elements
9. Design a web page for a news article using semantic elements
10. Write a java script program to validate the screen input
11. Write a program in java script to design calculator using event handler
12. Design a web page to change the background color of a web page using button element.
13. Create a web page for college admission forms
14. Write a program to create a web page using AngularJS expressions
15. Create a validation form in web page using Angular JS framework

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**B. TOPICS FOR SELF-STUDY:**

| S.No. | Topics | Web Links |
|---|---|---|
| 1 | Giphy with a unique API | https://medium.com/@mattcroak718/beginners-guide-to-the-giphy-api-316f98459d06 |
| 2 | AJAX-style login | https://www.youtube.com/watch?v=U1yQNnG4lyA |
| 3 | JavaScript quiz game | https://www.youtube.com/watch?v=49pYIMygIcU |
| 4 | Webpack Angular JS | https://codecraft.tv/courses/angularjs-migration/step-2-typescript-and-webpack/using-webpack/ |

**C. Text Books:**

1. Faithe Wempen, "HTML5 Step by Step", First edition, Microsoft Press, 2011.
2. Robert W. Sebesta, "Programming the World Wide Web", Pearson Education, Seventh Edition, 2014.
3. Felix Alvaro, "ANGULARJS: Easy AngularJS for Beginners", Kindle Edition, 2016.

**D. Reference Book:**
2. Joel Skylar, "Principles of Web Design: The Web Technologies Series," Fifth Edition, 2011.

**E. Web links:**
1. https://www.w3schools.com/js/DEFAULT.asp
2. https://www.javascripttutorial.net/
3. https://www.codecademy.com/learn/introduction-to-javascript

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Exercise | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1 | Create a sample web site for the college and courses offered using various formatting text tags and hyperlink | Develop a web site using basic html tags with hyperlinks and text formatting | K6 |
| 2 | Create a web page contain world map which link various parts of the map using hotspot in an image map | Construct a web site to locate a place in a world map and links its corresponding home page | K5 |
| 3 | Write a program to design a website of your home town with the using CSS | Design a web page for a home town with various style sheets | K6 |
| 4 | Create a web site for a restaurant that links pages using list and hyperlinks | Develop a web page for a restaurant contains its menu and other details with ordered and un ordered list | K6 |
| 5 | Design a web page to display the class time table using tables | Construct a class time table using table format | K6 |
| 6 | Create a web page to display various geometric transformations. | Build web page displaying various geometry shapes using canvas tags | K6 |
| 7 | Write a program to play a video and audio clip of your department activities using multimedia content in a web page | Adapt the audio and video content on the web page | K6 |

| 8 | Create a web page for a bio-data to enter the personal information using various input elements | Develop a web page to fill the personal details using forms with various elements | K6 |
|---|---|---|---|
| 9 | Design a web page for a news article using semantic elements | Design a news article about a college using semantic elements | K6 |
| 10 | Write a java script program to validate the screen input | Design a web page for login details with username and password | K6 |
| 11 | Write a program in java script to design calculator using event handler | Develop a calculator in a web page | K6 |
| 12 | Design a web page to change the background color of a web page using button element. | Design a web page to change the background color by clicking a button using event handler | K6 |
| 13 | Create a web page for college admission forms | Create an admission form for college | K6 |
| 14 | Create a validation form in web page using Angular JS framework | Create a web page for using expressions in angular JS | K6 |
| 15 | Create a validation form in web page using Angular JS framework | Create a web page to validate the form | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H | L | M | - | L | L | H | L | M | H | M | H | H |
| CO2 | H | H | H | L | H | - | L | L | M | M | H | H | H |
| CO3 | H | - | H | - | H | M | H | L | M | H | H | H | H |
| CO4 | H | H | M | L | M | M | M | - | H | M | H | H | H |
| CO5 | H | M | H | L | H | M | H | - | H | H | H | H | H |
| CO6 | H | L | M | M | H | M | H | M | M | H | H | H | H |

**L-Low**                    **M-Moderate**                    **H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**
1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2. Cooperative Learning Report, Assignment, Group Discussion, project Report, Seminar.
3. Pre/Post Test, Viva, Report for each Exercise.
4. Lab Model Examination & End Semester Practical Examination

**INDIRECT**:
1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr. M. LOVELIN PONN FELCIAH                    Dr.R.THAMARAI SELVI

***************

**SEMESTER : III**                                                    **CODE: P20CA308**
**CREDITS: 3**                                                        **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES

After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered Covered |
|-------|-----------------|-------|----------------------|
| CO1 | Explain various mobile application developing environments and IDEs | K5 | I |
| CO2 | Create mobile applications using intents, activities and components | K6 | II |
| CO3 | Choose the appropriate layouts and UI controls based on the specification | K6 | III |
| CO4 | Construct SQLite database to build Android application | K6 | IV |
| CO5 | Utilize the memory management mechanisms efficiently | K6 | V |
| CO6 | Test the applications in web and launch the services | K6 | V |

**UNIT I - Getting Started with Android Programming**:                    **12 Hours**

What Is Android? -Android Versions -Features of Android - Architecture of Android - Android Devices in the Market - The Android Market - **Obtaining the Required Tools**: Eclipse - Android SDK - Android Development Tools (ADT) - Creating Android Virtual Devices (AVDs) - Creating Android Applications. **Activities and Intents**: Understanding Activities: Applying Styles and Themes to Activity - Hiding the Activity Title - Displaying a Dialog Window - Displaying a Progress Dialog. **Linking Activities Using Intents**: Resolving Intent Filter Collision - Returning Results from an Intent - Passing Data Using an Intent Object

**UNIT II - Getting to Know the Android User Interface**:                  **12 Hours**

Understanding the Components of a Screen - Views and ViewGroups - LinearLayout - AbsoluteLayout - TableLayout - RelativeLayout - FrameLayout - ScrollView - **Adapting to Display Orientation**: Anchoring Views - Resizing and Repositioning.**Managing Changes to Screen Orientation**: Persisting State Information during Changes in Configuration - Detecting Orientation Changes - Controlling the Orientation of the Activity - **Creating the User Interface Programmatically -Listening for UI Notifications:** Overriding Methods Defined in an Activity - Registering Events for Views.

**UNIT III - Designing Your User Interface Using Views** : **Basic Views**:              **12 Hours**

TextView View - Button, ImageButton, EditText, CheckBox, ToggleButton, RadioButton and RadioGroup Views - ProgressBar View - AutoCompleteTextView View - **Picker Views**: TimePicker View - Displaying the TimePicker in a Dialog Window - DatePicker View - Displaying the DatePicker View in a Dialog Window - **List Views:**ListView View - Customizing the ListView - Using the Spinner View.Displaying Pictures and Menus with Views. **Using Image Views to Display Pictures**: Gallery and ImageView Views - ImageSwitcher - GridView. **Using Menus with Views**: Creating the Helper Methods - Options Menu - Context Menu

**UNIT IV - Data Persistence**:                                            **12 Hours**

Saving and Loading User Preferences - Using get Shared Preferences() -Using getPreferences() - Persisting Data to Files - **Saving to Internal Storage**: Saving to External Storage (SD Card) - Choosing the Best Storage Option - Using Static Resources - **Creating and Using Databases**:Creating the DBAdapter Helper Class - Using the Database Programmatically - Adding Contacts - Retrieving All the

Contacts - Retrieving a Single Contact - Updating a Contact - Deleting a Contact -Upgrading the Database - Pre-Creating the Database - Bundling the Database with an Application - **Content Providers** : Sharing Data in Android - Using a Content Provider - Predefined Query String Constants - Projections - Filtering - Sorting.

**UNIT V - Messaging and Location based services**:                                    **12 Hours**
        SMS Messaging: Sending SMS Messages Programmatically - Getting Feedback After Sending the Message - Sending SMS Messages Using Intent - Receiving SMS Messages - Updating an Activity from a Broadcast Receiver - Invoking an Activity from a BroadcastReceiver - Caveats and Warnings. **Sending E-Mail**. **Displaying Maps** : Creating the Project - Obtaining the Maps API Key - Displaying the Map - Displaying the Zoom Control - Changing Views - Navigating to a Specific Location - Adding Markers - Getting the Location That Was Touched - Geocoding and Reverse Geocoding - **Getting Location Data** : Monitoring a Location. Developing Android Services – Publishing Android Applications.

**B. TOPICS FOR SELF-STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Animations and Transitions | **https://developer.android.com/training/animation** |
| 2 | Sending SMS | **https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf** |
| 3 | Working with Sensor data | **https://google-developer-training.github.io/android-developer-advanced-course-practicals/Unit Covered-1-expand-the-user-experience/lesson-3-sensors/3-1-p-working-with-sensor-data/3-1-p-working-with-sensor-data.html#tolearn** |
| 4 | Google Play's billing system | **https://developer.android.com/google/play/billing** |

**C. Text Books:**
    1.  Wei-Meng Lee, "Beginning Android Application Development", Wrox, First Edition,2012.

**D. Reference Book:**
    1.   Tim Warren, "Android Programming for Beginners: The simple Guide to learning Android Programming Fast", Ingram Publications, 2020.
    2.   John Horton, "Android Programming for Beginners", Second Edition, Packt Publications, 2018.
    3.   PratiyushGuleria , "Android for Beginners" , BPB Publications.
**E. Web links:**
    1.  **https://developer.android.com/**
    2.  **https://www.tutorialspoint.com/android/index.htm**
    3.  **https://www.javatpoint.com/android-tutorial**
    4.  **https://www.vogella.com/tutorials/android.html**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Getting Started with Android Programming** | | |
| 1.1 | What Is Android? | Tell about android | K1 |
| 1.2 | Android Versions | List out the android versions | K1 |
| 1.3 | Features of Android | Outline the features of android OS | K2 |
| 1.4 | Architecture of Android | Explain the architecture of android | K2 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1.5 | Android Devices in the Market | Spell out android devices in the market | K2 |
| 1.6 | The Android Market | Discover the appropriate android market | K4 |
| **Obtaining the Required Tools** | | | |
| 1.7 | Eclipse | Test eclipse IDE | K6 |
| 1.8 | Android SDK | Test SDK plug in with eclipse | K6 |
| 1.9 | Android Development Tools (ADT) | Make use of ADT. | K3 |
| 1.10 | Creating Android Virtual Devices (AVDs) | Create Android Virtual Device(AVD) | K6 |
| 1.11 | Creating Android Applications | Develop simple android applications | K6 |
| **Activities and Intents** | | | |
| 1.12 | Applying Styles and Themes to Activity | Apply styles in activities | K3 |
| 1.13 | Hiding the Activity Title | Show the hiding activity title | K2 |
| 1.14 | Displaying a Dialog Window | Design an user defined dialog window | K6 |
| 1.15 | Displaying a Progress Dialog | Construct a progress dialog and display | K6 |
| **Linking Activities Using Intents** | | | |
| 1.16 | Resolving Intent Filter Collision | Utilize intents to link activities | K3 |
| 1.17 | Returning Results from an Intent | Inspect the results returned from intent | K4 |
| 1.18 | Passing Data Using an Intent Object | Demonstrate the use of passing the data through an intent object | K2 |
| **II** | **Getting to Know the Android User Interface** | | |
| 2.1 | Understanding the Components of a Screen | Create activities using various components | K6 |
| 2.2 | Views and ViewGroups | Compare the different views and viewGroups | K5 |
| 2.3 | LinearLayout | Build applications using linear layout | K6 |
| 2.4 | AbsoluteLayout | Develop android applications using absolute layout | K6 |
| 2.5 | TableLayout | Improve the developed applications by using TableLayout | K6 |
| 2.6 | RelativeLayout | Construct Services with relative layout | K6 |
| 2.7 | FrameLayout | Choose frame layout to develop applications | K6 |
| 2.8 | ScrollView | Adapt the scrollview | K6 |
| **Adapting to Display Orientation** | | | |
| 2.9 | Anchoring Views | Examine the anchoring views in android | K3 |
| 2.10 | Resizing and Repositioning | Demonstrate resizing and repositioning options | K3 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| | **Managing Changes to Screen Orientation** | | |
| 2.11 | Persisting State Information during Changes in Configuration | Recall the persisting state information during changes in configuration | K3 |
| 2.12 | Detecting Orientation Changes | Identify the various orientation changes | K3 |
| 2.13 | Controlling the Orientation of the Activity | Design applications with different orientations | K6 |
| | **Creating the User Interface Programmatically -Listening for UI Notifications** | | |
| 2.14 | Overriding Methods Defined in an Activity | Illustrate overriding methods in an activity | K2 |
| 2.15 | Registering Events for Views | Outline the importance of registering the events for views | K2 |
| | | | |
| **III** | **Designing Your User Interface Using Views** : **Basic Views** | | |
| 3.1 | TextView View, Button, ImageButton, EditText, CheckBox, ToggleButton, RadioButton and RadioGroup Views, ProgressBar View - AutoCompleteTextView View | Design a sample android application with basic views | K6 |
| | **Picker Views** | | |
| 3.2 | TimePicker View - Displaying the TimePicker in a Dialog Window - DatePicker View | Combine picker views with basic views. | K6 |
| 3.3 | Displaying the DatePicker View in a Dialog Window | Develop an application by DatePicker view | K6 |
| | **List Views** | | |
| 3.4 | ListView view | Improve application by embedding ListView view | K6 |
| 3.5 | Customizing the ListView | Build Android application that customize the ListView | K6 |
| 3.6 | Using the Spinner View.Displaying Pictures and Menus with Views | Adapt menus with views | K6 |
| | **Using Image Views to Display Pictures** | | |
| 3.7 | Gallery and ImageView Views | Apply gallery and image view | K3 |
| 3.8 | ImageSwitcher | Apply ImageSwitcher in developing applications | K3 |
| 3.9 | GridView | Test GridView | K6 |
| | **Using Menus with Views** | | |
| 3.10 | Creating the Helper Methods | Create Applications with Helper methods | K6 |
| 3.11 | Options Menu | Apply option menu | K3 |
| 3.12 | Context Menu | Design applications with Context Menu | K6 |
| **IV** | **Data Persistence** | | |
| 4.1 | Saving and Loading User Preferences | Apply saving and loading user preferences | K3 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 4.2 | Using getSharedPreferences() | Create Android applications with getSharedPreferences() | K6 |
| 4.3 | Using getPreferences() | Design application using getPreferences() | K6 |
| 4.4 | Persisting Data to Files | Develop Android applications by persisting data to files | K6 |
| **Saving to Internal Storage** | | | |
| 4.5 | Saving to External Storage (SD Card) | Improve application by integrating with SD card services | K6 |
| 4.6 | Choosing the Best Storage Option | Test application with best storage option | K6 |
| 4.7 | Using Static Resources | | |
| **Creating and Using Databases** | | | |
| 4.8 | Creating the DBAdapter Helper Class | Utilize DBAdapterHelper Class | K3 |
| 4.9 | Using the Database Programmatically | Develop applications using database | K6 |
| 4.10 | Adding Contacts | Develop applications with contacts | K6 |
| 4.11 | Retrieving All the Contacts | Develop applications for retrieving all contacts | K6 |
| 4.12 | Retrieving a Single Contact | Develop applications for retrieving a single | K6 |
| 4.13 | Updating a Contact, Deleting contact | Develop applications for deleting and updating all contacts | K6 |
| 4.14 | Upgrading the Database - Pre-Creating the Database - Bundling the Database with an Application | Design application with database | K6 |
| **Content Providers** | | | |
| 4.15 | Sharing Data in Android | Demonstrate sharing data in Android | K2 |
| 4.16 | Using a Content Provider | Demonstrate Content Providers | K2 |
| 4.17 | Predefined Query String Constants | Eloborate predefined query string constants | K6 |
| 4.18 | Projections - Filtering - Sorting. | Create applications with projections, filtering and sorting | K6 |
| V | **Messaging and Location based services** | | |
| 5.1 | SMS Messaging: Sending SMS Messages Programmatically - Getting Feedback After Sending the Message - Sending SMS Messages Using Intent - Receiving SMS Messages -. | Design application by applying SMS services | K6 |
| 5.2 | Updating an Activity from a BroadcastReceiver - Invoking an Activity from a BroadcastReceiver - Caveats and Warnings | Create application with the help of BroadcastReceiver | K6 |
| **Sending E- Mail. Displaying Maps** | | | |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.3 | Creating the Project - Obtaining the Maps API Key | Develop application with Maps services | K6 |
| 5.4 | Displaying the Map - Displaying the Zoom Control - Changing Views - Navigating to a Specific Location | Develop applications with location based services | K6 |
| 5.5 | Adding Markers - Getting the Location That Was Touched - Geocoding and Reverse Geocoding | Create applications with Geocoding and reverse geocoding | K6 |
| **Getting Location Data** | | | |
| 5.6 | Monitoring a Location | Develop applications with location monitoring services | K6 |
| 5.7 | Developing Android Services | Develop real time android services | K6 |
| 5.8 | Publishing Android Applications. | Test the android applications by publishing in play store | K6 |

## 4. MAPPING (CO, PO, PSO)

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | - | - | - | H | - | - | - | - | - | - | - | - |
| CO2 | M | H | M | M | H | - | - | - | - | H | M | M | - |
| CO3 | - | - | H | - | H | - | - | - | L | M | - | M | - |
| CO4 | H | M | M | L | M | - | - | - | - | H | H | H | L |
| CO5 | H | M | M | M | M | - | - | L | L | H | M | M | - |
| CO6 | H | H | H | M | H | - | - | L | L | M | H | H | L |

**L-Low      M-Moderate      H- High**

## 5. COURSE ASSESSMENT METHODS
**DIRECT:**
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:
1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr. B.ARPUTHAMARY                         Dr.R.THAMARAI SELVI

## Core IX: PROGRAMMING IN PYTHON

**SEMESTER : III**           **CODE: P20CA309**
**CREDITS: 3**           **HOURS/WEEK: 5**

### 1. COURSE OUTCOMES

After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Illustrate the basics of python to develop python programs with conditional controls and loops | K2 | I |
| CO2 | Experiment with python data structures –lists, tuples and dictionaries for programming | K3 | II |
| CO3 | Examine python functions and call them | K4 | III |
| CO4 | Construct programs using classes and objects | K6 | III |
| CO5 | Adapt files, modules and packages and perform database operations on them | K6 | IV |
| CO6 | Construct programs using GUI and django framework | K6 | V |

**UNIT I - Introduction to Python**           **12 Hours**

      Overview – History of Python – Python features – Environment: Environment setup – Getting Python – Install Python – Setting up Path – Running Python – Basic Syntax – Hello World – Interactive mode programming – Script mode Programming – A simple Python example-**Data, Expressions, Statements, Control Flow:** Python interpreter and interactive mode - Values and types: int, float, boolean, strings-variables – expressions – statements - tuple assignment - precedence of operators – comments – Numpy

**UNIT II - Built in Data Types**           **12Hours**

**Sequence : Lists**: List operations - list slices, list methods - list loop, mutability – aliasing - cloning lists - list parameters – **Tuples**: Tuple assignment - tuple as return value– **Dictionary**: Operations and methods – **Sets– Date &Time - F**low of execution - parameters and arguments - Conditionals: Boolean values and operators - conditional (if) - alternative (if-else) - chained conditional (if-elif-else) - Iteration: state – while – for – break – continue –pass. Fruitful functions: return values – parameters - local and global scope-Pandas Numpy

**UNIT III - Functions**           **12Hours**

      Function composition – recursion. Strings: string slices – Immutability - string functions and methods - string module - Lists as arrays. Object Oriented Programming: Classes and Objects: Creating a Class – Using a Class – A simple Inheritance – Multiple Inheritance.

**UNIT IV - Files, Modules, Packages, Database**           **12Hours**

Files and exception: text files - reading and writing files - format operator - command line arguments. Errors and exceptions: handling exceptions – modules – packages. - Illustrative programs: word count, copy file. **Database and SQL:** Database – Transactions – What is SQLDB? – Database connection Parameters – Insert, Update, Delete.

**UNIT V - GUI Programming**           **12Hours**

      **Python Tkinter (GUI) :** Working with widgets: Label – Button – Canvas – ComboBox – RadioButton – Entry – Frame – Message – Scale – Scrollbar – SpinBox – Text – Menu – Standard Attributes – Controlling Layout with Geometry Managers – Events and Event Handlers – Building GUI simple Calculator – **Web Framework:** Django Basics – Django Forms and Form fields – Render forms.

**B. TOPICS FOR SELF-STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Python MongoDB | **https://www.w3schools.com/python/python_mongodb_getstarted.asp** |
| 2 | Python Random Module | **https://www.w3schools.com/python/module_random.asp** |
| 3 | cMath Module | **https://www.w3schools.com/python/module_cmath.asp** |
| 4 | PostgreSQL | **https://www.tutorialspoint.com/postgresql/postgresql_python.htm** |

**C. Text Books:**

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", O'Reilly Publishers, Second Edition, 2016.
2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python, Network Theory Ltd., 2011.

**D. Reference Books:**

1. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.
2. John V Guttag, "Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press , 2013.
3. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.
4. Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd.,, 2015.

**E. Web links:**

1. **https://nptel.ac.in/courses/106/106/106106182**
2. **https://www.w3schools.com/python**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Introduction to Python** | | |
| 1.1 | Introduction | Outline the basics of python programming | K2 |
| 1.2 | Environmental setup | Build a python software and run Python programs | K3 |
| 1.3 | Basic syntax | Explain the basic syntax of the python program with examples | K2 |
| 1.4 | Interactive and script mode programming | Illustrate the interactive and script mode in Python programming | K2 |
| 1.5 | Simple python programs | Construct simple programs | K6 |
| | **Data, Statements, Control Flow** | | |
| 1.6 | Python values, data types | Illustrate the standard data types in python | K2 |
| | **Expressions** | | |
| 1.7 | Expressions and control statements | Classify the expressions and statements in python | K4 |
| | **Data Structures** | | |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1.8 | Lists and tuples | Compare list and tuples and perform operations on it | K5 |
| **Operators** | | | |
| 1.9 | Operators and its precedence | Discuss about the operators and its precedence | K6 |
| **II** | **Sequences: Lists** | | |
| 2.1 | Lists and its operations | Create list and do various operations on list | K6 |
| **Tuples** | | | |
| 2.2 | Tuples and its operations | Apply the various operations on tuples | K3 |
| **Dictionaries** | | | |
| 2.3 | Dictionaries in python | Create a dictionary and perform key value pair searching | K6 |
| **Sets** | | | |
| 2.4 | Set operations | Explain the set operations with suitable program | K5 |
| **Modules** | | | |
| 2.5 | Date and time | Create programs by using date and time modules | K6 |
| **Control Flow** | | | |
| 2.6 | Conditional statements | Evaluate the conditional statements | K5 |
| 2.7 | Iterative statements | Develop programs using while and for loop with break, continue and pass | K6 |
| **III** | **Functions** | | |
| 3.1 | Function composition – recursion | Explain the programs using functions and do recursion | K5 |
| 3.2 | Strings and its functions | Apply string handling functions | K3 |
| 3.3 | Lists as arrays | Compare Lists and Arrays | K5 |
| **Object Oriented Programming (OOPs)** | | | |
| 3.4 | Object oriented programming | Create a Class and invoke class members | K6 |
| 3.5 | Classes and objects | Create a Class and access the members of the class using objects | K6 |
| 3.6 | Inheritance | Compare the types of inheritance | K5 |
| **IV** | **Files and Exceptions** | | |
| 4.1 | Files and exception | Analyze the reading and writing operations on files | K4 |
| 4.2 | Errors and exceptions | Apply an exception handling mechanisms | K3 |
| **Modules and Packages** | | | |
| 4.3 | Modules and packages | Examine modules and python packages | K4 |
| 4.4 | Illustrative programs | Construct a various programs for word count and copy file | K3 |
| **Database** | | | |
| 4.5 | SQL database | Apply SQL database and do insert, delete and update operations | K3 |
| 4.6 | Database operations | Create a python program to insert, delete and update into a database | K6 |
| **V** | **GUI Programming** | | |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.1 | Working with widgets | Compare the working procedure of input widget classes | K4 |
| 5.2 | Controlling Layout with geometry managers | Examine the layouts in python with different geometry managers | K4 |
| 5.3 | Events and event handlers | Discuss in detail about the Event and Event Handlers in Python | K6 |
| 5.4 | Building GUI simple calculator | Design a simple calculator using GUI in python | K5 |
| | **Web Frame Work** | | |
| 5.5 | Django Basics | Develop a django framework for web programming in Python | K6 |
| 5.6 | Django Forms | Elaborate the working principles of form creation and rendering of forms with django Framework | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H | H | H | M | M | H | M | M | M | H | H | M | L |
| CO2 | H | H | H | M | M | L | L | L | M | H | M | L | H |
| CO3 | H | M | H | M | M | L | L | L | M | H | M | L | L |
| CO4 | H | M | H | M | M | L | L | L | M | H | M | L | L |
| CO5 | H | H | H | H | L | L | L | L | L | H | L | L | L |
| CO6 | H | H | H | H | H | M | M | M | M | H | M | M | L |

**L-Low        M-Moderate        H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Assignment, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)


**COURSE COORDINATOR**          **HEAD OF THE DEPARTMENT**
Ms. VINCY SHALLY                        Dr.R.THAMARAI SELVI



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# Core X: COMPUTER NETWORKS AND NETWORK SECURITY

**SEMESTER : III**

**CODE： P20CA310**

**CREDITS : 4**

**HOURS/WEEK: 5**

## 1. COURSE OUTCOMES:

After the completion of this course, the students will be able to

| S.No | Course Out Comes | Level | Unit Covered |
|------|------------------|-------|--------------|
| CO1 | Compare OSI and TCP/IP Reference Models | K4 | I |
| CO2 | Apply the framing methods and data-link layer issues of error detection, corrections and flow control | K3 | II |
| CO3 | Choose the routing algorithms for congestion control | K5 | III |
| CO4 | Analyze the functions of TCP and UDP protocols. | K4 | IV |
| CO5 | Evaluate the features and operations of application layer protocols | K5 | IV |
| CO6 | Test the cryptography and network security algorithms | K6 | V |

## 2A. Syllabus

**UNIT I - Introduction - Uses of Computer Networks:**         **15 hours**

Business Applications - Home Applications - Mobiles users - Social Issues - Network Hardware - Network Software. **Reference Models:** The OSI Reference model - The TCP/IP Reference model. **The physical Layer:** The Theoretical Basis for Data Communication - Guided Transmission Media - Wireless Transmission.

**UNIT II - The Data Link Layer:**         **15 hours**

Design Issues - Error Detection and Correction - Elementary Data Link Protocols - Sliding Window Protocols. **Ethernet:** Classic Ethernet Physical Layer - Classic Ethernet MAC Sub layer - Switched Ethernet- Fast Ethernet. **Bluetooth:** Bluetooth Architecture - Bluetooth Applications - The Bluetooth Protocol Stack - Bluetooth Frame Structure.

**UNIT III - The Network Layer:**         **15 hours**

Design Issues - Routing Algorithms. **Congestion Control Algorithms:** Approaches to Congestion Control - Traffic Aware Routing - Admission Control - Traffic Throttling - Load Shedding. **Quality of Service:** Application Requirements -Traffic Shaping - Packet Scheduling - Admission Control - Integrated Services - Differentiated Services - **The Network Layer in the Internet:** The IP Protocol - IP Address.

**UNIT IV - The Transport Layer:**         **15 hours**

The Transport Service - **The Internet Transport Protocol (UDP)**: Introduction to UDP - Remote Procedure Call - Real Time Transport Protocol. **The Internet Transport Protocol (TCP):** Introduction to TCP - TCP Service Model - The TCP Protocol - The TCP Segment Header - TCP Connection Establishment - TCP Connection Release. **The Application Layer:** Domain Name System - Electronic Mail.

**UNIT V - Computer and Network Security Concepts:**         **15 hours**

Computer Security Concepts **-** The OSI security Architecture - Security Attacks - Security Services - Security Mechanisms - **Classical Encryption Techniques:** Symmetric Cipher Model - Substitution Techniques - Transposition Techniques - Rotor Machines – Steganography - **Block Ciphers and the Data Encryption Standard :** Traditional Block Cipher structure - The Data Encryption Standard - The Strength

of DES - Cryptanalysis – Block Cipher Design Principles – **Public key Cryptography and RSA:** Principles of Public Key Cryptosystems – The RSA Algorithm.

## B. TOPICS FOR SELF-STUDY:

| S.No. | Topics | Web Links |
|---|---|---|
| 1 | Universal Mobile Telecommunication system | **https://www.tutorialspoint.com/universal-mobile-telecommunications-system** |
| 2 | IEEE 802.11 | **https://www.tutorialspoint.com/wi-fi/wifi_ieee_standards.htm** |
| 3 | SIP and H.323 | **https://www.geeksforgeeks.org/difference-between-h-323-and-sip/** |
| 4 | Stegnography | **https://www.geeksforgeeks.org/image-steganography-in-cryptography/** |

## C. Text Books:

1. Andrew S. Tanenbaum and David J Wetherall, "Computer Networks", Pearson Education, Fifth Edition, Eighteenth Impression, 2020. (Unit Covered I to IV).
2. William Stallings, "Cryptography and Network Security-Principles and Practice", Pearson Education, Seventh Edition, Eight Impressions, 2019. (Unit Covered V).

## D. Reference Books:

1. Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill, Fifth Edition, 2012.
2. William Stallings, "Data and Computer Communications", Pearson Education, Tenth Edition, 2014.

## E. Web links:

1. **https://nptel.ac.in/courses/106/105/106105183/**
2. **https://www.tutorialspoint.com/_computer_network/index.html**

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| **1** | **Introduction** | | |
| 1.1 | Uses of Computer Networks | Outline the uses of computer networks | K2 |
| 1.2 | Network Hardware | Explain the network hardware | K2 |
| 1.3 | Network Software | Summarize the network software | K2 |
| 1.4 | Reference Models: OSI Reference model | Estimate the layers of the OSI reference model | K5 |
| 1.5 | TCP\IP Reference model | Illustrate the TCP /IP reference model | K2 |
| | **The physical Layer** | | |
| 1.6 | The Theoretical Basis for Data Communication | Define Bandwidth | K1 |
| 1.7 | Guided Transmission Media. | Choose the guided transmission media | K3 |
| 1.8 | Wireless Transmission. | Select the appropriate wireless transmission media | K3 |
| **II** | **The Data Link Layer** | | |
| 2.1 | Design Issues | Solve the issues of data-link layer | K6 |
| 2.2 | Error Detection and Correction | Test the error detection and correction techniques | K6 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.3 | Elementary Data Link Protocols | Make use of the protocols of data link layer | K3 |
| 2.4 | Sliding Window Protocols | Utilize the sliding window protocol | K3 |
| | **Ethernet** | | |
| 2.5 | Classic Ethernet Physical Layer | Illustrate the use of Ethernet Physical Layer | K2 |
| 2.6 | Classic Ethernet MAC Sublayer | Make use of Classic Ethernet Mac sublayer | K3 |
| 2.7 | Switched Ethernet & Fast Ethernet | Apply the Concepts of Ethernet | K3 |
| | **Bluetooth** | | |
| 2.8 | Bluetooth Architecture | Illustrate the architecture of Bluetooth | K2 |
| 2.9 | Bluetooth Applications | Outline the various applications of Bluetooth | K2 |
| 2.10 | The Bluetooth Protocol Stack | Explain the Bluetooth protocol stack. | K2 |
| 2.11 | Bluetooth Frame Structure | Illustrate the frame structure of Bluetooth | K2 |
| **III** | **The Network Layer** | | |
| 3.1 | Design Issues | Analyze the design issues in network layer | K4 |
| 3.2 | Routing Algorithms | Test the various routing algorithms | K6 |
| | **Congestion Control Algorithms** | | |
| 3.3 | Approaches to Congestion Control | Discuss the Approaches to Congestion Control | K6 |
| 3.4 | Traffic Aware Routing & Admission Control | Explain Traffic Aware Routing & Admission Control | K5 |
| 3.5 | Traffic Throttling & Load Shedding | Assess Load Shedding & Traffic Throttling | K5 |
| 3.6 | Integrated Services - Differentiated Services - | Compare Integrated Services & Differentiated Services | K4 |
| | **The Network Layer in the Internet** | | |
| 3.7 | The IP Protocol | Illustrate on the IP protocol | K2 |
| 3.8 | IP Address | Classify IP addresses | K4 |
| **IV** | **The Transport Layer** | | |
| 4.1 | The Transport Service | Identify the services provided to the upper layers | K2 |
| | **The Internet Transport Protocol (UDP)** | | |
| 4.2 | Introduction to UDP | Explain the Internet transport protocol | K2 |
| 4.3 | TCP Service Model & The TCP Protocol | Compare the service and protocol models of TCP | K2 |
| 4.4 | The TCP Segment Header | Appraise the TCP segment header | K5 |
| 4.5 | TCP Connection Establishment | Explain the TCP connection establishment | K5 |
| 4.6 | TCP Connection Release | Make use of the TCP connection release | K3 |
| | **The Application Layer** | | |
| 4.7 | Domain Name System | Elaborate the domain name system | K6 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 4.8 | Electronic Mail | Illustrate the architecture of E-mail system | K2 |
| **V** | **Computer and Network Security Concepts** | | |
| 5.1 | Computer Security Concepts | Define Computer Security Concepts | K1 |
| 5.2 | The OSI Security Architecture | Outline OSI Security Architecture | K2 |
| 5.3 | Security Attacks | Analyze the Security Attacks | K4 |
| 5.4 | Security Services | Explain Security Services | K5 |
| 5.5 | Security Mechanisms | Choose Security Mechanisms | K5 |
| | **Classical Encryption Techniques** | | |
| 5.6 | Symmetric Cipher Model | Test the symmetric cipher model | K6 |
| 5.7 | Substitution Techniques | Define Substitution Techniques | K2 |
| 5.8 | Transposition Techniques | Elaborate on transposition techniques | K6 |
| 5.9 | Rotor Machines & Steganography | Explain Rotor Machines | K5 |
| | **Block Ciphers and the Data Encryption Standard** | | |
| 5.10 | Traditional Block Cipher Structure | Define Traditional Block Cipher Structure | K2 |
| 5.11 | The Data Encryption Standard | Analyze Data Encryption Standard | K4 |
| 5.12 | The Strength of DES & Cryptanalysis | Estimate the strength of DES & Cryptanalysis | K6 |
| 5.13 | Block Cipher Design Principles | Outline the principles of block cipher design | K2 |
| | **Public Key Cryptography and RSA** | | |
| 5.14 | Principles of Public Key Cryptosystems | Define Public Key Cryptosystems | K2 |
| 5.15 | The RSA Algorithm | Formulate and test public key cryptography using RSA Algorithm | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | M | H | M | L | M | - | M | L | - | - | - | M | L |
| **CO2** | M | H | M | M | M | - | - | L | L | - | L | M | M |
| **CO3** | H | M | M | H | H | - | - | - | M | M | M | H | M |
| **CO4** | M | M | M | M | M | L | - | - | L | L | L | L | M |
| **CO5** | H | H | H | H | H | M | - | - | M | H | - | H | M |
| **CO6** | H | H | H | H | H | L | L | - | M | L | L | M | L |

**L-Low    M-Moderate    H- High**

## 5. COURSE ASSESSMENT METHODS
**DIRECT:**
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Assignment, Group Discussion, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination.

**INDIRECT**:
1. Course end survey (Feedback).

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr. V. GEETHA DHANALAKSHMI                    Dr.R.THAMARAI SELVI

# Elective IV: ORGANIZATIONAL BEHAVIOUR

**SEMESTER: III**
**CREDITS: 3**

**CODE: P20CA3:1**
**HOURS/WEEK: 4**

## 1. COURSE OUTCOMES
After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Practice the use of scientific foundations of Organizational Behavior and analyze the Individual Behavior | K3 | I |
| CO2 | Analyze the personality, perception and attitudes of an in an organization and to examine the levels of job satisfaction | K4 | II |
| CO3 | Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization | K3 | III |
| CO4 | Evaluate the conflict management strategies used in organization and to analyze the job frustration and job stress | K5 | IV |
| CO5 | Evaluate the appropriateness of various leadership styles | K5 | V |
| CO6 | Explain how organizational change and culture affect working relationships within organizations | K6 | V |

## 2A. Syllabus

**UNIT I - Introduction to Organizational Behaviour**                    **12 Hours**
　　　**Introduction:** Elements of OB – Nature and Scope of OB – Contributing Disciplines to OB. Organizational Behaviour in Historical Perspective – **Foundations of Individual Behaviour:** Introduction – The Individual and Individual Differences – Human Behaviour and its Causation.

**UNIT II - Personality and Perception**                    **12 Hours**
　　　**Personality –Perception –Attitudes:** Concept of Attitudes – Formation of Attitudes – Types of Attitudes – Measurement of Attitude – Change of Attitude. **Values:** Concept of Value – Types of Values – Formation of Values – Values and Behaviour. **Job Satisfaction.**

**UNIT III - Learning and Motivation**                    **12 Hours**
　　　**Learning:** Meaning and Definition – Determinants of Learning – Learning Theories – Learning Principles – Reinforcement – Punishment – Learning and Behaviour. **Motivation:** Concepts – Meaning of Motivation – Nature of Motivation – Motivation Cycle or Process – Need for Motivation – Theories of Motivation – Motivation and morale.

**UNIT IV - Organizational Conflicts**                    **12 Hours**
　　　**Organizational Conflicts:** Definition of Conflict – Sources of Conflict – Types of Conflicts – Aspects of Conflicts – Functional Conflict – Dysfunctional Conflict – Conflict Process – Conflict Management. **Job Frustration –Stress Management.**

**UNIT V - Communication and Leadership**                    **12 Hours**
**Communication:** Nature and Need for Communication – Communication Process –Communication Channel – Communication Networks – Communication Barriers – Effective Communication. **Leadership – Organisational Structure – Organisational Culture**.

## B. TOPICS FOR SELF-STUDY:

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Human Resource Management | **https://open.lib.umn.edu/humanresourcemanagement/chapter/1-1-what-is-human-resources/** |
| 2 | Stress Management and Emotional Health | **https://my.clevelandclinic.org/health/articles/6409-stress-management-and-emotional-health** |
| 3 | Organizational Dynamics | **http://www.managingdynamics.com/organizational-dynamics.asp** |
| 4 | Managing for employee retention | **https://www.shrm.org/resourcesandtools/tools-and-samples/toolkits/pages/managingforemployeeretention.aspx** |

## C. Text Book:

1. S.S Khanka, "Organizational Behaviour", S. Chand and Company Ltd, Revised Edition 2009.

## D. Reference Books:

1. John W Newstrom and Keith Davis, "Organizational Behaviour", TMH, 13th Edition, 2010.
2. Hugh J Arnold and Daniel C Fieldman, "Organizational Behaviour", Mc Graw Hill, 10th Edition, 2005.

## E. Web links:

1. **https://open.umn.edu/opentextbooks/textbooks/30**
2. **https://managementhelp.org/organizationalbehavior/**

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|--------|-------|------|
| **I** | **Organizational Behavior Introduction** | | |
| 1.1 | Elements of OB | Recall the key elements of OB | K1 |
| 1.2 | Nature and Scope of OB | Summarize the nature and scope of OB | K2 |
| 1.3 | Contributing Disciplines to OB | List out the disciplines that contribute to the understanding of OB | K4 |
| 1.4 | OB in historical perspective | Outline the historic perspective of OB | K2 |
| | **Foundations of Individual Behavior** | | |
| 1.5 | The individual and individual differences | Analyze the factors affecting individual behavior | K4 |
| 1.6 | Human behavior and its causation. | Examine human behavior | K4 |
| 1.7 | OB Models | Classify the models of OB | K4 |
| **II** | **Personality, Perception and Attitudes** | | |
| 2.1 | Definition of Perception | Define perception | K1 |
| 2.2 | Perceptual Process | Elaborate the process involved in perception | K6 |
| 2.3 | Determinants of Personality | List out the determinants of Personality | K4 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.4 | Types of Personality | Classify personality | K4 |
| 2.5 | Theories of Personality | Criticize the theories of personality | K5 |
| **Values and Job Satisfaction** | | | |
| 2.6 | Concepts of Values | Explain the concepts of values on individual behavior | K5 |
| 2.7 | Formation of Values | Identify the formation of values | K3 |
| 2.8 | Types of Values | Categorize values | K4 |
| 2.9 | Determinants of Job Satisfaction | Analyze the sources of Job Satisfaction | K4 |
| **III** | **Learning** | | |
| 3.1 | Definition of Learning | Define learning | K1 |
| 3.2 | Determinants of Learning | Determine the factors that affect learning | K5 |
| 3.3 | Theories of Learning | Analyze the theories of learning | K4 |
| 3.4 | Principles of Learning | Establish relationship between learning and behavior | K6 |
| **Motivation** | | | |
| 3.5 | Meaning of Motivation | Explain the need for understanding motivation at work in organizations | K2 |
| 3.6 | Nature of Motivation | Recall the nature of motivation | K1 |
| 3.7 | Process of Motivation | Explain the process of motivation | K5 |
| 3.8 | Theories based on Human Needs | Compare the various motivational theories based on human needs | K4 |
| 3.9 | Theories based on Human Nature | Analyze the motivational theories based on human nature | K4 |
| 3.10 | Theories based on expectancy of human beings | Categorize the motivational theories based on expectancy of human beings | K4 |
| **IV** | **Organizational Conflicts** | | |
| 4.1 | Definition of Conflict | Recall the definition of Conflicts | K1 |
| 4.2 | Types of Conflicts | Classify conflicts | K2 |
| 4.3 | Aspects of Organizational Conflicts | Compare and contrast the aspects of organizational Conflicts | K5 |
| 4.4 | Management of Conflicts | Discuss the impacts of conflict management on the success of a company | K6 |
| **Job Frustration** | | | |
| 4.5 | Definition | Recall the definition of Job Frustration | K1 |
| 4.6 | Frustration affects Behavior | Identify the reasons for frustration | K3 |
| 4.7 | Frustration Management | Make use of the techniques to manage frustration | K3 |
| **Stress Management** | | | |
| 4.8 | Symptoms of Stress | List out the symptoms for stress | K1 |
| 4.9 | Measurement of Job Stress | Measure job stress | K5 |
| 4.10 | Sources of Stress | Identify the sources of stress | K3 |
| 4.11 | Management of Stress | Make use of the techniques for managing stress | K3 |
| **V** | **Communication** | | |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.1 | Nature of Communication | Recall the nature of communication | K1 |
| 5.2 | Process of Communication | Explain the communication process | K2 |
| 5.3 | Channels of Communication | Identify the communication channels | K3 |
| 5.4 | Networks of Communication | Analyze communication networks | K4 |
| 5.5 | Communication Barriers | List out the barriers for communication | K4 |
| 5.6 | Effective Communication | Make use of the techniques for effective communication | K3 |
| **Leadership** | | | |
| 5.7 | Definition of Leadership | Recall the definition of leadership | K1 |
| 5.8 | Leadership Styles | Identify the leadership style | K3 |
| **Organizational Structure** | | | |
| 5.9 | Definition of Organizational Structure | Outline the structure of organizations | K2 |
| 5.10 | Elements of Organizational Structure | Examine the elements of organizational structure | K4 |
| **Organizational Culture** | | | |
| 5.11 | Types of Organizational Culture | Classify organizational culture | K4 |
| 5.12 | Functions of Organizational Culture | Assess the functions of Organizational Culture | K5 |

## 4. MAPPING (CO, PO, PSO)

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | L | - | M | - | - | M | H | H | M | L | L | M | H |
| CO2 | M | H | M | M | L | H | M | M | M | L | L | M | M |
| CO3 | L | M | M | L | L | H | H | M | M | L | L | M | M |
| CO4 | L | M | M | L | - | M | H | M | H | L | L | M | M |
| CO5 | L | M | M | L | L | M | H | M | M | M | M | H | H |
| CO6 | M | H | M | M | H | M | H | H | M | M | M | H | H |

**L-Low        M-Moderate        H- High**

## 5. COURSE ASSESSMENT METHODS
**DIRECT:**
1. Continuous Internal Assessment Test I, II
2. Course-Embedded Assessment (e.g., Homework Assignment, Essays, Locally Developed Tests)
3. End Semester Examination Pre-Semester & End Semester Theory Examination

**INDIRECT**:
1. Course-End Survey
2. Student Satisfaction Survey


**COURSE COORDINATOR**                          **HEAD OF THE DEPARTMENT**
Mrs.J.JASMINE CHRISTINA MAGDALENE            Dr.R.THAMARAI SELVI

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# Elective IV: BUSINESS INTELLIGENCE

**SEMESTER : III**                                      **CODE: P20CA3:2**
**CREDITS:3**                                           **WEEK/HOURS: 4**

## 1. COURSE OUTCOMES

After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Identify the major frameworks of computerized decision support systems | K2 | I |
| CO2 | Categorize complex business problems in terms of analytical models | K4 | II |
| CO3 | Demonstrate ethical decision-making in structured or unstructured Problems | K2 | III |
| CO4 | Compare the impact of business reporting, information visualization, and dashboards | K2 | IV |
| CO5 | Adapt data mining tools, neural networks, web mining, web analytics in BI | K6 | V |
| CO6 | Elaborate how analytics are powering consumer applications and creating a new opportUnit Coveredy for entrepreneurship for analytics | K6 | V |

## 2A. Syllabus

**UNIT I - Management Support Systems: An Overview:**                    **12 hours**

Managers and Decision-Making – Managerial Decision-Making and Information Systems – Managers and Computer Support – Computerized Decision Support and the Supporting Technologies-A Framework for Decision Support – The Concept of Decision Support Systems – Group Support Systems– Enterprise Information Systems-Knowledge Management Systems-Expert Systems-Artificial Neural Networks-Advanced Intelligent Decision Support Systems-Hybrid Support Systems.
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**UNIT II - Decision-Making Systems, Modeling, and Support:**                    **12 hours**

Decision-Making: Introduction and Definitions-Systems-Models- Phases of the Decision-Making Process-Decision-Making: The Intelligence Phase - The Design Phase- The Choice Phase-The Implementation Phase-How Decisions Are Supported-ersonality Types, Gender, Human Cognition, and Decision Styles-The Decision-Makers.

**UNIT III - Decision Support Systems: An Overview:**                    **12 hours**

DSS Configurations-What Is a DSS?-Characteristics and Capabilities of DSS - Components of DSS-The Data Management Subsystem-The Model Management Subsystem-The User Interface (Dialog) Subsystem -The Knowledge-Based Management Subsystem-The User-DSS Hardware-DSS Classifications.

**UNIT IV - Modeling and Analysis:**                    **12 hours**

MSS Modeling-Static and Dynamic Models-Certainty, Uncertainty, and Risk-Influence Diagrams-MSS Modeling with Spreadsheets-Decision Analysis of a Few Alternatives (Decision Tables and Decision Trees)-The Structure of MSS Mathematical Models-Mathematical Programming Optimization-Multiple Goals, Sensitivity Analysis, What-If, and Goal Seeking-Problem-Solving Search Methods-Heuristic Programming-Simulation.

**UNIT V - Business Intelligence: Data Warehousing, Data Acquisition, Data Mining, Business Analytics, and Visualization:** 12 hours

The Nature and Sources of Data-Data Collection, -Database Management Systems in Decision Support Systems/Business Intelligence-Database Organization and Structures-Data Warehousing-Data Marts-Business Intelligence/Business Analytics-Online Analytical Processing (OLAP)-Data Mining -Data Visualization, Multidimensionality, and Real-Time Analytics.

**B. TOPICS FOR SELF-STUDY:**

| S.No. | Topics | Web Links |
|-------|--------|-----------|
| 1 | Information Systems | **https://www.youtube.com/watch?v=HrrfnPVaG9Q** |
| 2 | Decision-Making Systems, Modeling, and Support | **https://slideplayer.com/slide/5193091/** |
| 3 | MSS Modeling with Spreadsheets | **https://www.scribd.com/presentation/284185476/Mss** |
| 4 | Data Warehousing | **https://docs.oracle.com/cd/E11882_01/** |

**C. Text Book:**
   **1.** Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", 7th Edition, Pearson 2013.

**D. Reference Books:**
   1. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003.
   2. Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
   3. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager"s Guide", Second Edition, 2012.
   4. Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill, 2007.
   5. Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, "The Data Warehouse Lifecycle Toolkit", Wiley Publication Inc.,2007.

**E. Web links:**
   1. **https://www.youtube.com/watch?v=xFLE1_V7u6M**
   2. **https://www.youtube.com/watch?v=LFnewuBsYiY**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|-----------------------|----------------|-------------------|-----------------------------------------------|
| **I** | **An Overview** | | |
| 1.1 | Managers and Decision Making | Illustrate the concepts and principles of Decision Making | K2 |
| 1.2 | Managerial Decision | Summarize Managerial Decision | K2 |
| 1.3 | Making and Information Systems | Outline the uses of Information Systems | K2 |
| 1.4 | Managers and Computer Support | Identify the efficiency of Computer Support for Decision Making | K3 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1.5 | Computerized Decision Support and the Supporting Technologies | Explain the Computerized Decision Support Technologies | K2 |
| 1.6 | A Framework for Decision Support | Examine the Framework for Decision Support | K2 |
| 1.7 | The Concept of Decision Support Systems | Utilize Decision Support Systems concepts | K3 |
| 1.8 | Group Support Systems | Identify the Group Support Systems | K3 |
| 1.9 | Enterprise Information Systems | Illustrate the use Enterprise Information Systems | K2 |
| 1.10 | Knowledge Management Systems | Apply Knowledge Management Systems | K3 |
| 1.11 | Expert Systems | Identify the Expert Systems | K3 |
| 1.12 | Artificial Neural Networks | Explain the Artificial Neural Networks | K2 |
| 1.13 | Advanced Intelligent Decision Support Systems | Examine the Intelligent Decision Support Systems | K2 |
| **II** | **Decision-Making** | | |
| 2.1 | Introduction and Definitions | Outline the uses Decision-Making | K2 |
| 2.2 | Systems | Explain the Systems-Models | K2 |
| 2.3 | Models | Develop the model | K6 |
| 2.4 | Phases of the Decision Making Process | Illustrate Decision Making Process | K2 |
| 2.5 | Decision Making :The Intelligence Phase | Examine the Intelligence Phase | K2 |
| 2.6 | The Design Phase | Illustrate the Design Phase | K2 |
| 2.7 | The Choice Phase | Illustrate the uses of Choice Phase | K2 |
| 2.8 | The implementation phase | Explain the implementation phase | K2 |
| 2.9 | How Decisions Are Supported | Determine How the Decisions Are Supported | K5 |
| 2.10 | Types, Gender, Human Cognition, and Decision Styles | Compare Cognitive Style | K5 |
| 2.11 | The Decision-Makers | Identify the Decision-Makers | K3 |
| **III** | **Overview-DSS Configurations** | | |
| 3.1 | What Is a DSS | Illustrate the concepts DSS | K2 |
| 3.2 | Characteristics and Capabilities of DSS | Explain the Characteristics of DSS | K2 |
| 3.3 | Components of DSS | Analysis the Components of DSS | K3 |
| 3.4 | The Data Management Subsystem | Classify Data Management Subsystem | K4 |
| 3.5 | The Model Management Subsystem | Identify the Management Subsystem | K3 |
| 3.6 | The User Interface (Dialog) Subsystem | Apply User Interface | K3 |
| 3.7 | The Knowledge Based Management Subsystem | Illustrate the Knowledge Based Management Subsystem | K2 |
| 3.8 | The User | Illustrate the User | K2 |
| 3.9 | DSS Hardware | Make use of DSS Hardware | K3 |
| 3.10 | MSS Modelling | Explain MSS modeling | K2 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 3.11 | DSS Classifications | Illustrate the Classifications of DSS | K2 |
| **IV** | **Modeling and analysis** | | |
| 4.1 | MSS Modeling | Classify he role of MSS Modeling | K4 |
| 4.2 | Static and Dynamic Models | Distinguish between Static and Dynamic Models | K4 |
| 4.3 | Certainty, Uncertainty, and Risk | Determine the Certainty, Uncertainty | K5 |
| 4.4 | Influence Diagrams | Make use of Influence Diagrams | K3 |
| 4.5 | MSS Modeling with Spreadsheets | Build effective relationship MSS Modeling with Spreadsheets | K6 |
| 4.6 | Decision Analysis of a Few Alternatives (Decision Tables and Decision Trees) | Analysis of Alternatives for Decision | K4 |
| 4.7 | The Structure of MSS Mathematical Models | Assess the Mathematical Models | K5 |
| 4.8 | Mathematical Programming Optimization | Interpret the impact of Mathematical Programming Optimization | K5 |
| 4.9 | Multiple Goals, Sensitivity Analysis, What-If, and Goal Seeking | Analysis the goals, Goal seeking | K3 |
| 4.10 | Problem-Solving Search Methods | Identify the 11Problem-Solving Search Methods | K3 |
| 4.11 | Heuristic Programming | Test Heuristic Programming | K6 |
| 4.12 | Simulation | Illustrate the Simulation | K2 |
| **V** | **Business Intelligence: Data Warehousing, Data Acquisition, Data Mining, Business Analytics, and Visualization** | | |
| 5.1 | The Nature and Sources of Data | Explain the Nature and Sources of Data | K6 |
| 5.2 | Data Collection, Problems, and Quality | Illustrate the Data Collection, Problems | K6 |
| 5.3 | Data Collection | Identify Data Collection | K6 |
| 5.4 | Database Management Systems in Decision Support Systems/ Business Intelligence | Determine Business Intelligence for DSS | K5 |
| 5.5 | Database Organization and Structures | Apply Database Organization and Structures | K3 |
| 5.6 | Data Warehousing | Classify Data Warehousing | K4 |
| 5.7 | Data Marts | List Data Marts | K4 |
| 5.8 | Business Intelligence/Business Analytics | Identify Business Analytics | K3 |
| 5.9 | Online Analytical Processing (OLAP) | Classify Online Analytical Processing (OLAP) | K2 |
| 5.10 | Data Mining | Make use of data mining concepts | K3 |
| 5.11 | Data Visualization, Multidimensionality, and Real-Time Analytics | Examine Data Visualization, Multidimensionality | K4 |

**4. MAPPING (CO, PO, PSO)**

|       | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1   | M   | H   | M   | L   | M   | -   | M   | L   | -   | -    | -    | M    | L    |
| CO2   | M   | H   | M   | M   | M   | -   | -   | L   | L   | -    | L    | M    | M    |
| CO3   | H   | M   | M   | H   | H   | -   | H   | M   | M   | M    | M    | H    | M    |
| CO4   | M   | M   | M   | M   | M   | L   | -   | M   | L   | L    | L    | L    | M    |
| CO5   | H   | H   | H   | H   | H   | M   | -   | -   | M   | H    | -    | H    | M    |
| CO6   | H   | H   | H   | H   | H   | L   | L   | -   | M   | L    | L    | M    | L    |

**L-Low          M-Moderate          H- High**

**5. COURSE ASSESSMENT METHODS**

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book

2. Open Book Test.

3. Assignment, Group Discussion, Seminar, Quiz (written).

4. Pre-Semester & End Semester Theory Examination.

**INDIRECT**:

1. Course end survey (Feedback).

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr. L. JAYASIMMAN                                  Dr.R.THAMARAI SELVI

**SEMESTER  : III**                                            **CODE: P20CA3:3**
**CREDITS    : 3**                                            **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES
After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Outline the basic concepts, functions and processes of human resource management | K2 | I |
| CO2 | Analysis Job techniques and methods | K4 | II |
| CO3 | Build and communicate the human resources component of the organization's business plan | K3 | III |
| CO4 | Develop employability skills | K6 | III |
| CO5 | Agree to manage and plan key human resource functions within organizations | K5 | IV |
| CO6 | Determine to handle employee issues and evaluate the new trends in HRM | K5 | V |

## 2A. Syllabus
### UNIT I - Human Resource Planning Overview                                   12 Hours
Human Resource Planning: How HRP Relates to Organizational Planning or Strategic Planning, the need for Human Resource Planning, The Steps in Human Resource Planning Process, Situation Analysis, Environmental Scanning and Strategic Planning, Forecasting Human Resource Demands.

### UNIT II - Job Analysis                                                           12 Hours
Job Analysis and Job Design: Purpose and uses of Job Analysis, Job Analysis Technique, Job Analysis – Methods of Data Collection, Job Design Approaches, Job Characteristic Approach to Job Design.
The Recruitment Process: Environmental Factors Affecting Recruitment Process, Recruitment Methods, Evaluating the Recruitment Process.

### UNIT III - Selection Process                                                     12 Hours
The Selection Process: Step in Selection Process (Techniques of Selection Process), Ethical Standards of Testing, Types of Interviews, Evaluation of the Selection Program.
Training and Development: The Functions of Training, Assessing Training Needs, Types of Training, Evaluation of Training and Development.

### UNIT IV - Career Planning and Developing                                      12 Hours
Career Planning and Development: Career Development, Career Management. Industrial Relations: Characteristics of Industrial Relations, Significance of Harmonious Industrial Relations, Approaches to Industrial Relations, Factors Affecting Industrial Relations Strategy, Causes of Poor Industrial Relations, Effects of Poor Industrial Relations.
### UNIT V - Strategic HRM                                                           12 Hours
Strategic Human Resource Management: Strategic Human Resource Management, Strategic Planning, Need for Strategic Management, Benefits of Strategic Management, Dysfunctions of Strategic Management.

**B. TOPICS FOR SELF-STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Talent Management | **https://www.tutorialspoint.com/talent_management/talent_management_tutorial.pdf** |
| 2 | Recruitment Process | **https://www.wisdomjobs.com/e-university/recruitment-and-selection-tutorial-2682/recruitment-process-27164.html** |
| 3 | International HR Management | **http://elearning.nokomis.in/uploaddocuments/International%20HRM%20New/chap%201%20International%20HRM%20&%20Introduction/PPT/Chapter%201%20Intro%20to%2o%2**<br>**https://www.ftms.edu.my/images/Document/MOD001055%20-%20International%20Business/CHAPTER%208.pdf** |
| 4 | Human Resource in Information Technology Organization- | **https://www.analyticsinhr.com/blog/human-resources-information-system-hris/** |

**C. Text Book:**

1. B. Pattanayak, "Human Resource Management", 3rd Edition, Prentice-Hall of India, 2006.

C. **Reference Books:**

1. David A. Dedecenezo, Stephen P. Robbins, "Personnel/ Human Resource Management", 3rd Edition, Prentice-Hall of India, 1990.
2. Adwin B. Flippo," Personnel Management", (Mcgraw Hill Series in Management).
3. F. R. David, "Concept of Strategic Management". New York:Macmillan., 1993.
4. Narender. K. Chadha, "Human Resource Management: Issues, Challenges and Case Studies" (2nd revised ed.), Shri Sai Printographers, New Delhi, 2002.
5. Nirmal Singh. "Human Resource Management", Galgotia Publications Pvt. Ltd., New Delhi, 2004.

**E. Web Links:**

1. **https://www.tutorialspoint.com/human_resource_management/human_resource_management_quick_guide.htm**
2. **https://www.wisdomjobs.com/e-university/hr-management-tutorial-69.html**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|--------|--------|--------|
| **I** | **Human Resource Planning** | | |
| 1.1 | Introduction: Definition of HRP | Outline the concepts of HR planning | K2 |
| 1.2 | Nature and Objective of HRP | Classify the nature of HR planning | K4 |
| 1.3 | Need for Human Resource Planning in Organization | Identify the need of HR planning in organization | K3 |
| 1.4 | Importance and Factors Affecting HRP | Examine to gain information about different factors that affect HRP | K4 |
| | **Human Resource Planning Process** | | |
| 1.5 | HRP Process | Explain the HRP process | K2 |

| | | | |
|---|---|---|---|
| 1.6 | Requisites for successful HRP | Outline the pre requisites for successful HRP process | K2 |
| 1.7 | Barriers to HRP | Categorize the barriers to HRP | K4 |
| **II** | **Job Analysis and Job Design** | | |
| 2.1 | Introduction to Job Analysis | Illustrate job analysis | K2 |
| 2.2 | Uses of Job Analysis | Explain the uses of job analysis | K2 |
| 2.3 | Steps in Job Analysis | Outline the basic steps in job analysis | K2 |
| **Job Analysis and Techniques** | | | |
| 2.4 | Methods for collecting Job analysis data | Identify the major methods of collecting job analysis data | K3 |
| 2.5 | Job Description | Analyze the major elements of job descriptions | K4 |
| 2.6 | Writing Job Description | Explain how to prepare job descriptions | K2 |
| 2.7 | Job Specification | Classify job specification | K4 |
| 2.8 | Job Design and Methods in Job Design | Make use of job design and its various methods | K3 |
| **Recruitment Process** | | | |
| 2.9 | Recruitment Meaning and Definition | Explain the meaning of recruitment | K2 |
| 2.10 | Factors affecting Recruitment Process | Categorize the factors that affects recruitment process | K4 |
| 2.11 | Recruitment Methods | Examine the methods through which prospective candidates can be recruited. | K4 |
| 2.12 | Evaluation of Recruitment process | Evaluate the process of recruitment | K5 |
| **III** | **Selection Process** | | |
| 3.1 | Steps in Selection Process | Make use of steps in selection and its process. | K3 |
| 3.2 | Ethical standards of Testing | Identify the standard in testing | K3 |
| 3.3 | Types of Testing | Distinguish the various testing | K4 |
| 3.4 | Evaluation of Selection Program | Determine the evaluation of selection program | K5 |
| **Training and Development** | | | |
| 3.5 | Functioning of Training | Analyse the functions of training | K4 |
| 3.6 | Assessing Training Recruitment | Evaluate the processes in training | K5 |
| 3.7 | Evaluation of Training and Development | Assess the training and development | K5 |
| **IV** | **Career Planning and Development** | | |
| 4.1 | Career Development | Identify personal priorities, skills, interests, strengths, and values using a variety of contemporary assessment tools and reflection activities. | K3 |
| 4.2 | Career Management | Identify the opportUnit Coveredy for career exploration around the globe | K3 |
| **Industrial Relations** | | | |
| 4.3 | Characteristic of Industrial Relation | Demonstrate descriptive knowledge in the field of industrial relations. | K2 |
| 4.4 | Significance of Harmonious Industrial Relations | Identify the significance of industrial relation | K3 |
| 4.5 | Approaches to Industrial Relations | Categorize the approaches in Industrial relation | K4 |

| 4.6 | Factors Affecting Industrial Relations Strategy | Identify the factors affecting industrial relation | K3 |
|---|---|---|---|
| 4.7 | Causes and Effects of Poor Industrial Relations | Examine the causes and effects of poor relations | K4 |
| **V** | **Strategic Human Resource Management** | | |
| 5.1 | Strategic Planning | Make use of how HR strategies are related to business strategies | K3 |
| 5.2 | Need for Strategic Management | Identify relevant metrics in strategic human resource management | K3 |
| 5.3 | Benefits of Strategic Management | Estimate strategic human resource management to promoting and achieving the organisation's strategic intent | K6 |
| 5.4 | Dysfunctions of Strategic Management | Experiment with dysfunctions in management | K3 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | - | L | M | - | M | H | - | M | L | - | M | M | H |
| **CO2** | - | - | M | - | L | H | M | M | - | - | - | H | H |
| **CO3** | - | L | M | - | - | M | M | H | M | L | - | M | H |
| **CO4** | L | - | L | - | L | H | - | H | - | L | - | H | H |
| **CO5** | - | - | - | - | L | H | H | M | L | - | - | - | M |
| **CO6** | - | M | M | - | - | L | L | M | M | - | - | - | H |

**L-Low          M-Moderate          H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:
1. Course end survey (Feedback)


**COURSE COORDINATOR**          **HEAD OF THE DEPARTMENT**
Dr. M. LOVELIN PONN FELCIAH          Dr.R.THAMARAI SELVI


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## Elective V: BIG DATA AND CLOUD COMPUTING

**SEMESTER : III**                                                                   **CODE: P20CA3:4**
**CREDITS:3**                                                                          **HOURS/WEEK: 4**

### 1. COURSE OUTCOMES:
After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Importance of Big Data and Big Data Analytics | K5 | I |
| CO2 | Criticize the various Databases available in Big Data | K5 | II |
| CO3 | Elaborate the different technologies of big data | K6 | III |
| CO4 | Determine the concepts of cloud computing, cloud components, cloud architecture, services and models | K5 | IV |
| CO5 | Compare the various cloud storages and services | K5 | V |
| CO6 | Develop cloud applications | K6 | V |

### 2A. Syllabus
### UNIT I - Introduction to Big Data                                      12      Hours
**Types of Digital Data**: Classification of Digital Data-**Introduction to Big Data**: Characteristics of Data-Evolution of Big Data-Definition of Big Data-Challenges with Big Data-What Is Big Data-Other Characteristics of Data Which are Not Definitional Traits of Big Data-Why Big Data.**Big Data Analytics:**What Is Big Data Analytics-Classification of Analytics-Top Challenges Facing Big Data-Data Science.

### UNIT II - Big Data Technology                                              12 Hours
**The BigData Technology Landscape**: Nosql-Hadoop-**Introduction To Hadoop**:WhyHadoop?-RDBMS Versus Hadoop-Distributed Computing Challenges-History of Hadoop-Hadoop Overview-Use Case of Hadoop-Hadoop Distributors-HDFS -Processing Data With Hadoop-Managing Resources and Applications With Hadoop YARN-Interacting With Hadoop Ecosystem.**Introduction ToMongoDB:**What Is MongoDB?-Why MongoDB?-Terms Used In RDBMS and MongoDB-Data Types in MongoDB-MongoDBQuery Language.
### UNIT III - Mapreduce Programming                                         12 Hours
**Introduction ToMAPREDUCE Programming:** Introduction – Mapper – Reducer – Combiner – Partitioner – Searching –Sorting-Compression.**Introduction To Hive:** What Is Hive?- Hive Architecture-Hive Data Types-Hive File Format-Hive Query Language -RcfileImplementation.**Introduction To Pig:** What Is Pig?-The Anatomy of Pig- Pig on Hadoop-Data Types in Pig-Running Pig-Execution Modes of Pig-HDFS Commands-Relational Operators.

### UNIT IV - Cloud Computing Basics                                         12 Hours
**Getting Started:Cloud Computing Basics** - Cloud Computing Overview - Applications - Intranets and the Cloud – First Movers in the Cloud – **Your Organization and Cloud Computing**: When You Can Use Cloud Computing:  - Benefits – Limitations -Security Concerns – Regulatory Issues – **Cloud Computing Titans:** Google, EMC, NetApp, Microsoft, Amazon, Salesforce.com, IBM.

### UNIT V - Cloud Storage                                                       12 Hours
**Cloud Storage:** Overview-Cloud Storage providers-**Standards:** Application-Client-Infrastructure-Service.**Developing Applications :** Google – Microsoft – **Local Clouds and Thin Clients:** Virtualization in your Organization-Server Solutions-Thin Clients-**Migrating to the Cloud :**Cloud Services for individuals – Cloud Services aimed at  the Mid-Market- Enterprise-Class Cloud Offerings – Migration.

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**B. TOPICS FOR SELF STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Big Data and Hadoop | **https://www.youtube.com/watch?v=1vbXmCrkT3Y** |
| 2 | Hadoop and MapReduce | **https://www.youtube.com/watch?v=x-PCNX4prLA** |
| 3 | Mobile Cloud Computing | **https://en.wikipedia.org/wiki/Mobile_cloud_computing** |
| 4 | Cloud Cryptography | **www.cloudmanagementinsider.com** |

**C. Text Books:**

1. Seema Acharya and SubhashiniChellappan, "Big Data and Analytics", Wiley India Pvt. Ltd., 2016.
2. Anthony T. Velte Toby J. Velte, Robert Elsenpeter, "Cloud Computing : A Practical Approach", The McGraw Hill, 2010.

**D. Reference Books:**

1. Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman,"Big Data" Wiley Publications, 2014.
2. Tom White, "Hadoop: The definitive Guide", O'Reilly Media, 2010.
3. Barrie Sosinsky, "Cloud Computing Bible",Wiley Publishing, 2011.
4. RajkumarBuyya, James Broberg, and AndrzejGoscinski, "Cloud Computing Principles and Paradigms" Published by Wiley India Pvt Ltd, 2014.

**E. Web Links:**

1. **https://aws.amazon.com/**
2. **https://www.tutorialspoint.com/big_data_analytics/big_data_analytics_lifecycle.htm**

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|-----------------------|----------------|-------------------|------------------------------------------------|
| **I** | **Types of Digital Data** | | |
| 1.1 | Classification of Digital Data | Outline the types of digital data | K2 |
| | **Introduction to Big Data** | | |
| 1.2 | Characteristics of Data | Summarize the characteristics of big data | K2 |
| 1.3 | Evolution of Big Data | Explain the evolution of big data | K2 |
| 1.4 | Definition of Big Data | Recall the various functions of big data | K1 |
| 1.5 | Challenges with Big Data | Identify the challenges of big data | K3 |
| 1.6 | Other Characteristics of Data Which are Not Definitional Traits of Big Data | Outline the non-definitional traits of big data | K2 |
| 1.7 | Big Data | Classify the importance of big data | K4 |
| | **Big Data Analytics** | | |
| 1.8 | Big Data Analytics | Analyze the functionality of big data. | K4 |
| 1.9 | Classification of Analytics | Illustrate the various classifications of analytics | K2 |
| 1.10 | Top Challenges Facing Big Data | Discuss the top challenges of big data | K6 |
| 1.11 | Data Science | Elaborate on the features of data science | K6 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| **II** | **The Big Data Technology Landscape** | | |
| 2.1 | Nosql | Explain the types of NoSql database | K5 |
| 2.2 | Hadoop | Summarize on the overview of hadoop ecosystem | K6 |
| | | **Introduction To Hadoop** | |
| 2.3 | Hadoop | Identify the various functions of hadoop | K3 |
| 2.4 | RDBMS Versus Hadoop | Compare RDBMS and Hadoop | K5 |
| 2.5 | Distributed Computing Challenges | Discuss the various challenges of distributed computing | K6 |
| 2.6 | History of Hadoop | Criticize on the evolution of hadoop | K5 |
| 2.7 | Hadoop Overview | illustrate on the overview of hadoop | K2 |
| 2.8 | Use Case of Hadoop | Elaborate on the use cases of hadoop | K6 |
| 2.9 | Hadoop Distributors | Determine the distributors of hadoop | K5 |
| 2.1 | HDFS | Discuss on the concepts of HDFS. | K6 |
| 2.11 | Processing Data With Hadoop | Outline the concept of processing data with hadoop | K2 |
| 2.12 | Managing Resources and Applications With Hadoop YARN | Discuss the managing of resources and applications With hadoop YARN | K6 |
| 2.13 | Interacting With Hadoop Ecosystem | Recall the concept of interaction with hadoop ecosystem. | K1` |
| | | **Introduction To MongoDB** | |
| 2.14 | Introduction to MongoDB | Outline the concept of MongoDB | K2 |
| 2.15 | MongoDB | Summarize on the basics of MongoDB | K2 |
| 2.16 | Terms Used In RDBMS and MongoDB | Compare the difference between SQl and MongoDB. | K5 |
| 2.17 | Data Types in MongoDB | Discuss the data types of MongoDB | K6 |
| 2.18 | MongoDB Query Language. | Create MongoDB queries. | K5 |
| **III** | **Introduction To MAPREDUCE Programming** | | |
| 3.1 | Introduction to MapReduce | Outline on the concepts of mapreduce | K2 |
| 3.2 | Mapper | Recall on mapper | K1 |
| 3.3 | Reducer | Summarize the concepts of reducer. | K2 |
| 3.4 | Combiner | Compare between combiner class and reducer class | K2 |
| 3.5 | Partitioner | Recall on the concept of partitioner. | K2 |
| 3.6 | Searching | Construct a mapreduce program to search for a specific keyword in a file. | K6 |
| 3.7 | Sorting | Develop a MapReduce program to sort data by student name. | K6 |
| 3.8 | Compression | Recall on the concept of compression | K1 |
| | | **Introduction To Hive** | |
| 3.9 | Hive | Recall on hive | K1 |
| 3.1 | Hive Architecture | Elaborate on the architecture of hive. | K6 |
| 3.11 | Hive Data Types | Explain the various data types of hive | K5 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 3.12 | Hive File Format | Illustrate the hive file format. | K2 |
| 3.13 | Hive Query Language | Discuss on hive query language | K6 |
| 3.14 | RcfileImplementation. | Outline the concept of Rcfile implementation | K2 |
| | **Introduction To Pig** | | |
| 3.15 | Pig | Outline on the concepts of pig | K1 |
| 3.16 | The Anatomy of Pig | Determine the anatomy of pig | K5 |
| 3.17 | Pig on Hadoop | Explain the importance of pig on hadoop | K5 |
| 3.18 | Data Types in Pig | Illustrate the various data types in pig | K2 |
| 3.19 | Running Pig | Explain the working of pig | K2 |
| 3.2 | Execution Modes of Pig | Discuss the different execution modes of pig | K6 |
| 3.21 | HDFS Commands | Criticize on the various commands of HDFS | K5 |
| 3.22 | Relational Operators | Elaborate on relational operators | K6 |
| IV | **Getting Started - Cloud Computing Basics** | | |
| 4.1 | Cloud Computing Overview | Summarize the importance of cloud computing | K2 |
| 4.2 | Applications of Cloud Computing | List out the applications of cloud | K4 |
| 4.3 | Intranets and The Cloud | Illustrate the functionalities of intranet | K2 |
| 4.4 | First Movers in the Cloud | Elaborate on first movers of cloud | K6 |
| | **Your Organization and Cloud Computing** | | |
| 4.5 | When you can use cloud Computing | Discuss the scenarios in using cloud storage | K6 |
| 4.6 | Benefits of cloud computing | Explain the benefits of cloud computing | K5 |
| 4.7 | Limitations | Identify the limitations of cloud | K3 |
| 4.8 | Security Concerns | Outline the security concerns of cloud | K2 |
| 4.9 | Regulatory Issues | Explain the regulatory issues of cloud | K5 |
| | **Cloud Computing with the Titans** | | |
| 4.1 | Google | Identify the usage of Google applications | K3 |
| 4.11 | EMC | Illustrate the functionalities of EMC | K2 |
| 4.12 | NetApp | Outline the features of NetApp | K6 |
| 4.13 | Microsoft | Classify the benefits of Microsoft | K4 |
| 4.14 | Amazon | Elaborate on the features of Amazon | K6 |
| 4.15 | Salesforce.com | Discuss on Salesforce.com | K6 |
| 4.16 | IBM | Explain about the partnerships of IBM | K2 |
| V | **Cloud Storage** | | |
| 5.1 | Overview of Cloud Storage | Elaborate the uses of cloud storage | K6 |
| 5.2 | Cloud Storage Providers | Identify the cloud storage providers | K3 |
| | **Standards** | | |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.3 | Application | Explain the applications of cloud | K5 |
| 5.4 | Client | Assess the different means of store and display information | K5 |
| 5.5 | Infrastructure | Summarize virtualization in detail | K2 |
| 5.6 | Service | Recall web services | K1 |
| | **Developing Applications** | | |
| 5.7 | Google | Explain the advantages of Google. | K5 |
| 5.8 | Microsoft | Illustrate the various applications of microsoft | K2 |
| | **Local Clouds and Thin Clients** | | |
| 5.9 | Virtualization in your Organization | Discuss how virtualization is helpful in the organization | K6 |
| 5.1 | Server Solutions | Explain the concept of Microsoft hyper v | K5 |
| 5.11 | Thin Clients | Elaborate on the features of thin clients | K6 |
| | **Migrating to the Cloud** | | |
| 5.12 | Cloud Services for Individuals | Determine the services of cloud for individuals | K5 |
| 5.13 | Cloud Services Aimed at the Mid-Market | Elaborate on the services met at the mid-market | K6 |
| 5.14 | Enterprise-Class Cloud Offerings | Explain the different types of enterprise-class cloud offerings | K5 |
| 5.15 | Migration | Discuss the working principles of migration | K6 |

**4. MAPPING (CO, PO, PSO)**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | H | M | L | H | H | L | H | M | H | H | H | M |
| CO2 | H | L | H | H | H | H | M | L | H | H | H | M | L |
| CO3 | L | L | H | L | H | M | H | H | H | M | H | M | M |
| CO4 | H | M | H | M | H | H | M | M | H | H | M | M | H |
| CO5 | H | H | H | M | H | H | H | H | H | H | H | H | H |
| CO6 | H | H | H | H | H | M | M | H | H | H | H | M | M |

**L-Low        M-Moderate        H- High**

**5. COURSE ASSESSMENT METHODS**
   **DIRECT:**
      1.    Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
      2.    Open Book Test.
      3.     Assignment, Seminar
      4.    Semester & End Semester Theory Examination
   **INDIRECT**:
      1.    Course end survey (Feedback)


**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Mrs. PEARLY CHARLES                         Dr.R.THAMARAI SELVI


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**SEMESTER : III**　　　　　　　　　　　　　　　　　　**CODE: P20CA3:5**
**CREDITS:3**　　　　　　　　　　　　　　　　　　　　**HOURS/WEEK: 4**

## 1. COURSE OUTCOMES

After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Understand the benefits and limitations of Blockchain | K2 | I |
| CO2 | Make use of the **Cryptocurrency Bitcoin, Altcoin and Tokens** | K3 | II |
| CO3 | Examine Bitcoin features and its **Smart Contracts** | K4 | III |
| CO4 | Evaluate **Initial Coin Offering** | K5 | IV |
| CO5 | Propose security **algorithms for Blockchain** | K6 | IV |
| CO6 | Build applications using the features of Blockchain | K6 | V |

## 2A. Syllabus

**UNIT I - Fundamentals of Blockchain and Blockchain Types**　　　　　　**12 Hours**
　　　　**Fundamentals of Blockchain: The Evolution of Blockchain - Traditional vs. Blockchain Transactions - Blockchain Concepts - How Blockchain Technology Works -** Components of Blockchain - Block in a Blockchain - Blockchain Layers - Pros and Cons of Blockchain - **Blockchain Types and Consensus Mechanism:** Introduction - Decentralization and Distribution -Types of Blockchain - Consensus Protocol

**UNIT II - Cryptocurrency, Public Blockchain and Consortium Blockchain**　　　**12 Hours**
　　　　**Cryptocurrency: Bitcoin, Altcoin and Token:** Bitcoin and the Cryptocurrency -Cryptocurrency Basics - Types of Cryptocurrency - Cryptocurrency Usage - **Public Blockchain System:**The Bitcoin Blockchain - Ethereum Blockchain - **Consortium Blockchain:** Hyperledger Platform - Overview of Ripple - Overview of Corda

**UNIT III - Smart Contracts and Private Blockchain**　　　　　　　　　**12 Hours**
　　　　**Smart Contracts:** Smart Contract - Characteristics of a Smart Contract - Types of Smart Contracts - Types of Oracles - Smart Contracts in Ethereum - Smart Contracts in Industry - **Private Blockchain System:** Key Characteristics of Private Blockchain - Why We Need Private Blockchain -E-commerce Site Example - Smart Contract in Private Environment - State Machine - Different Algorithms of Permissioned Blockchain - ByzantineFault - Multichain

**UNIT IV - Initial Coin Offering and Security in Blockchain**　　　　　　**12 Hours**
　　　　**Initial Coin Offering:** Launching an ICO - Investing in an ICO - Pros and Cons of Initial Coin Offering - Successful Initial Coin Offerings - Evolution of ICO - **Security in Blockchain:** Security Aspects in Bitcoin - Security and Privacy Challenges of Blockchain in General - Performance and Scalability - Identity Management and authentication - Regulatory Compliance and Assurance - Safeguarding Blockchain Smart Contract (DApp)

**UNIT V - Applications, Limitations and Challenges of Blockchain**　　　　**12 Hours**
　　　　**Application of Blockchain:** Blockchain in Banking and Finance - Blockchain in Education - Blockchain in Energy - Blockchain in Healthcare - Blockchain in Real-estate - Blockchain in Supply Chain - The Blockchain and IoT - Limitations **and Challenges of Blockchain:** Blockchain Implementation - Limitations - Challenges.

**B. TOPICS FOR SELF-STUDY:**

| S.No | Topics | Web Links |
|------|--------|-----------|
| 1 | Blockchain Foundations and Uses Cases | **https://www.youtube.com/watch?v=SSo_EIwHSd4** |
| 2 | Blockchain and Python | **https://www.youtube.com/watch?v=pZSegEXtgAE** |
| 3 | Ethereum and Solidity | **https://www.youtube.com/watch?v=M576WGiDBdQ** |
| 4 | Blockchain and Bitcoin Fundamentals | **https://www.youtube.com/watch?v=KczTgdoYuTc** |

**C. Text Books:**

1. Chandramouli Subramanian, Asha A George, "Blockchain Technology", First Edition, Universities Press, 2021

**D. Reference Books:**

1. Imran Bashir, "Mastering Blockchain" PACKT Publishing-Kindle Edition,2017
2. Antony Lewis,"**The** Basics of Bitcoins and Blockchains"- Kindle Edition, 2018

**E. Web links:**

1. **https://www.coursera.org/learn/blockchain-basics**
2. **https://www.udemy.com/course/blockchain-101-beginners-free-course-bootcamp-cryptocurrency/**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered / Section | Course Content | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Fundamentals of Blockchain** | | |
| 1.1 | The Evolution of Blockchain | Recall the history of blockchain | K1 |
| 1.2 | Traditional vs. Blockchain Transactions | Compare traditional and blockchain transactions | K2 |
| 1.3 | Blockchain Concepts | Explain the concepts in blockchain | K2 |
| | **How Blockchain Technology Works** | | |
| 1.4 | Components of Blockchain | List out the components of blockchain | K2 |
| 1.5 | Block in a Blockchain | Illustrate the concept of double-spending in blockchain | K2 |
| 1.6 | Blockchain Layers | Examine the structure of blockchain ecosystem | K5 |
| 1.7 | Pros and Cons of Blockchain | Examine the characteristics of blockchain | K4 |
| | **Blockchain Types and Consensus Mechanism** | | |
| 1.8 | Decentralization and Distribution | Outline the concept of Distributed Ledger Technology (DLT) | K2 |

| Unit Covered / Section | Course Content | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1.9 | Types of Blockchain | Compare the Proof-of-Work (PoW) with Proof-of-Stake (PoS) in blockchain | K5 |
| 1.10 | Consensus Protocol | Recommend consensus protocol | K5 |
| **II** | **Cryptocurrency Bitcoin, Altcoin and Token** | | |
| 2.1 | Bitcoin and the Cryptocurrency | Outline the evolution of currency | K2 |
| 2.2 | Cryptocurrency Basics | Criticize the characteristics of cryptocurrency | K4 |
| 2.3 | Types of Cryptocurrency | Compare the types of cryptocurrency | K4 |
| 2.4 | Cryptocurrency Usage | Choose the cryptocurrency safety measures | K3 |
| | **Public Blockchain System** | | |
| 2.5 | The Bitcoin Blockchain | Summarize the characteristics of bitcoin network | K2 |
| 2.6 | Ethereum Blockchain | Interpret Ethereum blockchain | K5 |
| | **Consortium Blockchain** | | |
| 2.7 | Hyperledger Platform | Outline the characteristics of hyperledger | K2 |
| 2.8 | Overview of Ripple | Summarize the concepts of ripple | K2 |
| 2.9 | Overview of Corda | Illustrate the characteristics of corda | K2 |
| **III** | **Smart Contracts** | | |
| 3.1 | Characteristics of a Smart Contract | Examine the characteristics of smart contract | K4 |
| 3.2 | Types of Smart Contracts | Explain the Distributed Applications (DApps) | K2 |
| 3.3 | Types of Oracles | Classify the types of Oracles | K3 |
| 3.4 | Smart Contracts in Ethereum | Recommend smart contracts in ethereum | K5 |
| 3.5 | Smart Contracts in Industry | Build smart contracts applications | K6 |
| | **Private Blockchain System** | | |
| 3.6 | Key Characteristics of Private Blockchain | Summarize the characteristics of private blockchain | K2 |
| 3.7 | Why We Need Private Blockchain? | Make use of private blockchain | K2 |
| 3.8 | Smart Contract in Private Environment | Construct smart contracts in private environments | K6 |
| 3.9 | State Machine | Identify fault in a distributed environment | K3 |
| 3.10 | Different Algorithms of Permissioned Blockchain | Evaluate the PAXOS algorithm of permissioned blockchain | K5 |
| 3.11 | Byzantine Fault | Recommend byzantine general model for blockchain | K5 |

| Unit Covered / Section | Course Content | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 3.12 | Multichain | Make use of streams and commands in multichain concepts | K3 |
| **IV** | **Initial Coin Offering** | | |
| 4.1 | Launching an ICO | Outline the basic stages of an ICO | K2 |
| 4.2 | Investing in an ICO | Criticize the white paper of an ICO | K5 |
| 4.3 | Pros and Cons of Initial Coin Offering | Compare ICO with traditional IPO | K4 |
| 4.4 | Successful Initial Coin Offerings | Classify the ICO success pillars | K4 |
| 4.5 | Evolution of ICO | Outline the ICO variants | K2 |
| | **Security in Blockchain** | | |
| 4.6 | Security Aspects in Bitcoin | Test the security in Bitcoin | K6 |
| 4.7 | Security and Privacy Challenges of Blockchain in General | Classify the CIAR in blockchain | K4 |
| 4.8 | Performance and Scalability | Assess the performance and scalability | K5 |
| 4.9 | Identity Management and authentication | Test the authentication of transactions | K6 |
| 4.10 | Regulatory Compliance and Assurance | Determine the regulatory compliance and assurance | K5 |
| 4.11 | Safeguarding Blockchain Smart Contract (DApp) | Formulate measures for safeguarding blockchain smart contract (DApp) | K6 |
| **V** | **Application of Blockchain** | | |
| 5.1 | Blockchain in Banking and Finance | Analyze the challenges in finance sector | K4 |
| 5.2 | Blockchain in Education | Assess the use of blockchain in education system | K5 |
| 5.3 | Blockchain in Energy | Evaluate the impact of block chain technology in energy | K5 |
| 5.4 | Blockchain in Healthcare | Test the importance of blockchain in healthcare | K6 |
| 5.5 | Blockchain in Real-estate | Make use of the current initiatives in property listings | K3 |
| 5.6 | Blockchain in Supply Chain | Evaluate the benefits of block chain in supply chain management | K5 |
| 5.7 | The Blockchain and IoT | Propose the usage of blockchain in IoT | K6 |
| | **Limitations and Challenges of Blockchain** | | |
| 5.8 | Limitations | Outline the limitations in blockchain | K2 |
| 5.9 | Challenges | Summarize the challenges in blockchain | K2 |

**4. MAPPING (CO, PO, PSO)**

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | M | L | M | L | L | M | M | H | H | M | M | M | M |
| CO2 | H | H | M | H | M | H | M | H | H | H | H | M | H |
| CO3 | H | H | M | H | H | H | H | M | H | H | H | H | H |
| CO4 | H | H | H | H | H | M | M | H | H | H | H | M | M |
| CO5 | H | H | M | H | M | H | M | H | H | M | M | H | H |
| CO6 | H | H | H | H | H | M | H | M | M | H | H | H | H |

**L-Low          M-Moderate          H- High**

**5. COURSE ASSESSMENT METHODS**

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Assignment, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                     **HEAD OF THE DEPARTMENT**
Dr.A. FLORENCE DEEPA                             Dr.R.THAMARAI SELVI

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**SEMESTER  : III**                                                    **CODE:  P20CA3:6**
**CREDITS   : 3**                                                      **HOURS/WEEK: 4**

## 1. COURSE OUTCOMES
After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Analyze the efficiency of parallel computing system and evaluate the types of application for which parallel programming is useful | K4 | I |
| CO2 | Identify the development, analyze, and implement algorithms for parallel algorithms design | K3 | II |
| CO3 | Assess the different parallel architectures, inter-connect networks, programming models, and algorithms for common operations such as matrix-vector multiplication | K5 | III |
| CO4 | Evaluate issues of dense matrix multiplication and efficiency of solving system of linear equations | K5 | III |
| CO5 | Apply design and development principles in the construction of software systems of varying complexity | K3 | IV |
| CO6 | Choose knowledge of computing and mathematics appropriate to the graph algorithms | K5 | V |

## 2A. Syllabus

**UNITI - Introduction to Parallel Computing**                                    **12 Hours**
        Introduction to Parallel Computing – Motivating Parallelism – Scope of Parallel Computing – Parallel Programming Platforms – Implicit Parallelism – Limitations of Memory System Performance – Dichotomy of Parallel Computing Platforms – Physical Organization of Parallel Platforms – Communication Costs in Parallel Machines – Routing Mechanisms for Inter Connection Networks – Impact of Process Mapping and Mapping Techniques.

**UNIT II - Parallel Algorithm Design**                                           **12 Hours**
        Principles of Parallel Algorithm Design – Preliminaries – Decomposition Techniques – Characteristics of Tasks and Interactions – Mapping Techniques for Load Balancing – Methods for Containing Interaction Over Heads – Parallel Algorithm Models.

**UNIT III - Matrix Algorithms**                                                  **12 Hours**
        Dense Matrix Algorithms – Matrix Vector Multiplication – Matrix _ Matrix Multiplication – Solving a system of Linear Equations.

**UNIT IV - Sorting Algorithms**                                                  **12 Hours**
        **Sorting:** Issues in Sorting on Parallel Computers – Sorting Networks – Bubble Sort and its Variants – Quick Sort – Bucket and Sample Sort – Other sorting Algorithms.

**UNIT V - Graph Algorithms**                                                     **12 Hours**
        Graph Algorithms – Definitions and Representation Prim's Algorithm – Dijisktrars Algorithm – All Pairs Shortest Paths – Transitive Closure – Connected Components – Algorithm for Space Graphs.

**B. TOPICS FOR SELF-STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Permutation routing in mesh-based networks | **http://pages.cs.wisc.edu/~tvrdik/9/html/Section9.html** |
| 2 | NP Completeness Complexity Theory | **https://www.youtube.com/watch?v=2cyryXRmN5Q** |
| 3 | Parallel Matrix Operations | **https://www.youtube.com/watch?v=vwakGWXARw** |
| 4 | Parallel Design Patterns | **https://www.youtube.com/watch?v=L7sinmKkbJA** |

**C. Text Book:**

1. Ananth Grama, AnshulGuptha, George Karypis and Vipin Kumar, "Introduction to Parallel Computing ", Pearson Education, 1994.

**D. Reference Book:**

1. Harry F. Jordan, Gita Alaghband, "Fundamentals of Parallel Processing", Prentice Hall, 2003.

**E. Web links:**

1.**https://www.classcentral.com/course/swayam-parallel-algorithms-12934**
2.**http://www.digimat.in/nptel/courses/video/106102114/L03.html**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|------|------|------|------|
| **I** | **Parallel Computing Basics** | | |
| 1.1 | Introduction to parallel computing | Classify different types of parallel processing. | K4 |
| 1.2 | Scope of parallel computing | Discuss the operation of pipelined vector processor system | K6 |
| 1.3 | Platform for parallel computing | Describe the function of an array processor. | K2 |
| | | **Parallel Machines** | |
| 1.4 | Types of Communication costs | Identify the ways of reducing communication costs in parallel machines. | K1 |
| 1.5 | Methods of Routing mechanisms | Discuss the methods for message routing in parallel machines. | K2 |
| 1.6 | Problems in Process Mapping | Define maximum degree of concurrency and average degree of concurrency | K1 |
| **II** | **Parallel Algorithms Design** | | |
| 2.1 | Principles of parallel algorithm design | Outline the principles of parallel algorithm design. | K1 |
| 2.2 | Characteristics of parallel algorithms | Summarize the characteristics of parallel algorithms. | K1 |
| 2.3 | 2.3 Decomposition Techniques to solve concurrency problems | Analyse the decomposition techniques for achieving concurrency | K2 |
| | | **Mapping Techniques** | |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.4 | Mapping technique for Load Balancing | Classify different types of mapping techniques for load balancing | K6 |
| 2.5 | Containing interaction overhead methods | Explain the methods for containing interaction overhead | K1 |
| 2.6 | Models of Parallel algorithm | Compare the different models for parallel algorithm in problem solving. | K6 |
| III | **Dense Matrix Algorithm** | | |
| 3.1 | Definition of Matrix multiplication | Define matrix multiplication. | K1 |
| 3.2 | Using Vector matrix multiplication | Distinguish between vector and dense matrix multiplication | K4 |
| 3.3 | Applying Dense matrix multiplication | Solve the system of linear equations of n variables using dense matrix multiplication | K3 |
| 3.4 | Principles of dense matrix algorithm | List out the principles of dense matrix algorithm | K1 |
| | **Solving a System of Linear Equations** | | |
| 3.5 | Metrics of Parallel Algorithms | Discuss the performance metrics of parallel algorithms | K6 |
| IV | **Sorting** | | |
| 4.1 | Definition of sorting | Define sorting. | K1 |
| 4.2 | Issues in sorting on parallel computers | Analyse the criteria that are used to evaluate the cost and performance on sorting parallel computers. | K6 |
| 4.3 | Sorting networks types | Explain completely-connected, star, linear array and Mesh networks. | K2 |
| 4.4 | Sorting Management on parallel computers | Interpret the impacts of sorting management on parallel computers. | K2 |
| | **Sorting Algorithms** | | |
| 4.5 | Bubble sort algorithm | Examine the operations of bubble sort algorithm. | K5 |
| 4.6 | Quick sort algorithm | Improve recursive decomposition technique with an example. | K2 |
| 4.7 | Bucket sort algorithm | Evaluate the operations of bucket sort algorithm. | K2 |
| V | **Graph Algorithms** | | |
| 5.1 | Prim's algorithm | Apply the Prim's algorithm for solving minimum spanning tree problem in fuzzy environment. | K6 |
| 5.2 | Dijisktra's algorithm | Elaborate the Dijkstra's algorithm with an example. | K5 |
| 5.3 | Structure of all pairs shortest paths | Explain the structure of shortest paths. | K2 |
| | **Transitive Closure** | | |
| 5.4 | Definition of transitive closure | Define transitive closure | K1 |
| 5.5 | Connected components of tree | Construct the connected components in a graph with an example | K5 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 5.6 | Algorithms for space graph | Discuss Space Efficient Algorithms for optimization problems in bounded tree-width graph. | K6 |

## 4. MAPPING (CO, PO, PSO)

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H | M | M | M | L | _ | L | L | L | L | L | M | L |
| CO2 | M | M | H | M | M | L | _ | L | L | L | M | M | L |
| CO3 | M | M | M | M | M | _ | L | M | M | L | M | M | _ |
| CO4 | M | H | M | M | L | _ | L | M | M | L | M | M | L |
| CO5 | M | M | H | M | M | _ | M | M | M | M | M | H | M |
| CO6 | H | H | H | M | H | _ | H | M | M | L | M | H | L |

**L-Low          M-Moderate          H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

   1. Continuous Internal Assessment Test I, II
   2. Course-Embedded Assessment (e.g., Homework Assignment, Essays, Locally
      Developed Tests)
   3.  End Semester Examination

**INDIRECT**:

   1. Course-End Survey
   2. Student Satisfaction Survey


**COURSE COORDINATOR**               **HEAD OF THE DEPARTMENT**
Dr. H.B.VINCENTRAJ                        Dr.R.THAMARAI SELVI


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## Core Practical  V:SMART DEVICES PROGRAMMING LAB

**SEMESTER : III**                                    **CODE: P20CA3P5**
**CREDITS:3**                                         **HOURS/WEEK: 4**

### 1. COURSE OUTCOMES
After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Exercise |
|-------|-----------------|-------|----------|
| CO1 | Develop mobile applications using various layouts | K6 | 1,2,3 |
| CO2 | Create simulators such as AVD or test with mobile phone to execute the application | K6 | 4,5,6 |
| CO3 | Develop mobile application that integrates SMS and Call services | K6 | 7 |
| CO4 | Develop a mobile application by integrating an application with SQLite | K6 | 9, 10, 11 |
| CO5 | Build mobile web applications | K6 | 12,13,14 |
| CO6 | Maximize the use of HTML5, CSS3 and JavaScript to develop mobile web applications | K6 | 15 |

| Ex.No. | Exercises |
|--------|-----------|
| 1 | Create Hello World Application. |
| 2 | Demonstrate Life Cycle of an activity. |
| 3 | Layouts: Linear, Relative and Table |
| 4 | Create multiple activities with an application. |
| 5 | Demonstrate the use of Scroll view and List view. |
| 6 | Illustrate Menu in an application. |
| 7 | Create activity with Portrait and Landscape mode. |
| 8 | Make SMS and Phone call services. |
| 9 | Perform read, write and delete operations on SQLite Database. |
| 10 | Create an application with login and homepage. |
| 11 | Apply Geo-Location based Service in an application. |
| 12 | Real time applications: College Portal, Online Quiz. |

### A. TOPICS FOR SELF STUDY:

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Animations and Transitions | **https://developer.android.com/training/animation** |
| 2 | Sending SMS | **https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf** |
| 3 | Working with Sensor data | **https://google-developer-training.github.io/android-developer-advanced-course-practicals/Unit Covered-1-expand-the-user-experience/lesson-3-sensors/3-1-p-working-with-sensor-data/3-1-p-working-with-sensor-data.html#tolearn** |

| 4 | Google Play's billing system | **https://google-developer-training.github.io/android-developer-advanced-course-practicals/Unit Covered-1-expand-the-user-experience/lesson-3-sensors/3-1-p-working-with-sensor-data/3-1-p-working-with-sensor-data.html#tolearn** |
|---|---|---|

## 2. SPECIFIC LEARNING OUTCOMES (SLO)

| Ex.No. | Lab Exercises | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1 | Create Hello World Application. | Create Android application to display "Hello World" text | K6 |
| 2 | Demonstrate Life Cycle of an activity. | Design Android application with Activities | K6 |
| 3 | Layouts: Linear, Relative and Table | Construct Android application with layouts | K6 |
| 4 | Create multiple activities with an application. | Build Android web application with multiple activities | K6 |
| 5 | Demonstrate the use of Scroll view and List view. | Create applications with scroll and list view. | K5 |
| 6 | Illustrate Menu in an application. | Improve Android application with menus | K6 |
| 7 | Create activity with Portrait and Landscape mode. | Create Android application with portrait and Landscape mode. | K6 |
| 8 | Make SMS and Phone call services. | Construct Android application by integrating SMS and phone call Services. | K6 |
| 9 | Perform read, write and delete operations on SQLite Database. | Construct Android application for inserting, deleting and updating with SQLite | K6 |
| 10 | Create an application with login and homepage. | Create Android application with Login and Homepage. | K6 |
| 11 | Apply Geo-Location based Service in an application. | Design Android application with Geo-Location based services. | K6 |
| 12 | Real time applications: College Portal, Online Quiz. | Create real time applications. | K6 |

## 3. MAPPING (CO, PO, PSO)

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H | M | H | L | H | H | H | H | H | L | L | L | - |
| CO2 | H | M | M | M | H | H | H | M | H | L | L | L | - |
| CO3 | H | H | H | M | H | H | H | H | H | H | H | H | H |
| CO4 | H | H | H | M | H | H | H | H | H | H | H | H | H |
| CO5 | H | H | H | M | H | M | H | H | H | H | H | H | H |
| CO6 | H | H | H | M | H | H | H | H | H | H | H | H | H |

**L-Low          M-Moderate          H- High**

## 4. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2. Cooperative Learning Report, Assignment, Group Discussion, project Report, Seminar.
3. Pre/Post Test, Viva, Report for each Exercise.
4. Lab Model Examination & End Semester Practical Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr. B.ARPUTHAMARY                                Dr.R.THAMARAI SELVI


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## Core Practical VI : PROGRAMMING IN PYTHON LAB

**SEMESTER : III**                                              **CODE: P20CA3P6**
**CREDITS:3**                                                   **HOURS/WEEK:4**

### 1. COURSE OUTCOMES

After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Exercise Covered |
|-------|-----------------|-------|------------------|
| CO1 | Design programs using control structures and loops | K6 | 1,2 |
| CO2 | Develop programs using functions, classes and objects | K6 | 6 |
| CO3 | Develop Programs using different data structures | K6 | 4,5 |
| CO4 | Demonstrate the Concept of Packages, modules and files and Exception Handling | K6 | 3,7,8 |
| CO5 | Construct applications with database operations | K6 | 9 ,10,11,12,13 |
| CO6 | Demonstrate web programs with Django framework | K6 | 14,15 |

| Ex. No. | Exercise |
|---------|----------|
| 1 | Write Simple programs using Formulas |
| 2 | Write a Python program with Control Statements. |
| 3 | Define functions using Python and call them. |
| 4 | Create a List and add items into the list and do list operations using Python. |
| 5 | Perform various String Operations |
| 6 | Write Python program using Classes and Objects. |
| 7 | Exercise Error handling mechanisms in Python. |
| 8 | Illustrate Modules and Packages in Python. |
| 9 | Design a page and perform database connectivity. |
| 10 | Perform Various File operations. |
| 11 | Create an interactive user login form. |
| 12 | Design a Simple Calculator. |
| 13 | Design User Registration Form. |
| 14 | Illustrate Form creation with Django Framework. |
| 15 | Demonstrate rendering forms in Django Framework. |

### A. TOPICS FOR SELF-STUDY:

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Python Program to remove punctuations from a given string | **https://www.programiz.com/python-programming/examples** |
| 2 | Mail Merge using Python | **https://www.programiz.com/python-programming/examples** |
| 3 | Python program to count number of occurrences of key-value pair in a text file | **https://www.geeksforgeeks.org/python-programming-examples/#moreprograms** |
| 4 | PyGui and PySide Frameworks | **https://blog.resellerclub.com/the-6-best-python-gui-frameworks-for-developers/** |

## 2. SPECIFIC LEARNING OUTCOMES (SLO)

| Ex.No. | Lab Exercises | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1 | Write Simple programs using formulae | Construct Python programs using formulae like area of square, rectangle and circle | K6 |
| 2 | Write a Python program with Control Statements | Develop programs using control statements such as if, elif and else | K6 |
| 3 | Define functions using Python and call them | Define a function with user defined name and call the same | K6 |
| 4 | Create a List and add items into the list and do list operations using Python | Create a list and do all list operations | K6 |
| 5 | Perform various String Operations | Develop Programs for various string operations | K6 |
| 6 | Write Python program using Classes and Objects | Construct programs using classes and objects | K6 |
| 7 | Exercise Error handling mechanisms in Python | Build python programs with exception handling mechanisms | K6 |
| 8 | Illustrate Modules and Packages in Python | Examine modules and packages | K4 |
| 9 | Design a page and perform database connectivity | Create a web page and do various database operations | K6 |
| 10 | Perform Various File operations | Develop programs with various file operations | K6 |
| 11 | Widget Classes | Create an interactive user login form. | K6 |
| 12 | Controlling Layouts | Design a Simple Calculator | K6 |
| 13 | GUI programming | Design User Registration Form | K6 |
| 14 | Web Programming | Illustrate Form creation with Django Framework. | K4 |
| 15. | Forms Rendering | Demonstrate rendering forms in Django Framework. | K2 |

## 3. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H | H | H | M | M | H | M | M | M | H | H | M | L |
| CO2 | H | H | H | M | M | L | L | L | M | H | M | L | H |
| CO3 | H | M | H | M | M | L | L | L | M | H | M | L | L |
| CO4 | H | M | H | M | M | L | L | L | M | H | M | L | L |
| CO5 | H | H | H | H | L | L | L | L | L | H | L | L | L |
| CO6 | H | H | H | H | H | M | M | M | M | H | M | M | L |

L-Low          M-Moderate          H- High

**4. COURSE ASSESSMENT METHODS**

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2. Assignment, Group Discussion, project Report, Seminar.
3. Pre/Post Test, Viva, Report for each Exercise.
4. Lab Model Examination & End Semester Practical Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                          **HEAD OF THE DEPARTMENT**
Ms. VINCY SHALLY                                         Dr.R.THAMARAI SELVI

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**BRIDGE COURSE VII: DIGITAL COMPUTER FUNDAMENTALS AND ARCHITECTURE**

## 1. COURSE OUTCOMES
After the successful completion of this course the students will be able to

| S.No. | Course Outcomes | Level | Unit |
|-------|-----------------|-------|------|
| 1 | Apply Number Systems-to convert numbers from one form to another | K3 | I |
| 2 | Recall all binary codes | K1 | I |
| 3 | Develop k-map to design Boolean expression | K6 | II |
| 4 | Create the basic building blocks | K6 | III |
| 5 | Design RS flipflops, JK flipflops, D-flipflops, registers and n-modcounters | K6 | IV |
| 6 | Determine the central processing unit | K5 | V |

### 2A. Syllabus

### UNIT I
Number Systems – Binary Arithmetic – Binary codes.

### UNIT II
Logic Gates and Logic Circuits – Boolean Algebra – Karnaugh Map.

### UNIT III - Arithmetic Building Blocks:
Half Adder – Full Adder – Controlled Inverter –The Adder–Subtracter. **Data Processing Circuits:** Multiplexer – Demultiplexer – Decoder – Encoder.

### UNIT IV - Flip–Flops:
RS Flip Flop – Edge Triggered RS Flip Flop – Edge Triggered D Flip Flop – JK Flip Flop – JK Master Slave Flip Flop. **Registers:** Types of Registers – **Counters:** Asynchronous Counters – Synchronous Counters – MOD Counters – Decade Counters – Pre–Settable Counters.

### UNIT V - Central Processing Unit
**Central Processing Unit:** General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer And Manipulation – Program Control – Reduced Instruction Set Computer – CISC characteristics – RISC Characteristics.

### B. TOPICS FOR SELF-STUDY:

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | Distributed Computing | www.wiley.com |
| 2 | Digital Systems | www.geeksforgeeks.org |
| 3 | Data communication | https://www.tutorialspoint.com/ |
| 4 | Gate Level Minimization | www.geeksforgeeks.org |

## C. Text Books:
1. V.Vijayendran, "Digital Fundamentals", S.ViswanathanPvt.,Ltd., 2008.
2. Donald P Leach., Albert Paul Malvino, "Digital Principles and Applications", TMH, Fifth Edition 2005.
3. Morris Mano M, "Computer System Architecture", Prentice Hall of India, Third Edition, 2008.

## D. Reference Book:
1. ThomasL.Floyd, "Digital Fundmentals",Eleventh Edition ,Pearson publication,2015,

## E. Web Links:
1. https://onlinecourses.nptel.ac.in/noc18_ee33
2. **https://nptel.ac.in/courses/106103180/W1A1**
3. https://www.tutorialspoint.com/computer_logical.../digital_number_system.htm

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit covered /Section | Course Content | Learning outcomes | Blooms Taxonomy Level of Transaction |
|---|---|---|---|
| **I** | **Number System** | | |
| 1.1 | Number Systems- Decimal, Binary, Octal and Hexa decimal | Classify the various number systems | K4 |
| 1.2 | Binary Arithmetic Addition, Subtraction Multiplication, Division | Solve using binary arithmetic | K6 |
| 1.3 | Complements | Illustrate 2's complement with an example | K2 |
| 1.4 | Binary codes. | Elaborate on binary codes | K6 |
| **II** | **Logic Gates** | | |
| 2.1 | Logic Gates | List out the basic logic gates | K4 |
| 2.2 | Logic Cirsuits | Simplify the logic circuit using gates | K4 |
| 2,3 | Boolean Algebra, | Apply Boolean algebra for simplifying a circuit | K3 |
| 2.4 | Karnaugh Map | Construct a karnaugh map for the given expression | K6 |
| **III** | **Arithmetic Building Blocks and Circuits** | | |
| 3..1 | Arithmetic Building Blocks | Elaborate on the basic arithmetic building blocks | K6 |
| 3.2 | Half Adder | Explain about half adders | K5 |
| 3.3 | Full Adder | Design a full adder using the logic gates | K6 |
| 3.4 | Controlled Inverter, The Adder–Subtracter. | Illustrate the use of a controlled inverter | K2 |
| 3.5 | The Adder-Subtractor | Build an adder-subtractor using logic gates | K6 |
| 3.6 | Data Processing Circuits: Multiplexer | Explain Multiplexer | K5 |
| 3.7 | Demultiplexer | Discuss on demultiplexers | K6 |
| 3.8 | Decoder , Encoder | Construct a 4*16 decoder | K6 |
| **IV** | **Flip-Flops,Registers and Counters** | | |
| 4.1 | **Flip–Flops** RS Flip Flop | Discuss on RS Flip-Flops | K6 |
| 4.2 | Edge Triggered RS Flip Flop | Illustrate on edge triggered RS flip flop | K2 |
| 4.3 | D Flip Flop | Construct D flip flop using gates | K6 |

| Unit covered /Section | Course Content | Learning outcomes | Blooms Taxonomy Level of Transaction |
|---|---|---|---|
| 4.4 | JK Flip Flop | Explain JK Flip Flop | K5 |
| 4.5 | Master Slave Flip Flop | Elaborate on JK Master Slave flip flop | K6 |
| 4.6 | **Registers** Types of Registers | Design a parallel in parallel out register. | K6 |
| 47 | **Counters** Asynchronous Counters | Compare synchronous and asynchronous counters | K5 |
| 4.8 | Synchronous Counters | Illustrate on synchronous counters | K2 |
| 4.9 | MOD Counters | Classify MOD counters | K2 |
| 4.10 | Decade Counters | Explain about decade counter | K5 |
| 4.11 | Pre–Settable Counters. | Discuss on pre-settable counters | K6 |
| V | **Central Processing Unit** | | |
| 5.2 | **Stack organization** | Distinguish between memory stack and register stack | K4 |
| 5.3 | Instruction Formats | Classify the basic computer instruction formats | K4 |
| 5..4 | Addressing Modes | Discuss the addressing modes | K6 |
| 5.5 | Data Transfer And Manipulation , Program control | Elaborate on the types of interrupts | K6 |
| 5.6 | RISC characteristics | Elaborate on RISC characteristics | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | M | M | L | L | - | - | M | H | L | M | H | - | M |
| **CO2** | H | H | M | H | M | H | M | L | H | H | H | M | M |
| **CO3** | H | H | M | H | H | M | H | M | H | H | L | L | L |
| **CO4** | H | H | H | M | H | M | M | H | H | L | L | M | M |
| **CO5** | H | H | M | H | M | H | M | L | H | M | M | L | L |
| **CO6** | H | H | H | H | H | M | H | M | M | H | M | H | H |

**L-Low          M-Moderate          H- High**

## 5. COURSE ASSESSMENT METHODS
**DIRECT:**
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:
1. Course end survey (Feedback)

**COURSE COORDINATOR**              **HEAD OF THE DEPARTMENT**
Mrs.J.JASMINE CHRISTINA MAGDALENE          Dr.R.THAMARAI SELVI

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**SEMESTER :III**                                                                                    **CODE: PB20CA38**
**CREDITS: 4**

## 1. COURSE OUTCOMES:

After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit covered |
|-------|-----------------|-------|--------------|
| CO1 | Develop a PHP program using variables and basic statements | K6 | I |
| CO2 | Utilize the different types of arrays | K3 | I |
| CO3 | Create custom functions using PHP built-in functions | K6 | II |
| CO4 | Distinguish POST and GET in form submission | K4 | III |
| CO5 | Create sessions and cookies | K6 | IV |
| CO6 | Design Dynamic web site using server-side PHP and MYSQL Database | K6 | V |

## 2A. Syllabus

**UNITI - Introduction to PHP**                                                              **12 Hours**

PHP BASICS:  Introduction - PHP Getting Started - Syntax - PHP Variables, Predefined Variables: super globals, server variables - Constants - Echo and Print - Data Types - String Functions - Operators - Control Structures:  - Arrays - Sorting Arrays - Loops

**UNIT II - PHP   Functions and   File System**                                     **12 Hours**

PHP Functions - Math Operations - Date and Time -Classes and Objects - Forms: GET and POST -Include Files - File system- Parsing Directories- File Upload- File Download

**UNIT III - Cookies   and Session**                                                       **12 Hours**

State Management:  Cookies - Sessions - Form Handling - Form Validation - Filters - Error Handling - Send Email - PHP Magic Constants - JSON Parsing - Regular Expressions - Exception Handling

**UNIT IV - MYSQL Database**                                                            **12 Hours**

PHP  &  MySQL  DATABASE :     MySQL  Introduction:MySQLi  (object-oriented, MySQLiprocedural,PDO) -  MySQL Connect -  MySQL Create Database -  MySQL Create Table - MySQL Insert -  MySQL Prepared -  MySQL Last Inserted ID -  MySQL Select -  MySQL Where -  MySQL Limit -  MySQL Order By -  MySQL Update -  MySQL Delete.

**UNIT V - Ajax and MVC**                                                                  **12 Hours**

MySQL CRUD Application - MySQL Ajax Search - MySQL Login System – MVC - Simple PHP MVC Example

## B. TOPICS FOR SELF STUDY:

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | PHP  XML  parser | **www .w3schools.com** |
| 2 | Directory in PHP | **www .w3schools.com** |
| 3 | PHP Calendar | **www .w3schools.com** |
| 4 | PHP  with Backup Database | **www.tutorialspoint.com** |

## C. Text Books:

1.Antonio Lopez, "Learning PHP 7", PACKT Open Source Publication, 2016

2.Dennis Popel, "Learning PHP Data Objects: A Beginner's Guide to PHP Data Objects, Database Connection Abstraction Library for PHP 5", Packt Publishing, 2009. (UNIT V)

**D. Reference Books:**

1.Adrian W. West, "Practical PHP and MySQL Website Databases", Apress, 2016

2.Leon Atkinson, "Core PHP Programming", Pearson Education, 2004.

3. www.jkmaterials.yolasite.com/resources/labmanuals/BTech/WT-PHP-Record.pdf

4. MySQL® Notes for Professionals, GoalKicker.com

5. PHP Notes for Professionals, GoalKicker.com

**E. Web links:**

1. **www.tutorialspoint.com**
2. **www.w3school.com**
3. **www.javatpoint.com**

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered / Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| **I** | **Introduction to PHP** | | |
| 1.1 | Basics of PHP | Recall the basic concepts of PHP | K1 |
| 1.2 | PHP Variables | List out the PHP Variables | K2 |
| 1.3 | super global, server variables | Explain about super global, server variables | K2 |
| 1.4 | Echo and Print | Compare Echo and Print | K4 |
| 1.5 | Data Types | Classify Data types | K4 |
| | **Control Structures and Arrays** | | |
| 1.6 | Operators | Explain about Operators | K2 |
| 1.7 | String Functions | Apply String functions | K3 |
| 1.8 | Control Structures | Explain Control Structures | K2 |
| 1.9 | Arrays | Illustrate Arrays | K2 |
| **II** | **Functions and Classes** | | |
| 2.1 | PHP Functions | Create functions in PHP | K6 |
| 2.2 | Math Operations | Apply Math operations in program | K3 |
| 2.3 | Date and Time | Explain Date and Time | K3 |
| 2.4 | Classes and Objects | Discuss Classes and Objects | K6 |
| | **Forms and File systems** | | |
| 2.5 | 2.3 Forms | Utilize Forms to get data | K3 |
| 2.6 | 2.4 GET and POST | Make use of GET and POST methods | K3 |
| 2.7 | 2.5 File system | Discuss the File System | K6 |
| 2.8 | 2.6 Parsing Directories | Explain Parsing Directories | K2 |
| 2.9 | 2.7 File Upload | Utilize File Upload Controls | K3 |
| 2.10 | 2.8 File Download | Make use of File Download operations | K3 |
| **III** | **Cookies and Sessions** | | |
| 3.1 | Cookies and Sessions | Explain Cookies and Sessions | K2 |
| 3.2 | Form Handling | Create and handle forms | K6 |
| 3.3 | Filters | Illustrate the use of Filters | K2 |
| 3.4 | Send Email | Discuss about Email | K6 |

| | | Constants and Regular Expressions | | |
|---|---|---|---|---|
| 3.5 | PHP Magic Constants | Recall the basic concepts of Magic constant | K1 |
| 3.6 | Regular Expressions | Explain Regular expressions | K2 |
| 3.7 | Exception Handling | Apply Exception Handling | K3 |
| IV | **PHP & MySQL Database** | | |
| 4.1 | MySQL Connect | Construct database connectivity | K6 |
| 4.2 | MySQL Create Database | Create tables, views and index | K6 |
| 4.3 | MySQL Insert | Apply Insert statement in table | K3 |
| 4.4 | MySQL Prepared | CreateMySQL Prepared statement | K6 |
| | | **MYSQL Operations** | |
| 4.5 | MySQL Select | Make use of select statement | K3 |
| 4.6 | MySQL Where | Apply Where Clause in SQL statement | K3 |
| 4.7 | MySQL Order By | Categorize Order by clause | K4 |
| 4.8 | MySQL Update | Utilize Update statement | K3 |
| 4.9 | MySQL Delete | Apply Delete Statement | K3 |
| V | **Ajax and MVC** | | |
| 5.1 | 5.1MySQL CRUD Application | Summarize CRUD Application | K2 |
| 5.2 | 5.2 MySQL Ajax Search | Explain Ajax Search | K2 |
| 5.3 | 5.3 MySQL Login System | List out the Built-in functions | K1 |
| 5.4 | 5.4   MVC | Discuss Model View Controller | K6 |
| 5.5 | 5.5 Simple PHP MVC Example | Design simple Model View Controller | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | L | - | H | H | - | M | M | M | - | M |
| CO2 | M | H | M | H | M | H | H | L | M | M | H | M | L |
| CO3 | H | M | H | M | H | H | H | M | M | M | L | L | M |
| CO4 | M | L | H | H | H | H | H | M | H | L | H | H | M |
| CO5 | H | H | L | H | M | L | M | H | H | M | H | M | L |
| CO6 | H | M | M | M | H | H | H | M | M | H | M | H | H |

<center>**L-Low          M-Moderate          H- High**</center>

## 5. COURSE ASSESSMENT METHODS
**DIRECT:**
1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Cooperative Learning Report, Assignment, Group Presentation, Group Discussion, project Report, Poster Presentation, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:
1. Course end survey (Feedback)


**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr.R.THAMARAI SELVI                              Dr.R.THAMARAI SELVI


<center>***************</center>

# BRIDGE COURSE IX: PHP AND MYSQL LAB

**SEMESTER : IV**                                                                   **CODE: PB20CA3P**
**CREDITS:2**

## 1. COURSE OUTCOMES:
After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Exercise covered |
|-------|-----------------|-------|------------------|
| CO1 | Develop PHP programs using Control structures | K6 | 1,2 |
| CO2 | Apply various functions on arrays, Math, String | K3 | 3,4 |
| CO3 | Design PHP programs using Class and Object | K2 | 5 |
| CO4 | Design PHP programs using Form Handling and Files | K6 | 6,7 |
| CO5 | Apply cookies, sessions in PHP program Sending Mail | K3 | 8,9,10 |
| CO6 | Develop web application PHP programing and Database using MySQL | K6 | 11,12,13 |

## 2A. Syllabus

| Ex.No. | Exercise |
|--------|----------|
| 1 | Write a PHP program using Control structures |
| 2 | Write a PHP program to read an integer Array and sorting the array in Ascending order |
| 3 | Write a PHP program using functions |
| 4 | (a) Write a PHP program using date and time objects <br> (b) Write a PHP program using string objects |
| 5 | Write a PHP program using class and objects |
| 6 | Write a PHP program to design form to get student information using POST and GET |
| 7 | Write a PHP program to upload and down load a files |
| 8 | Write a PHP program to create cookies and sessions |
| 9 | Write a PHP program to create cookies and sessions |
| 10 | Write a PHP program to Handle runtime Exception |
| 11. | Write a PHP program to send Email |
| 12. | Write a PHP program to Create Database and tables using MySQLi |
| 13. | Write a PHP program to Create simple CRUD Application |

**B. TOPICS FOR SELF STUDY:**

| S.No | Topics | Web Link |
|------|--------|----------|
| **1** | Use  XML parser in PHP | **www .w3schools.com** |
| **2** | Develop PHP Program using Directory | **www .w3schools.com** |
| **3** | Develop PHP Program using Calendar | **www .w3schools.com** |
| **4** | Develop PHP Program to Backup database | **www.tutorialspoint.com** |

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Ex.No. | Lab Exercise | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|--------|--------------|-------------------|-----------------------------------------------|
| 1 | Control structures | Develop PHP Program using control structures | K6 |
| 2 | Arrays  and strings | Develop PHP Program using arrays and strings | K6 |
| 3 | PHP Functions | Apply Functions in PHP program | K6 |
| 4 | Math, String and Date and Time objects | Apply Math, Date and Time functions in PHP Program | K6 |
| 5 | PHP programs using Objects and classes | Create a PHP program using Class and Object | K6 |
| 6 | Form Handling (POST & GET) | Create A Form using GET and POST | K6 |
| 7 | File upload and download | Apply File upload and download in a program | K6 |
| 8 | Statemanagement using cookies, sessions | Create cookies, sessions in a program | K6 |
| 9 | Error Handling | Build simple Program using Error Handling | K6 |
| 10 | Sending Email | Develop PHP programto send Email | K6 |
| 11 | Data base Connectivity using MySQLi | Create Database and tables using MySQLi | K6 |
| 12 | Create CRUD Application | Create simple CRUD Application | K6 |

**4. MAPPING (CO, PO, PSO)**

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| **CO1** | H | H | H | L | M | M | H | H | H | H | M | H | M |
| **CO2** | H | H | M | H | H | M | M | M | H | H | L | H | M |
| **CO3** | H | H | M | H | M | M | M | M | H | L | H | H | H |
| **CO4** | H | M | H | H | M | M | H | M | L | L | L | H | M |
| **CO5** | H | H | M | H | M | M | H | L | L | M | L | H | M |
| **CO6** | H | M | H | M | M | H | H | L | H | M | H | M | H |

**L-Low          M-Moderate          H- High**

**5. COURSE ASSESSMENT METHODS**

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book
2. Cooperative Learning Report, Assignment, Group Discussion, project Report, Seminar.
3. Pre/Post Test, Viva, Report for each Exercise.
4. Lab Model Examination & End Semester Practical Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**
Dr.R.THAMARAI SELVI

**HEAD OF THE DEPARTMENT**
Dr.R.THAMARAI SELVI

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## Core XII: MACHINE LEARNING FOR DATA SCIENCE

**SEMESTER: IV**             **CODE: P20CA411**
**CREDITS:3**             **HOURS/WEEK: 4**

### 1. COURSE OUTCOMES
After the successful completion of this, course the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Understand the statistical terminologies for building a model | K2 | I |
| CO2 | Categorize and explore data using R | K4 | II |
| CO3 | Compare the various classification algorithms | K5 | III |
| CO4 | Identify the patterns and association in a dataset using association rules | K3 | 1V |
| CO5 | Build models for forecasting | K6 | V |
| CO6 | Evaluate the performance of the developed model | K5 | V |

### 2A. Syllabus

**UNIT I - Journey from Statistics to Machine Learning**        **9 Hours**
Statistical terminology for model building and validation- machine learning-major differences between statistical modeling and machine learning-steps in machine learning model development and deployment-statistical fundamentals and terminology for model building and validation.

**UNIT II - Using R for Machine Learning Managing and Understanding Data**     **9 Hours**
R Data Structures – Vectors-Factors-Managing data with R. **Exploring and understanding data:** Exploring the structure of data-exploring numerical variables-exploring categorical variables-Exploring relationships between variables.

**UNIT III - Lazy learning – Classification using Nearest Neighbors**      **9 Hours**
Understanding classification using nearest neighbors. **Probabilistic Learning- Classification using Naives Bayes:** Understanding Naïve Bayes. **Divide and Conquer- Classification using Decision trees and rules:** Understanding Decision Trees-Understanding Classification Rules.

**UNIT IV - Forecasting Numeric Data- Regression Methods**        **9 Hours**
Understanding Regression -Understanding Regression Trees and Model Trees. **Black Box Methods- Neural Networks And Support Vector Machines:** Understanding Neural Networks-Understanding Support Vector Machines. **Finding Patterns-Market Basket Analysis Using Association Rules**. **Finding Groups of Data:** Clustering With K-Means.

**UNIT V - Evaluating Model Performance**             **9 Hours**
Measuring performance for classification – Estimating future performance. **Improving Model Performance:** Tuning stock models for better performance-improving model performance with meta-learning.

**B. TOPICS FOR SELF-STUDY:**

| S.No. | Topics | Web Links |
|---|---|---|
| 1 | Generative models | **https://www.youtube.com/watch?v=sucqskXRkss** |
| 2 | Model selection and learning | **https://machinelearningmastery.com/a-gentle-introduction-to-model-selection-for-machine-learning/** |
| 3 | Deep generative models | **http://www.cs.toronto.edu/~slwang/generative_model.pdf** |
| 4 | Probabilistic programming | **https://livebook.manning.com/book/practical-probabilistic-programming/chapter-1/7** |

**C. Text Books:**

1. Brett Lanz, Machine Learning with R, PACKT publishing Ltd., Third Edition
2. Pratap Dangeti, Statistics for Machine Learning, Packt Publishing Ltd., July 2017.

**D. Reference Book:**

1. SaikutDutt, Subramanian Chandramouli, Amit Kumar Das, Machine Learning, Pearson Education, 2019

**E. Web links:**

1. **https://www.javatpoint.com/machine-learning**
2. **https://www.youtube.com/watch?v=G7fPB4OHkys**

**3. SPECIFIC LEARNING OUTCOMES (SLO)**

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| **I** | **Journey from Statistics to Machine Learning** | | |
| 1.1 | Statistical terminology for model building and validation | Outline the statistical model for building and validation | K2 |
| 1.2 | Machine learning - Major differences between statistical modeling and machine learning | Compare the difference between machine learning and statistical model | K5 |
| 1.3 | Steps in machine learning model development and deployment | Examine the steps in machine learning model | K4 |
| 1.4 | Statistical fundamentals and terminology for model building and validation | Make use of statistical terminology for building models | K3 |
| 1.5 | Bias versus variance trade-off 32 Train and test data | Experiment with Trained and Test data sets | K3 |
| | **Machine learning terminology for model building and validation** | | |
| 1.6 | Linear regression versus gradient descent -Machine learning losses | Distinguish Linear regression and gradient descent model | K4 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1.7 | When to stop tuning machine learning models -Train, validation, and test data | Discuss on how to tune the machine learning model for trained and test data set | K6 |
| 1.8 | Cross-validation -Grid search | Explain cross validation on grid search | K5 |
| **II** | **Using R for Machine Learning Managing and Understanding Data** | | |
| 2.1 | R Data Structures | Explain the Data structure in R | K2 |
| 2.2 | Vectors-Factors | Examine the vectors and factors in R | K4 |
| 2.3 | Data frames-Matrices and Arrays | Classify the data frames, matrices and arrays | K3 |
| 2.4 | Managing data with R | Inference the data in R tool | K5 |
| **Exploring and understanding data** | | | |
| 2.4 | Exploring the structure of data | Analyze the structure of data | K4 |
| 2.5 | Exploring numerical variables | Analyze the numerical variable | K4 |
| 2.6 | Exploring categorical variables | Analyze the categorical variable | K4 |
| 2.7 | Exploring relationships between variables. | Compare and analyze the variables in data | K5 |
| **III** | **Lazy learning – Classification using Nearest Neighbours** | | |
| 3.1 | Understanding classification using nearest neighbors | Illustrate the classification using nearest neighbor | K2 |
| 3.2 | The KNN Algorithm | Analyze the KNN algorithm | K4 |
| 3.3 | Case Study for k-NN Algorithm | Test a problem for k-NN algorithm | K6 |
| **Probabilistic Learning- Classification using Naives Bayes** | | | |
| 3.5 | Basic concepts of Bayesian methods | Examine the concepts of Bayesian methods | K4 |
| 3.6 | Classification with Naive Bayes | Interpret the classification with naive bayes | K5 |
| 3.7 | Case study for Naive Bayes Algorithm | Test a problem for Naive Bayes algorithm | K6 |
| **Divide and Conquer- Classification using Decision trees and rules** | | | |
| 3.8 | Understanding Decision trees | Explain the Decision tree | K5 |
| 3.9 | Understanding Classification Rules. | Analyze the classification using decision tree rules | K5 |
| 3.10 | Case study for Decision tress | Test a problem for Decision trees | K6 |
| **IV** | **Forecasting Numeric Data- Regression Methods** | | |
| 4.1 | Understanding Regression | Evaluate the Regression model | K5 |
| 4.2 | Understanding Regression Trees and Model Trees | Compare the regression and model tree | K4 |
| **Black Box Methods- Neural Networks and Support Vector Machines** | | | |
| 4.3 | Understanding Neural Networks | Outline the concept of neural network | K2 |
| 4.3 | Case Study for ANN | Test a problem for ANN | K6 |
| 4.4 | Understanding Support Vector | Explain the support Vector Machine | K5 |
| 4.5 | Case Study for SVM | Test problem for SVM | K6 |
| **Finding Patterns-Market Basket Analysis Using Association Rules** | | | |
| 4.7 | Understanding Association Rules | Explain the Association Rule | K5 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 4.8 | Case study for Finding Patterns | Test problem for finding pattern | K6 |
| 4.9 | Clustering with K means | Examine the clustering with K means | K4 |
| **V** | **Evaluating Model Performance** | | |
| 5.1 | Measuring performance for classification | Determine the performance for classification | K5 |
| 5.2 | Estimating future performance | Measure the performance | K5 |
| | **Improving Model Performance** | | |
| 5.3 | Tuning stock models for better performance | Design the model for stock data for effective performance | K6 |
| 5.4 | Improving model performance with meta-learning | Develop a model using meta learning for effective performance | K6 |

## 4. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | H | H | M | M | M | L | - | L | M | L | H | M | L |
| **CO2** | H | H | M | H | H | M | L | L | L | H | H | L | M |
| **CO3** | H | H | H | M | M | L | L | L | H | H | H | M | - |
| **CO4** | H | H | H | H | M | - | L | - | M | H | H | H | L |
| **CO5** | H | H | M | M | M | - | - | L | M | M | H | H | L |
| **CO6** | M | H | M | H | M | L | - | - | M | M | H | M | L |

**L-Low      M-Moderate      H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book
2. Open Book Test.
3. Assignment, Group Presentation, Group Discussion, Seminar, Quiz (written).
4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
                                                              Dr.R.THAMARAI SELVI

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## Core XII: INTERNET OF THINGS

**SEMESTER: IV**                                            **CODE: P20CA412**
**CREDITS:3**                                            **HOURS/WEEK: 4**

### 1. COURSE OUTCOMES
After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level | Unit Covered |
|-------|-----------------|-------|--------------|
| CO1 | Discuss the physical and logical design of the Internet of Things (IoT) | K5 | I |
| CO2 | Elaborate on domain-specific IoT | K6 | II |
| CO3 | Explain IoT system management with NETCONF-YANG | K5 | III |
| CO4 | Analyze the various M2M and IoT system management | K4 | III |
| CO5 | Discuss the building blocks of IoT physical devices and endpoints | K6 | IV |
| CO6 | Develop IoT solutions using IoT data analytics | K6 | V |

### 2A. Syllabus

**UNIT I - Introduction & Concepts:**                                     **9 Hours**
Introduction to Internet of Things- Physical Design of IoT- Logical Design of IoT- IoT Enabling Technologies- IoT Levels & Deployment Templates

**UNIT II - Domain Specific IoTs:**                                     **9 Hours**
Home Automation- Cities- Environment- Energy- Retail- Logistics- Agriculture- Industry- Health & Life style

**UNIT III - IoT and M2M**:                                     **9 Hours**
M2M-Difference between IoT and M2M- SDN and NFV for IoT- Software Defined Networking- Network Function Virtualization-**IoT System Management with NETCONF-YANG:** Need for IoT Systems Management- Simple Network Management Protocol- Limitations of SNMP- Network Operator Requirements- NETCONF- YANG- IoT Systems Management with NETCONF-YANG-NETOPEER

**UNIT IV - IoT Physical Devices & Endpoints**:                                     **9 Hours**
What is an IoT Device- Exemplary Device: Raspberry Pi- About the Board-Linux on Raspberry Pi-Raspberry Pi Interfaces-Programming Raspberry Pi with Python - Other IoT Devices.

**UNIT V - Data Analytics for IoT:**                                     **9 Hours**
Introduction-Apache Hadoop-Apache Oozie-Apache Spark-Apache Storm-Using Apache Storm for Real-time Data Analysis.
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## B. TOPICS FOR SELF-STUDY:

| S.No. | Topics | Web Links |
|-------|--------|-----------|
| 1 | IoT solution architecture models | **https://www.javatpoint.com/iot-architecture-models** |
| 2 | IoT analytics-reaping value from IoT data | **https://www.cio.com/article/3542670/iot-analytics-reaping-value-from-iot-data.html** |
| 3 | Multi-tier IoT deployment | **https://cs.ucsb.edu/research/tech-reports/2019-11** |
| 4 | IoT cloud application development | **https://www.embitel.com/iot-cloud-application-development** |

## C. Text Books:

1. ArshdeepBahga and Vijay Madisetti, "Internet of Things: A HANDS-ONAPPROACH", First Edition, Universities Press, 2020
2. Cuno Pfister, "Getting started with the internet of things", O'Rielly Publication, First Edition, 2014, Kindle Edition Publication.

## D. Reference Books:

1. Francis DaCosta, "Rethinking the Internet of Things-A scalable approach to connecting everything", First edition, Apress open publication, 2013.
2. Peter Waher, "Learning Internet of Things", PACKT Publishing-First Edition, 2015.

## E. Web links:

1. **www.tutorialspoint.com**
2. **www.geeksforgeeks.org**
3. **www.javatpoint.com**

## 3. SPECIFIC LEARNING OUTCOMES (SLO)

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|-----------------------|----------------|-------------------|------------------------------------------------|
| **I** | **Introduction to IoT** | | |
| 1.1 | Introduction | Define IoT | K1 |
| 1.2 | Physical design of IoT | Summarize the physical design of IoT | K2 |
| 1.3 | Logical design of IoT | Discuss the logical design of IoT | K6 |
| 1.4 | IoT enabling technologies | Identify the technologies of the IoT | K3 |
| 1.5 | IoT levels and deployment templates | Discuss various levels in IoT | K6 |
| **II** | **Domain specific IoT** | | |
| 2.1 | Introduction | Recall the definition of IoT domains | K1 |
| 2.2 | Home Automation | Identify the techniques in home automation | K2 |
| 2.3 | Cities | Analyze the role of IoT in cities | K4 |
| 2.4 | Environment | Discuss the applications of various environments | K4 |
| 2.5 | Energy | Summarize the uses of energy in IoT | K3 |
| 2.6 | Retail | Interpret the components of IoT in retail industry | K2 |
| 2.7 | Logistics | Identify the fleet tracking in IoT | K2 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 2.8 | Agriculture | Apply the concepts of IoT in agriculture | K3 |
| 2.9 | Industry | Interpret the conditions for machine diagnosis | K5 |
| 2.10 | Health and Lifestyle | Examine the importance of health and lifestyle devices | K6 |
| **III** | **IoT and M2M** | | |
| 3.1 | Introduction | Rephrase the machine interface technology in IoT | K1 |
| 3.2 | M2M | Analyze the various M2M devices | K4 |
| 3.3 | Difference between IoT and M2M | Distinguish between IoT and M2M | K4 |
| 3.4 | SDN and NFV for IoT | Choose the SDN and NFV for IoT devices | K6 |
| | **IoT System Management with NETCONF-YANG** | | |
| 4.1 | Need for IoT system management | Explain the need for IoT system management | K2 |
| 4.2 | Simple Network Management Protocol | Inspect SNMP elements | K4 |
| 4.3 | Network operator requirements | Discuss the requirements of the network operator | K6 |
| 4.4 | NETCONF | Illustrate operations of NETCONF | K2 |
| 4.5 | YANG | Examine the features of YANG | K4 |
| 4.6 | System management with NETCONF and YANG | Simplify the system management process using NETCONF and YANG | K4 |
| **IV** | **IoT Physical devices and endpoints** | | |
| 7.1 | IoT device | Define IoT device | K1 |
| 7.2 | Raspberry Pi | Explain intelligence near the edge | K2 |
| 7.3 | About the board | Connect legacy devices with IoT | K6 |
| 7.4 | Linux on Raspberry Pi | Develop the concept of staying in the loop | K6 |
| 7.5 | Raspberry Pi interfaces | Apply the concept of IoT in agriculture | K3 |
| 7.6 | Programming in Raspberry Pi with Python | Design home healthcare devices | K6 |
| 7.7 | Other IoT devices | Identify the common features in IoT devices. | K3 |
| **V** | **Data Analytics for IoT** | | |
| 10.1 | Introduction | Outline the purpose of data analytics | K2 |
| 10.2 | Apache Hadoop | Develop the data processing model using Apache Hadoop | K6 |
| 10.3 | Using Apache Hadoop for batch data analysis | Critically examine the role of Apache Hadoop in batch data analysis | K6 |
| 10.4 | Apache Oozie | Develop workflows for Apache Oozie | K6 |
| 10.5 | Apache Spark | Assess the types of deploy modes in Apache Spark | K5 |

| Unit Covered/ Section | Course Content | Learning outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 10.6 | Apache Storm | Design Apache Storm Architecture | K6 |
| 10.7 | Using Apache Storm for Real-time Data Analysis | **Explain how data is stream flow in Apache Storm.** | K2 |

## 4. MAPPING (CO, PO, PSO)

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H | M | L | - | M | - | M | H | L | M | M | - | L |
| CO2 | M | H | M | H | M | H | M | L | L | H | H | M | L |
| CO3 | H | M | M | L | H | L | - | M | L | H | L | L | L |
| CO4 | H | M | H | M | H | M | M | H | M | H | H | M | - |
| CO5 | H | H | M | H | M | H | M | - | H | M | M | L | L |
| CO6 | M | H | M | - | L | M | H | M | M | L | L | H | M |

**L-Low          M-Moderate          H- High**

## 5. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Theory & Practical Components): Closed Book

2. Open Book Test.

3. Assignment, Group Discussion, Seminar, Quiz (written).

4. Pre-Semester & End Semester Theory Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr. H.B.VINCENTRAJ                              Dr.R.THAMARAI SELVI

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## Core Practical VII: MACHINE LEARNING FOR DATA SCIENCE

**SEMESTER : IV**                                          **CODE: P20CA4P7**
**CREDITS:3**                                              **HOURS/WEEK: 4**

### 1. COURSE OUTCOMES
After the successful completion of this, course the students will be able to

| S.No. | Course Outcomes | Level | Exercise |
|-------|-----------------|-------|----------|
| CO1 | Apply various operations in vectors, lists, matrices and arrays | K5 | 1,2 |
| CO2 | Evaluate the dataset | K6 | 3 |
| CO3 | Choose the visualization technique | K5 | 4,5,6 |
| CO4 | Predict the patterns using association rules | K5 | 7,8,10 |
| CO5 | Build models using logistic regression | K6 | 9 |
| CO6 | Test the performance of the developed model | K6 | 11 |

| Ex. No. | Exercise |
|---------|----------|
| 1 | Vectors and List operations in R |
| 2 | Matrices and Array operations in R |
| 3 | Saving, loading and removing R datastructes |
| 4 | Visualizing numeric data – scatterplot, boxplot, piechart, histograms |
| 5 | Measuring the central tendency |
| 6 | Pre-processing methods |
| 7 | Build model using K-Nearest Neighbour |
| 8 | Construct model using Decision Trees |
| 9 | Develop a model using logistic regression |
| 10 | Identify patterns using Association Rules |
| 11 | Evaluation of models |

### B. TOPICS FOR SELF-STUDY:

| S.No | Topics | Web Link |
|------|--------|----------|
| 1 | dplyr | **https://www.rdocumentation.org/packages/dplyr/versions/0.7.8** |
| 2 | Random Forest | **https://www.geeksforgeeks.org/random-forest-approach-in-r-programming/** |
| 3 | Dimensionality Reduction | **https://www.listendata.com/2015/06/simplest-dimensionality-reduction-with-r.html** |

| 4 | Stochastic Gradient Descent | https://www.geeksforgeeks.org/ml-stochastic-gradient-descent-sgd/ |
|---|---|---|

## 2. SPECIFIC LEARNING OUTCOMES (SLO)

| Ex.No. | Lab Exercises | Learning Outcomes | Highest Bloom's Taxonomic Level of Transaction |
|---|---|---|---|
| 1 | Vectors and List operations in R | Develop a R Program to list the data in vector | K6 |
| 2 | Matrices and Array operations in R | Develop a R program to operate on matrices and arrays | K6 |
| 3 | Saving, loading and removing R datastructes | Develop a R program to load and remove data in R data structures | K6 |
| 4 | Visualizing numeric data – scatterplot, boxplot, pie chart, histograms | Develop a R program to visualize the data with different chart | K6 |
| 5 | Measuring the central tendency | Develop a R program to measure the central tendency | K6 |
| 6 | Pre-processing methods | Develop a R program to preprocessing stages | K6 |
| 7 | Build model using K-Nearest Neighbour | Develop a R to model K-nearest neighbor | K6 |
| 8 | Construct model using Decision Trees | Develop a R to construct model for Decision tree | K6 |
| 9 | Develop a model using logistic regression | Develop a R to model for logistic regression | K6 |
| 10 | Identify patterns using Association Rules | Develop a R to identify the pattern using association rule | K6 |
| 11 | Evaluation of models | Develop a R program to evaluate the models | K6 |

## 3. MAPPING (CO, PO, PSO)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H | H | M | M | M | L | - | L | M | L | H | M | L |
| CO2 | H | H | M | H | H | M | L | L | L | H | H | L | M |
| CO3 | H | H | H | M | M | L | L | L | H | H | H | M | - |
| CO4 | H | H | H | H | M | - | L | - | M | H | H | H | L |
| CO5 | H | H | M | M | M | - | - | L | M | M | H | H | L |
| CO6 | M | H | M | H | M | L | - | - | M | M | H | M | L |

**L-Low          M-Moderate          H- High**

## 4. COURSE ASSESSMENT METHODS

**DIRECT:**

1. Continuous Assessment Test: T1, T2 (Practical Components): Closed Book

2. Assignment, Group Discussion, project Report, Seminar.

3. Pre/Post Test, Viva, Report for each Exercise.

4. Lab Model Examination & End Semester Practical Examination

**INDIRECT**:

1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
Dr. M. LOVELIN PONN FELCIAH                    Dr.R.THAMARAI SELVI

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# Core Project II: PROJECT

**SEMESTER: IV**                                         **CODE : P20CA4PJ**
**CREDITS: 10**                                          **HOURS/WEEKS: 18**

## 1. COURSE OUTCOMES
After the successful completion of this course, the students will be able to

| S.No. | Course Outcomes | Level |
|-------|-----------------|-------|
| CO1 | Make use of the concepts of Software Engineering. | K3 |
| CO2 | Utilize the appropriate software development model to create software. | K3 |
| CO3 | Make use of the testing principles. | K3 |
| CO4 | Build applications using database connectivity. | K6 |
| CO5 | Test the quality of the developed software. | K6 |
| CO6 | Develop an application based on the requirements. | K6 |

## 2. MAPPING (CO, PO, PSO)

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | H | H | H | H | H | H | H | H | H | H | H | H | H |
| CO2 | H | H | H | H | H | H | H | H | H | H | H | H | H |
| CO3 | H | H | H | H | H | H | H | H | H | H | H | H | H |
| CO4 | H | H | H | H | H | H | H | H | H | H | H | H | H |
| CO5 | H | H | H | H | H | H | H | H | H | H | H | H | H |
| CO6 | H | H | H | H | H | H | H | H | H | H | H | H | H |

**L-Low          M-Moderate          H- High**

## 3. COURSE ASSESSMENT METHODS

**DIRECT:**
1. Continuous Internal Reviews.
2. End Semester Viva-Voce

**INDIRECT:**
1. Course end survey (Feedback)

**COURSE COORDINATOR**                    **HEAD OF THE DEPARTMENT**
   Dr.R.THAMARAI SELVI                            Dr.R.THAMARAI SELVI

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