

**CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)
NATIONALLY ACCREDITED WITH A+ GRADE BY NAAC
TIRUCHIRAPPALLI**

PG DEPARTMENT OF INFORMATION TECHNOLOGY



M. Sc. INFORMATION TECHNOLOGY SYLLABUS

2025-2026 and Onwards

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

PG DEPARTMENT OF INFORMATION TECHNOLOGY

Vision

The Department of Information Technology envisions to create technically competent, skilled intellectual IT professionals, efficient problem solvers, innovators and entrepreneurs to meet the current challenges of the modern computing industry.

Mission

- To provide quality education and elevate the students towards higher educational programs
- To encourage and guide the students to improve their competency skills in information technology market
- To equip the students to cater the industrial demands through providing advance training

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	LEARNING ENVIRONMENT To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields.
PEO2	ACADEMIC EXCELLENCE To provide a conducive environment to unleash their hidden talents and to nurture the spirit of critical thinking and encourage them to achieve their goal.
PEO3	EMPLOYABILITY To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains.
PEO4	PROFESSIONAL ETHICS AND SOCIAL RESPONSIBILITY To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation.
PEO5	GREEN SUSTAINABILITY To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development.

PROGRAMME OUTCOMES FOR M.Sc. INFORMATION TECHNOLOGY PROGRAMME

PO NO.	Programme Outcome On completion of M.Sc. Information Technology The students will be able to
PO1	DOMAIN KNOWLEDGE Acquire the in-depth computing knowledge both conceptual and applied pertaining to the core discipline
PO2	PROBLEM SOLVING Procure knowledge-based skills to satisfy the needs of society and the industry by providing hands on experience of various technologies in Computer Science
PO3	INNOVATION AND CRITICAL THINKING Critically evaluate global issues, recognize the need and identify sustainable solutions through research capabilities towards Nation building initiatives
PO4	LIFE LONG LEARNING Capable of upgrading and advancing knowledge through innovation and technology as evidenced by current developments
PO5	LEADERSHIP AND TEAMWORK Work in collaborative environment through applications of scientific reasoning and communicate effectively to the stakeholders

PROGRAMME SPECIFIC OUTCOMES FOR
M.Sc. INFORMATION TECHNOLOGY PROGRAMME

PSO No.	Programme Specific Outcomes Students of M.Sc. Information Technology will be able to	POs Addressed
PSO1	Acquiring in-depth knowledge of computing fundamentals and advanced topics in various information technology domains.	PO1
PSO2	Pursuing lifelong learning and research as computing professionals to meet industry standards and corporate demands by providing innovative solutions.	PO1 PO2
PSO3	Apply theoretical foundations and practical expertise in Information Technology to develop effective, efficient, and innovative real-time solutions that contribute to societal impact.	PO2 PO3
PSO4	Ability to adapt to rapidly evolving IT technologies and engage in continuous learning to stay current with industry trends and challenges.	PO3 PO4
PSO5	Demonstrate ability to collaborate, apply scientific principles, and communicate complex solutions to stakeholders	PO4 PO5



Cauvery College for Women (Autonomous), Trichy

PG Department of Information Technology

M.Sc. Information Technology

LEARNING OUTCOME BASED CURRICULUM FRAMEWORK (CBCS- LOCF)

(For the Candidates admitted from the Academic year 2025-2026 and onwards)

Semester	Course	Course Title	Course Code	Inst. Hrs. / Week	Credits	Exam			Total
						Hrs.	Marks		
							Int.	Ext.	
I	Core Course– I (CC)	J2EE Technologies	25PIT1CC1	6	5	3	25	75	100
	Core Course – II (CC)	Object Oriented Analysis and Design	25PIT1CC2	6	5	3	25	75	100
	Core Course –III (CC)	Mathematical Foundation for Information Technology	25PIT1CC3	6	5	3	25	75	100
	Core Practical - I (CP)	J2EE(P)	25PIT1CC1P	6	5	3	40	60	100
	Discipline Specific Elective Course-I (DSE)	A. Software Testing	25PIT1DSE1A	6	3	3	25	75	100
		B. Software Project Management	25PIT1DSE1B						
		C. Agile software Process	25PIT1DSE1C						
Total				30	23	-	-	-	500
15 Days INTERNSHIP during Semester Holidays									
II	Core Course– IV(CC)	Advanced Database Management Systems	25PIT2CC4	6	5	3	25	75	100
	Core Course– V(CC)	Advanced Operating Systems	25PIT2CC5	6	5	3	25	75	100
	Core Choice Course–I (CCC)	A. Data Mining Techniques using R	25PIT2CCC1A	6	4	3	25	75	100
		B. Open-Source Technologies	25PIT2CCC1B						
		C. Cloud Computing	25PIT2CCC1C						
	Core Practical-II(CP)	Advanced Database Management Systems (P)	25PIT2CC2P	6	5	3	40	60	100
	Discipline Specific Elective Course-II (DSE)	A. Data Mining Techniques using R(P)	25PIT2DSE2AP	6	3	3	40	60	100
		B. Open-Source Technologies(P)	25PIT2DSE2BP						
		C. Cloud Computing (P)	25PIT2DSE2CP						
	Internship	Internship	25PIT2INT	-	2	-	25	75	100
Extra Credit Course	SWAYAM	As per UGC Recommendation							
Total				30	24	-	-	-	600

Semester	Course	Course Title	Course Code	Inst. Hrs. / Week	Credits	Exam			Total
						Marks			
						Int	Ext		
III	Core Course– VI (CC)	Natural Language Processing	25PIT3CC6	6	5	3	25	75	100
	Core Course – VII (CC)	Internet of Things and its Applications	25PIT3CC7	6	5	3	25	75	100
	Core Choice Course– II (CCC)	A. Cyber Security	22PGCS3CCC2A	5	4	3	25	75	100
		B. Mobile Application Development using Android	25PIT3CCC2B						
		C. Parallel Processing	25PIT3CCC2C						
	Core Practical - III (CP)	Internet of Things and its Applications (P)	25PIT3CC3P	5	4	3	40	60	100
	Discipline Specific Elective Course-III (DSE)	A. Competitive Examinations for Computer Science	25PIT3DSE3A	5	3	2	-	100	100
		B. Android Programming(P)	25PIT3DSE3BP						
		C. Parallel Processing (P)	25PIT3DSE3CP						
Generic Elective Course -I (GEC)	AI Tools For Human Resource Management – I (P)	25PIT3GEC1P	3	2	3	40	60	100	
Extra Credit Course	SWAYAM	As per UGC Recommendation							
Total				30	23	-	-	-	600

The Internal and External marks for theory and practical courses are as follows:

Course	Internal Marks	External Marks
Theory	25	75
Practical	40	60
Project	-	100
Internship	25	75

For Theory courses:

- The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)
- The passing minimum for End Semester Examinations shall be 40% out of 75 marks (i.e. 30 marks)
- The passing minimum not less than 50% in the aggregate

For Practical courses:

- a) The passing minimum for CIA shall be 40% out of 40 marks (i.e. 16 marks)
- b) The passing minimum for End Semester Examinations shall be 40% out of 60 marks (i.e. 24 marks)
- c) The passing minimum not less than 50% in the aggregate

For Project Work:

- a) The passing minimum not less than 50% out of 100 marks
- d) For Internship:
 - a) The passing minimum not less than 50% in the aggregate

Semester I	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT1CC1	J2EE Technologies	Core Course - I	6	5

Course Objectives

- To explore key features and core concepts of J2EE
- To provide a comprehensive understanding of JavaServer Pages, Servlets and Entity Java Beans
- To impart knowledge on database connectivity and operations

Course Outcomes and Cognitive Level Mapping

On the successful completion of the course, students will be able to

CO Number	Course Outcome	Cognitive Level
CO1	Identify and understand the key concepts of J2EE, its multi-tier architecture, and foundational technologies like HTML, XML, and XHTML, along with generating and parsing XML documents	K1, K2
CO2	Describe and apply JSP concepts, including elements, implicit objects, error handling, Expression Language, and JSTL	K2
CO3	Apply servlet concepts by designing HTTP server programs, managing sessions, handling exceptions, and implementing the MVC architecture	K3
CO4	Develop different types of EJBs and analyze their use with JSP, Servlets, and design patterns in enterprise applications	K3, K4
CO5	Analyze database operations and evaluate transaction handling and concurrency control	K4, K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	1	2	2	2	3	3	3
CO2	3	2	3	1	2	3	3	2	3	2
CO3	3	3	3	2	2	3	3	2	2	3
CO4	3	2	3	2	3	2	3	3	3	2
CO5	3	3	2	3	2	3	3	2	2	3

“1” – Slight (Low) Correlation

“2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation “-” indicates there is no correlation

SYLLABUS

UNIT	CONTENTS	HOURS	COs	COGNITIVE LEVEL
I	J2EE ESSENTIALS: Introduction to J2EE – Need for J2EE – J2EE Multi-Tier Architecture – Features and Concepts in J2EE – J2EE Foundation: HTML, XML and XHTML – Generating an XML document – Parsing XML	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	JAVASERVER PAGES: Introduction to JSP – JSP Elements – Implicit Objects – Scope – Errors and Exceptions – Including and Forwarding from JSP Pages – Expression Language – Custom Actions and Tag Libraries – JavaServer Pages Standard	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	SERVLETS: HTTP and Server Programs – Basic Servlet Design – Request and Response Objects – Deployment Descriptors – Servlet Life Cycle – Handling Exceptions – Session Management – Filters	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	EJB FUNDAMENTALS: Introduction – Three kinds of EJBs – Anatomy of a Session Bean – Stateful Vs. Stateless Session Beans – Anatomy of an Entity Bean – Features of Entity Beans – Developing CMP and BMP Entity Beans – Developing Message-Driven Beans – Using JSP, Servlets and Design	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	WORKING WITH DATABASES: Connecting to Databases – Statements – Resultsets – Prepared Statements – Callable Statements – Data Sources and Connection Pools – Transactions – Locking and Isolation	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	SELF STUDY: Web Services – JavaMail – Remote Method Invocation – Java Message Services – J2EE Management and Deployment Specifications	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

TEXT BOOKS

1. James L. Weaver, Kevin Mukhar and James Crume, “**Beginning J2EE 1.4: From Novice to Professional**”, 1st Edition, APress Media LLC, 2013
2. Jim Keogh, “**The Complete Reference: J2EE**”, Tata McGraw Hill Edition, 2017

REFERENCE BOOKS

1. Eric Armstrong, “The J2EE 1.4 Tutorial “, 2005
2. Martin Bond, “Teach Yourself J2EE”, 2002

WEB REFERENCES

1. <https://www.java4coding.com/contents/servlet/jee-tutorial>
2. <https://mindmajix.com/j2ee-tutorial>
3. <https://www.digitalocean.com/community/tutorials/java-tutorial-java-ee-tutorials>

PEDAGOGY

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

COURSE DESIGNER

Dr. M. Thangam, Associate Professor, Dept. of Information Technology

Semester I	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT1CC2	Object Oriented Analysis and Design	Core Course – II (CC)	6	5

Objectives:

- To understand the fundamentals of object analysis and design.
- To understand and differentiate Unified Process from other approaches.
- To design with static UML diagrams and identify the concept.
- To design with the UML dynamic and implementation diagrams.
- To design the software with appropriate design patterns.
- To test the software against its requirements specification techniques of conceptual UML modeling.

Course Outcomes and Cognitive Level Mapping

On the successful completion of the course, students will be able to

CO Number	Course Outcome	Cognitive Level
CO1	To understand the interface between the classes and objects.	K1,K2
CO2	Build a model for the user interface (UI) for a software application	K2,K3
CO3	Measure the Level of User satisfaction and software quality assurance.	K3,K4
CO4	Gain exposure from design to Implementation	K5
CO5	Create class diagrams that model both the domain and design model of a software system.	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2	2	2	3	3	3
CO2	3	2	3	2	2	3	3	2	3	2
CO3	3	3	3	2	2	3	3	2	3	3
CO4	3	2	3	2	3	2	3	3	3	3
CO5	3	3	3	3	3	3	3	2	2	3

“1” – Slight (Low) Correlation “2” – Moderate (Medium) Correlation
“3” – Substantial (High) Correlation “.” indicates there is no correlation.

Syllabus:

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	An overview - Object basics - Object state and properties - Behavior - Methods - Messages - Information hiding - Class hierarchy - Relationships - Associations - Aggregations- Identity - Dynamic binding - Persistence - Metaclasses - Object oriented system development life cycle.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	Introduction - Rumbaugh, Booch, Jacobson methods - Patterns - Frameworks - Unified approach - Unified modeling language - Static and Dynamic models - UML diagrams - Class diagram - Usecase diagrams - Dynamic modeling - Model organization - Extensibility	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	Identifying Usecase - Business object analysis - Usecase driven object oriented analysis - Usecase model - Documentation - Classification - Identifying object, relationships, attributes, methods - Super-sub class - A part of relationships Identifying attributes and methods - Object responsibility	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	Design process - Axioms - Designing classes - Class visibility - Refining attributes - Methods and protocols- Object storage and object interoperability - Databases - Object relational systems - Designing interface objects - The purpose of a view layer interface	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	Quality assurance - Testing strategies - Object orientation testing - Test cases - Test Plan – Debugging principles - Usability - Satisfaction - Usability testing - Satisfaction testing	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	UML - Examples on: Behavioural models – Structural models – Architectural models from real world problems. Case Study -Student Admission System-Banking Systems	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

TEXT BOOKS

1. Bahrami Ali, Object oriented systems development, Irwin McGrawHill, 2005 (First 4 units covered here).
2. Booch Grady, Rumbaugh James, Jacobson Ivar, The Unified modeling language – User Guide, Pearson education, 2006 (ISBN 81-7758-372-7)

REFERENCES BOOKS:

1. Grady Booch, Michael W. Engel, Kelli A. Houston, Robert A. Maksimchuk, Bobbi J. Young, Jim Conallen, “Object-Oriented Analysis and Design with Applications”, 3rd Edition, Pearson Education, 2009
2. Michael Blaha and James Rumbaugh, “Object-Oriented Modeling and Design with UML”, 2nd Edition, Pearson Education, 2005
3. Erich Gamma, Richard Helm, Ralph Johnson & John Vlissides, “Design Patterns: Elements of Reusable Object-oriented Software”, Pearson Education India, 2004.

WEB REFERENCES

https://www.tutorialspoint.com/object_oriented_analysis_design/ooad_tutorial.pdf
<https://www.scribd.com/doc/74801730/Case-Study-on-Traffic-Management-System>

Course Designer

Dr.S.Suguna Devi Dept. of Information Technology

Semester I	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT1CC1P	J2EE (P)	Core Course Practical - I	6	3

COURSE OBJECTIVES

- To deploy and manage J2EE applications
- To provide a comprehensive understanding of JavaServer Pages, Servlets and Entity Java Beans
- To impart knowledge on database connectivity and operations

Course Outcomes and Cognitive Level Mapping

On the successful completion of the course, students will be able to

CO Number	Course Outcome	Cognitive Level
CO1	Understand the architecture and components of J2EE applications	K1
CO2	Develop web-based applications using Servlets and JSP	K2
CO3	Demonstrate session management techniques	K3
CO4	Design and deploy enterprise-level applications using Enterprise JavaBeans	K4
CO5	Implement database connectivity using JDBC	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	2	3	1	2	2	1
CO2	3	3	2	3	3	2	3	2	3	2
CO3	3	2	3	3	3	3	3	3	2	3
CO4	3	3	3	2	3	2	3	3	3	3
CO5	3	3	3	3	3	3	3	2	3	3

“1” – Slight (Low) Correlation

“2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation

“-” indicates there is no correlation

LAB EXERCISES

1. Create a basic HTML webpage with headings, paragraphs, and a link.
2. Write a servlet to accept username input from a form and display a greeting message.
3. Demonstrate the servlet life cycle by printing messages from `init()`, `service()`, and `destroy()` methods.
4. Implement basic session tracking using `HttpSession`
5. Develop a simple JSP page displaying static and dynamic content.
6. Demonstrate usage of JSP elements: Declarations, Scriptlets, Expressions.
7. Create a JSP page using Expression Language (EL) to display data.
8. Create a simple Stateless Session Bean that returns a welcome message.
9. Create a simple Stateful Session Bean that stores and retrieves a student's name.
10. Write a simple JDBC program to connect to a MySQL database.
 - Insert a few student records into a database using a Java program and a `PreparedStatement`.
 - Retrieve and display all student names from a database table.
 - Demonstrate how to perform commit and rollback in JDBC transactions.

COURSE DESIGNER

Dr. M. Thangam, Associate Professor, Dept. of Information Technology

Semester I	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT1DSE1A	Software Testing	Discipline Specific Elective Course – I (DSE)	6	3

Objectives:

To study the fundamental concepts of software testing which includes objectives, process, criteria, strategies, and methods.

To discuss various software testing types and levels of testing like black and white box testing along with levels unit test, integration, regression, and system testing.

It also helps to learn the types of bugs, testing levels with which the student can very well identify a bug and correct as when it happens.

To learn the domain testing, path testing and logic based testing to explore the testing process easier.

Course Outcomes and Cognitive Level Mapping

On the successful completion of the course, students will be able to

CO Number	Course Outcome	Cognitive Level
CO1	Know the basic concepts of software testing and its essentials.	K1
CO2	Able to identify the various bugs and correcting them after knowing the consequences of the bug.	K2
CO3	Use of program's control flow as a structural model is the corner stone of testing.	K3
CO4	Performing functional testing using control flow and transaction flow graphs.	K4
CO5	provides knowledge on transaction flow testing and data flow testing techniques so that the flow of the program is tested as well.	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	2	1	2	2	3	3	3
CO2	3	2	3	2	2	3	3	2	3	2
CO3	3	3	3	2	2	3	3	2	3	3
CO4	3	2	3	2	3	2	3	3	3	3
CO5	3	3	3	3	3	3	3	2	2	3

“1” – Slight (Low) Correlation

“2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation “-” indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Introduction:-Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs, Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	Transaction Flow Testing:-transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing,application of dataflow testing.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	Paths,Path products and Regular expressions:- path products &path expression, reduction procedure, applications, regular expressions & flow anomaly detection. Logic Based Testing:-overview,decision tables,path expressions,kev charts, specifications	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips. Graph Matrices and Application:- Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	Self Study for Enrichment: (Not included for End Semester Examination) Implementation:Synopsis- Overview-Strategies for Programmers-Strategies for Independent Teste-r-Tests as software Products-Tools:-Test Execution Automation Test Design Automation-Tools Usage and Training	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

TEXT BOOKS

1. Software Testing techniques – Boris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

REFERENCES BOOKS:

1. The craft of software testing – Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Dr.J. Sangeetha, Dept. of Information Technology

Semester I	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT1DSE1B	Software Project Management	Discipline Specific Elective Course – I (DSE)	6	3

Objectives:

- To introduce the primary important concepts of project management related to managing software development projects.
- To get familiar with the different activities involved in Software Project Management.
- To know how to successfully plan and implement a software project management activity, and to complete a specific project in time with the available budget

Course Outcomes and Cognitive Level Mapping

On the successful completion of the course, students will be able to

CO Number	Course Outcome	Cognitive Level
CO1	Understand the fundamental principles of software project management.	K1, K2
CO2	Apply the principles of modern software management and life cycle phases.	K3
CO3	Examine the work flows of the software process.	K4
CO4	Explain the responsibilities of project manager and project organizations	K5
CO5	Develop small scale and large-scale software products.	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2	2	2	3	3	3
CO2	3	2	3	2	2	3	3	2	3	3
CO3	3	3	3	2	2	3	3	2	2	3
CO4	3	2	3	2	3	2	3	3	3	2
CO5	3	3	2	3	2	3	3	2	2	2

“1” – Slight (Low) Correlation

“2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation “-” indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	SOFTWARE MANAGEMENT & ECONOMICS: The Waterfall Model, Conventional Software Management Performance; Evolution of Software Economics - Software economics, Pragmatic software cost estimation. Improving Software Economics: Reducing software product size, improving software processes, Improving Team Effectiveness, improving automation.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	THE OLD AND THE NEW WAY OF PROJECT MANAGEMENT: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process. Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures : A Management perspective and technical perspective.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	WORK FLOWS OF THE PROCESS: Software process workflows, Iteration workflows. Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	PROJECT ORGANIZATIONS AND RESPONSIBILITIES: Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation Building blocks, The Project Environment. Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	Tailoring the Process: Process discriminants, Small-scale project Vs Large scale project. Looking Forward: Modern Project Profiles, Next generation Software economics.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	Self Study for Enrichment: (Not included for End Semester Examination) The COCOMO cost estimation model, Change metrics, CCPDS-R – Core Metrics, People factors.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

TEXT BOOKS

3. Walker Royce, “Software Project Management”, 1st Edition, Pearson Education, 2006.

REFERENCES BOOKS:

1. Bob Hughes and Mike Cotterell, “Software Project Management”, 3rd Edition, Tata McGraw Hill Edition, 2005.
2. Joel Henry, “Software Project Management”, 1st Edition, Pearson Education, 2006.
3. PankajJalote, “Software Project Management in practice”, 1st Edition, Pearson Education, 2005.

WEB REFERENCE:

https://www.tutorialspoint.com/software_engineering/software_project_management.html

https://onlinecourses.nptel.ac.in/noc19_cs70/preview

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Dr.A. BHUVANESWARI, Dept. of Information Technology

Semester I	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT1DSE1C	Agile Software Process	Discipline Specific Elective Course – I (DSE)	6	3

Course Objective:

1. To familiarize the students with the features of agile development.
2. To familiarize the students with basic Agile Estimation & Planning.
3. To facilitate students in understanding the Tracking Agile Projects.
4. To facilitate students in differentiating tools

Course Outcomes and Cognitive Level Mapping

On the successful completion of the course, students will be able to

CO Number	Course Outcome	Cognitive Level
CO1	Describe the fundamental principles and practices associated with each of the agile development methods	K1
CO2	Compare agile software development model with traditional development models and identify the benefits and pitfalls	K2
CO3	Use techniques and skills to establish and mentor Agile Teams for effective software development	K3
CO4	Apply core values and principles of Agile Methods in software development	K4
CO5	Develop Extreme Programming	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	2	3	2	1	2	2	2	3	2
CO2	3	2	3	2	2	3	3	2	3	2
CO3	3	3	3	2	2	3	3	2	3	3
CO4	3	2	3	2	3	2	2	2	3	3
CO5	3	3	3	2	3	3	3	2	2	3

“1” – Slight (Low) Correlation “2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation “-” indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Fundamentals of Agile Process: Introduction and background, Agile Manifesto and Principles, Stakeholders and Challenges, Overview of Agile Development Models: Scrum, Extreme Programming, Feature Driven Development, Crystal, Kanban, and Lean Software Development.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	Agile Projects: Planning for Agile Teams: Scrum Teams, XP Teams, General Agile Teams, Team Distribution; Agile Project Lifecycles: Typical Agile Project Lifecycles, Phase Activities, Product Vision, Release Planning: Creating the Product Backlog, User Stories, Prioritizing and Estimating, Creating the Release Plan; Monitoring and Adapting: Managing Risks and Issues, Retrospectives	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	Introduction to Scrum: Agile Scrum Framework, Scrum Artifacts, Meetings, Activities and Roles, Scrum Team Simulation, Scrum Planning Principles, Product and Release Planning, Sprinting: Planning, Execution, Review and Retrospective; User story definition and Characteristics, Acceptance tests and Verifying stories, Burn down chart, Daily scrum	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	Introduction to Extreme Programming (XP): XP Lifecycle, The XP Team, XP Concepts: Refactoring, Technical Debt, Time boxing, Stories, Velocity; Adopting XP: Pre-requisites, Challenges; Applying XP: Thinking- Pair Programming, Collaborating, Release, Planning, Development	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	Agile Software Design and Development: Agile design practices, Role of design Principles, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control; Agility and Quality Assurance: Agile Interaction Design, Agile approach to Quality Assurance, Test Driven Development, Pair programming: Issues and Challenges	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	Self Study for Enrichment: (Not included for End Semester Examination) Scrum Case Study- XP Case Study-Payroll Case Study-Weather Station Study- Proxy and Stairway to Heaven	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Recommended Books:

1. Robert C. Martin, Agile Software Development- Principles, Patterns and Practices, Prentice Hall, 2013.
2. Kenneth S. Rubin, Essential Scrum: A Practical Guide to the Most Popular Agile Process, Addison Wesley, 2012.
3. James Shore and Shane Warden, The Art of Agile Development, O'Reilly Media, 2007.
4. Craig Larman, —Agile and Iterative Development: A manager's Guide, Addison-Wesley, 2004.
5. Ken Schawber, Mike Beedle, Agile Software Development with Scrum, Pearson, 2001.
6. Cohn, Mike, Agile Estimating and Planning, Pearson Education, 2006.
7. Cohn, Mike, User Stories Applied: For Agile Software Development Addison Wisley, 2004.

Online Resources:

1. IEEE Transactions on Software Engineering
2. IEEE Transactions on Dependable and Secure Computing
3. IET Software
4. ACM Transactions on Software Engineering and Methodology (TOSEM)
5. ACM SIGSOFT Software Engineering Notes

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Dr.J. Sangeetha, Dept. of Information Technology.

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT2CC4	Advanced Database Management systems	CORE COURSE IV	6	5

Course Objectives

- Deepen knowledge on advanced relational database concepts.
- Explore query processing, optimization, concurrency & recovery.
- Understand distributed, parallel, object & emerging database models.
- Provide hands-on experience in advanced SQL & transaction systems.
- Prepare students for research and industry-level DB technologies.

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
CO1	On the successful completion of the course, students will be able to Understand the principles of SQL, and advanced database features	K1,K2
CO2	Apply advanced SQL techniques, triggers, stored procedures, indexing, and query optimization	K3
CO3	Analyze query processing strategies, indexing structures, concurrency control & recovery mechanisms	K4
CO4	Evaluate database architectures, including centralized, client-server, parallel & distributed systems	K5
CO5	Apply advanced database technologies in real-world data management scenarios	K3, K4

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	1	1	3	2	1	2	1
CO2	3	2	3	2	1	3	3	2	2	1
CO3	3	3	2	3	2	3	3	3	2	2
CO4	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	2	3	3	2	3	2

“1” – Slight (Low) Correlation, “2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation “-” indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Intermediate SQL : Joins, Views – Transactions – Integrity Constraints - Advanced SQL – Functions and Procedures – Triggers – Recursive Queries - Query Processing – Overview - Measures of Query Cost - Selection Operation – Sorting - Join Operation – Evaluation of Expressions	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	Indexing and Hashing - Basic Concepts - Ordered Indices - B+-Tree Index Files - B+-Tree Extensions - Multiple-Key Access - Static Hashing - Dynamic Hashing - Transactions - Transaction Concept - A Simple Transaction Model - Transaction Atomicity and Durability - Transaction Isolation – Serializability - Transaction Isolation and Atomicity - Transaction Isolation Levels - Implementation of Isolation Levels - Transactions as SQL Statements	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	Concurrency Control - Lock-Based Protocols - Deadlock Handling - Multiple Granularity - Timestamp-Based Protocols - Validation-Based Protocols - Concurrency Control - Lock-Based Protocols - Deadlock Handling - Timestamp-Based Protocols - Validation-Based Protocols - Recovery System - Failure Classification – Log based Recovery principles – Check point	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	Parallel Databases – Introduction - I/O Parallelism - Interquery Parallelism - Interquery Parallelism - Intraoperation Parallelism - Interoperation Parallelism - Distributed Databases - Homogeneous and Heterogeneous Databases - Distributed Data Storage - Distributed Transactions - Commit Protocols	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	Introduction to NoSQL databases – Types - Data Modelling – CRUD operations and Querying – Data Modeling and Design Pattern – Transaction and Concurrency – NoSQL in real world scenario	18	CO1, CO2, CO3, CO4, CO5	K1 K2 K3 K4 K5
VI	Self Study for Enrichment (Not included for End Semester Examinations) Query Optimization – Recovery system - Early Lock Release and Logical Undo Operations - ARIES** - Remote Backup Systems - Object-Based Databases	-	CO1, CO2, CO3, CO4, CO5	K1 K2 K3 K4 K5

Text Book

1. Database System Concepts, AviSilberschatz, Henry F. Korth, S. Sudarshan, Sixth Edition, McGraw-Hill Publication, 2017
2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition.
3. Mastering NoSQL A Comprehensive Guide to Learn NoSQL, Cybellium, 2023

Reference Book

1. Advanced Database Management System by RiniChakrabarti, ShilbhadraDasgupta, Dreamtech Publication, 2020
2. Fundamentals of Database Systems, Elmasri Navathe Pearson Education.
3. An Introduction to Database systems, C.J. Date, A.Kannan, S.Swami Nadhan, Pearson, Eight Edition

Web References

1. <https://nptel.ac.in/courses/106106220>
2. <https://www.coursera.org/learn/database-management>
3. <https://www.w3schools.in/dbms/database>

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar

Course Designer

Dr. P. Tamil Selvi, Associate Professor, Department of Information Technology.

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT2CC5	Advanced Operating Systems	CORE COURSE V	6	5

Course Objectives

- Define the fundamentals of Operating Systems.
- Explain distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols
- Illustrate resource management components viz. the algorithms for implementation of shared memory, recovery and commit protocols
- Identify the Virtual machine and windows components and management aspects of Real time

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Describe and explain the advanced components of a computer operating system	K1,K2
CO2	Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems.	K3
CO3	Understand new design approaches to address challenges of security, robustness, and concurrency	K3
CO4	Implement and performance tuning of operating systems in preparation to entering the industry or in pursuit of graduate studies	K4
CO5	Apply Virtual Machine, Windows design principles and advanced Operating system technologies in real-world	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	1	2	3	2	1	3	2
CO2	3	2	3	2	3	2	2	2	2	2
CO3	2	3	3	2	3	3	3	1	3	3
CO4	3	3	3	2	3	2	3	3	3	2
CO5	3	2	2	2	2	3	3	2	3	3

“1” – Slight (Low) Correlation, “2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation “-” indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Introduction: Computer-system – Organization - Operating-system structure and operations-Process Management-Memory management-Storage management-Protection and Security-Open Source Operating Systems-User and operating-system Interface-Operating-system debugging-Operating system Generation-System Boot	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	Process Management: Process concepts – Process scheduling – Multicore Programming– Multithreading models – Thread Libraries-Implicit Threading-Threading issues. Process Synchronization: Critical section problem – synchronization hardware – Semaphores – Classical problems of synchronization – Monitors	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	Memory management – Swapping – Contiguous memory allocation. Paging – Segmentation– Structure of the page table. Virtual memory – Demand paging – Copy–on–write- page replacement – Allocation of Frames-Thrashing-Memory-mapped files. Storage Management: Overview of Mass-storage structure - disk structure-disk attachment - disk scheduling - disk management-swap - space management RAID Structure- File Systems: Access methods - Directory structure – File –system structure-file system implementation - Allocating methods-free space management-efficiency and performance-Recovery	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	Protection and Security: Goals of Protection-Principles of Protection-Domain of Protection-Access Matrix-Implementation of Access Matrix-Access control - Revocation of Access Rights-Capability Based Systems-Language based protection Security Problem- Program Threats - System and Network Threads - cryptography as a security tool-User authentication - Firewalling to protect systems and networks	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	Virtual Machines: History- Benefits and Features-Building Blocks-Types of Virtual Machines and their implementation - virtualization and Operating systems components-Windows 7 - Design Principles-System Components-Terminal services and Fast User Switching-File System- Networking- Programmer Interface	18	CO1, CO2, CO3, CO4, CO5	K1 K2 K3 K4 K5
VI	Self Study for Enrichment (Not included for End Semester Examinations) Distributed Operating Systems-Types of Network-based Operating Systems-Network Structure-Communication Protocols-Distributed Files Systems-Linux System	-	CO1, CO2, CO3, CO4, CO5	K1 K2 K3 K4 K5

Text Book

1. Silberschatz and Galvin, “Operating System Concepts”, Ninth Edition, John Wiley and Sons, 2012.

Reference Book

1. Advanced Operating Systems and Kernel Applications Resources, By Song Jiang · 2010, Information Science
2. DeitelChoffnes, Operating Systems, 3rd Edition, Pearson Education, 2003.
3. Stuart E. Madnick, John J.Donovan. Operating Systems, 3rd Edition, Tata McGraw-Hill,2003.

Web References

1. https://onlinecourses.nptel.ac.in/noc20_cs04/preview
2. <https://minnie.tuhs.org/CompArch/Resources/os-notes.pdf>

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar

Course Designer

Dr. J.Sangeetha, Associate Professor, Department of Information Technology.

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT2CCC1A	Data Mining Techniques using R	Core Choice Course-I (CCC)	6	4

Course Objectives

- Understand the fundamental concepts and process of data mining and knowledge discovery.
- Apply data mining algorithms practically using R.
- Develop the ability to analyze and interpret mining results in real-world contexts.

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Explain the process and functionalities of knowledge discovery and data mining.	K1, K2
CO2	Apply association, classification, and clustering techniques to datasets.	K2
CO3	Evaluate and compare data mining algorithms using suitable metrics.	K3
CO4	Implement data mining tasks in R using relevant packages.	K3, K4
CO5	Discuss new trends such as deep learning and ethical considerations.	K4, K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	1	2	2	2	3	3	3
CO2	3	2	3	1	2	3	3	2	3	2
CO3	3	3	3	2	2	3	3	2	2	3
CO4	3	2	3	2	3	2	3	3	3	2
CO5	3	3	2	3	2	3	3	2	2	3

“1” – Slight (Low) Correlation, “2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation “-” indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Data Mining: What is Data Mining? – Data Mining: an essential step in knowledge discovery – Diversity of data types of data mining – Mining various kinds of knowledge – Data mining: confluence of multiple disciplines –Data mining and applications – Data mining and society.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	Data, measurements, and data pre processing: Data Types Statistics of data– Similarity and distance measures-Data quality, data cleaning, and data integration– Data transformation– Dimensionality reduction.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	Classification: basic concepts and methods: Basic concepts – Decision tree induction – Decision tree induction – Bayes classification methods. Lazy learners (or learning from your neighbors) - Linear classifiers - Model evaluation and selection: Metrics for evaluating classifier performance.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	Data Mining with R: Introduction to R – Starting with R – Basic Interaction with the R Console – R Objects and Variables – R Functions – Vectors – Vectorization – Factors- Generating Sequences – Sub-Setting – Matrices and Arrays – Lists – Data Frames – Useful Extensions to Data Frames – Objects, Classes, and Methods.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	Data Mining with R: A Bird’s Eye View on Data Mining – Data Collection and Business Understanding – Data and Datasets – Importing Data into R – Data Pre-Processing : Data Cleaning – Transforming Variables – Dimensionality Reduction – Modeling: Clustering.	18	CO1, CO2, CO3, CO4, CO5	K1 K2 K3 K4 K5
VI	SELF STUDY: Evaluation: The Hold out and Random Subsampling – Cross Validation – Bootstrap Estimates – Recommended Procedures.	-	CO1, CO2, CO3, CO4, CO5	K1 K2 K3 K4 K5

Text Book

1. Jiawei Han, Jian Pei, Hanghang Tong , “**Data Mining Concepts and Techniques Fourth Edition**”, Morgan Kaufmann Publishers, 2023.
2. Luís Torgo, “**Data Mining with R, Learning with Case Studies, Second Edition**”, CRC Press Taylor & Francis Group, 2017.

Reference Book

3. Michael Hahsler, “An R Companion for Introduction to Data Mining “, 2024
4. Charu C. Aggarwa, “Data Mining The Textbook”, 2015

Web References

1. <https://www.rdatamining.com/>
2. <https://www.tutorialspoint.com/exploring-data-mining-with-r>
3. <https://youtu.be/BB2O4VCu5j8?si=MXlkJMuWGIJAAEcs>
4. <https://share.google/ynv1Nxa2XSZrQLEl>

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar

Course Designer

Dr. P. SUDHA, Associate Professor, PG and Research Department of Mathematics

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT2CCC1B	Open Source Technologies	Core Choice Course – I	6	4

Course Objectives

- To understand concepts, strategies, and methodologies of open source software development
- To explore key features and core concepts open source software products and development tools
- To utilize open source software for developing a variety of software applications, particularly Web applications

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Identify and understand the key concepts of Linux	K1, K2
CO2	Demonstrate proficiency in developing web-based applications using PHP and MySQL	K2, K3
CO3	Apply programming constructs and object-oriented concepts in Python for solving real-world problems	K3
CO4	Analyze and configure open-source web servers and development environments	K4
CO5	Evaluate open-source tools and technologies for effective software development, emphasizing collaboration, scalability, and enterprise use cases	K4, K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	2	2	2	2	3	3	1
CO2	3	2	3	2	2	3	3	2	3	2
CO3	3	3	3	2	2	3	3	2	2	3
CO4	3	2	3	2	3	2	3	3	3	2
CO5	3	3	2	3	2	3	3	2	2	3

“1” – Slight (Low) Correlation, “2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation “-” indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Introduction: Need of Open Sources – Advantages of Open Sources – Applications – Open source Operating Systems. LINUX: Introduction – General Overview – Kernel mode and User mode process – Basic shell commands – Logging in, Listing files, editing files, copying/moving files, viewing file contents, changing file modes and permissions, process management User and group management – File ownerships and permissions	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	PHP: Introduction – Basic Syntax of PHP – Common PHP Script Elements – Using Variables – Constants – Data types – Operators – Working With Arrays – Using Functions – OOP – String manipulation and regular expression – File and Directory Handling– Including Files – File Access. Working With Forms: Processing Forms – Form Validation – Introduction to advanced PHP concepts – Simple programs using PHP	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	MySQL: Introduction – The Show Databases and Table – The USE command – Create Database and Tables – Describe Table – Select, Insert, Update, and Delete statement – Table Joins PHP and MYSQL: PHP Connectivity – Sending and receiving emails – PHP Database Connectivity: Retrieving data from MYSQL – Manipulating data in MySQL using PHP – Simple programs using MySQL	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	Python: Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	Open Source Tools and Technologies: Web Server – Apache Web Server – Working with Web Server – Configuring and using apache web services – Open source software tools: Browsers – Processors – Compilers – Model driven architecture tools – Eclipse IDE platform: Architecture – History – Simultaneous Releases – Case study: E–Governance – Government Policy toward Open Source.	18	CO1, CO2, CO3, CO4, CO5	K1 K2 K3 K4 K5
VI	Self Study for Enrichment: (Not included for End Semester Examination) Commercial aspects of Open Source movement – Certification courses issues – programming in web environment – Some Administrative detail	-	CO1, CO2, CO3, CO4, CO5	K1 K2 K3 K4 K5

Text Book

1. Lee, J., & Ware, B. “**Open Source Web Development with LAMP using Linux, Apache, MySQL, PERL and PHP**”, Addison-Wesley, 2003.

Reference Book

1. Michael K. Glass, "The LAMP Stack: Linux, Apache, MySQL, PHP, Perl, Python", Packt Publishing, 2018
2. Eric Rosebrock, Eric Filson, “Setting Up LAMP Getting Linux, Apache, MySQL, and PHP Working Together”, Wiley, 2006

Web References

4. https://www.academia.edu/9030473/Using_LAMP_for_Web_Development
5. <https://dokumen.pub/open-source-web-development-with-lamp-using-linux-apache-mysql-perl-and-php-020177061x-9780201770612.html>
6. https://www.w3schools.com/php/php_mysql_intro.asp
7. https://www.w3schools.com/php/php_mysql_intro.asp

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar

Course Designer

Ms. V. Infine Sinduja, Associate Professor, Department of Information Technology

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT2CCC1C	Cloud Computing	Core Choice Course – I	6	4

Course Objectives

- To learn about the basic concepts in Cloud Computing
- To know about Cloud infrastructure mechanisms and cloud service management
- To describe the cloud computing architecture design principles
- To understand the role of virtualization in building an efficient cloud architecture
- To identify and discuss cloud security threats

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	To define the core concepts of cloud computing paradigm, characteristics, advantages, challenges and threats from various cloud computing models and services	K1,K2
CO2	To identify the cloud computing, models, services, techniques and applications with different cloud architectures	K2,K3
CO3	To apply the fundamental concepts of Virtualization in cloud and discuss its types and usage with different cloud models and services	K3
CO4	To analyze the performance of cloud computing with cloud security issues in recent technologies and platforms	K4
CO5	To summarize the importance of cloud computing models, services, usage of virtualization with cloud security issues	K5

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	1	2	3	3	1	2	2
CO2	2	2	3	2	2	2	3	2	2	2
CO3	3	3	3	2	3	3	3	1	3	3
CO4	3	2	3	2	3	3	3	2	3	3
CO5	3	3	3	2	3	3	3	2	3	3

“1” – Slight (Low) Correlation

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-” indicates there is no correlation

SYLLABUS

UNIT	CONTENTS	HOURS	COs	COGNITIVE LEVEL
I	Introduction to the Cloud Computing Introduction to Cloud Computing: Basic Concepts and Terminology, Goals and Benefits, Risks and Challenges. Virtualization Technology: Hardware Independence, Server Consolidation, Resource Replication, Operating System-based Virtualization, Hardware-Based Virtualization, Virtualization Management.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	Fundamental concepts and models: Roles and boundaries, Cloud Characteristics, Cloud Delivery models, Cloud Deployment models. Cloud service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). Fundamental Cloud Security: Basics, Threat agents, Cloud security threats. Industrial Platforms and New Developments: Amazon Web Services, Google App Engine, Microsoft Azure	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	Fundamental Cloud Architectures: Workload Distribution Architecture, Resource Pooling Architecture, Dynamic Scalability Architecture, Elastic Resource Capacity Architecture, Service Load Balancing Architecture, Cloud Bursting Architecture, Elastic Disk Provisioning Architecture, Redundant Storage Architecture. Advanced Cloud Architectures: Hypervisor Clustering Architecture, Load Balanced Virtual Server Instances Architecture, Non-Disruptive Service Relocation Architecture, Zero Downtime Architecture, Cloud Balancing Architecture, Resource Reservation Architecture, Dynamic Failure Detection and Recovery Architecture, Bare-Metal Provisioning Architecture, Rapid Provisioning Architecture, Storage Workload Management Architecture	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	Fundamental Cloud Architectures: Workload Distribution Architecture, Resource Pooling Architecture, Dynamic Scalability Architecture, Elastic Resource Capacity Architecture, Service Load Balancing Architecture, Cloud Bursting Architecture, Elastic Disk Provisioning Architecture, Redundant Storage Architecture. Advanced Cloud Architectures: Hypervisor Clustering Architecture, Load Balanced Virtual Server Instances Architecture, Non-Disruptive Service Relocation Architecture, Zero Downtime Architecture, Cloud Balancing Architecture, Resource Reservation Architecture, Dynamic Failure Detection and Recovery Architecture	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	Cloud Delivery Model Considerations: Cloud Delivery Models: The Cloud Provider Perspective, Cloud Delivery Models: The Cloud Consumer Perspective, Cost Metrics and Pricing Models: Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	Self-Study for Enrichment (Not included for End Semester Examinations) Service Quality Metrics and SLAs: Service Quality Metrics, SLA Guidelines	–	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

TEXT BOOKS

1. Ricardo Puttini, Thomas Erl, and Zaigham Mahmood “**Cloud Computing - Concepts, Technology and Architecture**” 2013
2. A. Srinivasan, “**Cloud Computing: A Practical Approach for Learning and Implementation**” 1st Edition by, 2014

REFERENCE BOOKS

3. Mastering Cloud Computing: Foundations and Applications Programming by Christian Vecchiola, Rajkumar Buyya, and S.Thamarai Selvi, 2013
4. Distributed and Cloud Computing: From Parallel Processing to the Internet of Things by Geoffrey C Fox, Jack Dongarra, and Kai Hwang, 2012

WEB REFERENCES

4. <https://www.coursera.org/learn/cloud-computing>
5. <https://www.geeksforgeeks.org/cloud-computing/cloud-computing-tutorial/>

PEDAGOGY

Chalk and Talk, Power Point Presentation, Discussion, Assignment, Demo, Quiz and Seminar.

COURSE DESIGNER

Dr.M.Ellakkiya, Associate Professor, Department of Information Technology

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT2CC2P	Advanced Database Management Systems (P)	CORE PRACTICAL II	6	5

Course Objectives

- Provide hands-on experience in fundamental and advanced SQL, covering data definition, manipulation, joins, sub-queries, and view creation.
- Impart practical skills in database performance tuning, including indexing and query optimization using execution plans.
- Develop proficiency in procedural SQL (PL/SQL) for implementing stored procedures, functions, cursors, and triggers to enforce complex business logic.
- Enable students to practically demonstrate and analyze core concepts of transaction management, concurrency control, and system recovery.

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Apply fundamental and advanced SQL (CRUD, Joins, Sub-queries, Views) for effective data retrieval and management	K3
CO2	Analyze and optimize query performance by creating and evaluating indexing strategies using tools like EXPLAIN	K4
CO3	Implement procedural constructs (PL/SQL) including stored procedures, functions, and triggers to automate database tasks.	K3
CO4	Demonstrate and analyze transaction properties, concurrency control (locking), and database recovery simulation.	K4
CO5	Simulate and analyze database recovery system functionalities, including the management of undo/redo logs and checkpoints to ensure data resilience.	K4, K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	2	1	3	2	1	2	1
CO2	3	2	3	2	1	3	3	2	2	1
CO3	3	3	3	3	2	3	3	3	3	2
CO4	3	3	3	3	2	3	3	3	3	2
CO5	3	3	3	3	2	3	3	3	3	2

“1” – Slight (Low) Correlation

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-” indicates there is no correlation

EXERCISES

1. Set up DB, create tables, perform basic CRUD, simple queries
2. Implement joins, set operations, aggregates, views.
3. Implement Sub queries and nested queries
4. Query Processing & Cost Estimation
 - a. EXPLAIN
5. Create single column and composite indexes
 - a. Use EXPLAIN to see index usage
 - b. Drop index and compare timings
6. Demonstrate atomicity, commit/rollback, savepoints.
7. PL/SQL Basics
8. Stored Procedures & Functions
9. Cursors & Triggers
10. PL/SQL Packages & Bulk Operations
11. Demonstrate shared/exclusive locks, deadlocks, isolation levels
12. Understand undo/redo logs, checkpoints and recovery simulation

WEB REFERENCES

1. <https://www.dbvis.com/thetable/sql-explain-the-definitive-tool-to-optimize-queries>
2. <https://www.geeksforgeeks.org/sql>
3. <https://www.tutorialspoint.com/plsql/index.htm>

PEDAGOGY

Chalk and Talk, Power Point Presentation, Demo

COURSE DESIGNER

Dr.P.Tamilselvi. Associate Professor, Department of Information Technology

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT2DSE2AP	Data Mining Techniques using R (P)	Discipline Specific Elective Course-II (DSE)	6	3

Course Objectives

- To understand Data mining techniques and algorithms.
- Comprehend the data mining environments and application.
- Develop the ability to analyze and interpret mining results in real-world contexts.

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Compare various conceptions of data mining as evidenced in both research and application.	K1
CO2	Evaluate mathematical methods underlying the effective application of data mining.	K2
CO3	Should be able to apply the type of techniques based on the problems considered.	K3
CO4	Can find out the market patterns and association amongst different products.	K4
CO5	Implement data mining tasks in R using relevant packages.	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	2	3	1	2	2	1
CO2	3	3	2	3	3	2	3	2	3	2
CO3	3	2	3	3	3	3	3	3	2	3
CO4	3	3	3	2	3	2	3	3	3	3
CO5	3	3	3	3	3	3	3	2	3	3

“1” – Slight (Low) Correlation

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-” indicates there is no correlation

LAB EXERCISES

1. Get and Clean data using dplyr exercises.
2. Visualize all Statistical measures(Mean ,Mode, Median, Range, Inter Quartile Range etc.,using Histograms, Boxplots and Scatter Plots).
3. Create a data frame with atleast 10 entries of columns EMPID, EMPNAME, SALARY, STARTDATE a. Extract two column names using column name. b. Extract the first two rows and then all columns. c. Extract 3rd and 5th row with 2nd and 4th column.
4. Create a data frame with 10 observations and 3 variables and add new rows and columns to it using 'rbind' and 'cbind' function.
5. Create a function to discretize a numeric variable into 3 quantiles and label them as low, medium, and high. Apply it on each attribute of any dataset to create a new data frame. 'discrete' with Categorical variables and the class label.
6. Create a simple scatter plot using any dataset using 'dplyr' library. Use the same data to indicate distribution densities using box whiskers.
7. Write R Programs to implement k-means clustering, k-medoids clustering and density based clustering on any datasets.
8. Write a R Program to implement decision trees using 'reading Skills' dataset.
9. Implement decision trees using any dataset using package party and 'rpart'.
10. Generate top 5 association rules using apriori.
11. Generate top 5 association rules using ECLAT.
12. Write an R program to implement Naïve bayes Classification.

Web References

1. <https://www.rdatamining.com/>
2. <https://www.tutorialspoint.com/exploring-data-mining-with-r>
3. <https://youtu.be/BB2O4VCu5j8?si=MXlkJMuWGIJAAEcs>
4. <https://share.google/ynv1Nxa2XSZrQLEI>

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar

Course Designer

Dr. P. SUDHA, Associate Professor, PG and Research Department of Mathematics

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT2DSE2BP	Open Source Technologies (P)	Discipline Specific Elective Course-II	6	3

Course Objectives

- To understand the fundamental concepts and syntax of open-source programming languages such as Shell scripting, PHP, and Python
- To develop programs using open-source tools for file handling, string processing, arithmetic operations, and database connectivity
- To apply problem-solving techniques in designing and implementing small-scale applications using open-source technologies..

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Recall basic syntax and commands used in Shell scripting, PHP, and Python	K1
CO2	Identify the logic and structure of open-source programs for file and data manipulation	K2, K3
CO3	Apply programming concepts to develop Shell, PHP, and Python scripts for given tasks	K3, K4
CO4	Analyze and debug open-source programs for functional accuracy and efficiency	K4
CO5	Evaluate and integrate open-source tools to develop complete software solutions	K4, K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	1	3	3	2	2	3	2	3	3	3
CO2	3	2	3	2	2	3	3	2	3	3
CO3	3	3	3	2	2	3	3	2	2	3
CO4	3	2	3	2	3	3	3	3	3	2
CO5	3	3	2	3	2	3	3	2	2	3

“1” – Slight (Low) Correlation

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-” indicates there is no correlation

LAB EXERCISE

1. Create a shell script that accept a file name starting and ending line numbers as arguments and display all the lines between given line no:
2. Create a script that delete all lines containing a specified word
3. Create a shell script that displays a list of all the files in the current directory
4. Create a shell script to find the factorial of given integer
5. Construct a shell script that list the all files in a directory.
6. Create a PHP script to redirect a user to a different page
7. Create a PHP script to calculate the difference between two dates.
8. Connect with MySQL and create student marksheet
9. Create a simple calculator to do all the arithmetic operations in Python
10. Create new module for mathematical operations and use it in the Python program
11. Develop a Python program to read and write files, create and delete directories
12. Develop a Python program using string handling and regular expressions

Web References

1. <https://www.geeksforgeeks.org/linux-unix/shell-script-to-perform-operations-on-a-file/>
2. <https://dokumen.pub/open-source-web-development-with-lamp-using-linux-apache-mysql-perl-and-php-020177061x-9780201770612.html>
3. <https://www.sourcecodester.com/srms-makumbusho>

Pedagogy

Chalk and Talk, Power Point Presentation, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Ms. V. Infine Sinduja, Associate Professor, Department of Information Technology

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT2DSE2CP	Cloud Computing (P)	Discipline Specific Elective Course-II	6	3

Course Objectives

- To understand the basics of virtualization, web services, and cloud platforms using tools such as VMware, Hyper-V, Azure, and Google App Engine.
- To develop and deploy virtual machines, web services, and cloud-based applications with database connectivity.
- To apply hands-on skills in implementing Storage as a Service, Platform as a Service, and other cloud concepts through practical experiments.

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome On the successful completion of the course, students will be able to	Cognitive Level
CO1	Understand and apply basic virtualization concepts using VMware and Hyper-V.	K1
CO2	Configure virtual networks for communication between virtual machines.	K2, K3
CO3	Develop and deploy basic web services with database connectivity.	K3, K4
CO4	Demonstrate the use of cloud service models such as SaaS and PaaS.	K4
CO5	Build and deploy simple applications on cloud platforms like Azure and Google App Engine.	K4, K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	1	3	3	2	2	3	2	3	3	3
CO2	3	2	3	2	2	3	3	2	3	3
CO3	3	3	3	2	2	3	3	2	2	3
CO4	3	2	3	2	3	3	3	3	3	2
CO5	3	3	2	3	2	3	3	2	2	3

“1” – Slight (Low) Correlation

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-” indicates there is no correlation

LAB EXERCISE

1. Creating VMs using VMWare workstation.
2. Connecting VMs in a network.
3. Implement virtualization using VMWare ESXi Server and managing with vCenter.
4. Implement Windows Hyper V virtualization.
5. Show the implementation of web services.
6. Implementing Web Service that connects to MySQL database.
7. Study and Implementation of Storage as a Service.
8. Study and Implementation of Platform as a Service.
9. Develop an application for Microsoft Azure.
10. Develop an application for Google App Engine

Web References

1. VMware Virtualization Documentation
<https://www.vmware.com/support/pubs/>
2. Microsoft Hyper-V and Azure Documentation
<https://learn.microsoft.com/>
3. Google Cloud & App Engine Documentation
<https://cloud.google.com/docs>

Pedagogy

Chalk and Talk, Power Point Presentation, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Dr.M.Ellakkiya Associate Professor, Department of Information Technology

Semester III	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT3CC6	Natural Language Processing	Core Course - VI (CC)	6	5

Course Objectives

- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems.
- Able to manipulate probabilistic, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.
- Able to design, implement, and analyze NLP algorithms.
- Able to design different language modeling techniques.

S. No.	Course Features	• Relevance Status
1	Course emphasis on Employability/Entrepreneurship/Skill Development	Employability / Skill Development
2	Course integrates cross cutting issues relevant to Professional Ethics/Gender Sensitization / Environment and Sustainability / Human Values / Indian Knowledge System	Professional Ethics, Human Values
3	Course relevant to Local/Regional/National/Global needs	Global
4	Course focus on Sustainable Development Goals	SDG 4, 8, 9,17

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome On the Successful Completion of the course	Cognitive Level
CO1	Remembering and understanding basic NLP concepts	K1, K2
CO2	Understanding and applying parsing and syntax models	K2, K3
CO3	Analyse semantic and discourse-level language-processing techniques.	K3, K4
CO4	Applying, analyzing, and evaluating representation models	K3, K4
CO5	Design and evaluate advanced NLP applications using neural and transformer-based models	K5, K6

Mapping of CO with PO and PSO

	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PO1	PO 2	PO3	PO 4	PO 5
CO1	3	2	2	1	2	3	2	1	2	2
CO2	3	2	3	1	3	3	3	1	2	2
CO3	3	2	3	1	3	3	3	1	2	2
CO4	3	3	3	1	3	3	3	1	2	3
CO5	3	3	3	1	3	3	3	1	3	3

“1” – Slight (Low) Correlation

“2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation “-” indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Natural Language Processing-History of NLP, Advantages of NLP, Disadvantages of NLP-Challenges of NLP, Components of NLP, Applications of NLP, how to build an NLP pipeline? Phases of NLP, NLP APIs, NLP Libraries.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
II	Natural Language Processing Models and Algorithm: Unigram Language Model, Bigram, Trigram, N-gram, Advanced smoothing for language modelling, Applications of Language Modeling, Natural Language. Generation, Parts of Speech Tagging, Morphology, Named Entity Recognition	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
III	Text Processing: Continuous Bag-Of-Words, embedding representations for words Lexical Semantics, Word Sense Disambiguation, Knowledge-Based and Supervised Word Sense Disambiguation, Tokenization, Cleaning, Tokenizing, Removing Special Characters, Expanding Contractions, Removing Stop words, Correcting Words, Stemming, Lemmatization, Understanding Text structure.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
IV	Text Analysis, Summarization and Extraction: Text Classification, Text Summarization, Information Extraction, Named Entity, Recognition, Question Answering in Multilingual Setting; NLP in Information, Retrieval, Cross-Lingual IR	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
V	Applications of NLP: Unsupervised Learning on Text Clustering by Document Similarity – Distance Metrics, Partitive Clustering, Hierarchical Clustering: Analyzing Document Similarity, Document Clustering, Speech recognition.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6

VI	<p>Self Study for Enrichment (Not included for End Semester Examinations)</p> <p>Machine Translation: Need of MT, Problems of Machine Translation, MT Approaches, Direct Machine, Translations, Rule-Based Machine Translation, Knowledge-Based MT System, Statistical Machine Translation (SMT)</p> <p>Assignments: Chatbot for College Enquiry System, Spam Email Detection.</p>		CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5 K6
----	--	--	-------------------------------------	--------------------------------------

Text Books

1. Speech and Language Processing - An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition Second Edition by Daniel Jurafsky and James H. Martin, Pearson Education India,2013.
2. Text analytics with python, Dipanjan Sarkar, Apress,2019.
3. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and Imed Zitouni, Pearson Publication,2012.

Reference Books

1. Steven Bird, Ewan Klein, Edward Loper, *Natural Language Processing with Python*, O'Reilly Media, Sebastopol, 2019.
2. Nitin Indurkha, Fred J. Damerau, *Handbook of Natural Language Processing*, CRC Press, Boca Raton, 2018.
3. Christopher D. Manning, Hinrich Schütze, *Foundations of Statistical Natural Language Processing*, MIT Press, Cambridge, 2019.

Web References

1. <https://nlp.stanford.edu>
2. <https://huggingface.co/learn>
3. <https://www.nltk.org>
4. <https://spacy.io/usage>
5. <https://machinelearningmastery.com/natural-language-processing/>

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Dr. M.Ellakkiya, Associate Professor, Department of Information Technology.

Semester III	Internal Marks: 25		External Marks: 75	
COURSE CODE	COURSE TITLE	CATEGORY	HRS./ WEEK	CREDITS
25PIT3CC7	Internet of Things and its Applications	Core Course – VII (CC)	6	5

Course Objective

- To impart fundamental knowledge of IoT architecture, design methodologies, and communication protocols
- To introduce sensors, devices, and system management techniques
- To enable students to develop and deploy real-world IoT applications using Raspberry Pi and cloud platforms.

S. No.	Course Features	Relevance Status
1	Course emphasis on Employability/Entrepreneurship/Skill Development	Employability
2	Course integrates cross cutting issues relevant to Professional Ethics/Gender Sensitization / Environment and Sustainability / Human Values / Indian Knowledge System	Environment and Sustainability
3	Course relevant to Local/Regional/National/Global needs	Global
4	Course focus on Sustainable Development Goals	SDG 9, 11,12

Course Outcome with Cognitive Level

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Understand the fundamentals, architecture, and design principles of Internet of Things (IoT) systems	K1, K2
CO2	Analyze IoT communication models, protocols, and system management frameworks	K4
CO3	Illustrate the working of sensors, actuators, RFID, and wireless sensor networks in IoT environments	K3
CO4	Apply IoT protocols and device interfacing techniques using Raspberry Pi and Python for simple IoT applications.	K3
CO5	Explore cloud platforms and IoT-enabled solutions for real-world applications like smart cities, healthcare, and agriculture.	K5, K6

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	2	2	3	2	2	2	1
CO2	3	3	3	2	2	3	3	3	2	1
CO3	3	2	3	2	1	3	3	3	2	1
CO4	3	3	2	2	2	3	3	2	2	2
CO5	3	3	3	3	2	3	3	3	3	2

“1”-Slight (Low)Correlation

“2”-Moderate(Medium)Correlation

“3” –Substantial (High)Correlation

“-” - Indicates there is no Correlation

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Introduction to IoT: Definition and Characteristics of IoT - Physical Design of IoT: Things in IoT - IoT Protocols - Logical Design of IoT: Function blocks - Communication Models - IoT Enabled Technologies - IoT Levels and Deployment Templates.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
II	IoT and M2M: M2M - Difference between IoT and M2M - Software Defined Networks - Network Function virtualisation - IoT System Management with NETCONF–YANG: Need for IoT systems management - SNMP - Network Operator requirements - IoT systems management. IoT Design Methodology: Purpose & Requirements Specification - Process Specification - Domain Model Specification - Information Model Specification - Service Specifications - IoT Level Specifications - Functional View Specification - Operational View Specification - Device & Component Integration - Application Development.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
III	Sensors, Participatory Sensing, RFIDs: Introduction – Sensor Technology – Participatory Sensing, Industrial IoT and Automotive IoT – Actuator – Sensor Data Communication Protocols, RFID – Wireless Sensor Networks Technology.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6

IV	<p>Protocols for IoT: Layered Architecture for IoT – Protocol Architecture of IoT – IEEE802.15.4 – 6LoWPAN – Bluetooth Low Energy – Z-Wave – ZigBee.</p> <p>IoT Physical Devices and Endpoints: Building blocks of an IoT Device, Exemplary device: Raspberry Pi, Linux on Raspberry Pi, Raspberry Pi Interfaces - Serial, SPI, I2C, Programming Raspberry Pi with Python.</p>	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
V	<p>IoT Physical Servers & Cloud Offerings: Introduction to Cloud Storage Models – WAMP for IoT – Xively Cloud for IoT – Amazon Web Services for IoT</p> <p>Applications of IoT: Home Automation, Cities, Logistics, Health and Lifestyle. Case study on IoT: Smart Parking, Weather Monitoring.</p>	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
VI	<p>Self Study for Enrichment (Not included for End Semester Examinations) Tools for IoT: Introduction – Chef – Chef case studies. Applications of IoT: Environment - Retail – Industry. Case Studies Illustrating IoT Design: Smart Irrigation – Productivity Applications.</p>		-	-

Text Books

1. Internet of Things – A Hands-on Approach – Arshdeep Bahga, Vijay Madiseti – University Press (India) Pvt. Ltd., 2015
2. Internet of Things Architecture and Design Principles – Raj Kamal – McGraw Hill Education (India) Private Limited, 2017
3. The Internet of Things, Enabling Technologies, Platforms, and Use Cases – Pethuru Raj and Anupama C. Raman – CRC Press Taylor & Francis – 2017

Reference Books

1. Internet of Things – Architecture, Protocols and Standards – Simone Cirani, Gianluigi Ferrari, Marco Picone, Luca Velti – John Wiley & Sons Ltd – 2019.
2. From Machine-to-Machine to the Internet of Things – Introduction to a New Age of Intelligence, Jan Höller, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle and Elsevier, 2014

WebReferences

1. https://onlinecourses.nptel.ac.in/noc26_cs37/preview
2. https://onlinecourses.nptel.ac.in/noc26_cs38/preview
3. <https://www.youtube.com/watch?v=1KVrBjSqS5s>

Pedagogy

Chalk and talk, Power Point Presentation, Demonstration, Online Resource

Course Designer

Dr. A. BHUVANESWARI, Associate Professor, Information Technology

Semester III	Internal Marks: 25		External Marks: 75	
Core Choice Course– II (CCC)	COURSE TITLE	CATEGORY	HRS./ WEEK	CREDITS
25PIT3CCC2B	B. Mobile Application Development using Android	Core Choice Course– II (CCC)	5	4

Course Objective

- To provide the students with the basics of Android Software Development tools, development of software on mobile platforms and deploying software to mobile devices.

S. No.	Course Features	Relevance Status
1	Course emphasis on Employability/Entrepreneurship/Skill Development	Employability
2	Course integrates cross cutting issues relevant to Professional Ethics/Gender Sensitization / Environment and Sustainability / Human Values / Indian Knowledge System	Environment and Sustainability
3	Course relevant to Local/Regional/National/Global needs	Global
4	Course focus on Sustainable Development Goals	SDG 4, 8, 9

Course Outcome with Cognitive Level

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Demonstrate the setup and configuration of Android Development Environment.	K1, K2
CO2	Apply the necessary UI components with different styles, themes, views, and layouts	K1
CO3	Examine and implement the required services such as messaging, mailing, multimedia concepts for the given problem	K3
CO4	Test and debug the Android applications with different inputs.	K4
CO5	Create mobile applications that make use of various android features, functions and database tasks	K5, K6

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3	3	3	2	3	3
CO2	3	3	3	3	3	3	3	3	2	3
CO3	3	2	3	2	3	3	3	2	2	3
CO4	3	3	3	3	3	3	3	3	3	3
CO5	3	2	3	3	2	3	3	2	2	3

“1”-Slight (Low)Correlation

“2”-Moderate(Medium)Correlation

“3” –Substantial (High)Correlation

“-” - Indicates there is no Correlation

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Getting Started with Android Programming – Getting to know the Android User Interface: Understanding the Components of a Screen - Display Orientation - Screen Orientation.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
II	Designing your User Interface with views: Basic Views – Picker Views – List Views - Displaying Pictures and Menus with Views	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
III	Activities, Fragments and Intents: Understanding Activities – Applying Styles and Themes to an Activity – Displaying a Dialog Window – Displaying a Progress Dialog – Linking Activities Using Intents – Fragments.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
IV	Utilizing the Action Bar: Adding Action Items to the Action Bar – Customizing the Action Items and Application Icon -Working with Audio and Video. Data Persistence: Creating and Using Databases.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
V	Messaging: SMS Messaging – Sending E- Mail. Location-Based Services: Displaying Maps. Developing Android Services – Publishing Android Applications	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
VI	Self Study for Enrichment Using Eclipse for Android Development – Using Android Emulator - Getting Location Data, Monitoring Location (Not included for End Semester Examinations)		-	-

Text Books

Wei – Meng Lee, (2012), Beginning Android 4 Application Development, Wiley India Edition

Reference Books

1. OnurCinar, (2012), Android Apps with Eclipse, Apress, Springer(India) Private Limited.
2. RetoMeier, (2010), Professional Android 2 Application Development, Wiley India Edition

WebReferences

1. <http://developer.android.com/training/basics/firstapp/index.html>
2. www.vogella.com/articles/Android/article.html
3. www.edumobile.org/android/category/android-beginner-tutorial
4. <http://www.androidhive.info/2011/11/android-sqlite-database-tutorial/>
(Unit V: Ex. No.3 (SQLite Database))

Pedagogy

Chalk and talk, Power Point Presentation, Demonstration, Online Resources

Course Designer

Dr. A. BHUVANESWARI, Associate Professor, Information Technology

Semester III	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT3CCC2C	C. Parallel Processing	Core Choice Course – II	5	4

Course Objectives

- To understand fundamental concepts of parallel computing architectures and performance models
- To design and analyze parallel algorithms for real-world computational problems

S.No	Course Features	Relevance Status
1.	Course emphasis on Employability/Entrepreneurship/Skill Development	Employability, Skill Development
2.	Course integrates cross cutting issues relevant to Professional Ethics/Gender Sensitization / Environment and Sustainability / Human Values / Indian Knowledge System	Professional Ethics, Sustainability, Cyber Security
3.	Course relevant to Local/Regional/National/Global needs	Global Need
4.	Course focus on Sustainable Development Goals	SDG 4, 7, 9 & 13

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome On the successful completion of the course, students will be able to	Cognitive Level
CO1	Recognize the fundamental concepts of parallel architectures, programming models and performance metrics	K1, K2
CO2	Classify the parallel algorithm design strategies and scalability models	K2
CO3	Apply shared and distributed memory programming paradigms	K3
CO4	Analyze the performance and optimize parallel programs	K3, K4
CO5	Implement the emerging trends in heterogeneous and high-performance computing	K5, K6

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	2	2	2	2	3	3	1
CO2	3	2	3	2	2	3	3	2	3	2
CO3	3	3	3	2	2	3	3	2	3	3
CO4	3	2	3	2	3	2	3	3	3	2
CO5	3	3	3	3	3	3	3	2	2	3

“1” – Slight (Low) Correlation

“2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation

“-” indicates there is no correlation

SYLLABUS

UNIT	CONTENTS	HOURS	COs	COGNITIVE LEVEL
I	Parallel Computing & Architecture: Introduction - Need for Parallel Computing - Concurrency vs Parallelism - Flynn’s Classification multicore, Manycore, Clusters, NUMA -Memory Hierarchy and Cache Coherence-Interconnection Networks - Performance Metrics: Speedup, Efficiency - Amdahl’s Law and Gustafson’s Law	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
II	Shared Memory Programming: Threads and Synchronization - Critical Sections, Mutex, Semaphores - OpenMP Programming Model - Work-sharing Constructs - Parallel Loops and Reduction – Task Paralleling - Memory Consistency Models - False Sharing and Optimization	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
III	Distributed Memory Programming: Message Passing Model - MPI Architecture and Environment - Point-to-Point Communication - Collective Communication - Derived Data Types - Domain Decomposition Techniques - Deadlocks and Debugging MPI Programs	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
IV	GPU and Accelerator Programming: GPU Architecture and SIMT Model - CUDA/OpenCL Programming Model - Kernel Execution and Thread Hierarchy - Memory Management (Global, Shared, Constant) - Performance Optimization Techniques - Hybrid Programming (MPI + OpenMP / CUDA) - Parallel Libraries (BLAS, cuBLAS, TBB Overview)	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6

V	Parallel Algorithms & Performance Engineering: Parallel Sorting Algorithms - Parallel Matrix Multiplication - Parallel Graph Algorithms (BFS) - Load Balancing Techniques Scalability Analysis - Roofline Model	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6
VI	Self Study for Enrichment: (Not included for End Semester Examination) Multi-GPU Programming - SYCL and Heterogeneous Computing - Energy Efficient Parallel Computing - Parallel Frameworks: Spark / MapReduce - Parallel Debugging and Profiling Tools	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5, K6

TEXT BOOKS

1. Wen-mei W. Hwu and David B. Kirk. Programming Massively Parallel Processors: A Hands-On Approach, 4th Edition, Morgan Kaufmann, Burlington, 2022

REFERENCE BOOKS

1. Ananth Grama, Anshul Gupta, George Karypis and Vipin Kumar. *Introduction to Parallel Computing*, 2nd Edition, Addison-Wesley, Boston, 2003.
2. Michael J. Quinn. *Parallel Programming in C with MPI and OpenMP*, McGraw-Hill, New York, 2003.
3. Thomas Rauber and Gudula Runger. *Parallel Programming: for Multicore and Cluster Systems*, Springer, Heidelberg, 2013

WEB REFERENCES

1. <https://www.openmp.org>
2. <https://www.ibm.com/think/topics/parallel-computing>
3. <https://www.techtarget.com/searchdatacenter/definition/parallel-processing>

PEDAGOGY

Chalk and Talk, Power Point Presentation, Discussion, Assignment, Demo, Quiz and Seminar.

COURSE DESIGNER

Ms. V. Infine Sinduja, Associate Professor, Department of Information Technology

Semester III	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	HOURS / WEEK	CREDITS
25PIT3CC3P	Internet of Things and its Applications (P)	Core Practical - III (CP)	5	4

Course Objectives

- To provide hands-on experience with IoT hardware platforms and development tools
- To enable students interface sensors, actuators, and displays using Arduino
- To develop IoT applications integrated with web and cloud platforms.

S. No.	Course Features	Relevance Status
1	Course emphasis on Employability/Entrepreneurship/Skill Development	Employability
2	Course integrates cross cutting issues relevant to Professional Ethics/Gender Sensitization / Environment and Sustainability / Human Values / Indian Knowledge System	Environment and Sustainability
3	Course relevant to Local/Regional/National/Global needs	Global
4	Course focus on Sustainable Development Goals	SDG 9, 11,12

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
CO1	Identify and explain the components, architecture, and working of Arduino-based IoT systems.	K2
CO2	Apply Arduino IDE and programming concepts to control LEDs, displays, and motors.	K3
CO3	Interface and analyze data from sensors such as DHT11 and other input devices.	K4
CO4	Design IoT applications using PWM	K3
CO5	Implement web-based and cloud-based IoT solutions for sensor data visualization and storage	K5, K6

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	3	3	2	2	2	3
CO2	3	3	3	2	3	3	3	3	2	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	2	3	3	3	3	2	3

“1” – Slight (Low) Correlation

“2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation

“-” indicates there is no Correlation.

Syllabus

To provide programming experience on

1. Understanding Arduino UNO Board and Components
2. Installing and work with Arduino IDE
3. Blinking LED sketch with Arduino
4. Simulation of 4-way Traffic Light with Arduino
5. LED Dimmer using Pulse Width Modulation
6. Weather Monitoring using DHT11
7. Display Temperature Data with LCD interfacing
8. DC Motor Controlling
9. Time Display using 7-Segment Display
10. Display Sensor Data using Web Application
11. Sending Sensor Data to Thing Speak Cloud
12. Development of an Arduino-Based Application Incorporating Sensors, Actuators, Displays, and Cloud Integration

Web References

<https://iotvirtuallab.github.io/vlab/Experiments/index.html>

Pedagogy

Chalk and talk, Power Point Presentation, Demonstration, Online Resource

Course Designer

Dr. A. BHUVANESWARI, Associate Professor, Information Technology

Semester III	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT3DSE3A	A. Competitive Examinations for Computer Science	Discipline Specific Elective Course-III (DSE)	5	3

Course Objectives

- To provide a strong conceptual foundation in core areas of Computer Science and Information Technology required for competitive examinations.
- To develop the ability to **analyze, interpret, and apply concepts** for solving complex academic and examination-oriented problems.
- To enhance **conceptual clarity and critical thinking skills** necessary for success in national-level competitive examinations

S. No.	Course Features	Relevance Status
1	Course emphasis on Employability/Entrepreneurship/Skill Development	Skill Development
2	Course integrates cross cutting issues relevant to Professional Ethics/Gender Sensitization / Environment and Sustainability / Human Values / Indian Knowledge System	Professional Ethics and Sustainability
3	Course relevant to Local/Regional/National/Global needs	Global
4	Course focus on Sustainable Development Goals	SDG 4, 8,9

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome On the Successful Completion of the course	Cognitive Level
CO1	Demonstrate a clear understanding of fundamental and advanced theoretical concepts.	K2
CO2	Apply conceptual knowledge to solve analytical and problem-based questions	K3
CO3	Analyze complex concepts and interpret relationships among theoretical constructs.	K4
CO4	Evaluate different approaches and techniques to derive accurate and logical solutions.	K4
CO5	Integrate and synthesize knowledge effectively to meet the requirements of national-level competitive examinations.	K5, K6

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	1	2	3	2	1	2	2
CO2	3	2	3	1	3	3	3	1	2	2
CO3	3	2	3	1	3	3	3	1	2	2
CO4	3	3	3	1	3	3	3	1	2	3
CO5	3	3	3	1	3	3	3	1	3	3

“1” – Slight (Low) Correlation

“2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation

“-” indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	UNIT I: Digital Systems and Programming Foundations Digital Logic Number Systems – Boolean Algebra – Karnaugh Map Simplification – Combinational Circuits – Sequential Circuits Memory Hierarchy Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory Programming Languages Overview of Programming Languages – C Programming – Object-Oriented Programming Concepts – Programming in C++ / Java – Introduction to Web Programming	15	CO1 CO2 CO3 CO4 CO5	K1, K2, K3, K4 K5 K6
II	UNIT II: Operating Systems and Algorithmic Foundations Operating Systems Threads – CPU Scheduling – Disk Scheduling – Deadlocks – Paging – Process Management – Memory Management – Storage Management – File and Input/Output Systems – Security – Kernel Modules – Linux Operating System Data Structures and Algorithms Time and Space Complexity – Linked Lists – Stacks and Queues – Trees – Searching and Sorting Algorithms – Hashing Algorithm Design Techniques Greedy Approach – Divide and Conquer – Dynamic Programming – Graph Search Algorithms – Minimum Spanning Trees – Shortest Path Algorithms – Complexity Theory (P and NP Class Problems)	15	CO1 CO2 CO3 CO4 CO5	K1, K2, K3, K4 K5 K6
III	UNIT III: Computer Networks and Artificial Intelligence Concept of Layering – Network Types and Models – OSI and TCP/IP Reference Models – Functions of OSI & TCP/IP Layers – Flow Control and Error Control Techniques – Switching Techniques – IPv4 and IPv6 – Routers and Routing	15	CO1 CO2 CO3 CO4 CO5	K1, K2, K3, K4 K5 K6

	<p>Algorithms – TCP and UDP – Socket Programming – Congestion Control Application Layer Protocols World Wide Web (WWW) – Domain Name System (DNS) – SMTP – POP – FTP – HTTP Network Security Authentication – Basics of Public Key Cryptography – Digital Signatures and Certificates – Firewalls Artificial Intelligence Approaches to Artificial Intelligence – Knowledge Representation: Logic, Semantic Networks, Frames, Rules, Scripts, Conceptual Dependency and Ontologies – Expert Systems – Handling Uncertainty in Knowledge Turing Test Approach – Rational Agent Approach – State Space Representation of Problems – Heuristic Search Techniques – Minimax Search – Alpha-Beta Pruning Natural Language Processing Grammar and Language – Parsing Techniques – Semantic Analysis – Pragmatics Soft Computing Fuzzy Sets – Genetic Algorithms: Encoding Strategies, Genetic Operators, Fitness Functions and GA Cycle – Problem Solving using Genetic Algorithms Artificial Neural Networks Supervised Learning – Unsupervised Learning – Reinforcement Learning</p>			
IV	<p>UNIT IV: Data Management and Big Data Technologies Database management systems Basic Concepts – Data Modeling – SQL – Normalization – Data Models – Algorithms for Query Processing and Optimization – Transaction Processing – Concurrency Control Techniques – Database Recovery Techniques – Object-Oriented and Object-Relational Databases – Database Security and Authorization Data Warehousing and Data Mining Data Modeling for Data Warehouses – Concept Hierarchies – OLAP and OLTP – Association Rule Mining – Classification – Clustering – Regression – Support Vector Machines – K-Nearest Neighbour – Hidden Markov Models – Summarization – Dependency Modeling – Link Analysis – Sequence Analysis – Social Network Analysis Big Data Systems Characteristics of Big Data – Types of Big Data – Big Data Architecture – Introduction to MapReduce – Hadoop Framework – Distributed File Systems – HDFS NoSQL Databases NoSQL Concepts – Query Optimization – NoSQL Data Models – Querying and Managing NoSQL Databases – Indexing and Ordering Datasets – NoSQL in Cloud Environments</p>	15	CO1 CO2 CO3 CO4 CO5	K1, K2, K3, K4 K5 K6

V	<p>UNIT V: Computation, Artificial Intelligence, and Software Engineering</p> <p>Theory of Computation Finite Automata and Regular Languages – Context-Free Languages and Pushdown Automata – Recursively Enumerable Sets – Turing Machines</p> <p>Compiler Design Lexical Analysis – Syntax Analysis and Parsing – Syntax-Directed Translation – Intermediate Code Generation – Code Optimization Techniques</p> <p>Software Engineering Software Process Models – Software Requirements Engineering – Requirement Analysis and Modeling – Software Design – Software Quality – Software Reliability – Project Estimation and Scheduling – Software Testing – Software Configuration Management</p>	15	CO1 CO2 CO3 CO4 CO5	K1, K2, K3, K4 K5 K6
---	---	----	---------------------------------	-------------------------------------

Textbooks

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne (2018), **Operating System Concepts**, 10th Edition, Wiley
2. Andrew S. Tanenbaum, David J. Wetherall (2011), **Computer Networks**, 5th Edition, Pearson Education.
3. Stuart Russell, Peter Norvig (2020), **Artificial Intelligence: A Modern Approach**, 4th Edition, Pearson
4. Abraham Silberschatz, Henry F. Korth, S. Sudarshan (2020), **Database System Concepts**, 7th Edition, McGraw Hill,
5. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein (2022), **Introduction to Algorithms**, 4th Edition, MIT Press

Reference Books

1. M. Morris Mano(2013), **Digital Logic and Computer Design** , 5th Edition, Pearson,.
2. Mark Allen Weiss (2011), **Data Structures and Algorithm Analysis**, 3rd Edition, Pearson
3. James F. Kurose, Keith W. Ross (2021)**Computer Networking: A Top-Down Approach** , 8th Edition, Pearson
4. Jiawei Han, Micheline Kamber (2011), **Data Mining Concepts and Techniques**, Jian Pei, 3rd Edition, Morgan Kaufmann.
5. Nathan Marz, James Warren (2015), **Big Data: Principles and Best Practices of Scalable Real-Time Systems**, 1st Edition, Manning Publications
6. **Compilers: Principles, Techniques, and Tools** (2006), Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, 2nd Edition, Pearson,.

7. Roger S. Pressman, Bruce R. Maxim (2015) **Software Engineering: A Practitioner's Approach**, 9th Edition, McGraw Hill,.
8. Kevin Gurney 1997 , **Artificial Neural Networks: A Modern Approach**, 1st Edition, Springer

Web References

<https://www.geeksforgeeks.org/computer-science-basics>
<https://www.tutorialspoint.com/index.htm>
<https://www.os-book.com>
<https://linux.dev>
<https://visualgo.net>
<https://www.cs.princeton.edu/courses/archive/spring03/cs126>
<https://www.coursera.org/learn/computer-networking>
<https://www.cloudflare.com/learning/>
<https://ai.google/education>
<https://www.fast.ai>
<https://www.w3schools.com/sql/>
<https://hadoop.apache.org>
<https://www.softwaretestinghelp.com>
<https://agilemanifesto.org>

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

1. Dr.S.Suguna Devi, Associate Professor, Department of Information Technology
2. Dr. P.Tamilselvi, Associate Professor, Department of Information Technology.

Semester III	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	HOURS / WEEK	CREDITS
25PIT3DSE3BP	B. Android Programming (P)	Discipline Specific Elective Course-III (DSE)	5	3

Course Objectives

- To provide practical exposure to Android application development by enabling students to design and implement mobile applications using Android SDK.
- To emphasize user interface design, data management, background processing, multimedia, web services, and location-based services for real-world mobile application development.

S. No.	Course Features	Relevance Status
1	Course emphasis on Employability/Entrepreneurship/Skill Development	Employability
2	Course integrates cross cutting issues relevant to Professional Ethics/Gender Sensitization / Environment and Sustainability / Human Values / Indian Knowledge System	Environment and Sustainability
3	Course relevant to Local/Regional/National/Global needs	Global
4	Course focus on Sustainable Development Goals	SDG 4, 8, 9

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
CO1	Design and develop Android applications using layouts, views, event handling, and content providers.	K1, K2
CO2	Implement data storage mechanisms using files, shared preferences, and SQLite databases in Android applications.	K3
CO3	Integrate web services and parse server responses while managing background processing using services and threads.	K3
CO4	Develop Android applications using multimedia, notifications, alarms, and long-running background services.	K4
CO5	Build location-based and interactive applications including map-based apps and simple mobile games.	K5, K6

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	3	3	2	2	2	3
CO2	3	3	3	2	3	3	3	3	2	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	2	3	3	3	3	2	3

“1” – Slight (Low) Correlation
Substantial (High) Correlation

“2” – Moderate (Medium) Correlation
“3” – Substantial (High) Correlation
“-” indicates there is no Correlation.

Syllabus

To provide programming experience on application development for Mobile Devices.

1. Android Environment set up and simple “Hello World” application creation
2. Understanding UI components and orientation
3. Create an application using Android Layouts, Views and Events
4. Implement DatePicker and TimePicker control
5. Display images using ImageView and Handle menu actions
6. Create an application to implement new activity using explicit intent and implicit intent.
7. Creating Android Audio Video Application
8. Create an application with One-Time and Repeating Alarms
9. Create an application which uses Map Activity and points the locations onto the Map Locations
10. Create an application to send an email
11. Create application to Create, Modify and Query an SQLite Database
12. Create a user registration application that stores the user details in a database table

Web References

1. <https://www.geeksforgeeks.org/android/introduction-to-android-development/>
2. <https://www.youtube.com/playlist?list=PLEiEAq2VkUULG4j7aDpamb6b5Ym3RFQOj>
3. www.coreservlets.com/android-tutorial/

Course Designer

Dr. A. BHUVANESWARI, Associate Professor, Information Technology

Semester III	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT3DSE3CP	C. Parallel Processing (P)	Discipline Specific Elective Course - III	5	3

Course Objectives

- To implement parallel programs using shared, distributed and accelerator-based programming models
- To develop optimized parallel solutions for computational problems

S.No	Course Features	Relevance Status
1.	Course emphasis on Employability/Entrepreneurship/Skill Development	Employability & Skill Development
2.	Course integrates cross cutting issues relevant to Professional Ethics/Gender Sensitization / Environment and Sustainability / Human Values / Indian Knowledge System	Industry Relevance (Global)
3.	Course relevant to Local/Regional/National/Global needs	Professional Ethics & Sustainability
4.	Course focus on Sustainable Development Goals	SDG 4, 9 & 13

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome On the successful completion of the course, students will be able to	Cognitive Level
CO1	Recall and explain fundamental parallel computing concepts and programming models	K1, K2
CO2	Demonstrate understanding of shared and distributed memory programming paradigms	K2
CO3	Apply OpenMP, MPI and CUDA constructs to implement parallel programs	K3
CO4	Analyze scalability, synchronization issues and performance bottlenecks in parallel programs	K3, K4
CO5	Develop and optimize parallel solutions based on performance metrics and experimental results	K5, K6

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	2	2	2	2	3	3	2
CO2	3	2	3	2	2	3	3	2	3	2
CO3	3	3	3	2	2	3	3	3	3	3
CO4	3	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3

“1” – Slight (Low) Correlation
“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation
“-” indicates there is no correlation

Lab Listing

1. Study of Linux environment and measurement of execution time for serial programs.
2. Implementation of parallel loops using OpenMP directives.
3. Demonstration of synchronization techniques and race condition handling using OpenMP.
4. Implementation of task parallelism and scheduling strategies using OpenMP.
5. MPI program using point-to-point communication (Send and Receive operations).
6. MPI collective communication using Broadcast, Scatter, Gather and Reduce operations.
7. Parallel matrix addition and matrix multiplication using MPI.
8. Implementation of distributed sorting algorithms using MPI.
9. CUDA/OpenCL program for vector addition and performance comparison with CPU execution.
10. CUDA/OpenCL implementation of matrix multiplication using shared memory optimization.
11. Performance analysis of parallel programs using speedup, efficiency and scalability metrics.
12. Mini Project: Development of a Hybrid Parallel Application using MPI + OpenMP or CUDA with performance evaluation report.

WEB REFERENCES

1. <https://www.ibm.com/think/topics/parallel-computing>
2. <https://www.techtarget.com/searchdatacenter/definition/parallel-processing>
3. <https://www.scribd.com/document/920150416/Lab-Manual/>

PEDAGOGY

Chalk and Talk, Power Point Presentation, Discussion, Assignment, Demo, Quiz and Seminar.

COURSE DESIGNER

Ms. V. Infine Sinduja, Associate Professor, PG Department of Information Technology

Semester III	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
25PIT3GEC1P	AI TOOLS FOR HUMAN RESOURCE MANAGEMENT – I (P)	Generic Elective Course-I (GEC)	3	2

COURSE OBJECTIVES

- **Introduce the fundamentals of Artificial Intelligence** and its applications in core Human Resource Management functions.
- **Develop practical skills in using AI tools** for recruitment, resume screening, interviewing, and HR communication.
- **Enable students to analyze employee data** using AI-assisted HR analytics for informed decision-making.

S. No.	Course Features	Relevance Status
1	Course emphasis on Employability/Entrepreneurship/Skill Development	Employability / Skill Development
2	Course integrates cross cutting issues relevant to Professional Ethics/Gender Sensitization / Environment and Sustainability / Human Values / Indian Knowledge System	Professional Ethics
3	Course relevant to Local/Regional/National/Global needs	Global
4	Course focus on Sustainable Development Goals	SDG 4, 8, 9

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome On the successful completion of the course, students will be able to	Cognitive Level
CO1	Understand the role and scope of Artificial Intelligence in modern Human Resource Management practices.	K1
CO2	Apply AI tools for HR functions such as recruitment, resume screening, and job description generation.	K2
CO3	Design and implement AI-based chatbots and automated systems for HR communication and interview processes.	K3
CO4	Analyze employee data using AI-assisted techniques for performance evaluation and workforce insights.	K4
CO5	Evaluate ethical, legal, and bias-related issues in the application of AI tools in HR decision-making.	K5, K6

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	2	3	1	2	2	1
CO2	3	3	2	3	3	2	3	2	3	2
CO3	3	2	3	3	3	3	3	3	2	3
CO4	3	3	3	2	3	2	3	3	3	3
CO5	3	3	3	3	3	3	3	2	3	3

“1” – Slight (Low) Correlation

“2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation

“-” indicates there is no correlation

LAB EXERCISES

- 1. Introduction to AI in Human Resource Management:** Overview of AI in HRM, Understanding HR datasets, Ethical issues and bias in AI.(ChatGPT, Google Gemini, Microsoft Copilot)
- 2. AI-Based Recruitment and Resume Screening:** Job description generation, Resume parsing and keyword matching, Candidate shortlisting and ranking. (ChatGPT (JD creation, screening prompts), Zoho Recruit (AI – Zia) – demo, Resume Parser tools, Microsoft Excel / Google Sheets)
- 3. AI in Interviewing and HR Chatbots:** Interview question generation, AI-assisted interview simulation, HR chatbot design for employee queries. (ChatGPT, Dialogflow (Google), Botpress (basic))
- 4. HR Analytics and Employee Data Analysis:** Employee performance analysis, Attrition trend identification, HR KPI dashboards. (Microsoft Excel (AI features), Power BI, Orange Data Mining (no-code AI))
- 5. AI in Employee Engagement and Learning:** Sentiment analysis of employee feedback, Personalized learning recommendations, AI-supported appraisal insights. (ChatGPT, MonkeyLearn (sentiment analysis), SurveyMonkey (AI features))

COURSE DESIGNER

Dr. P. Sudha, Associate Professor