FACULTY OF SCIENCE AND HUMANITIES

ACADEMIC CURRICULA

POSTGRADUATE DEGREE PROGRAMME
(REGULATIONS - 2025)

MASTER OF SCIENCE
IN
COMPUTER SCIENCE

Two Years (Full-Time)

National Education Policy

Learning Outcome-based Curricula Framework

National Credit Framework

Academic Year
2025 - 2026

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

(Deemed to be University u/s 3 of UGC Act, 1956)

Kattankulathur, Chengalpattu District 603203, Tamil Nadu, India

1.	Department Vision Statement
Stmt - 1	Always strive to be the frontiers in learning and inculcating the technical skills and knowledge to excel in all possible dimensions.
Stmt - 2	Energizing the art of learning to explore beyond professional assignments through research.
Stmt - 3	Contribute to the growth of the nation and society by applying acquired knowledge in technical, computing and managerial skills.

2.	Department Mission Statement
Stmt - 1	To provide a great platform to learn and practice technologies to meet the growing demands in the industries
Stmt - 2	To be distinguished as an renowned department for learning, experimenting and continuing research
Stmt - 3	Encouraging the students to understand the best of practices and standards of software and apply the same while developing applications that benefits the society
Stmt - 4	To make the learners recognize the need for engaging themselves in continuing professional development
Stmt- 5	Promoting students to integrate technical ability and IT-based solutions into appropriate user environments

3.	Program Education Objectives (PEO)
PEO - 1	Graduates will demonstrate advanced knowledge in computer science, enabling them to design, develop, and implement innovative solutions for complex computing problems.
PEO - 2	Graduates will engage in cutting-edge research, contribute to the advancement of computer science, and apply innovative technologies to solve real-world challenges.
PEO - 3	Graduates will exhibit leadership, teamwork, and lifelong learning skills, allowing them to adapt to emerging technologies and advance in their professional careers.
PEO - 4	Graduates will uphold ethical standards, understand the societal impact of computing, and contribute responsibly to the global digital ecosystem.
PEO - 5	Graduates will leverage their technical expertise and problem-solving abilities to excel in industry roles, drive technological entrepreneurship, and contribute to the growth of the digital economy.

4. Consistency of PEO's with Mission of the Department					
	Mission Stmt. - 1	Mission Stmt. - 2	Mission Stmt. – 3	Mission Stmt. - 4	Mission Stmt. - 5
PEO - 1	3	2	1	2	3
PEO - 2	2	1	2	3	2
PEO - 3	1	1	2	3	2
PEO - 4	1	2	2	1	3
PEO - 5	1	3	2	3	3

3 – High Correlation, 2 – Medium Correlation, 1 – Low Correlation

5. Consistency of PEO's with Program Learning Outcomes (PO)												
	Program Learning Outcomes (PO)											
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
	Disciplinary Knowledge	Problem Solving	Design &Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethical Practices & Social Responsibility	Individual & Team Work	Communication	Project Management & Finance	Life Long Learning
PEO - 1	3	2	3	2	3	1	1	1	1	1	1	1
PEO - 2	2	2	3	2	1	1	1	2	1	2	1	2
PEO - 3	3	2	2	3	1	2	1	1	1	1	1	1
PEO - 4	3	3	2	3	1	1	1	1	1	1	1	2
PEO - 5	3	3	2	2	1	1	1	2	2	1	1	2

3 – High Correlation, 2 – Medium Correlation, 1 – Low Correlation

6. Programme Structure(Total Credits : 80 Credits)

1. Professional Core Courses (C)
(10 Courses)

Course Code	Course Title	Hours/ Week L	T	P	C
PCS25C11J	Data Structures and Algorithms	3	0	2	4
PCS25C12J	Java Programming	3	0	2	4
PCS25C13J	Computer Networks	3	0	2	4
PCS25C21J	Open Source Technology	3	0	2	4
PCS25C22J	Distributed Operating System	3	0	2	4
PCS25C23J	Database Management	3	0	2	4
PCS25C24T	Software Engineering	4	0	0	4
PCS25C31J	Python Programming	3	0	2	4
PCS25C32J	Compiler Design	3	0	2	4
PCS25C33J	Big Data Analytics	3	0	2	4
Total Learning Credits					**40**

2. Discipline Elective Courses (D)
(3 Courses)

Course Code	Course Title	Sessions / Week L	T	P	C
PCS25D11T	Software Testing	4	0	0	4
PCS25D12J	Artificial Intelligence	3	0	2	
PCS25D13J	Cloud Services Management	3	0	2	
PCS25D21T	Agile Software Development	4	0	0	4
PCS25D22J	Machine Learning	3	0	2	
PCS25D23J	Information Storage Management	3	0	2	
PCS25D31T	Artificial Intelligence in Software Engineering	4	0	0	4
PCS25D32J	Deep Learning	3	0	2	
PCS25D33J	Interfacing with Virtualization	3	0	2	
Total Learning Credits					**12**

3. Generic Elective Courses (G)
(2 Courses)

Course Code	Course Title	Sessions / Week L	T	P	C
PCS25G11J	Service Oriented Architecture	1	0	2	2
PCS25G12J	Data Analysis using Open Source Tools				
PCS25G13J	Cloud Computing Tools and Techniques				
PCS25G34J	Software Project Management	1	0	2	2
PCS25G35J	Responsible AI				
PCS25G36J	Security and Privacy in Cloud				
Total Learning Credits					**4**

4. Skill Enhancement Courses (S)
(2 Courses)

Course Code	Course Title	Hours/ Week L	T	P	C
PCS25S11J	Information Literacy	3	0	2	4
PCS25S21J	Web Development using AngularJS and Mongo	3	0	2	4
Total Learning Credits					**8**

5. Project Work, Internship in Industry/Higher Technical Institutions (P)
(2 Courses)

Course Code	Course Title	Hours/ Week L	T	P	C
PCS25P31L	Internship	0	0	0	2
PCS25P41L	Project Work	0	0	20	10
Total Learning Credits					**12**

6. Ability Enhancement Courses (AE)
(2 Courses))

Course Code	Course Title	Hours/ Week L	T	P	C
PCD25AE1T	Comprehensive Skills in Quantitative and Logical Reasoning	2	0	0	2
PCD25AE2T	Soft Skills and Verbal Mastery	2	0	0	2
Total Learning Credits					**4**

7. Implementation Plan

Semester - I					
Code	Course Title	Hours/ Week			C
		L	T	P	
PCS25C11J	Data Structures and Algorithms	3	0	2	4
PCS25C12J	Java Programming	3	0	2	4
PCS25C13J	Computer Networks	3	0	2	4
PCS25D11T	Software Testing	4	0	0	4
PCS25D12J	Artificial Intelligence	3	0	2	
PCS25D13J	Cloud Services Management	3	0	2	
PCS25G11J	Service Oriented Architecture	1	0	2	2
PCS25G12J	Data Analysis using Open Source Tools				
PCS25G13J	Cloud Computing Tools and Techniques				
PCS25S11J	Information Literacy	3	0	2	4
PCD25AE1T	Comprehensive Skills in Quantitative and Logical Reasoning	2	0	0	2
	Total	29			24

Semester - II					
Code	Course Title	Hours/ Week			C
		L	T	P	
PCS25C21J	Open Source Technology	3	0	2	4
PCS25C22J	Distributed Operating System	3	0	2	4
PCS25C23J	*Database Management*	3	0	2	4
PCS25C24T	Software Engineering	4	0	0	4
PCS25D21T	Agile Software Development	4	0	0	4
PCS25D22J	Machine Learning	3	0	2	
PCS25D23J	Information Storage Management	3	0	2	
PCS25S21J	Web Development using AngularJS and Mongo	3	0	2	4
PCD25AE2T	Soft Skills and Verbal Mastery	2	0	0	2
	Total	30			26

Semester - III					
Code	Course Title	Hours/ Week			C
		L	T	P	
PCS25C31J	Python Programming	3	0	2	4
PCS25C32J	Compiler Design	3	0	2	4
PCS25C33J	Big Data Analytics	3	0	2	4
PCS25D31T	Artificial Intelligence in Software Engineering	4	0	0	4
PCS25D32J	Deep Learning	3	0	2	
PCS25D33J	Interfacing with Virtualization	3	0	2	
PCS25G34J	Software Project Management	1	0	2	2
PCS25G35J	Responsible AI				
PCS25G36J	Security and Privacy in Cloud				
PCS25P31L	Internship	0	0	0	2
	Total	22			20

Semester - IV					
Code	Course Title	Hours/ Week			C
		L	T	P	
PCS25P41L	Project Work	0	0	20	10
	Total	20			10

Total Number of Subjects: 21
Total Number of Credits: 80

8. Program Articulation Matrix

Course Code	Course Title	Programme Learning Outcomes (PO)											
		Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethical Practices & Social Responsibility	Individual & Team Work	Communication	Project Management & Finance	Life Long Learning
PCS25C11J	Data Structures and Algorithms	3	3	3	3	3	2	1	3	3	2	3	3
PCS25C12J	Java Programming	3	3	3	3	3	2	1	3	3	2	3	3
PCS25C13J	Computer Networks	3	3	3	3	3	2	1	3	3	2	3	3
PCS25D11T	Software Testing	3	3	3	3	3	2	1	3	3	2	3	3
PCS25D12J	Artificial Intelligence	3	3	3	3	3	2	1	3	3	2	3	3
PCS25D13J	Cloud Services Management	3	3	3	3	3	2	1	3	3	2	3	3
PCS25G11J	Service Oriented Architecture	3	3	2	3	3	2	1	3	3	2	3	3
PCS25G12J	Data Analysis using Open Source Tools	3	3	2	3	3	2	1	3	3	2	3	3
PCS25G13J	Cloud Computing Tools and Techniques	3	3	2	3	3	2	1	3	3	2	3	3
PCD25AE1T	Comprehensive Skills in Quantitative and Logical Reasoning	3	3	2	3	3	2	1	3	3	2	3	3
PCS25S11J	Information Literacy	3	3	3	3	3	2	1	3	3	2	2	3
PCS25C21J	Open Source Technology	3	3	3	3	3	2	1	3	3	2	3	3
PCS25C22J	Distributed Operating System	3	3	3	3	3	2	1	3	3	2	3	3
PCS25C23J	*Database Management*	3	3	3	3	3	2	1	3	3	2	3	3
PCS25C24T	Software Engineering	3	3	3	3	3	2	1	3	3	2	3	3
PCS25D21T	Agile Software Development	3	3	3	3	3	2	1	3	3	2	3	3
PCS25D22J	Machine Learning	3	3	3	3	3	2	1	3	3	2	3	3
PCS25D23J	Information Storage Management	3	3	3	3	2	2	1	3	3	2	3	3
PCS25S21J	Web Development using AngularJS and Mongo	3	3	3	3	3	2	1	3	3	2	3	3
PCD25AE2T	Soft Skills and Verbal Mastery	3	3	3	3	3	2	1	3	3	2	3	3
PCS25C31J	Python Programming	3	3	3	3	3	2	1	3	3	2	3	3
PCS25C32J	Compiler Design	3	3	3	3	3	2	1	3	3	2	3	3
PCS25C33J	Big Data Analytics	3	3	3	3	3	2	1	3	3	2	2	3
PCS25D31T	Artificial Intelligence in Software Engineering	3	3	2	3	3	2	1	3	3	2	2	3
PCS25D32J	Deep Learning	3	3	2	3	3	2	1	3	3	2	2	3
PCS25D33J	Interfacing with Virtualization	3	3	2	3	3	2	1	3	3	2	3	3
PCS25G34J	Software Project Management	3	3	2	3	3	2	1	3	3	2	3	3
PCS25G35J	Responsible AI	3	3	2	3	3	2	1	3	3	2	2	3
PCS25G36J	Security and Privacy in Cloud	3	3	2	3	3	2	1	3	3	2	3	3
PCS25P31L	Internship	3	3	3	3	2	2	1	3	3	2	3	3
PCS25P41L	Project Work	3	3	3	3	3	2	1	3	3	2	3	3
	Program Average	3	3	3	3	3	2	1	3	3	2	3	3

Semester - I

Code	PCS25C11J	Title	Data Structures and Algorithms	Category	C	Core	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	NIL	Co-requisite Courses	NIL	Progressive Courses	NIL	Data Book / Codes/Standards	NIL

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	Understand the role of data structures in computing
CR-2	Effectively organize and access data that can be used in problem solving
CR-3	Develop the ability of analyzing time and space complexity of algorithms
CR-4	Understand the role of data structures in storage management
CR-5	Applying appropriate data structures to solve real-time applications

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth: Conceive	Design	Implement	Operate	Attainment: Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	PO1 Disciplinary Knowledge	PO2 Problem Solving	PO3 Design & Development	PO4 Analysis, Design, Research	PO5 Modern Tool Usage	PO6 Society & Culture	PO7 Environment Sustainability	PO8 Ethical Practices	PO9 Individual & Team Work	PO10 Communication	PO11 Project Management	PO12 Life Long Learning
CO-1	*Write algorithms to solve simple problems*	✓	✓		✓	3	70	65	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*2*
CO-2	*Evaluate the efficiency of algorithm based on space and time requirements*	✓	✓		✓	3	75	65	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-3	*Choose the appropriate data structures for the application*	✓	✓	✓	✓	3	80	70	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-4	*Transform the mathematical understanding to executable code*	✓	✓	✓	✓	3	70	65	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-5	*Solve the real world problems*	✓	✓	✓	✓	3	85	75	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*

Title & Session Outcomes	CO-1	CO-2	CO-3	CO-4	CO-5
Duration (60 minutes)	15	15	15	15	15
SO-1	Introduction	Trees: terminologies	Searching: Linear and Binary	Hash tables	File Organizations
SO-2	What is an algorithm	Binary trees	Insertion Sorting: Insertion sort	Hashing functions	Sequential file organization
SO-3	Writing algorithm in SPARKS	Binary tree traversal	Merge sort	Overflow functions	Random file organization
SO-4	Writing Structured programs	Threaded binary trees	Heap sort	Theoretical evaluation of overflow techniques	Linked organization
SO-5	Analyzing algorithms	Applications of trees	Quick sort	Files: Files, queries	inverted files
SO-6	Elementary Data Structures	Graphs: terminologies	Practical considerations for internal sorting	sequential organizations	cellular partitions
SO-7-8	Practice 1: data types and conditional statements	Practice 3: stack – compare the implementations that use array and list	Practice 5: Binary tree traversal - implementation	Practice 7: linear search	Practice 9: Insertion sort
SO-9	Arrays	Traversals	External Sorting: storage devices	Index techniques: Cylinder surface indexing	Storage management
SO-10	Linked List and Application	connected components	Sorting with disks	Hash Table	Fixed size nodes

SO-11	Stacks, Linked stacks	spanning trees	Sorting with tapes	Tree indexing	Variable size nodes
SO-12	Queue, linked queues	Shortest path and transitive closure	Symbol tables	B trees	Case Study: compare the behavior of linear and binary search through complexity analysis
SO-13	Garbage collection and compaction	Activity Networks, topological sort, critical paths	Static tree tables and dynamic tree tables	Trie indexing	Case Study: Compare the behavior of insertion sort and merge sort through complexity analysis
SO 14-15	Practice 2: finding complexity of a simple algorithm	Practice 4: Queue – compare the implementations that use array and list	Practice 6: implementation of shortest path algorithm	Practice 8: binary search	Practice 10: SDG Mini Project

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources

1	*Ellis Horowitz, SartajSahni, " Fundamentals of Data Structutes, , Computer Science Press Inc, US*
2	https://www.coursera.org/learn/algorithms-graphs-data-structures

Designers

Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Mr. K V Srivallaban, Principal Consultant,Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head , Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	P. Muthulakshmi, Professor of Computer Science, FSH, SRMIST

Code	PCS25C12J	Title	Java Programming	Category	C	Core	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	*The purpose of learning this course is to:*	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design,	Modern Tool Usage	Society & Culture	Environment Sustainability	Ethical Practices	Individual & Team Work	Communication	Project Management	Life Long Learning
CR-1	*An overview of Java, Buzz words, object oriented features*																			
CR-2	*Create and understand the Java program structure*																			
CR-3	*Understand the Java packages and Interfaces*																			
CR-4	*Use the multithreading programming scenario*																			
CR-5	*Create GUI based applications*																			
Outcomes (CO)	*At the end of this course, learners will be able to:*																			
CO-1	*Understand the difference between C++ and Java*	✓	✓			3	80	75	*3*	*2*	*3*	*2*	*3*	*1*	*1*	*2*	*3*	*2*	*3*	*3*
CO-2	*Develop Java program, using various kinds of packages and interfaces*	✓	✓	✓	✓	3	80	75	*3*	*3*	*3*	*3*	*3*	*1*	*1*	*2*	*3*	*2*	*3*	*3*
CO-3	*Apply the Exception handling methods in Java program.*	✓	✓	✓	✓	3	75	75	*3*	*3*	*3*	*3*	*3*	*1*	*1*	*2*	*3*	*2*	*3*	*3*
CO-4	*Create Synchronized Multithreaded applications with Java*	✓	✓	✓	✓	3	75	75	*3*	*2*	*3*	*3*	*3*	*1*	*1*	*2*	*3*	*2*	*3*	*3*
CO-5	*Build GUI based applications*	✓	✓	✓	✓	3	80	75	*3*	*3*	*3*	*3*	*3*	*1*	*1*	*2*	*3*	*2*	*3*	*3*

Title & Session Outcomes	***CO-1***	***CO-2***	***CO-3***	***CO-4***	***CO-5***
Duration (60 minutes)	***15***	***15***	***15***	***15***	***15***
SO-1	*The Genesis of Java, Java's Byte Code*	*Introducing classes- Class fundamentals*	*Inheritance and its Types*	*Java Thread model- Creating a Thread*	*Introduction to Event Handling - Understanding different Events*
SO-2	*Evolution of Java, Introduction to Object Oriented Concepts of Java*	*Constructors, its Types and this pointer*	*Super keyword-Method Overriding*	*Creating multiple threads, Thread priorities*	*Listeners – Different Listeners*
SO-3	*Lexica Issues of Java*	*Garbage Collection- Finalize() method*	*Dynamic method dispatch - Abstract keyword-Abstract class*	*Synchronization- Inter-thread communication*	*Working with Container Listener, Key Listener & Mouse Listener*
SO-4-5	*Practice 1: Working with Operators and Datatypes*	*Practice 4: Classes and Objects*	*Practice 7: Inheritance, Method Overriding, Abstract classes and methods*	*Practice 10: Multithreading*	*Practice 13: Event Handling, AWT Controls*
SO-6	*Introduction to Data types of Java*	*Overloading methods- Overloading constructors-Using objects as parameters-Argument Passing- Returning Objects-Recursion*	*Working with Abstract class and Method & Using final wit inheritance*	*Introduction to Legacy Classes Vector class, Stack class,*	*Item Listener, Component Listener*
SO-7	*Variable-Declaring a variable, dynamic initialization of variables, Scope and lifetime of variables*	*Access Control- Static variables and methods-Final variables and methods*	*Creating a Package, Access Protection-Importing packages*	*Legacy Interfaces Understanding Enumeration Interface,*	*Introduction AWT Controls* *Working with Label controls, Buttons controls*

SO-8	*Introduction to Operators, Operator Types*	*Working with Nested Class - Inner Class*	*Introduction to Interfaces How Interfaces are extended*	*Utility classes Working with String Tokenizer,*	*Working with Check Box Group controls Working with Choice controls, Lists controls Text Field*
SO-9,10	*Practice 2:* Arrays in Java	*Practice 5: Overloading Methods, finalize() method, Constructor*	*Practice 8: Packages and Interfaces*	*Practice 11: Utility Classes & Legacy classes*	*Practice 14: AWT Controls and GUI Components*
SO-11	*Array &Types of Array*	*String Class- String array*	*Exception handling, Working with try and catch, Multiple catches*	*Working with Date class ,Working with Gregorian Calendar*	*Layout Manager, Byte Streams classes*
SO-12	*Control Statements in Java*	*String Handling Methods*	*Exception Types, Built-in Exceptions*	*Random Class*	*I/O Streams*
SO-13	*Control Statements in Java*	*Command Line arguments*	*User Defined Exceptions*	*Scanner Class*	*Character Streams classes*
SO-14,15	***Practice 3: Control Statements***	*Practice 6: String Handling and Static Members*	*Practice 9: Exception handling*	*Practice 12: Working with Date, Calendar, Random, Scanner*	*Practice 15: SDG Mini Project + I/O Streams*

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources

1	Herbert Schildt (2007), Java: The Complete Reference, Tata McGraw-Hill, Seventh Edition, New Delhi.
2	Horstmann S., Gray Cornell (2001), Core Java 2 Volume In, Fundamentals, Addition Wesley, NewYork.
3	*Arnold and Gosling, J. (2000), The Java Programming Language, Addition Wesley, 2nd Edition, NewDelhi.*

Designers

Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam, Principal, Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr.B.Mahalakshmi, Assistant Professor, Department of Computer Science, SRMIST, FSH,KTR

Code	PCS25C13J	Title	Computer Networks	Category	C	Core	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses		Co-requisite Courses		Progressive Courses		Data Book / Codes/Standards	

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	*Understand the evolution of computer networks using the layered network architecture*
CR-2	*Understand how data is framed, transmitted, and managed over a local link using MAC protocols and error control techniques.*
CR-3	*To explore IP addressing and routing methods that enable data transfer across interconnected network*
CR-4	*To examine how end-to-end communication is established, managed, and made reliable using transport protocols.*
CR-5	*To study commonly used application protocols and understand session control, network security.*

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth: Conceive	Design	Implement	Operate	Attainment: Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	PO1 Disciplinary Knowledge	PO2 Problem Solving	PO3 Design & Development	PO4 Analysis, Design, Research	PO5 Modern Tool Usage	PO6 Society & Culture	PO7 Environment Sustainability	PO8 Ethical Practices	PO9 Individual & Team Work	PO10 Communication	PO11 Project Management	PO12 Life Long Learning
CO-1	*Acquire the basics of computer network and its architecture*	✓	✓	✓		3	80	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-2	*Understand the functionality of the Data Link Layer*	✓	✓	✓	✓	3	85	75	3	2	2	2	3	1	1	2	2	3	2	3
CO-3	*Ability to design the network routing methods*	✓	✓	✓	✓	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-4	*Ability to understand the transport layer functions and components*	✓	✓	✓	✓	3	85	80	3	2	2	2	3	1	1	2	2	3	2	3
CO-5	*Implement Application Layer Protocols*	✓	✓	✓	✓	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3

Title & Session Outcomes	***CO-1***	***CO-2***	***CO-3***	***CO-4***	***CO-5***
Duration (60 minutes)	***15***	***15***	***15***	***15***	***15***
SO-1	*Introduction - Networking Fundamentals*	*Role of the Data Link layer*	*Functions of Network Layer*	*Role of the Transport Layer*	*Role of Application and Session Layer*
SO-2	*Evolution of Networks - Types of Network*	*Framing*	*IPV4 Addressing*	*Multiplexing and Demultiplexing*	*Session Layer Responsibilities*
SO-3	*Reference models: OSI reference Models,*	*Error Detection*	*Subnetting*	*UDP*	*DNS – Domain Name System*
SO-4-5	***Practice 1:*** *Familiarizing with Network Commands*	***Practice 4*** *:Establishing a Peer to Peer N/W*	***Practice 7:*** *Connecting Two LAN's Using Static Router*	***Practice 10****: Simulate Working of DNS*	***Practice 13****: Simulate the working of DHCP*
SO-6	*TCP/IP Protocol Suit*	*Error Correction*	*IPV6 Overview*	*TCP : Basics*	*Email Protocol : SMTP*
SO-7	*OSI Vs TCP/IP Model Compare*	*Flow Control Methods*	*Routing – Types and Strategies*	*TCP : Connection Establishment and Termination*	*Host Configuration : DHCP*
SO-8	*Network Topologies*	*MAC Sublayer – Role in Data Link Layer*			*Web Protocols : HTTP & HTTPS*
SO-9-10	***Practice 2****: Familiarizing with Cisco Packet Tracer.*	***Practice 5:*** *Demonstrate the working of LAN Topologies*	***Practice 8****: Multi-routing Connections with Static Route*	***Practice 11:*** *Simulate Working of FTP*	***Practice 14:*** *SMTP Simulation*
SO-11	*Switching Techniques*	*Data link layer design issues.*	*Distance Vector Routing*	*Flow Control in TCP*	*Network Management Protocol : SNMP*
SO-12	*Network Performance Factors*	*Channel Allocation : FDMA*	*Link State Routing*	*Error Control and Reliability Mechanisms*	*Firewalls*
SO-13	*Transmission Media : Guided and Unguided*	*Channel Allocation: TDMA*	*NAT and PAT*	*Congestion Control in TCP*	*Network Threats*
SO-14-15	***Practice 3:*** *IP addressing and device configuration*	***Practice 6:*** *Analyze MAC Address Behavior*	***Practice 9:*** *Working with ARP*	***Practice 12:*** *Simulate Congestion Control*	***Practice 15:*** *SDG Mini Project*

Evaluation											
Level of Thinking		**Continuous Learning Assessment (CLA)** (50 % weightage)								**Final Exam** (50% Weightage)	
		CLA – 1 (10%)		CLA– 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
	Remember										
	Understand	20%	20%	15%	15%	15%	15%	20%	20%	20%	20%
	Apply										
	Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Evaluate										
	Create	10%	10%	15%	15%	15%	15%	10%	10%	10%	10%
Total		100%		100%		100%		100%		100%	

Strategies					
Technology		**Pedagogy / Andragogy**		**Sustainable Development**	
Simulations	✓	Case Studies		No Poverty	
Emulations		Group Discussion		Zero Hunger	
Prototypes		Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools	✓	Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map	✓	Affordable & Clean Energy	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
2	*James F Kurose, Keith W Ross, Computer Networks :A Top Down Approach, 8th Edition, Pearson, 2022*
2	Larry L. Peterson, *Computer Networks: A Systems Approach, 6th Edition, Morgan Kaufmann Publishers, 2021*
3	*https://www.netacad.com/*

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr Arul Leena Rose P J, Professor, Department of Computer Science, FSH,SRMIST

Code	PCS25D11T	Title	Software Testing	Category	D	Discipline Elective	L	T	P	C
							4	0	0	4

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	To understand the basics of software testing
CR-2	To learn how to do the testing and planning effectively
CR-3	To build test cases and execute them
CR-4	To focus on wide aspects of testing and understanding multiple facets of testing
CR-5	To get an insight about test automation and the tools used for test automation

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth				Attainment		
		1 Conceive	2 Design	3 Implement	4 Operate	1 Level of Thinking	2 Expected Proficiency (%)	3 Expected Attainment (%)
CO-1	Understand the basic concepts of software testing and the need for software testing	✓	✓	✓		3	80	70
CO-2	Design Test planning and different activities involved in test planning	✓	✓	✓	✓	3	85	75
CO-3	Design effective test cases that can uncover critical defects in the application	✓	✓	✓	✓	3	75	70
CO-4	Carry out advanced types of testing	✓	✓	✓	✓	3	85	80
CO-5	Testing Interactive Web Applications	✓	✓	✓	✓	3	75	70

Program Outcomes (PO)											
1 Disciplinary Knowledge	2 Problem Solving	3 Design & Development	4 Analysis, Design, Research	5 Modern Tool Usage	6 Society & Culture	7 Environment Sustainability	8 Ethical Practices	9 Individual & Team Work	10 Communication	11 Project Management	12 Life Long Learning
3	*2*	*2*	*2*	*3*	*1*	*1*	*2*	*2*	*3*	*2*	*3*
3	2	2	2	3	1	1	2	2	3	2	3
3	2	2	2	3	1	1	2	2	3	2	3
3	2	2	2	3	1	1	2	2	3	2	3
3	2	2	2	3	1	1	2	2	3	2	3

Title & Session Outcomes	*CO-1*	*CO-2*	*CO-3*	*CO-4*	*CO-5*
Duration (60 minutes)	**12**	**12**	**12**	**12**	**12**
SO-1	Introduction: Purpose of testing	Software Testing Principles	Test Phases	Testable Requirements	Test Case Design Effectiveness
SO-2	Software Testing Life Cycle	Program Inspections	Test Strategy	Modeling a Test Design Process	Model-Driven Test Design
SO-3	*Types of Software Testing*	Stages of Testing: Unit Testing	Resource Requirements	Modeling Test Results	Test Procedures
SO-4	Black-Box Testing	Integration Testing	Tester Assignments	Boundary Value Testing	Introduction to Performance Testing
SO-5	White-Box Testing	System Testing	Test Schedule, Test Cases	Equivalence Class Testing	Load Testing and Stress Testing
SO-6	*Functional & Non-Functional Testing*	*Acceptance Testing*	Test Scripts and Test Scenarios	Path Testing	Volume Testing and Fail-Over Testing
SO-7	V-model of Software Testing,	Manual Testing	*Bug Lifecycle and Bug Reporting*	Decision Table Testing	Recovery Testing, Configuration Testing
SO-8	Program Correctness and Verification	*Automated Testing*	Metrics and Statistics	State Transition Testing	Compatibility Testing, Usability Testing,

SO 9-10	*Case Study: Analyzing how poor test planning led to critical failures in a banking application.*	*Case Study: How an improper boundary value analysis led to incorrect fare calculations in a ride-hailing app*	*Case Study: How lack of automated regression testing caused a social media app to crash after an update.*	*Case Study: How improper load testing led to e-commerce website crashes during peak sale events.*	*Case Study: How AI-powered automation improved fraud detection in a financial software system.*
SO-11	Reliability versus Safety	High Level Expectations	Test Design Factors	Data Flow Testing	Testing the Documentation, Security testing, Testing in the Agile Environment,
SO-12	Failures, Errors and Faults (Defects)	Intergroup Responsibilities	Requirement identification	Test Design Preparedness Metrics	Testing Web and Mobile Applications.

Assessment

Level of Thinking		Continuous Learning Assessment (CLA) (50 % weightage)								Final Exam (50% Weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 (10 %)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
1	Remember	*40%*	--	*30%*	--	*30%*	--	*40%*	--	*40%*	--
2	Understand										
3	Apply	*40%*	--	*40%*	--	*40%*	--	*40%*	--	*40%*	--
4	Analyze										
5	Evaluate	*20%*	--	*30%*	--	*30%*	--	*20%*	--	*20%*	--
6	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Case Studies		No Poverty	
Emulations		Group Discussion		Zero Hunger	
Prototypes		Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools	✓	Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map	✓	Affordable & Clean Energy	
		Minute Paper			
		Peer Review			
		Problem Based Learning			

Resources

1	Yogesh Singh, "Software Testing", Cambridge University Press, 2012
2	Paul C. Jorgensen, Software Testing: A Craftsman's Approach, Fourth Edition, 2014, Taylor & Francis Group.
3	Ron Patton, Software testing, 2nd Edition, 2006, Sams Publishing

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr.Revathi.S, Assistant Professor, Department of Computer Science Faculty of Science and Humanities, SRMIST,KTR.

Code	PCS25D12J	Title	Artificial Intelligence	Category	D	Discipline Elective	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	NIL	Co-requisite Courses	NIL	Progressive Courses		Data Book / Codes/Standards	

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	*Gain knowledge about Artificial Intelligence(AI) and Heuristic search technique*
CR-2	*Gain knowledge about Knowledge representations and Predicate logic*
CR-3	*Understand Machine Learning and concept learning, Develop a Learning System*
CR-4	*Understand and Apply real time problem using Artificial Intelligence*
CR-5	*Understand the Decision tree and , Neural Network and Genetic algorithm*

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth: Conceive	Depth: Design	Depth: Implement	Depth: Operate	Attainment: Level of Thinking	Attainment: Expected Proficiency (%)	Attainment: Expected Attainment (%)	PO1: Disciplinary Knowledge	PO2: Problem Solving	PO3: Design & Development	PO4: Analysis, Design, Research	PO5: Modern Tool Usage	PO6: Society & Culture	PO7: Environment Sustainability	PO8: Ethical Practices	PO9: Individual & Team Work	PO10: Communication	PO11: Project Management	PO12: Life Long Learning
CO-1	*Have an understanding of AI and its challenges*	✓	✓	✓		3	80	70	*3*	*2*	*2*	*2*	*3*	*1*	*1*	*2*	*2*	*3*	*2*	*3*
CO-2	*Apply searching algorithms for problem solving*	✓	✓	✓	✓	3	80	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-3	*Understand the knowledge based agents, various learning methods and their applications*	✓	✓	✓	✓	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-4	*Clear understanding of the First Order Logic fundamentals*	✓	✓	✓	✓	3	80	75	3	2	2	2	3	1	1	2	2	3	2	3
CO-5	*Apply ML, Expert System for solving real-life problems*	✓	✓	✓	✓	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3

Title & Session Outcomes	*CO-1*	*CO-2*	*CO-3*	*CO-4*	*CO-5*
Duration (60 minutes)	***15***	***15***	***15***	***15***	***15***
SO-1	*Artificial Intelligence—Introduction*	*Problem-Solving Agents, Toy Problem*	*Hill-climbing search, Simulated annealing search*	*Assertions and queries in first-order logic,*	*The EM Algorithm, Instance Based Learning*
SO-2	*Goal and Philosophy of AI, Sub areas of AI, applications, AI Techniques*	*Searching for Solutions, Breadth-first search*	*Local Beam Search, Genetic Algorithms*	*Knowledge Engineering in First-Order Logic*	*Introduction to Neural Networks, Deep Learning, Machine Learning*
SO-3	*Applications of AI, History of AI*	*Depth-first search, Depth-limited search*	*Knowledge Based Agents, Propositional Logic Introduction*	*Propositional vs. First-Order Inference*	*Expert systems: - Introduction*
SO-4,5	*Practice 1: AI Techniques Implementation*	*Practice 4 Knowledge implementation*	*Practice 7: Concept Learning task*	*Practice 10: Implementation of candidate elimination algorithm*	*Practice 13: Neural Network model implementation*
SO-6	*Types of Intelligence*	*Iterative deepening depth-first Search, Bidirectional search*	*Propositional Logic Semantics, Reasoning Patterns in Propositional Logic*	*Learning and Forms of Learning, Inductive Learning*	*Structure of expert systems. The human element in expert systems how expert systems works,*
SO-7	*Inductive and Deductive Reasoning, Human Vs Machine Intelligence*	*Comparing uninformed search Strategies, Avoiding Repeated States*	*Forward and Backward Chaining, Agents Based on Proportional Logic*	*Learning Decision Trees, Ensemble Learning, Computational Learning Theory*	*Types of expert systems*

SO-8	*Agents and Environments, Concept of Rationality*	*Searching with Partial Information*	*First-Order Logic- Models for first-order logic*	*Knowledge in Learning, Explanation based learning,*	*Expert systems and the web*
SO-9,10	*Practice 2: Implementation of intelligent Agents*	*Practice 5: Implementations of FOPL and Rules*	*Practice 8: Propositional Logic*	*Practice 11: Implementation of Decision tree*	*Practice 14: Expert Systems & Knowledge*
SO-11	*Structure of Agents, Problem solving Agents*	*Informed (Heuristic) Search Strategies,*	*Symbols and interpretations for first-order logic*	*Learning used Relevant Information*	*Knowledge engineering and scope of knowledge*
SO-12	*Types of Agents-Simplex, Model based,*	*Greedy best-first search*	*Terms for first-order logic*	*Inductive Logic Programming*	*Selecting an appropriate knowledge acquisition method*
SO-13	*Goal based, Utility Based.*	*A* search*	*Atomic sentences in First Order Logic*	*Learning with Hidden Variables*	*Inference with rules, with frames*
SO-14,15	*Practice 3: Types of Agents and Problem solving*	*Practice 6: Heuristic Search*	*Practice 9: Design a Learning System with FOL*	*Practice 12: Implementation of K- Mean algorithm*	*Practice 15: SDG Mini Project*

Assessment

Level of Thinking		Continuous Learning Assessment (CLA) (50 % weightage)								Final Exam (50% Weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 (10 %)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
1	Remember	20%	20%	15%	15%	15%	15%	20%	20%	20%	20%
2	Understand										
3	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
4	Analyze										
5	Evaluate	10%	10%	15%	15%	15%	15%	10%	10%	10%	10%
6	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Case Studies		No Poverty	
Emulations		Group Discussion		Zero Hunger	
Prototypes		Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools	✓	Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map	✓	Affordable & Clean Energy	
		Minute Paper			
		Peer Review			
		Problem Based Learning			

Resources

1	*Stuart Russell, Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson, 4th Edition, 2020.*
2	Zhongzhi Shi "Advanced Artificial Intelligence", World Scientific; 2019
3	*Rich Elaine & Kevin Knight – Artificial Intelligence – TataMcGraw Hill -1993*

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr.B.Mahalakshmi, Assistant Professor,Department of Computer Science, SRMIST,FSH,KTR.

Code	PCS25D13J	Title	Cloud Services Management	Category	D	Discipline Elective	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	NIL	Co-requisite Courses	NIL	Progressive Courses	-	Data Book / Codes/Standards	-

Rationale (CR)	*The purpose of learning this course is to:*	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment Sustainability	Ethical Practices	Individual & Team Work	Communication	Project Management	Life Long Learning
CR-1	*Introduce cloud computing and cloud services management*																			
CR-2	*Understand cloud service management framework and library*																			
CR-3	*Select appropriate structures for designing, deploying and running cloud-based services ina business environment*																			
CR-4	*Introduce operational management and pricing services*																			
CR-5	*Understand cloud governance*																			
Outcomes (CO)	*At the end of this course, learners will be able to:*																			
CO-1	*Possess Strong theoretical foundation in cloud technology*	✓	✓	✓		3	80	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-2	*Expert in cloud management technologies*	✓	✓	✓	✓	3	80	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-3	*Possess cloud-design skills*	✓	✓	✓	✓	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-4	*Able to solve the real world problems using Cloud services*	✓	✓	✓	✓	3	80	75	3	2	2	2	3	1	1	2	2	3	2	3
CO-5	*Knowledge in cloud governance*	✓	✓	✓	✓	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3

Title & Session Outcomes	CO-1	CO-2	CO-3	CO-4	CO-5
Duration (60 minutes)	15	15	15	15	15
SO-1	Introduction to cloud computing	Introduction to Cloud Service Management (CSM)	Introduction to CSM reference model	Introduction to cloud service operations management	Cloud governance context
SO-2	The essential characteristics	Understanding CSM: Business support, Provisioning and configuration	Reference model key concepts	Operational tasks	Cloud governance ways of working
SO-3	Cloud service models	Portability and interoperability	IT value chain, Service model	Cloud service capabilities	Governance principles
SO-4	Cloud service consumptions	CSM framework	IT value streams and service models	Cloud support model	Cloud governance framework
SO-5	Enterprises Transformation	IT infrastructure library	Basics of Cloud Service Design	Introduction to pricing models for cloud services	Cloud governance model
SO-6	Digital Transformation Strategy	COBIT	Cloud Service deployment and migration	Procurement of cloud based services	Cloud Governance lifecycle
SO-7-8	Practice 1: Create a Cloud Organization in AWS	Practice 3: Create a Cloud Organization in Openstack	Practice 5: Create a Cloud Organization in OpenNebula	Practice 7: Create a Cost-model for a web application	Practice 9: Create Billing alerts for your Cloud Organization
SO-9	Cloud first, security, data, process, technology, organizations	ITIL processes	Cloud service capacity planning	Cloud service charging	Cloud governance performance metrics

SO-10	Roles in the transformed organization	ITIL practices, service value system	Cloud marketplace	Freemium, Pay Per Reservation	Cloud Centre of Excellence
SO-11	Cloud ecosystem	SIAM, process transformation	Legacy systems and services	Pay per Use, Subscription based Charging	Cloud Service Model Risk Matrix
SO-12	Cloud deployment models	Cloud Strategy Fundamentals	Cloud services operations management	Cloud cost models	Understanding Value of Cloud Services
SO-13	Service Orchestration	Cloud Strategy Management Framework	Benchmarking of cloud services	Capex vs Opex Shift	Measuring the value of Cloud Services
SO-14-15	Practice 2: Create a Cloud Organization in Google Cloud	Practice 4: Create a Cloud Organization in Eucalyptus	Practice 6: Create a Cloud Organization with role based access control	Practice 8: Create alerts for usage of Cloud resources	Practice 10: SDG Mini Project

Assessment

Level of Thinking		Continuous Learning Assessment (CLA) (50 % weightage)								Final Exam (50% Weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 (10 %)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
1	Remember	20%	20%	15%	15%	15%	15%	20%	20%	20%	20%
2	Understand										
3	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
4	Analyze										
5	Evaluate	10%	10%	15%	15%	15%	15%	10%	10%	10%	10%
6	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Case Studies	✓	No Poverty	
Emulations		Group Discussion		Zero Hunger	
Prototypes		Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools	✓	Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map	✓	Affordable & Clean Energy	
		Minute Paper			
		Peer Review			
		Problem Based Learning			

Resources

1 *EnamulHaque, "Cloud Service Management and Governance: Smart Service Management in Cloud Era", Enel Publications, London, 2023.*

2 Thomas Erl, Ricardo Puttini,Zaigham Mohammad, "Cloud Computing", Prentice Hall, 2023

3 *https://www.itjones.com/blogs/components-of-it-service-management-framework-beginners-guide*

Designers

Professional Experts	Higher Institution Experts	Internal Experts
1 Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1 Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1 P. Muthulakshmi, Professor of Computer Science, FSH, SRMIST

Code	PCS25G11J	Title	Service Oriented Architecture	Category	G	Generic Elective	L	T	P	C
							1	0	2	2

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	*Understand XML and XML DTD, Schema*
CR-2	*Explains SOA architecture , characteristics*
CR-3	*Explore various protocol stacks , SOA and web service*
CR-4	*Explains Web services technologies*
CR-5	*Explores on WS security overview and framework*

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment Sustainability	Ethical Practices	Individual & Team Work	Communication	Project Management	Life Long Learning
CO-1	*XML basics XML xquery*	✓	✓	✓	✓	3	80	70	*3*	2	2	*2*	*3*	*1*	*1*	2	2	*3*	2	*3*
CO-2	*SOA architecture and its characteristics*	✓	✓	✓	✓	3	80	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-3	*Web services basics , understanding SOAP and UDDI*	✓	✓	✓	✓	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-4	*Web services technologies and standard*	✓	✓	✓	✓	3	80	75	3	2	2	2	3	1	1	2	2	3	2	3
CO-5	*XML and WS- =Security, XML encryption*	✓	✓	✓	✓	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3

Title & Session Outcomes	*CO-1*	*CO-2*	*CO-3*	*CO-4*	*CO-5*
Duration (60 minutes)	**9**	**9**	**9**	**9**	**9**
SO-1	*XML Introduction and Web*	*Service oriented architecture(SOA)*	*Service descriptions - WSDL*	*SOA support in j2EE, JAX-WS*	*XML Security overview*
SO-2	*Namespaces, XML Document structures*	*Comparing SOA with Client server and distributed architectures*	*Messaging with SOAP*	*JAXB, JAXR, JAX-RPC*	*Canonicalization*
SO-3	*Structuring with schema*	*Characteristics of SOA*	*Service discovery - UDDI*	*WSITSOA support in .NET* *ASP.NET Web services*	*XML Security framework*
SO 4-5	*Practice 1:XML , documents, Name space*	*Practice 3 Databases in XML*	*Practice 5: .NET basics*	*Practice 7 Interest calculation component using .NET:*	*Practice 9:creation of web service client*
SO-6	*Modeling databases in XML*	*Principles of service orientation*	*XML and Web services*	*Abstraction , Application service layer*	*XML Signature*
SO-7	*XQuery*	*Service layers*	*Enterprise service bus*	*Business service layer*	*XKMS structure*
SO 8-9	*Practice 2: XML schema, DTD*	*Practice 4:XQuery*	*Practice 6: Time stamp using .Net*	*Practice 8:temperature conversion component using .NET*	*Practice 10: SDG Mini Project*

Assessment								
Level of Thinking	Continuous Learning Assessment (CLA) (100 % weightage)							
	CLA– 1 (20%)		CLA– 2 (20%)		CLA– 3 (40%)		CA – 4 (20%)	
	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Remember / Understand	20%	20%	20%	15%	20%	15%	20%	15%
Apply / Analyze	20%	20%	20%	20%	20%	20%	20%	15%
Evaluate / Create	10%	10%	10%	15%	10%	15%	10%	20%
Total	100%		100%		100 %		100%	

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Case Studies		No Poverty	
Emulations		Group Discussion	✓	Zero Hunger	
Prototypes		Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools	✓	Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map		Affordable & Clean Energy	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
1	Ron Schmelzer et al. "XML and Web Services", Pearson Education, 2008. (Unit 1 and 3)
2	Thomas Erl, " Service Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005 (Unit 2, 3, 4, and 5)
3	*James McGovern, Sameer Tyagi, Michael E Stevens, Sunil Mathew, "Java Web Services Architecture", Elsevier, 2011*

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	DrAarthi E, Assistant ProfessFSor, Department of Computer Science , FSH, SRMIST, KTR

Code	PCS25G12J	Title	Data Analysis using Open Source Tools	Category	G	Generic Elective	L	T	P	C
							1	0	2	2

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	Understand the fundamentals of data analysis and its importance in decision making processes.
CR-2	Learn how to collect, clean, and preprocess data for analysis
CR-3	Understanding statistical data analysis
CR-4	Develop skills in data visualization using library and other visualization libraries
CR-5	Exploratory data analysis (EDA) techniques and statistical methods for deriving insights from data.

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment Sustainability	Ethical Practices	Individual & Team Work	Communication	Project Management	Life Long Learning
CO-1	Handle big data for data analysis	✓	✓	✓		3	80	70	*3*	*2*	*2*	*2*	*3*	*1*	*1*	*2*	*2*	*3*	*2*	*3*
CO-2	Visualize the data	✓	✓	✓	✓	3	80	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-3	Handle single or two variable	✓	✓	✓	✓	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-4	Perform statistical analysis	✓	✓	✓	✓	3	80	75	3	2	2	2	3	1	1	2	2	3	2	3
CO-5	Work on real world data	✓	✓	✓	✓	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3

Title & Session Outcomes	*CO-1*	*CO-2*	*CO-3*	*CO-4*	*CO-5*
Duration (60 minutes)	**9**	**9**	**9**	**9**	**9**
SO-1	*Introduction: Data Analysis*	*Introduction: Data Visualization*	*Advanced Data Analysis Techniques*	*Introduction: Statistical Analysis*	*Advanced Data Cleaning Techniques*
SO-2	*Open Source Tools for Data Analysis*	*Basic Plots, Customizing Plots*	*Grouping and Aggregation*	*Basic concepts of Data statistical analysis*	*Handling Large Dataset*
SO-3	*Data Analysis : Python and PERL*	*Exploratory Data Analysis*	*Time Series Analysis*	*Hypothesis Testing*	*Advanced Statistical Data Analysis*
SO 4-5	*Practice 1: Setting up environment for basic data analysis.*	*Practice 3: Data Visualization*	*Practice 5:Program for aggregation*	*Practice 7:Program using statistical analysis*	*Practice 9: Program to handle large dataset*
SO-6	*Data Analysis : Python and PERL*	*Descriptive Analysis, Correlation Analysis*	*ML for Data Analysis*	*Model Fitting, Under fitting, Over Fitting*	*Handling Large Dataset*

SO-7	*Data Collection Methods: Web Scraping, APIs and Databases*	*Descriptive Analysis, Correlation Analysis*	*Array Creation and Manipulation*	*Regression Analysis*	*ML Concepts: Supervised and Unsupervised Learning*
SO 8-9	*Practice 2:Data collection and cleaning*	*Practice 4: Program using Mathematical operation and statistical functions*	*Practice 6:Implementation of Data preprocessing methods , and plotting*	*Practice 8: Program to implement under fitting and over fitting*	*Practice 5:SDG Mini Project*

Assessment									
Level of Thinking		***Continuous Learning Assessment (CLA)*** *(100 % weightage)*							
		CLA – 1		*CLA – 2*		*CLA – 3*		*CLA – 4*	
		(20%)		*(20%)*		*(40%)*		*(20%)*	
		Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
	Remember					*20%*			*15%*
	Understand	*20%*	*20%*	*20%*	*15%*		*15%*	*20%*	
	Apply					*20%*			*15%*
	Analyze	*20%*	*20%*	*20%*	*20%*		*20%*	*20%*	
	Evaluate								*20%*
	Create	*10%*	*10%*	*10%*	*15%*	*10%*	*15%*	*10%*	
	Total	*100%*		*100%*		*100 %*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*	✓	*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map		*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
1	Philipp K. Janert, "Data Analysis with Open Source Tools", O'Reilly Media Inc.
2	Wes Meckenny, "Python for Data Analysis"

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr. M. Ramesh, Assistant Professor, Department of Computer Science, FSH, SRM IST

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Code	PCS25G13J	Title	Cloud Computing Tools and Techniques	Category	G	Generic Elective	L	T	P	C
							1	0	2	2

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses		Data Book / Codes/Standards	

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	*Understand the fundamental ideas behind Cloud Computing, the evolution of the paradigm and its benefits*
CR-2	*Learn cloud enabling technologies and get exposure to advanced clouds*
CR-3	*Explore cloud storage technologies and relevant distributed file systems, NoSQL databases and object storage*
CR-4	*Understand the cloud security threats and protective mechanism for cloud computing*
CR-5	*Know the algorithms behind the protocols that helps data transfer*

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Outcomes (PO)											
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment Sustainability	Ethical Practices	Individual & Team Work	Communication	Project Management	Life Long Learning
CO-1	*Explain terms used in secured software development and life cycle process*	✓	✓	✓		3	70	65	3	3	3	3	3	2	1	3	3	2	3	2
CO-2	*Apply fundamental concepts in cloud infrastructures to understand the cloud system*	✓	✓	✓	✓	3	75	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-3	*Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS*	✓	✓	✓	✓	3	80	70	3	3	3	3	3	2	1	3	3	2	3	3
CO-4	*Evaluate the security issues related to cloud computing and handle the security threats and construct different clouddelivery design models*	✓	✓	✓	✓	3	70	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-5	*Describe the Cloud Security i.e., Risks, Privacy and Privacy impacts assessments*	✓	✓	✓	✓	3	85	75	3	3	3	3	3	2	1	3	3	2	3	3

Title & Session Outcomes	*CO-1*	*CO-2*	*CO-3*	*CO-4*	*CO-5*
Duration (60 minutes)	**9**	**9**	**9**	**9**	**9**
SO-1	The cloud ecosystem Introduction toCloud Computing , Evolution of cloud computing	Parallel processing and distributed computing	Cloud data storage -Introduction to Cloud DataStorage	Cloud Security - Introduction , Security—the top concern for cloud users	Cloud applications - development andarchitectural styles
SO-2	Network- Centric Computing ,Origin of loud Computing	Grand architectural complications, ARM architecture , SIMD architectures	Storage Models, Solid-state disks	Cloud security risks , Cloud SecurityMechanisms	Coordination based on astate machinemodel—zookeeper
SO-3	Basic Concepts and Terminology	Graphics processing units , Tensor processing units	File Systems and databases , General parallel file system	Digital Signature, PublicKey Infrastructure	MapReduce programmingmodel
SO 4-5	Practice 1: Create a virtual machine	Practice 3 : Create a drop boxusing Google APP	Practice 5: Encryption andDecryption of Text	Practice 7: Develop a HelloWorld application usingGoogle App Engine	Practice 9: Create aWarehouse Application inSales force.Com
SO-6	Cloud Service Models , Cloud Deployment Models	Modularity. Soft modularityversus enforced modularity,Layering and hierarchy	Google file system , Locks , Chubby—a locking service	Identity and AccessManagement Single Sign-On: Kerberos authentication	Current cloud applications and new applications opportunities

SO-7	Cloud Service	Peer-to-peer systems, Large-scale systems	NoSQL databases	Basic cloud data security mechanisms	Social computing, digital content,
SO8-9	Practice 2: installation of Platforms	Practice 4: Transfer Data usingGoogle App	Practice 6: SimpleExperiments in CloudSim	Practice 8: Develop Guestbook App Engine	Practice 10: SDG Mini Project

Assessment									
Level of Thinking		***Continuous Learning Assessment (CLA)*** *(100 % weightage)*							
		CLA– 1		*CLA– 2*		*CLA– 3*		*CLA – 4*	
		(20%)		*(20%)*		*(40%)*		*(20%)*	
		Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
	Remember					*20%*			*15%*
	Understand	*20%*	*20%*	*20%*	*15%*		*15%*	*20%*	
	Apply					*20%*			*15%*
	Analyze	*20%*	*20%*	*20%*	*20%*		*20%*	*20%*	
	Evaluate					*10%*			*20%*
	Create	*10%*	*10%*	*10%*	*15%*		*15%*	*10%*	
	Total	*100%*		*100%*		*100 %*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*	✓	*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map		*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
1	Dan C. Marinescu, "Cloud Computing Theory andPractice", Third Edition Copyright © 2023 Elsevier Inc. ISBN: 978-0-323-85277-7 Unit (I – V)
2	homasErl, ZaighamMahmood, and RichardoPuttini, "Cloud Computing: Concepts, Technology & Architecture", Prentice Hall/PearsonPTR, Fourth Printing, 2014, ISBN: 978013338752
3	*Dan C. Marinescu, "Cloud Computing Theory and Practice", Third Edition Copyright © 2023 Elsevier Inc. ISBN: 978-0-323-85277-7 Unit (I – V*

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr.Pavithra. Assistant Professor Computer Science ,SRMIST,KTR

Code	PCS25S11J	Title	Information Literacy	Category	S	SKILL ENHANCEMENT	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	The purpose of learning this course is to:
CR-1	To recognize when information is needed.
CR-2	To Understand the economic, legal, and social issues surrounding the use of information ethically and legally
CR-3	To have the ability to locate valuate and use effectively.
CR-4	To have the ability to locate valuate and use effectively.
CR-5	To have the ability to locate valuate and use effectively.

Outcomes (CO)	At the end of this course, learners will be able to:	Depth				Attainment			Program Outcomes (PO)											
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment Sustainability	Ethical Practices	Individual & Team Work	Communication	Project Management	Life Long Learning
CO-1	Analyze a research need	3	2	2	2	3	80	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-2	Find information effectively and efficiently by using a variety of search techniques	3	2	3	3	3	85	75	3	2	2	2	3	1	1	2	2	3	2	3
CO-3	Access needed information in multiple publication formats	3	2	2	2	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3
CO-4	Evaluate the quality and relevance of information sources	3	3	3	3	3	85	80	3	2	2	2	3	1	1	2	2	3	2	3
CO-5	Recognize several ethical and legal issues related to the use of information	3	3	3	3	3	75	70	3	2	2	2	3	1	1	2	2	3	2	3

Title & Session Outcomes	CO-1	CO-2	CO-3	CO-4	CO-5
Duration (60 minutes)	15	15	15	15	15
SO-1	An introduction to Information literacy, understanding practical	Special interest organizations, media	Switch	Arithmetic, relational and logical operations on matrices.	**Automating Tasks in MATLAB**: Writing scripts and using functions to automate repetitive processes
SO-2	Aspects of information literacy such as Matlab Environment	Data types	Break	Polynomial evaluations, roots of polynomial and arithmetic operations on polynomials.	**Data Modeling and Curve Fitting**: Using polyfit, interp1, and regression tools
SO-3	Getting familiarized with command window, program using matlab	Constants, Variables	Continue statement	Graphics:2Dplots	**Plagiarism Detection Tools**: Understanding Turnitin, Grammarly, and other academic integrity tools
SO-4-5	Practice 1: practice simple libraries	Practice 4: write a program involving data types and constants	Practice 7: write a program to demonstrate the functions of switch case statement	Practice 10: write a programtoplot2d graphs	Practice13: Create interactive applications using uicontrol and callbacks
SO-6	community resources	Character constants	Multiple media, Input functions	Printing labels, Grid & Axesbox	**Evaluating Social Media as an Information Source**: Bias, credibility, and influence
SO-7	Current directory	Operators	Output functions, Reading data	Text in plot, Barchart	**Ethics in Artificial Intelligence and Data Use**: Legal and social responsibility of algorithms

SO-8	*Figure Window Edit Window*	*Assignment statements*	*Statement, Storing data*	*Pie chart*	***Real-Time Data Visualization**: Plotting dynamic graphs using animatedline, drawnow*
SO-9,10	*Practice 2: write a simple program in matlab using the basic tools*	*Practice 5: write a program using variables and operators.*	*Practice 8: write a program to demonstrate the functions of break*	*Practice 11 :Working with histograms, scatter plots, and real-world data sets*	***Practice 14:**Analyze an open dataset (e.g., COVID-19, education stats) and report*
SO-11	*Exploring Matlab Environment*	*Control Structures, For loop*	*Vectors, Graphical, aural, textual*	***Data Cleaning and Preprocessing**: Handling missing data, outliers, and normalization*	*Matlab - Load, display,*
SO-12	*Digital Media Literacy*	*While loop, Do-while*	*Commands to operate on vectors and matrices*	***Statistical Analysis using MATLAB**: Mean, median, mode, standard deviation, regression*	*Manipulate images*
SO-13	*Compare Search Techniques on Google Scholar vs Academic Databases*	*If control structures*	*Matrix Manipulations*	***MATLAB File Handling**: Reading from and writing to text/CSV files*	***Simulating Mathematical Models in MATLAB**: Solving equations, modeling systems using ode45*
SO-14,15	*Practice 3: Evaluate How Information Overload Affects Decision Making in Academic Settings*	*Practice 6: write a program using for loop and while loop.*	*Practice 9: write a program to demonstrate the commands operated on vectors*	***Practice12: Working with Real-World Datasets in MATLAB**: Importing CSV, Excel, and live data sources*	*Practice 15: SDG Mini Project*

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
1	*Luz Chourio-Acevedo, Jacqueline Köhler, "Information literacy development and assessment at school level: a systematic review of the literature", 2024*
2	*Amelia Hassoun, Ian Beacock, Sunny Consolvo"Practicing Information Sensibility: How Gen Z Engages with Online Information", 2023*
3	*BansalR.K,GoelA.K.,SharmaM.K.,"MATLABanditsApplicationsinEngineering",PearsonEducation,2012*

Designers					
Professional Experts		***Higher Institution Experts***		***Internal Experts***	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu*	*1*	*Dr.Revathi.S, Assistant Professor, Department of Computer Science Faculty of Science and Humanities, SRMIST,KTR.*

Code	PCD25AE1T	Title	Comprehensive Skills in Quantitative and Logical Reasoning	Category	AE	Ability Enhancement Course	L	T	P	C
							2	0	0	2

Offering Department	Career Guidance	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	The purpose of learning this course is to:	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CR-1	Build a strong foundation in numerical concepts and arithmetic techniques, enabling learners to solve mathematical problems accurately and efficiently.																			
CR-2	Equip learners with essential skills for understanding and solving financial and proportional reasoning problems relevant to real-life scenarios and career needs.																			
CR-3	Develop problem-solving skills in time, work, speed, distance, and ratio-based applications, enabling learners to tackle real-world mathematical challenges efficiently..																			
CR-4	Enhance learners' logical reasoning and data interpretation skills, enabling them to solve real-life problems involving clocks, calendars, directions, relationships, and data analysis.																			
CR-5	Sharpen learners' logical thinking and problem-solving abilities, helping them develop skills in tackling number puzzles, logical puzzles, reasoning-based problems, and coding challenges.																			

Outcomes (CO)	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethicalpractices&SocialResponsibility	Individual & Team Work	Communication	Project Management & Finance	Life Long Learning
CO-1	Apply numerical methods to solve problems involving number classification, divisibility tests, progressions, HCF & LCM, simplification techniques, and vinculum-based calculations.	✓	✓	✓	✓	1	85	75	-	3	1	3	1	-	-	-	2	-	-	-
CO-2	Calculate interest, analyze profit and loss, and solve problems related to percentages, discounts, permutations, combinations, and probability, enhancing their quantitative reasoning skills.	✓	✓	✓	✓	3	85	75	-	3	1	3	1	-	-	-	2	-	-	-
CO-3	Solve problems related to time and work, speed and distance, boats and streams, mixtures and alligations, height and distance, and age-based calculations with accuracy and efficiency.	✓	✓	✓	✓	4	85	75	-	3	1	3	1	-	-	-	2	-	-	-
CO-4	Solve problems related to clocks, calendars, directions, blood relations, and interpret data from various graphical representations, including tables, bar charts, pie charts, and line graphs, with accuracy and clarity.	✓	✓	✓	✓	4	85	75	-	3	1	3	1	-	-	-	2	-	-	-
CO-5	Solve number puzzles, logical puzzles, sequential output tracing, and reasoning problems, as well as alphanumeric series and coding/decoding problems, with precision and speed.	✓	✓	✓	✓	5	85	75	-	3	1	3	1	-	-	-	2	-	-	-

Title & Session Outcomes	Numbers and Basic Arithmetic	Business Mathematics and Applications	Applied Arithmetic Problems	Logical Reasoning and Data Interpretation	Reasoning and Puzzle Solving
Duration (hour)	6	6	6	6	6
SO-1	Classification of Numbers & Tests of Divisibility	Problems on Averages and Percentage	Time and work - Problems	Clock - Problems	Number Puzzles - Problems
SO-2	Unit Digit &Trailing Zeroes	Problems on Discount	Time, Speed and Distance Problems	Problems on Calendar	Logical Puzzles –Problems
SO-3	Arithmetic Progression Geometric Progression	Problems on Simple Interest and Compound Interest	Boats and Streams - Problems	Direction Sense - Problems	Sequential Output Tracing - Problems

SO-4	Highest Common Factor (HCF) Least Common Multiples (LCM)	Profit and Loss - Problems	Mixtures and Alligations - Problems	Blood relation-Problems	Inductive, Logical, Abstract and Diagrammatic Reasoning - Problems
SO-5	Simplification – Problems	Permutation and Combination – Problems	Height and Distance - Problems	Data Interpretation – Table and Bar chart	Alphanumeric Series - Problems
SO-6	Virnaculum – Problems	Problems on Probability	Problems based on Ages	Data Interpretation – Pie Chart and Line graph	Coding and Decoding - Problems

Assessment

Level of Thinking		Continuous Learning Assessment (CLA) (100 % weightage)							
		CLA– 1 (20%)		CLA– 2 (20%)		CLA– 3 (30%)		CLA – 4 (30%)	
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
1	Remember	40%	-	40%	-	40%	-	40%	-
2	Understand								
3	Apply	40%	-	40%	-	40%	-	40%	-
4	Analyze								
5	Evaluate	20%	-	20%	-	20%	-	20%	-
6	Create								
Total		100 %		100 %		100 %		100%	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Case Studies		No Poverty	
Emulations		Group Discussion	✓	Zero Hunger	
Prototypes		Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools	✓	Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map		Affordable & Clean Energy	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources

1	Dr. Agarwal.R.S, Quantitative Aptitude for Competitive Examinations, S. Chand and Company Limited, 2018 Edition	2	Archana Ram, PlaceMentor: Tests of Aptitude for Placement Readiness, Oxford University Press, Oxford, 2018
3	AbhijitGuha, Quantitative Aptitude for Competitive Examinations, Tata McGraw Hill, 5th Edition	4	Edgar Thrope, Test Of Reasoning for Competitive Examinations, Tata McGraw Hill, 6th Edition

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. VaradhaRajan M (External Expert), Assistant Manager – Human Resources, Justdial Limited, Chennai – 600015 varadha1723@gmail.com	1	Dr. Premavathy M, Associate Professor , Department of English Center for Distance and Online Education, Bharathidasan University, Tiruchirappalli – 620024 drmpremavathy@bdu.ac.in	1	Dr. Deepalakshmi S, HoD, Department of Career Guidance Cell, FSH, SRMIST
				2	Dr. Sathish K, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST
				3	Dr. Aarthi S, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST

Semester – II

Code	PCS25C21J	Title	Open Source Technology	Category	C	Core	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	The purpose of learning this course is to:
CR-1	Learn Open Source Technology
CR-2	Designing web page using PHP
CR-3	Database Applications using PHP with MYSQL
CR-4	PERL
CR-5	Advanced PERL

Outcomes (CO)	At the end of this course, learners will be able to:	Depth				Attainment			Program Outcomes (PO)											
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment Sustainability	Ethical Practices	Individual & Team Work	Communication	Project Management	Life Long Learning
CO-1	Design a web page using OSS	3	2	2	3	3	70	65	3	3	3	3	3	2	1	3	3	2	3	2
CO-2	Create a web page using PHP	3	2	2	3	3	75	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-3	Design a web page using PHP with MYSQL	3	2	2	3	3	80	70	3	3	3	3	3	2	1	3	3	2	3	3
CO-4	Web page with CMS	2	2	3	3	3	70	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-5	Implement PERL Commands and Techniques	3	2	3	3	3	85	75	3	3	3	3	3	2	1	3	3	2	3	3

Title & Session Outcomes	CO-1	CO-2	CO-3	CO-4	CO-5
Duration (60 minutes)	15	15	15	15	15
SO-1	Introduction to PHP	Exception Handling& its Functions	PHP with AJAX	Control Structures	Read and Write data form File
SO-2	Web Server : Apache	Cookies & its Functions	AJAX Basics	PERL Functions and Subroutines	Directory Operations
SO-3	PHP Data Types	Session Handling	PHP with AJAX Database Driven Apps	Modules in PERL	Process Management
SO-4,5	Practice 1:Program using various datatypes	Practice 4: Sample application using Exception handling	Practice 7:Simple Application using PHP and MYSQL	Practice 10:PERL program to demonstrate various control structure.	Practice 13:PERL program to demonstrate I/O and File read/write operations
SO-6	Operators and Expressions	Introduction to PHP with MYSQL	SEO - Basics	Hash Functions	Process Communication

SO-7	*Control Structures and Iterative statements*	*MYSQL Basics: Query*	*CMS - Basics*	*Lists and Arrays*	*String Processing*
SO-8	*Functions and its Types*	*PHP and MYSQL Functions*	*Simple Web page using CMS*	*Sample Application using List and Arrays*	*Sorting*
SO-9,10	*Practice 2:Simple Calculator using Control Structures*	*Practice 5:Sample Queries in MYSQL*	*Practice 8:Designa a simple web page using CMS*	*Practice 11:Simple Application using List and Array*	*Practice 14:SDG Mini Project*
SO-11	*String, Math, Date & Time, URL and Mail functions*	*Database creation*	*PERL : Basics*	*Advanced PERL*	*Database Application*
SO-12	*Arrays : Types of Arrays*		*Scalar variable, operators*	*File Input and Output*	*Introduction to Git and GitHub*
SO-13	*PHP Execution Environment*	*DML*	*PHP Security: Input Validation, SQL Injection Prevention*	*Regular Expression in Pearl*	*Creating and Managing a GitHub Repository*
SO-14,15	*Practice 3: Array Sorting and Searching*	*Practice 6: Simple Applications using PHP and MYSQL*	*Practice 9: Create and call user-defined functions*	*Practice 12: Write automation scripts (e.g., log analyzer)*	*Practice 15:SDG Mini Project*

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
1	*Mehdi Achour, Friedhelm, Betz Antony Dovgal, Nuno Lopes, Hannes Magnusson, Georg Richter, Damien Seguy, JakubVrana And several others, (1997-2011), "PHP Manual (Download the manual from PHP official website www.php.net)", The PHP Documentation Group.*
2	*JaimieSirovich and CristianDarie, (2007), "Professional Search Engine Optimization with PHP A Developer's Guide to SEO", Wiley Publishing, Inc., Indianapolis, Indiana.*
3	*Randal L. Schwartz, Tom Phoenix, brian d foy, "Learning Perl, Fifth Edition*

Designers					
Professional Experts		***Higher Institution Experts***		***Internal Experts***	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu*	*1*	*Dr. M. Ramesh Assistant Professor,Department of Computer Science, FSH, SRM IST*

Code	PCS25C22J	Title	Distributed Operating System	Category	C	Core	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	Operating System	Co-requisite Courses	NIL	Progressive Courses	NIL	Data Book / Codes/Standards	

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	*To strengthen the knowledge in Operating Systems*
CR-2	*To examine the fundamental principles of distributed systems.*
CR-3	*To comprehend about the communication that takes place in Distributed systems.*
CR-4	*To realize the necessity of synchronization, consistency and Fault tolerance in a Distributed System*
CR-5	*To acquire apparent scheme regarding distributed object-oriented based systems*

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Outcomes (PO)											
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	*Disciplinary Knowledge*	*Problem Solving*	*Design & Development*	*Analysis, Design, Research*	*Modern Tool Usage*	*Society & Culture*	*Environment Sustainability*	*Ethical Practices*	*Individual & Team Work*	*Communication*	*Project Management*	*Life Long Learning*
CO-1	*Categorize layered protocol sand comprehend the communications in distributed systems.*	✓	✓	✓	✓	*3*	*70*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*2*
CO-2	*List the principles of distributed systems and describe the problems and challenges associated with these principles.*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-3	*Understand Distributed Computing techniques, Synchronous and Processes.*	✓	✓	✓	✓	*3*	*80*	*70*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-4	*Understand Distributed File Systems and Distributed Shared Memory.*	✓	✓	✓	✓	*3*	*70*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-5	*Apply Distributed web-based system.*	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*

Title & Session Outcomes	***CO-1***	***CO-2***	***CO-3***	***CO-4***	***CO-5***
Duration (60 minutes)	***15***	***15***	***15***	***15***	***15***
SO-1	*Introduction :Overview of operating system concepts, Process management*	*Synchronization in distributed systems, Clock synchronization*	*Distributed File Systems: Introduction,*	*Resource Management in DOS , Types of resources*	*Distributed Web-based Systems, Architecture ,Processes*
SO-2	*Scheduling: CPU Scheduling, Disk Scheduling*	*Events, Time In distributed systems, ,*	*Features and goal of distributed file system*	*Issues of resource sharing , Task assignment*	*Communication ,Naming, Synchronization*
SO-3	*Memory management, Device and File management*	*Concurrency control mechanism in DOS*	*File models, File sharing semantics*	*Types of Distributed Load Balancing Algorithms,*	*Consistency and Replication, WebProxy Caching*
SO-4-5	*Practice 1:Virtual Machines ,System Design And Implementation*	*Practice 4 : :Basic calculator program using RMI*	*Practice 7:Programto implement token/non token based algorithm*	*Practice 10:Implement Network File System*	*Practice 13::Study of Web Service Programming*
SO-6	*Introduction to distributed Systems,*	*Mutual exclusion in distributed environment.*	*File caching scheme, File replication, Fault tolerance*	*Load estimation policy Location policy,*	*Replication for Web Hosting Systems,*
SO-7	*Definition and goals Design Issues,*	*Deadlock in distributed systems*	*Fault tolerance, Trends in Distributed File System, Distributed Shared Memory*	*State information exchange policy, Priority assignment policy*	*Replication of Web Applications*
SO-8	*Communication in Distributed System,*	*Transactions in distributed environment, Processes*	*General architecture of DSM,*	*Process migration and case studies, Identifiers*	*Security in Distributed OS: Introduction, Importance of security,*
SO-9,10	*Practice 2:Program to implement Remote procedure call*	Practice 5 :Implement process strategies: creation of child, zombie, orphan *process*	*Practice 8: Program to Implement locking algorithm*	*Practice 11 :Implement Load Balancing Algorithm*	*Practice 14: Implement a clock synchronization algorithm*

SO-11	*Message passing and related issues, ATM Networks,*	*Processes and processors in, Distributed systems, Threads*	*Advantages& challenges of DSM*	*,Addresses, Name Resolution, System oriented names,*	*Types of External attacks, Basic elements of Information System security and policy*
SO-12	*Client Server model, Remote Method Invocation*	*System model, Processor al location, Scheduling in distributed systems*	*Design and implementation issues of DSM, Memory coherence,*	*Object locating mechanisms*	*Trust Management, Access Control Models, Cryptography,*
SO-13	*Case Studies: SUNRPC,DEC RPC*	*Load balancing and sharing approach, Fault tolerance, Real time distributed systems, Process migration and related issues*	*Granularity ,structure of shared memory space, Replacement strategy, Thrashing*	*Issues in designing human oriented names, Name caches. Naming and security, DNS*	*Case Study: Sun Network File System, Andrew Network file system*
SO-14,15	*Practice 3:Set up a client-server architecture using socket programming*	*Practice 6: Implement a simple Remote Procedure Call (RPC) mechanism.*	*Practice 9: Write a program to simulate mutual exclusion using Lamport's algorithm.*	*Practice 12: Demonstrate inter-process communication (IPC) between distributed processes*	*Practice 15: SDG Mini Project*

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
1	1. PradeepK.Sinha,"DistributedOperatingSystem ConceptsandDesign",PHI,NewDelhi,2007.
2	AndrewS.Tanenbaum,"DistributedOperating Systems"PearsonEducation,2011.
3	*Internet soruces*

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu*	1	Dr. S.R.K.JuhiReashma. Assistant Professor, Department of Computer Science, SRMIST

Code	PCS25C23J	Title	Database Management	Category	C	Core	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	NIL	Co-requisite Courses	NIL	Progressive Courses		Data Book / Codes/Standards	

Rationale (CR)	*The purpose of learning this course is to:*	Depth				Attainment			Program Outcomes (PO)											
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	*Disciplinary Knowledge*	*Problem Solving*	*Design & Development*	*Analysis, Design, Research*	*Modern Tool Usage*	*Society & Culture*	*Environment Sustainability*	*Ethical Practices*	*Individual & Team Work*	*Communication*	*Project Management*	*Life Long Learning*
CR-1	*Understand the basics of Database Management Systems, their architecture, and languages.*																			
CR-2	*Gain insight into the database design process using the ER Model and Relational Model.*																			
CR-3	*Design logical database schemas and map them to implementation-level schemas using database language features.*																			
CR-4	*Learn to write and execute queries using Structured Query Language (SQL) and PL/SQL.*																			
CR-5	*Enhance database design by applying normalization techniques and optimize queries for better performance.*																			
Outcomes (CO)	*At the end of this course, learners will be able to:*																			
CO-1	*Understand the basic concepts of DBMS, including data models, schemas, and architecture.*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*2*
CO-2	*Implement relational database design using ER diagrams and normalization.*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-3	*Use SQL to create, manipulate, and query databases.*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-4	*Manage transactions, concurrency control, and recovery techniques in a database.*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-5	*Apply advanced concepts like indexing, cloud databases, and Big Data management.*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*

Title & Session Outcomes	***CO-1***	***CO-2***	***CO-3***	***CO-4***	***CO-5***
Duration (60 minutes)	***15***	***15***	***15***	***15***	***15***
SO-1	*Overview of Database Systems and DBMS*	*Relational Model: Tables, Keys, Relationships*	*Database Design: Conceptual, Logical, and Physical Design*	*Concept of Transactions in DBMS*	*NoSQL Databases: Types (Key-Value, Document, Column-Family, Graph)*
SO-2	*Types of Databases (Relational, Hierarchical, Network, Object-Oriented)*	*Introduction to SQL: Data Definition Language (DDL), Data Manipulation Language (DML)*	*Normalization: First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF)*	*ACID Properties: Atomicity, Consistency, Isolation, Durability*	*Introduction to Big Data and Data Warehousing*
SO-3	*Components of DBMS (DBMS Architecture, Data Models, Database Languages)*	*Data Retrieval with SELECT, WHERE, ORDER BY, GROUP BY*	*Boyce-Codd Normal Form (BCNF)*	*Transaction States and Schedules*	*OLAP vs. OLTP Systems*
SO-4-5	*Practice 1: Design an ER diagram for a library management system.*	*Practice 4: Write SQL queries to retrieve student information based on specific conditions.*	*Practice 7: Normalize a given Un-Normalize table to 3NF.*	*Practice 10: Simulate transactions and demonstrate the effect of concurrency control mechanisms.*	*Practice 13: Implement a NoSQL database using MongoDB to store and retrieve documents.*
SO-6	*Entity-Relationship (ER) Model: Entities, Attributes, Relationships*	*QL Joins: Inner, Outer, Self, and Cross Join*	*Multivalued and Join Dependencies*	*Concurrency Control: Locks, Timestamp Ordering*	*Indexing: B-trees, Hashing, and Bitmap Indexes*
SO-7	*Keys in DBMS: Primary, Foreign, Candidate, Super Keys*	*Subqueries: Nested Queries and Correlated*	*Denormalization and its Use Cases*	*Deadlock Detection and Prevention*	*Query Optimization Techniques*
SO-8	*Data Independence: Logical and Physical Data Independence*	*Constraints in SQL (Primary, Foreign, Unique, Check, Not Null)*	*Functional Dependencies and their Role in Normalization*	*Recovery in DBMS: Log-based Recovery, Checkpoint*	*Cloud Databases and Database as a Service (DBaaS)*
SO-9,10	*Practice 2: Create a simple database using SQL to store student details and course enrollments.*	*Practice 5: Create a database and perform operations like insert, update, and delete using SQL.*	*Practice 8: Create a relational schema for a hospital management system and normalize*	*Practice 11: Implement a simple recovery mechanism using logging for database operations.*	*Practice 14: SDG Mini Project*

SO-11	*Relational Algebra: Operations*	*Views, Indexes, and Sequences*	*Design Considerations in Database Development*	*Write-Ahead Logging Protocol*	*Ethical and Legal Issues in Database Management*
SO-12	*Storage Structure and File Organization*	*Stored Procedures, Functions, and Triggers*	*Case Study: Database Design for an Online Shopping System*	*Introduction to Distributed Databases and Concurrency in Distributed Systems*	*Case Study: Big Data Application in E-Commerce*
SO-13	*Overview of Data Models and Schemas*	*Transactions in SQL: COMMIT, ROLLBACK, SAVEPOINT*	*Tools for Database Design: MySQL Workbench / dbdiagram.io*	*Isolation Levels in SQL (READ COMMITTED, SERIALIZABLE, etc.)*	*Ethical Issues: Privacy, Security, and Legal Compliance*
SO-14,15	*Practice 3: List different types of keys in a table and identify each in a sample dataset.*	*Practice 6: Write a query using GROUP BY and HAVING clause on employee salary data.*	*Practice 9: Use a design tool to draw an ER diagram and convert it into a schema*	*Practice 12: Write SQL queries to demonstrate COMMIT and ROLLBACK behavior.*	*Practice 15: Use a cloud-based tool to create a small database application.*

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources

1	*Abraham Silberschatz, Henry F. Korth, and S. Sudarshan, "Database System Concepts"*
2	RamezElmasri and Shamkant B. Navathe, "Fundamentals of Database Systems"
3	*W3Schools SQL Tutorial: https://www.w3schools.com/sql/*

Designers

Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu*	1	Dr.S.Kanchana Assistant Professor, Department of Computer Science, SRM Institute of Science and Technology, Kattankulathur.

Code	PCS25C24T	Title	Software Engineering	Category	C	Core	L	T	P	C
							4	0	0	4

Offering Department	Computer Science	Pre-requisite Courses	NIL	Co-requisite Courses	NIL	Progressive Courses	NIL	Data Book / Codes/Standards	NIL

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	*Familiarize the software lifecycle models and software development process*
CR-2	*Understand the various techniques for requirements, planning and managing a technology project*
CR-3	*Examine basic methodologies for software design, development, testing, closure and implementation*
CR-4	*Understand manage users expectations and the software development team*
CR-5	*Acquire the latest industry knowledge, tools and comply to the latest global standards for project management*

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Outcomes (PO)											
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	*Disciplinary Knowledge*	*Problem Solving*	*Design & Development*	*Analysis, Design, Research*	*Modern Tool Usage*	*Society & Culture*	*Environment Sustainability*	*Ethical Practices*	*Individual & Team Work*	*Communication*	*Project Management*	*Life Long Learning*
CO-1	*Identify the process of life cycle model and process project*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*2*
CO-2	*Analyze and specify software requirements through a productive working Relationship with project stakeholders*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-3	*Design the system based on Functional Oriented and Object Oriented Approach for Software Design.*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-4	*Develop the correct and robust code for the software products*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-5	*Perform by applying the test plan and various testing techniques*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*

Title & Session Outcomes	***CO-1***	***CO-2***	***CO-3***	***CO-4***	***CO-5***
Duration (60 minutes)	***12***	***12***	***12***	***12***	***12***
SO-1	*Introduction to software Engineering Characteristics of software*	*System Engineering Components of System Engineering*	*Introduction to Testing Definition , Characteristics of Testing*	*Project Management Spectrum Four P's*	*Risk Management Reactive and Proactive Risk Strategies*
SO-2	*The Changing Nature of software Legacy Software*	*Requirements Engineering Tasks Process, Initiating and Eliciting requirements.*	*Testing Strategies for Conventional Software Unit and Integration Testing*	*The People and the Product Role of People*	*Software Risks Risk Identification and Risk Projection*
SO-3	*A Generic view of process Software Engineering layered Technology*	*Building the Analysis Model Analysis Modeling Approaches*	*Validation Testing Verification Vs. Validation*	*The Process and the Project Role of Process*	*Risk refinement Risk Mitigation*
SO-4	*A process framework Capability Maturity Model Integration*	*Data Modeling Concepts Example Diagram Scenario based Modeling*	*System Testing on-Functional testing*	*Metrics for Process and Projects-Estimation*	*Monitoring and Management Example*
SO-5	*Software Myths*	*Class - based Modeling*	*Debugging Process*	*LOC, FP, Object Oriented, Estimation*	*Quality Concepts, Criteria*
SO-6	*Process Models Water fall , RAD model*	*USE-CASE Diagram Flow Oriented Modeling*	*Testing Tactics White Box Testing, Basic-Path Testing*	*Estimation models The Project Planning Process Resources*	*SQA Activities Software Reviews and FTR*
SO-7	*Unified process, History, phases*	*Data Flow Diagram-Levels of DFD*	*Cyclomatic complexity*	*Specialized estimation techniques*	*Statistical Quality Assurance*

SO-8	Iterative Process Models Incremental, Prototype and Spiral	Design Engineering Example	Black Box Testing Equivalence Partitioning	Decomposition Techniques calculations of Decomposition techniques	SCM Repository
SO-9	Prescriptive models Phases of the model An agile view of Process	Software Design process, Quality Guide Line and Attribute.	BVA , Error Guessing Cause-Effect Graphing	Empirical Estimation Models COCOMO model	Business Process Reengineering,
SO -10	Dynamic Systems Development Method (DSDM)	Software Design Concepts Example Diagrams.	Testing for Specialized Environments	Estimation For Object Oriented Project.	Reengineering Diagram and Example. Reverse Engineering.
SO-11	Specialized Process Models and its types	The Design Models.	object-oriented Testing Strategies	Project Scheduling Concepts	Forward Engineering
SO-12	Case study on Best SDLC selection based on the Scenario.	Examples for all designs	Preparation of Test case plan and report	Performing Testing and Debugging for a sample code	Restructuring and its Types

Assessment

Level of Thinking		Continuous Learning Assessment (CLA) (50 % weightage)								Final Exam	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 (10 %)		(50% Weightage)	
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
1	Remember	40%	--	30%	--	30%	--	40%	--	40%	--
2	Understand										
3	Apply	40%	--	40%	--	40%	--	40%	--	40%	--
4	Analyze										
5	Evaluate	20%	--	30%	--	30%	--	20%	--	20%	--
6	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Case Studies	✓	No Poverty	
Emulations		Group Discussion		Zero Hunger	
Prototypes	✓	Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools	✓	Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map	✓	Affordable & Clean Energy	
		Minute Paper			
		Peer Review	✓		
		Problem Based Learning			

Resources

1	Roger, S. Pressman,Software Engineering: APractitioner Approach, McGraw Hill InternationalEdition, Sixth Edition, New Delhi(2004),
2	RohitKhurana, Software Engineering-Principles and Practices, Vikas PublishingHouse Pvt. Ltd., Second Edition, New Delhi. (2011),
3	https://www.geeksforgeeks.org/software-engineering/

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr.D.ELANGOVAN, Assistant Professor, Department of Computer Science FSH, SRM IST,KTR

Code	PCS25D21T	Title	Agile Software Development	Category	D	Discipline Elective	L	T	P	C
							4	0	0	4

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses		Data Book / Codes/Standards	

Rationale (CR)	The purpose of learning this course is to:	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design,	Modern Tool Usage	Society & Culture	Environment	Ethical Practices	Individual & Team Work	Communication	Project Management	Life Long Learning
CR-1	Understand the principles and values of Agile methodologies for software development.																			
CR-2	Explore Agile frameworks such as Scrum, XP, and Kanban and their real-world applications.																			
CR-3	Enhance team collaboration and iterative development skills in Agile projects.																			
CR-4	Develop skills in Agile project management, sprint planning, and backlog prioritization.																			
CR-5	Evaluate Agile performance metrics and their impact on software quality and delivery.																			
Outcomes (CO)	**At the end of this course, learners will be able to:**																			
CO-1	Apply software engineering principles to develop high-quality software solutions.	✓	✓	✓	✓	3	80	75	3	3	3	3	3	2	1	3	3	2	3	2
CO-2	Demonstrate problem-solving abilities in managing Agile projects.	✓	✓	✓	✓	3	75	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-3	Analyze Agile methodologies and implement them in real-world applications.	✓	✓	✓	✓	3	75	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-4	Develop communication and collaboration skills required for Agile team environments.	✓	✓	✓	✓	3	75	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-5	Apply continuous integration, testing, and deployment strategies in Agile projects.	✓	✓	✓	✓	3	80	75	3	3	3	3	3	2	1	3	3	2	3	3

Title & Session Outcomes	CO-1	CO-2	CO-3	CO-4	CO-5
Duration (60 minutes)	12	12	12	12	12
SO-1	Agile Manifesto and Principles	Scrum Basics: Roles, Events, and Artifacts	Principles of Extreme Programming (XP)	Agile Leadership and Team Collaboration	Hybrid Agile Models: Combining Agile and Waterfall
SO-2	Traditional vs. Agile Development Approaches	Sprint Planning and Sprint Execution	Pair Programming and Code Reviews	Agile Contracting and Vendor Management	Design Thinking and Agile
SO-3	Agile Frameworks Overview: Scrum, XP, Kanban	Daily Stand-ups and Sprint Reviews	Test-Driven Development (TDD) and Behavior-Driven Development (BDD)	Risk Management in Agile Projects	Scaling Agile Beyond IT: HR, Marketing, and Operations
SO-4	Agile Project Lifecycle and Iterative Development	Sprint Retrospectives and Continuous Improvement	Continuous Integration and Deployment (CI/CD)	Agile Scaling Frameworks (SAFe, LeSS)	Agile Beyond Software: Agile in Manufacturing and Healthcare
SO-5	Roles in Agile: Product Owner, Scrum Master, Development Team	Product Backlog Management and Prioritization	Refactoring and Code Simplicity	Agile Tools and Software (JIRA, Trello, Azure DevOps)	Agile and AI: The Role of AI in Agile Development
SO-6	Agile Artifacts: Product Backlog, Sprint Backlog, Increment	User Stories, Epics, and Acceptance Criteria	Agile Testing: Unit Testing, Integration Testing, and Regression Testing	Role of Business Analysts in Agile	Agile and Blockchain for Decentralized Applications
SO-7	Agile Estimation Techniques: Story Points, Planning Poker	Definition of Done (DoD) and Definition of Ready (DoR)	Agile Metrics and Quality Assurance	Agile Budgeting and Cost Estimation	Agile and Cybersecurity Considerations

SO-8	Sprint Planning and Execution	Release Planning and Incremental Delivery	DevOps and Agile Synergy	Agile Performance Metrics (Velocity, Burndown Charts)	Business Agility and Agile Mindset
SO-9	Agile Documentation and User Story Writing	Scaling Scrum: SAFe, LeSS, and Nexus	Version Control and Configuration Management in Agile	Agile and Compliance (ISO, CMMI, GDPR)	Emerging Agile Certifications (CSM, SAFeAgilist)
SO-10	Challenges in Agile Adoption	Common Pitfalls in Scrum Implementation	Agile Architecture and Design Principles	Managing Distributed Agile Teams	Measuring Agile Maturity in Organizations
SO-11	Agile in Large-Scale Software Development	Agile Coaching and Scrum Master Responsibilities	Lean Software Development and Kanban	Agile Transformation Roadmap	The Future of Agile: Trends and Predictions
SO-12	Case Study: Agile Transformation in a Software Enterprise	Case Study: Scrum Adoption in a Software Development Team	Case Study: Implementation of TDD in an Agile Project	Case Study: Agile Adoption Challenges in a Large Organization	Case Study: Scaling Agile in a Global Enterprise

Assessment

Level of Thinking		Continuous Learning Assessment (CLA) (50 % weightage)								Final Exam	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 (10 %)		(50% Weightage)	
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
7	Remember										
8	Understand	40%	--	30%	--	30%	--	40%	--	40%	--
9	Apply										
10	Analyze	40%	--	40%	--	40%	--	40%	--	40%	--
11	Evaluate										
12	Create	20%	--	30%	--	30%	--	20%	--	20%	--
	Total	100 %		100 %		100 %		100 %		100 %	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Case Studies	✓	No Poverty	
Emulations		Group Discussion		Zero Hunger	
Prototypes	✓	Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools	✓	Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map	✓	Affordable & Clean Energy	
		Minute Paper			
		Peer Review	✓		
		Problem Based Learning			

Resources

1	Mike Cohn, "Agile Estimating and Planning"
2	Kenneth S. Rubin, "Essential Scrum: A Practical Guide to the Most Popular Agile Process"
3	Agile Alliance Website – https://www.agilealliance.org

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr.S.Kanchana Assistant Professor, Department of Computer Science, SRM Institute of Science and Technology Kattankulathur.

Code	PCS25D22J	Title	Machine Learning	Category	D	Discipline Elective	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses		Co-requisite Courses		Progressive Courses		Data Book / Codes/Standards	

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	*Gain knowledge in the areas of Machine Learning.*
CR-2	*Understand algorithms for analyzing data*
CR-3	*Learn advanced algorithms for analytics*
CR-4	*Discover patterns in the user data*
CR-5	*To make predictions and intricate patterns*

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Outcomes (PO)											
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Analysis	Design &Development	Analysis, Design,	Modern Tool Usage	Society & Culture	Environment	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning
CO-1	*Understand Machine Learning and concept learning*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*2*
CO-2	*Develop a Learning System*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-3	*Understand and Apply Machine Learning inreal time problem*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-4	*Learn the basics of data collection*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-5	*Knowledge about analysis and inference*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*

Title & Session Outcomes	*CO-1*	*CO-2*	*CO-3*	*CO-4*	*CO-5*
Duration (60 minutes)	*15*	*15*	*15*	*15*	*15*
SO-1	*Introduction to Machine Learning, Types of learning*	*Support vector machine, K-Nearest Neighbors H*	*Euclidean Distance, Euclidean DistanceManhattan Distance*	*Role of Distance Measures, Information Retrieval and Extraction*	*Implementing any one classification algorithm*
SO-2	*Supervised learning, Unsupervised learning*	*Classification accuracy, Introduction to Decision trees*	*Minkowski Distance, Similarity Functions,*	*Categorization, Clustering, Border increment text mining algorithm*	*Model Selection, Tree model*
SO-3	*Issues in Machine Learning, Perspectives*	*Gini Impurity, Information Gain, Chi-square*	*Error measures, K-Means algorithm*	*compare the various distance calculation methods,*	*Boosting ,Tensorflow, keras*
SO-4-5	*Practice 1:Concept Learning task*	*Practice 4:Extract the data from database*	*Practice7:Implement k-nearest neighbours classification*	*Practice 10: Learn Waikato Environment for Knowledge Analysis tool to pre-process the data*	*Practice 13: POS Tagging, Text Cleaning Script*
SO-6	*Concept Learning as a search,*	*Classification by decision tree induction,*	*Fuzzy C Means algorithm,*	*Implement K-Means Algorithm ,Hierarchial Clustering,*	*Advanced Regression,*
SO-7	*Issues regarding classification*	*Tree pruning methods*	*Expectation approach*	*Extended decision trees*	*Timeseries Processing,*
SO-8	*Issues regarding Prediction, Various types of classifications,*	*Cost complexity pruning , Implementation of learning models for real time problem*	*Maximization approach, Probabilistic clustering algorithms*	*Linear Regression, Logistic Regression*	*Transformer Networks, Semantic Segmentation*
SO-9,10	*Practice 2:Design a Learning System*	*Practice 5:Implement Bayesian classification*	*Practice 8:Implement decision tree algorithm*	*Practice 11:Foundations of NLP*	*Practice 14: Text Classification (e.g., Spam vs Ham)*
SO-11	*Bayesian Classification C, Classification by back propagation, :*	*Implement k-nearest neighbours classification, Issues in decision trees*	*Introduction to text analytics, Chi square pruning*	*Naive Bayes, Implement various operations of text analytics*	*Generative Models,Model Interpretation*
SO-12	*Reinforcement Learning, Classification based on concepts from association rule mining*	*Extended Decision Trees, Fuzzy decision trees*	*AI in text mining, Pre-processing techniques*	*Implement NLP*	*Introduction to Convolutional Neural Networks*

SO-13	*Goals and applications of machine learning, Logistic Regression*	*Hierarchical clustering algorithm, Mixture of Gaussian algorithm*	*Feature selection using dimensionality reduction, Foundations of NLP*	*Explore NLP, Over fitting, validation dataset*	*Benefits of CNN, Recurrent Neural Networks, Drawbacks of RNN*
SO-14,15	*Practice 3:Load and explore a dataset*	*Practice 6: Perform Logistic Regression on a binary classification problem*	*Practice 9: Build a Decision Tree classifier for a dataset and visualize it*	*Practice 12:Tokenization and Stopword Removal*	*Practice 15: SDG Mini Project*

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources

1	EthemAlpaydin, Introduction to Machine Learning, Third edition, The MIT Press Cambridge.
2	Tom M Mitchell, Machine Learning, McGraw Hill Education
3	*Machine Learning Mastery – https://machinelearningmastery.com*

Designers

Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu*	1	DR. SRK. JuhiReashma, Assistant Professor, SRMIST

Code	PCS25D23J	Title	Information Storage Management	Category	D	Discipline Elective	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	NIL	Co-requisite Courses	NIL	Progressive Courses		Data Book / Codes/Standards	

Rationale (CR)	The purpose of learning this course is to:
CR-1	Evaluate storage architectures and key data center elements in classic, virtualized and cloud environments
CR-2	Explain physical and logical components of a storage infrastructure including storage subsystems, RAID and intelligent storage systems
CR-3	Describe storage networking technologies such as FC-SAN, IP-SAN, FCoE, NAS and object-based, and unified storage
CR-4	Understand and articulate business continuity solutions – backup and replications, along with archive for managing fixed content
CR-5	Explain key characteristics, services, deployment models,and infrastructure components for a cloud computing

Outcomes (CO)	At the end of this course, learners will be able to:	Depth: Conceive	Design	Implement	Operate	Attainment: Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	PO1 Engineering Knowledge	PO2 Problem Analysis	PO3 Design & Development	PO4 Analysis, Design, Research	PO5 Modern Tool Usage	PO6 Society & Culture	PO7 Environment Sustainability	PO8 Ethics	PO9 Individual & Team Work	PO10 Communication	PO11 Project Mgt. & Finance	PO12 Life Long Learning
CO-1	Describe and apply storage technologies	✓	✓	✓	✓	3	80	75	3	3	3	3	3	2	1	3	3	2	3	2
CO-2	Identify leading storage technologies that provide cost-effective IT solutions for medium to large scale businesses and data centers	✓	✓	✓	✓	3	75	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-3	Describe important storage technologies" features such as availability, replication, scalability and performance	✓	✓	✓	✓	3	75	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-4	Work in project teams to install, administer and upgrade popular storage solutions	✓	✓	✓	✓	3	75	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-5	Identify and install current storage virtualization technologies.Manage virtual servers and storage between remote locations Design, analyze and manage clusters of resources	✓	✓	✓	✓	3	80	75	3	3	3	3	3	2	1	3	3	2	3	3

Title & Session Outcomes	CO-1	CO-2	CO-3	CO-4	CO-5
Duration (60 minutes)	15	15	15	15	15
SO-1	Storage System : Introduction to information storage	Fibre Channel SAN components	Business continuity terminologies, planning and solutions	Cloud Computing - Characteristics and benefits	Security in virtualized
SO-2	Virtualization and cloud computing	FC protocol and operations	Clustering and multipathing to avoid single points of failure	Services and deployment models	Cloud environment
SO-3	Key data center elements	Block level storage virtualization	Backup and recovery – methods, targets and topologies	Cloud infrastructure components	Monitoring and managing various information infrastructure
SO 4-5	Practice 1: Configuring the storage system	Practice 4 :Creating storage pools on a SAN	Practice 7: Implementing backup and replication policies using specialized software	Practice 10: data management workflows	Practice 13: implementing optimization strategies
SO-6	Compute, application,	iSCL and FCIP as an IP-SAN solutions,	data deduplication and backup in virtualized environment	Cloud migration considerations	components in classic and virtual environments
SO-7	storage virtualization,	Converged networking option – FcoE	fixed content and data archive	Storage Infrastructure Security threats	Information lifecycle Management (ILM)
SO-8	Disk dive & flash drive components and performance	Network Attached Storage (NAS) - components, protocol and operations	Local replication in classic and virtual environments	countermeasures in various domains	Storage security domains

SO 9-10	Practice 2: Configuring RAID arrays on a storage system	Practice 5: Managing storage pools on a SAN	Practice 8: Setting up cloud storage buckets	Practice 11: Analyzing storage performance metrics	Practice 14: SDG Mini Project
SO-11	RAID	File level storage virtualization	Remote replication in classic and virtual environments,	Security solutions for FC-SAN	Security Implementations
SO-12	Intelligent storage system and storage provisioning	Object based storage and unified storage platform	Three-site remote replication and continuous data protection.	IP-SAN and NAS environments	Storage tiering
SO-13	Software defined storage concepts, architecture, and benefits	Erasure coding and object storage resilience techniques	Storage orchestration and automation tools	Emerging trends in storage (NVMe over Fabrics, SCM)	Compliance and regulatory requirements for data storage
SO-14,15	Practice 3: Configuring software-defined storage environments	Practice 6: Implementing storage automation with orchestration tools	Practice 9: Simulating disaster recovery and failover scenarios	Practice 12: Monitoring storage performance	Practice 15: Capstone lab – Integrated virtualized and cloud storage deployment

Evaluation

Level of Thinking	Continuous Learning Assessment (CLA) (50 % weightage)								Final Exam (50% Weightage)	
	CLA – 1 (10%)		CLA– 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)			
	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Remember										
Understand	20%	20%	15%	15%	15%	15%	20%	20%	20%	20%
Apply										
Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Evaluate										
Create	10%	10%	15%	15%	15%	15%	10%	10%	10%	10%
Total	100%		100%		100%		100%		100%	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Case Studies		No Poverty	
Emulations		Group Discussion		Zero Hunger	
Prototypes		Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools	✓	Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map	✓	Affordable & Clean Energy	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources

1	Information Storage and Management: Storing, Managing and Protecting Digital Information in classic, Virtualized and Cloud Environments, 2nd Edition, EMC Educations Services, Wiley, May 2012
2	Ulf Troppens, Rainer Erkens, Wolfgang Mueller-Friedt, Rainer Wolafka, Nils Haustein ,"Storage Networks Explained: Basics and Application of Fibre Channel SAN, NAS, iSCSI, InfiniBand and FCoE, 2nd Edition, Wiley, July 2009
3	Information Storage and Management: Storing, Managing, and Protecting Digital Information, EMC Education Services, Wiley, January 2010

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr.Pavithra. Assistant Professor Computer Science, SRMIST,KTR

Code	PCS25S21J	Title	Web Development using AngularJS and Mongo	Category	S	Skill Enhancement	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	HTMLBASICS	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	*The purpose of learning this course is to:*	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	*Engineering Knowledge*	*Problem Analysis*	*Design & Development*	*Analysis, Design,*	*Modern Tool Usage*	*Society & Culture*	*Environment*	*Ethics*	*Individual & Team Work*	*Communication*	*Project Mgt. & Finance*	*Life Long Learning*
CR-1	*Create single page applications and understand the functional behavior of dynamic webpages*																				
CR-2	*Understand and presentation components that look like HTML elements*																				
CR-3	*Build corner to corner interactive components in dynamic web pages*																				
CR-4	Understand MVC framework/architecture of web programming/client-server architecture																				
CR-5	*Build synchronized objects across view and model components*																				
Outcomes (CO)	*At the end of this course, learners will be able to:*																				
CO-1	*Make use of expressions, do data binding with external components*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*2*
CO-2	*Distinguish the role of MVC in creating dynamic web applications*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-3	*Understand the role of reusability and data encapsulation in the form of objects*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-4	*Distinguish RDBMS and schema design of MongoDB*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-5	*Perform query operations using MongoDB*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*

Title & Session Outcomes	***CO-1***	***CO-2***	***CO-3***	***CO-4***	***CO-5***
Duration (60minutes)	***15***	***15***	***15***	***15***	***15***
SO-1	*Introduction of JavaScript, Need of Scripting Language*	*Looping Statements*	*AngularJS Objects*	*AngularJS Scope, Perform Query Operation for the following situations* *i) Query on nested documents* *ii)Query an array*	*Document with different types of values ii) Document with Documents CRUD operation: Insert Operation I) insert One() and ii) insertMany() with examples*
SO-2	*Data Types, Primitive Types*	*Function Definition, Function Parameters*	*Arrays, Difference between client and server-side scripting Script tag in HTML*	*ii)Query an array of nested documents iv) Geospatial Queries Query Operation Examples*	i)Document with Scalar Values, *ii) Document with Documents as values iii) Document with Array as values*
SO-3	*JavaScript statements, Comments and Variables.*	*Function Return Types*	*Role of a Controller, Controllers & Modules*	*Using filters* *,iii) find OneAndDelete() Delete operation Examples*	*Working with CURD operations*
SO-4-5	*Practice 1: Java Script Input and Output*	*Practice 4: Looping Statements*	*Practice 7: Modules In Files*	*Practice 10: Sorting an Array based on User input*	*Practice 13:* Update Operation: updateOne(),updateMany() *Aggregation in MongoDB: i) aggregate() method*
SO-6	*JavaScript Operators -*	*Angular Environment setup–windows*	*Controllers in Files Using controllers*	*Custom Filters*	*replaceOne(),find And Modify() Update operation: Examples*

SO-7	*Logical*	*AngularJS Framework*	*AngularJS Controller*	*Introduction to entities of MongoDB : i) Databases ii) Collections*	*Monitoring Deployment using MongoDB: i) mongo stat,*
SO-8	*Bitwise Arithmetic*	*Features of Angular JS, Model-View-Controller*	*Controller Methods*	*Database: i) create Database() method with example*	*ii)server Status iii) dbStats*
SO-9,10	*Practice 2: Java Script Operators and Conditions*	*Practice 5: Functions*	*Practice 8: Data binding: controllers and External files*	*Practice 11: creating a database in MongoDB*	*Practice 14: SDG Mini Project*
SO-11	*Array Properties: index, input length*	*AngularJS directives*	*Nested Controllers*	*MongoDB Operators*	*Introduction to MongoDB Shell*
SO-12	*Array Basic Methods*	*AngularJS Strings Handling*	*Using Filters in Controllers: Uppercase, Lowercase, currency*	*Aggregation Commands*	*Shell Collection Methods*
SO-13	*Array Functional Methods, Multidimensional arrays*	*Additional Built-in Filters*	*Filter, order by filter*	*Advanced Pipeline operators*	*CRUD Operations in Shell*
SO-14,15	*Practice 3: Java Script Array methods*	*Practice 6: String Filters*	*Practice 9: Angular JS Filters*	*Practice 12: Aggregation commands*	*Practice 15: Security configuration*

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
1	*1. KenWilliamson(2015),"LearningAngularJS:AGuidetoAngularJSDevelopment", O'REILLY*
2	2..URL:https://docs.AngularJS.org/api
3	*3. URL:https://docs.mongodb.com/manual/tutorial/*

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu*	1	Dr.T.NathiyaAssistant Professor,Department of Computer Science

Code	PCD25AE2T	Title	Soft Skills and Verbal Mastery	Category	AE	Ability Enhancement	L	T	P	C
							2	0	0	2

Offering Department	Career Guidance	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	

Rationale (CR)	The purpose of learning this course is to:
CR-1	Help individuals develop key skills for personal and professional growth
CR-2	Prepares individuals to navigate daily challenges with confidence, professionalism, and a positive mindset
CR-3	Create a strong resume, participate in group discussions, and perform well in interviews
CR-4	Enhance vocabulary and verbal reasoning skills
CR-5	Develop the skills needed for effective communication and critical thinking in both written and spoken language

Outcomes (CO)	At the end of this course, learners will be able to:	Depth				Attainment			Program Outcomes (PO)											
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethical practices & Social Responsibility	Individual & Team Work	Communication	Project Management & Finance	Life Long Learning
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CO-1	Gain a deeper understanding of self, including emotional intelligence and career aspirations	✓	✓	✓	✓	3	85	75	1	-	3	-	3	3	-	-	3	3	2	3
CO-2	Apply effective presentation skills for clear, engaging communication	✓	✓	✓	✓	6	85	75	1	3	3	-	3	2	-	-	3	3	2	3
CO-3	Participate confidently and effectively in group discussions and interviews	✓	✓	✓	✓	3	85	75	1	3	1	-	3	2	-	-	3	3	2	3
CO-4	Enhance their ability to understand and use language effectively in different contexts	✓	✓	✓	✓	2	85	75	1	-	-	-	1	-	-	-	-	3	2	2
CO-5	Improve language comprehension and accuracy	✓	✓	✓	✓	5	85	75	1	-	-	-	1	-	-	-	-	3	2	2

Title & Session Outcomes	Personal Development	Mastering Workspace Dynamics	Career Essentials	Verbal Ability	Verbal Reasoning and Comprehension
Duration (hour)	6	6	6	6	6
SO-1	Self-analysis through SWOT, The JohariWindow	Personal, Professional and Social Etiquette	Resume Preparation and Activity	Synonyms and Antonyms	Statement and Assumption
SO-2	Goal Setting Importance, Goal Setting based on the Principle of SMART	Professional Communication - Presentation Skills	E-mail Drafting and Practice	One Word Substitution	Paragraph Summary
SO-3	Emotional Intelligence (Identifying, Managing and Understanding Emotions)	Presentation for Internal and External Communication - online & offline Meetings	Techniques to Follow in Group Discussion	Word Analogy	Idioms and Phrases

SO- 4	Process of Career Exploration	Time Management and Planning Tools	Mock Group Discussion	Verbal Classification	Cloze Test
SO-5	STAR Technique (situation, task, approach and response) for Facing an Interview	Decision Making Skills	Interview Techniques	Spotting Errors	Theme Detection
SO-6	Professional Attitude – Entrepreneurial, Rational, Optimistic Attitude	Teamwork in Workspace - Resilience and Stress Management	Mock Personal Interview	Sentence Correction	Reading Comprehension

Assessment

Level of Thinking		Continuous Learning Assessment (CLA) (100 % weightage)							
		CLA – 1 (20 %)		CLA – 2 (20 %)		CLA – 3 (30 %)		CLA – 4 (30%)	
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
7	Remember	25%	-	20%	-	30%	-	50%	-
8	Understand								
9	Apply	50%	-	50%	-	40%	-	25%	-
10	Analyze								
11	Evaluate	25%	-	30%	-	30%	-	25%	-
12	Create								
Total		100 %		100 %		100 %		100 %	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Case Studies	✓	No Poverty	
Emulations	✓	Group Discussion	✓	Zero Hunger	
Prototypes		Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools		Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map	✓	Affordable & Clean Energy	
		Minute Paper			
		Peer Review	✓		
		Problem Based Learning	✓		

Resources

5	"The Johari Window: A Model for Self-awareness and Personal Growth" by Joseph Luft& Harrington Ingham	6	Campus Recruitment complete Reference , Praxis Groups
7	"The 7 Habits of Highly Effective People" by Stephen R. Covey	8	A Modern Approach to Verbal and Non Verbal Reasoning – Dr A S Agarwal
9	"SMART Goals: How to Set and Achieve Your Personal and Professional Goals" by S.J. Scott	10	Verbal Ability & Reading Comprehension for CAT - Arun Sharma

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. VaradhaRajan M (External Expert), Assistant Manager – Human Resources, Justdial Limited, Chennai – 600015 varadha1723@gmail.com	1	Dr. Premavathy M, Associate Professor , Department of English Center for Distance and Online Education, Bharathidasan University, Tiruchirappalli – 620024 drmpremavathy@bdu.ac.in	1	Dr. Deepalakshmi S, HoD, Department of Career Guidance Cell, FSH, SRMIST
				2	Dr. MuthuDeepa M, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST
				3	Dr. Sam Israel S, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST
				4	DrElamathiyan E, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST

Semester – III

Code	PCS25C31J	Title	Python Programming	Category	C	Core	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses		Co-requisite Courses		Progressive Courses		Data Book / Codes/Standards	

Rationale (CR)	The purpose of learning this course is to:
CR-1	Describe the core syntax and semantics of Python programming language
CR-2	Need for working with the strings and functions
CR-3	The process of structuring the data using lists, dictionaries, tuples and sets.
CR-4	The use of regular expressions and built-in functions to navigate the file system.
CR-5	Understand Object oriented programming, Event driven programming

Outcomes (CO)	At the end of this course, learners will be able to:	Depth: Conceive	Design	Implement	Operate	Attainment: Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	PO1 Disciplinary Knowledge	PO2 Problem Solving	PO3 Design & Development	PO4 Analysis, Design,	PO5 Modern Tool Usage	PO6 Society & Culture	PO7 Environment &	PO8 Ethical practices &Social	PO9 Individual & Team Work	PO10 Communication	PO11 Project Management &	PO12 Life Long Learning
CO-1	Develop, document, and debug modular python programs to solve computational problems	✓	✓	✓	✓	3	80	75	3	3	3	3	3	2	1	3	3	2	3	2
CO-2	Work on strings and functions in python	✓	✓	✓	✓	3	75	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-3	Use built-in strings, lists, sets, tuples and dictionary in applications	✓	✓	✓	✓	3	75	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-4	Define classes and use them in applications	✓	✓	✓	✓	3	75	65	3	3	3	3	3	2	1	3	3	2	3	3
CO-5	Use files for I/O operations	✓	✓	✓	✓	3	80	75	3	3	3	3	3	2	1	3	3	2	3	3

Title & Session Outcomes	CO-1	CO-2	CO-3	CO-4	CO-5
Duration (60 minutes)	15	15	15	15	15
SO-1	An Introduction to python programming	Array , Array methods	Python sets , set operations	Traversing dictionary	Introduction to files and directories
SO-2	Structure of a Python program , variables	Strings , mutable and immutable strings	Methods to manipulate set	Sorting , Searching a dictionary	File creation , file open , error and close functions
SO-3	Datatypes , Arithmetic expressions	String methods	Tuple operations and its methods	Conversion to other datatypes and vice-versa	Read , Write , file position operations
SO-4-5	Practice programs for Datatypes , Variables, Arithmetic expresions	Practice 4 Array and Array methods	Practice 7: Set ,Tuple , functions	Practice 10 dictionaries and methods	Practice 13 file operations
SO-6	Operators	String modules, numpy	List and its operations	Lambda functions – functional programming in Python	-Frameworks- -Django, Flask, Web2Py.

SO-7	*Conditional statements*	*Functions , function types*	*List methods, replacing an element, sorting and searching a list*	*mapping, filtering ,reducing and substituting*	*OOPS in Python – Classes, Objects, Inheritance*
SO-8	*Looping statements ,*	*Anonymous functions*	*Conversion of lists to other data types*	*Iterators and generators, List*	*Polymorphism – operator overloading*
SO-9,10	*Practice 2: Operators , Conditional statements*	*Practice 4: Strings and its methods*	*Practice 8:List - operations and methods*	*Practice 11 Lambda functions*	*Practice 14: OOPS concepts in Python*
SO-11	*Conditional iteration*	*Abstract functions , Default functions*	*Other Python datatypes to list*	*Modules and Packages*	*Exceptional handling basics*
SO-12	*More on loops*	*Standard libraries in Python*	*Dictionary and its operations*	*Creation of packages*	*Exceptional handling Methods*
SO-13	*Arrays- Introduction*	*More on functions in Python*	*Dictionary methods*	*NUMPY, Pandas, Matplotlib, Plotly*	*operations of exceptional handling in Python*
SO-14,15	*Practice 3 – Loops*	*Practice 5 : Functions and its types*	*Practice 9: More on List and its conversions*	*Practice 12 : Modules and Packages*	*Practice 15 : Exceptional handling*

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
1	*Kenneth A. Lambert, (2011), "The Fundamentals of Python: First Programs", Cengage Learning*
2	*www.realpython.org*

Designers					
Professional Experts		***Higher Institution Experts***		***Internal Experts***	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu*	*1*	*Dr.Aarthi E , Assistant Professor, Department of Computer Science , FSH, SRM IST, KTR*

Code	PCS25C32J	Title	Compiler Design	Category	C	Core	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	*The purpose of learning this course is to:*	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	*Design*	*Implement*	*Operate*	*Level of Thinking*	*Expected Proficiency (%)*	*Expected Attainment (%)*	*Disciplinary Knowledge*	*Problem Solving*	*Design & Development*	*Analysis, Design,*	*Modern Tool Usage*	*Society & Culture*	*Environment & Ethical practices &Social*	*Individual & Team Work*	*Communication*	*Project Management &*	*Life Long Learning*		
CR-1	*Utilize the mathematics and engineering principles for the Design of Compilers*																				
CR-2	*Acquire knowledge of Lexical Analyzer from a specification of a language's lexical rules and Syntax Analyzer*																				
CR-3	*Gain knowledge to translate a system into various intermediate codes*																				
CR-4	*Analyze the methods of implementing a Code Generator for compilers*																				
CR-5	*Analyze and Design the methods of developing a Code Optimizer*																				
Outcomes (CO)	*At the end of this course, learners will be able to:*																				
CO-1	*Utilize the mathematics and engineering principles for the Design of Compilers*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*2*	
CO-2	*Acquire knowledge of Lexical Analyzer from a specification of a language's lexical rules and Syntax Analyzer*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*	
CO-3	*Gain knowledge to translate a system into various intermediate codes*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*	
CO-4	*Analyze the methods of implementing a Code Generator for compilers*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*	
CO-5	*Analyze and Design the methods of developing a Code Optimizer*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*	

Title & Session Outcomes	***CO-1***	***CO-2***	***CO-3***	***CO-4***	***CO-5***
Duration (60 minutes)	***15***	***15***	***15***	***15***	***15***
SO-1	*Compilers – Analysis of the source program, Phases of a compiler – Cousins of the Compiler*	*Syntax Analysis Definition – Role of parser, Lexical versus Syntactic Analysis*	*Bottom Up Parsing, Reductions, Handle Pruning. Shift Reduce Parsing*	*Intermediate Code Generation, Intermediate Languages - prefix – postfix, Quadruple - triple - indirect triples Representation*	*Code optimization, Introduction– Principal Sources of Optimization*
SO-2	*Grouping of Phases – Compiler construction tools, Lexical Analysis – Role of Lexical Analyzer, Input Buffering, Specification of Tokens*	*Representative Grammars, Syntax Error Handling, Elimination of Ambiguity, Left Recursion, Left Factoring*	*Problems related to Shift Reduce Parsing, Conflicts During Shift Reduce Parsing*	*Syntax tree- Evaluation of expression - three-address code, Synthesized attributes – Inherited attributes, Intermediate languages – Declarations*	*Function Preserving Transformation, Loop Optimization, Optimization of basic Blocks, Building Expression of DAG*
SO-3	*Finite automation – deterministic, non-deterministic, Transition Tables, Acceptance of Input Strings by Automata*	*Top down parsing, Recursive Descent Parsing, back tracking, Computation of FIRST*	*LR Parsers- Why LR Parsers, Items and LR(0) Automaton, Closure of Item Sets, LR Parsing Algorithm*	*Assignment Statements, Boolean Expressions, Case Statements, Back patching – Procedure calls*	*Peephole Optimization, Basic Blocks, Flow Graphs, Next -Use Information*
SO 4-5	*Practice 1: Implementation of Lexical Analyzer*	*Practice 3 Elimation of Ambiguity, Left Recursion and Left Factoring*	*Practice 5: FIRST AND FOLLOW computation*	*Practice 7: Shift Reduce Parsing, Computation of LEADING AND TRAILING, Computation of LR(0) items*	*Practice 9: Implementation of DAG, Implementation of SLO-2 Global Data Flow Analysis, Implement any one storage allocation*
SO-6	*State Diagrams and Regular Expressions, Conversion of regular expressions to NFA – Thompson's*	*Problems related to FIRST, Computation of FOLLOW, Problems related to FOLLOW*	*Operator Precedence Parser Computation of LEADING, Computation of TRAILING*	*Code Generation, Issues in the design of code generator, The target machine – Runtime Storage management*	*Introduction to Global Data Flow Analysis, Computation of gen and kill, Computation of in and out*
SO-7	*Conversion of NFA to DFA, Simulation of an NFA.*	*Construction of a predictive parsing table,*	*Problems related to LEADING AND TRAILING, SLR Grammars, SLR Parsing Tables*	*A simple Code generator, Code Generation Algorithm*	*Parameter Passing, Runtime Environments*
SO-8	*Converting Regular expressions directly to DFA*	*Predictive Parsers LL(1) Grammars , Transition Diagrams for Predictive Parsers*	*Problems related to SLR,*	*Register and Address Descriptors*	*Source Language issues*

SO 9-10	Practice 2: Conversion from Regular Expressions to NFA	Practice 5: Elimation of Ambiguity, Left Recursion and Left Factoring	Practice 8: Predictive Parsing Table	Practice 11: Intermediate code generation – Postfix, Prefix, Intermediate code generation – Quadruple, Triple, Indirect triple,	Practice 14: SDG Mini Project
SO-11	Minimization of DFA,NFA	Error Recovery in Predictive Parsing	Construction of Canonical LR(1)	Generating Code of Assignment Statements	Storage Organization,
SO-12	Design of lexical analysis (LEX)	Predictive Parsing Algorithm	Construction of LALR	Cross Compiler – T diagrams,	Activation Records
SO-13	Error Handling in Lexical Analysis	Non Recursive Predictive Parser	Problems related to Canonical LR(1) and LALR Parsing Table	Issues in Cross compilers	Storage Allocation strategies
SO-14,15	Practice 3: Implement a LEX	Practice 6: Implement a non-recursive predictive parser	Practice 9: Construct a LALR	Practice 12: A simple code Generator	Practice 15: SDG Mini Project

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources

1	AlfredVAho,JefferyDUllman,RaviSethi,"Compilers,Principlestechniquesandtools",Pearson Education2011
2	S.GodfreyWinster,S.ArunaDevi,R.Sujatha,"CompilerDesign",YesdeePublishingPvt.Ltd,2016
3	WilliamM.WaiteandGerhardGoos.CompilerConstruction.Springer-Verlag,New York,2013.

Designers

Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu*	1	*Dr.S.Meenakshi, Assistant Professor, Department of Computer Science, SRMIST.*

Code	PCS25C33J	Title	Big Data Analytics	Category	C	Core	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	Understand the fundamental concepts, characteristics, and challenges of Big Data.
CR-2	Learn and apply clustering algorithms such as K-Means for data segmentation and pattern recognition
CR-3	Learn and apply Big Data storage and processing techniques using Hadoop, MapReduce
CR-4	Learn the processing techniques using Hadoop, MapReduce using clustering methods.
CR-5	Explore real-world applications of Big Data across different industries

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Outcomes (PO)											
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	*Design*	*Implement*	*Operate*	*Level of Thinking*	*Expected Proficiency (%)*	*Expected Attainment (%)*	*Disciplinary Knowledge*	*Problem Solving*	*Design & Development*	*Analysis, Design,*	*Modern Tool Usage*	*Society & Culture*	*Environment & Ethical practices &Social*	*Individual & Team Work*	*Communication*	*Project Management &*	*Life Long Learning*	
CO-1	Acquire the basics of computer network and its architecture	✓	✓	✓	✓	3	80	75	*3*	*2*	*1*	*3*	*3*	*1*	*1*	*1*	*2*	*2*	*2*	*3*
CO-2	Acquire the knowledge of various networks devices and addressing methods	✓	✓	✓	✓	3	60	85	*3*	*3*	*2*	*3*	*3*	*2*	*1*	*2*	*3*	*2*	*2*	*3*
CO-3	Design the network routing methods	✓	✓	✓	✓	3	85	80	*3*	*3*	*2*	*3*	*3*	*2*	*2*	*2*	*3*	*2*	*3*	*3*
CO-4	Find the error type that may happen during data transportation	✓	✓	✓	✓	3	80	75	*3*	*3*	*3*	*3*	*3*	*2*	*2*	*2*	*3*	*3*	*3*	*3*
CO-5	Understand the physical layer functions and components	✓	✓	✓	✓	3	85	80	*3*	*3*	*3*	*3*	*3*	*3*	*2*	*2*	*3*	*3*	*3*	*3*

Title & Session Outcomes	*CO-1*	*CO-2*	*CO-3*	*CO-4*	*CO-5*
Duration (60 minutes)	***15***	***15***	***15***	***15***	***15***
SO-1	Introduction: Big Data	Analytical Theory and Methods	Introduction: Hadoop	Setting up a Hadoop Cluster	Applications of Big Data
SO-2	Challenges of Conventional Systems	Overview of Clustering	The Hadoop Distributed File System	Cluster specification	Data Processing operators
SO-3	Analytic process an overview	K-Means	Components of Hadoop	Cluster Setup and Installation	Hive QL,Tables
SO-4-5	Practice 1:Elementary mathematical operations and control statements	Practice 4: Create subplots and color plots	Practice 7: Implementation of spam and non-spam classification problem.	Practice 10: Develop a MapReduce program to find the grades of student's.	Practice 13: Write queries to sort and aggregate the data in a table using HiveQL.
SO-6	Analysis Vs Reporting	Use case	Analyzing the Data with Hadoop Scaling Out-Hadoop Streaming	Hadoop Configuration	Structure of Hbase, Hbase QL

SO-7	Model Data Analytics Tools	Determining the number of Clusters	How Map Reduce Works	Security in Hadoop	Comparing base with Relational Database
SO-8	Analysis Vs Reporting	Classification: Decision Trees	Job scheduling shuffle and sort	Administering Hadoop -HDFS	Structure of Zoo Keeper
SO-9-10	Practice 2: Operations on Matrices and Vectors	Practice 5:Implementation of Linear regression with multiple regression	Practice 8: Implementation of K-Means cluster	Practice 11: Install, configure and run Hadoop and HDFS.	Practice 14: Implement and Perform Streaming Data Analysis using HIVE for data analysis of twitter data.
SO-11	Sampling Distribution	Evaluating Decision Tree	Task Execution Map read& Map writeanatomy	Monitoring	The Zoo keeper services
SO-12	High Performance Architecture: Overview	Examples of Decision Tree	Map reduce features	Maintenance	Case study - I
SO-13	Background and Overview of Data Analytics Lifecycle	Naive Bayes – Theorem	Examples of Map reduce	Applications of HDFS	Case study - II
SO-14-15	Practice 3: Creating Various types of plots /charts from various data source	Practice 6:Implementation of Data preprocessing methods , Correlation matrix	Practice 9: Write a program to implement word count program using MapReduce	Practice 12: Implement an application that stores big data in MongoDB / Pig using Hadoop	Practice 15: SDG Mini Project

Assessment

Level of Thinking		***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam***	
		CLA – 1 (10 %)		*CLA – 2 (15 %)*		*CLA – 3 (15 %)*		*CLA – 4 (10 %)*		*(50% Weightage)*	
		Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
1	*Remember*										
2	*Understand*	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
3	*Apply*										
4	*Analyze*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
5	*Evaluate*										
6	*Create*	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
	Total	*100*	*%*	*100*	*%*	*100*	*%*	*100*	*%*	*100*	*%*

Strategies

Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*	✓	*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources

1	Michael Berthold, David J. Hand, (2007), "Intelligent Data Analysis", Springer.
2	RSN Pillai, Bagavathi, "Statistics Theory and Practice", S.Chand
3	Tom White (2012), "Hadoop:The Definitive Guide" Third Edition, O'reilly Media

Designers

Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,AssociateProfessor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu*	1	Dr. M. Ramesh, Assistant Professor, Department of Computer Science, FSH, SRM IST

Code	PCS25D31T	Title	Artificial Intelligence in Software Engineering	Category	D	Discipline Elective	L	T	P	C
							4	0	0	4

Offering Department	Computer Science	Pre-requisite Courses	NIL	Co-requisite Courses	NIL	Progressive Courses		Data Book / Codes/Standards	

Rationale (CR)	The purpose of learning this course is to:
CR-1	Understand the fundamental concepts of Artificial Intelligence (AI) and its role in software engineering.
CR-2	Explore AI-driven techniques for software design, development, and testing.
CR-3	Learn how machine learning, natural language processing, and automation impact modern software engineering practices.
CR-4	Investigate AI-powered tools for project management, debugging, and optimization.
CR-5	Apply AI-based methodologies to real-world software engineering problems through case studies.

Outcomes (CO)	At the end of this course, learners will be able to:	Depth				Attainment			Program Outcomes (PO)											
		1 Conceive	2 Design	3 Implement	4 Operate	1 Level of Thinking	2 Expected Proficiency (%)	3 Expected Attainment (%)	1 Disciplinary Knowledge	2 Problem Solving	3 Design & Development	4 Analysis, Design,	5 Modern Tool Usage	6 Society & Culture	7 Environment &	8 Ethical practices &Social	9 Individual & Team Work	10 Communication	11 Project Management &	12 Life Long Learning
CO-1	Describe the core concepts of AI and its applications in software engineering.	✓	✓	✓	✓	3	80	75	3	2	1	3	3	1	1	1	2	2	2	3
CO-2	Design and implement AI-driven automation tools for software development.	✓	✓	✓	✓	3	60	85	3	3	2	3	3	2	1	2	3	2	2	3
CO-3	Apply machine learning models to improve software performance and security.	✓	✓	✓	✓	3	85	80	3	3	2	3	3	2	2	2	3	2	3	3
CO-4	Utilize AI techniques for software testing, maintenance, and optimization.	✓	✓	✓	✓	3	80	75	3	3	3	3	3	2	2	2	3	3	3	3
CO-5	Evaluate the effectiveness of AI solutions in software project management.	✓	✓	✓	✓	3	85	80	3	3	3	3	3	3	2	2	3	3	3	3

Title & Session Outcomes	CO-1	CO-2	CO-3	CO-4	CO-5
Duration (60 minutes)	12	12	12	12	12
SO-1	Overview of Artificial Intelligence and Machine Learning	Introduction to Machine Learning for Software Engineering	AI in Software Testing: Concepts and Techniques	AI in Legacy Software Modernization	AI in Software Project Planning and Scheduling
SO-2	AI and Its Role in Modern Software Development	Supervised and Unsupervised Learning Models in Software	Automated Test Case Generation using AI	AI-Based Software Refactoring and Code Optimization	AI for Risk Analysis and Management in Software Projects
SO-3	History and Evolution of AI in Software Engineering	Deep Learning in Software Optimization	AI-Powered Unit Testing and Regression Testing	Predictive Maintenance using AI Models	AI-Powered Decision Support Systems in Software Engineering
SO-4	AI-Driven Software Development Life Cycle (SDLC)	Reinforcement Learning for Software Decision Making	AI-Based Functional and Non-Functional Testing	AI for Software Evolution and Adaptability	AI in DevOps and Continuous Integration/Continuous Deployment .
SO-5	Role of AI in Code Generation and Optimization	AI-Powered Predictive Analytics in Software Maintenance	Role of Natural Language Processing (NLP) in Test Automation	Automated Software Documentation Generation	AI-Driven Requirements Engineering and Analysis
SO-6	AI-Powered Software Design and Architecture	Feature Selection and Engineering in AI-driven Software	AI-Driven Performance Testing and Load Testing	AI in Software Code Review and Best Practices Enforcement	AI-Based Cost Estimation and Resource Allocation

SO-7	Knowledge-Based Systems in Software Engineering	Anomaly Detection in Software Systems using AI	AI-Based Security Testing and Vulnerability Detection	AI-Driven Code Reuse and Component Analysis	Intelligent Assistants for Software Engineers
SO-8	AI-Assisted Debugging and Code Refactoring	AI for Fault Prediction and Bug Detection	Self-Healing Test Automation Systems	Self-Learning Software Systems	AI and Human Collaboration in Software Development
SO-9	AI in Software Configuration Management	Automated Bug Fixing using Machine Learning	AI and Continuous Testing in DevOps	AI-Driven Reverse Engineering in Software	AI for Agile and Lean Software Development
SO-10	Introduction to AI Tools in Software Engineering	Machine Learning Models for Software Performance Optimization	AI in Code Quality and Maintainability Analysis	AI for Technical Debt Reduction	AI-Enhanced Software Documentation and Knowledge Management
SO-11	Ethical Considerations in AI-Based Software Development	Explainability and Interpretability of AI Models in Software	Challenges and Limitations of AI in Software Testing	AI in Real-Time Software Maintenance	Future Trends and Challenges in AI for Software Engineering
SO-12	Case Study: AI-assisted Code Generation using GitHub Copilot	Case Study: Bug Prediction and Anomaly Detection using Machine Learning	Case Study: AI-Powered Automated Testing using Selenium and AI	Case Study: AI-Based Predictive Maintenance in Software Engineering	Case Study: AI-Powered Project Management Tools like Jira and Trello

Assessment

Level of Thinking		Continuous Learning Assessment (CLA) (50 % weightage)								Final Exam	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 (10 %)		(50% Weightage)	
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
1	Remember										
2	Understand	40%	--	30%	--	30%	--	40%	--	40%	--
3	Apply										
4	Analyze	40%	--	40%	--	40%	--	40%	--	40%	--
5	Evaluate										
6	Create	20%	--	30%	--	30%	--	20%	--	20%	--
	Total	100 %		100 %		100 %		100 %		100 %	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Case Studies	✓	No Poverty	
Emulations		Group Discussion		Zero Hunger	
Prototypes		Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools	✓	Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map		Affordable & Clean Energy	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources

1	Melanie Mitchell, "Artificial Intelligence: A Guide for Thinking Humans"
2	Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach"
3	MIT Artificial Intelligence Course: https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr.S.Kanchana Assistant ProfessorDepartment of Computer Science, SRM Institute of Science and TechnologyKattankulathur.

Code	PCS25D32J	Title	Deep Learning	Category	D	Discipline Elective	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	

Rationale (CR)	The purpose of learning this course is to:
CR-1	To introduce the basic principles of artificial neural networks and how deep learning evolved from traditional machine learning.
CR-2	To equip learners with the knowledge of training deep neural networks and improving their performance using optimization techniques.
CR-3	To understand the structure and function of convolutional neural networks for solving image-related problems.
CR-4	To explore how deep learning handles sequential data through RNNs, LSTMs, and their applications in NLP and time-series tasks.
CR-5	To expose learners to emerging trends, applications, and ethical practices in deploying deep learning models in real-world scenarios.

Outcomes (CO)	At the end of this course, learners will be able to:	Depth				Attainment			Program Outcomes (PO)											
		1 Conceive	2 Design	3 Implement	4 Operate	1 Level of Thinking	2 Expected Proficiency (%)	3 Expected Attainment (%)	1 Disciplinary Knowledge	2 Problem Solving	3 Design & Development	4 Analysis, Design,	5 Modern Tool Usage	6 Society & Culture	7 Environment &	8 Ethical Practices & Social	9 Individual & Team Work	10 Communication	11 Project Management &	12 Life Long Learning
CO-1	Describe the fundamentals of deep learning and construct basic neural network models.	✓	✓	✓	✓	3	80	75	3	2	1	3	3	1	1	1	2	2	2	3
CO-2	Train, evaluate, and tune deep neural networks using appropriate techniques.	✓	✓	✓	✓	3	90	85	3	3	2	3	3	2	1	2	3	2	2	3
CO-3	Develop convolutional neural networks for solving real-world image classification tasks.	✓	✓	✓	✓	3	85	80	3	3	2	3	3	2	2	2	3	2	3	3
CO-4	Implement recurrent models for sequence prediction and natural language processing tasks.	✓	✓	✓	✓	3	80	75	3	3	3	3	3	2	2	2	3	3	3	3
CO-5	Implement recurrent models for sequence prediction and natural language processing tasks.	✓	✓	✓	✓	3	85	80	3	3	3	3	3	3	2	2	3	3	3	3

Title & Session Outcomes	CO-1	CO-2	CO-3	CO-4	CO-5
Duration (60 minutes)	15	15	15	15	15
SO-1	Introduction to AI, ML, and Deep Learning	Introduction to Deep Neural Networks (DNNs)	Introduction to Image Data	Introduction to Sequential Data	Generative Models – Autoencoders Overview
SO-2	History and Applications of Deep Learning	Architecture of DNNs – Layers and Weights.	Convolution Operation and Filters	Recurrent Neural Networks – Basics	Introduction to GANs (Generative Adversarial Networks)
SO-3	Biological vs Artificial Neurons	Overfitting and Underfitting	Padding, Stride, and Pooling	Vanishing and Exploding Gradients	Attention Mechanism and Transformers
SO-4,5	Practice 1: *Python and NumPy refresher – working with matrices*	Practice 4: *Building a multi-layer neural network in Keras*	Practice 7: *Building a simple CNN with Keras*	Practice 10 *Sentiment analysis using LSTM on IMDB dataset*	Practice 13: *Build an autoencoder for image reconstruction*
SO-6	Basics of Neural Networks – Perceptron	Regularization Techniques: L1, L2, Dropout	CNN Architectures – LeNet, AlexNet, VGG	Long Short-Term Memory (LSTM) Networks	Use of DL in NLP, CV, and Healthcare.
SO-7	Activation Functions: Sigmoid, ReLU, Tanh	Batch Normalization	Role of Fully Connected Layers	Gated Recurrent Units (GRUs)	Model Deployment Basics

SO-8	*Loss Functions: MSE, Cross Entropy*	*Weight Initialization Techniques*	*Transfer Learning Basics*	*Applications: Text, Time Series, Speech*	*Ethical Considerations in DL.*
SO-9,10	Practice2: *Implementing a single-layer perceptron from scratch*	Practice 5: *Tuning hyperparameters on MNIST dataset*	Practice 8: Image classification on CIFAR-10	Practice 11: *Text generation using RNNs*	Practice 14: *Deploy a DL model using Flask or Streamlit* Boltzmann Machines with layer-wise
SO-11	*Feedforward and Backpropagation*	*Optimizers: SGD, Adam, RMSProp*	*Data Augmentation Techniques*	*Word Embeddings and Tokenization*	*Explainability and Interpretability in Models*
SO-12	*Gradient Descent and Optimization Basics*	*Hyperparameter Tuning*	*Image Classification Pipeline*	*Introduction to NLP tasks: Sentiment Analysis, Language Modeling*	*Introduction to Edge and Mobile DL.*
SO-13	*Overview of Deep Learning Libraries (TensorFlow, Keras, PyTorch)*	*Epochs, Batch Size, and Learning Rate*	Challenges in Training CNNs	*Evaluation Metrics for Sequence Models*	*Research Trends and Career Paths in Deep Learning*
SO-14,15	Practice 3: *Simple classification using Keras/TensorFlow*	Practice 6: *Visualizing training/validation loss and accuracy*	Practice 9: Applying transfer learning with pre-trained models	Practice 12: *Sequence prediction using GRUs*	Practice 15: SDG *Mini project: Choose a dataset and apply DL end-to-end*

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
1	*Ian Goodfellow, YoshuaBengio and Aaron Courville, " Deep Learning", MIT Press, 2017.*
2	***François Chollet,*** Deep Learning with Python, *Manning Publications, 2nd Edition, 2021.(Keras based DL Applications)*
3	***MIT Deep Learning Lectures – YouTube Series*** *by Lex Fridman (https://youtube.com/playlist?list=PLkDaE6sCZn6Ec-XTbcX1uRg2_u4xOEky0)*

Designers					
Professional Experts		***Higher Institution Experts***		***Internal Experts***	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,Associate Professor and Head , Jamal Mohamed College, Trichirappalli, Tamil Nadu*	*1*	*Dr. Sweety Bakyarani E, Assistant Professor, Department of Computer Science, SRMIST.*

Code	PCS25D33J	Title	Interfacing with Virtualization	Category	D	Discipline Elective	L	T	P	C
							3	0	2	4

Offering Department	Computer Science	Pre-requisite Courses	NIL	Co-requisite Courses	NIL	Progressive Courses		Data Book / Codes/Standards	

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	*Gain **theoretical and practical knowledge** of virtualization technologies.*
CR-2	*Understand **hypervisors and virtual machines** for efficient resource management.*
CR-3	*Explore **cloud migration strategies** to transition from traditional to cloud-based environments.*
CR-4	*Develop skills in **monitoring and managing** cloud resources to ensure security, scalability, and cost-effectiveness.*
CR-5	*Explore various hypervisor technologies **(e.g., VMware, KVM, Xen) to efficiently manage virtual machines.***

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	*Engineering Knowledge*	*Problem Analysis*	*Design & Development*	*Analysis, Design,*	*Modern Tool Usage*	*Society & Culture*	*Environment*	*Ethics*	*Individual & Team Work*	*Communication*	*Project Mgt. & Finance*	*Life Long Learning*	
CO-1	*Understand the fundamental concepts of virtualization and its role in cloud computing.*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*2*
CO-2	*Explain different types of virtualization and hypervisors used in server and desktop environments.*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-3	*Analyze virtualization solutions and their impact on infrastructure optimization.*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-4	*Demonstrate knowledge of cloud migration strategies, challenges, and deployment models.*	✓	✓	✓	✓	*3*	*75*	*65*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-5	*Apply monitoring and management techniques to optimize cloud-based resources efficiently.*	✓	✓	✓	✓	*3*	*80*	*75*	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*

Title & Session Outcomes	***CO-1***	***CO-2***	***CO-3***	***CO-4***	***CO-5***
Duration (60 minutes)	***15***	***15***	***15***	***15***	***15***
SO-1	*Introduction to Virtualization*	*Introduction to hypervisors.*	*Introduction to virtualization Solutions.*	*How to migrate to cloud, steps involved.*	*Monitoring and Managing Cloud Resources*
SO-2	*Virtualization and cloud computing*	*Hypervisors and Virtual machines.*	*Understanding Microsoft's Virtualization solutions.*	*Introduction, Challenges while migrating to Cloud.*	*Cloud monitoring tools:*
SO-3	*Need of virtualization,cost, limitations.*	*Server Virtualization.*	*Microsoft's Infrastructure Optimization Model.*	*Broad approaches to migrating into the cloud*	*AWS CloudWatch, Azure Monitor, Google Cloud Operations.*
SO-4-5	***Practice 1**: Create a new virtual machine using VirtualBox or VMware.*	***Practice 4**:Install a hypervisor on your computer (e.g., VMware Workstation, Oracle VirtualBox, or Hyper-V).*	***Practice 7**:Set up a simple virtualized datacenter using Hyper-V on a Windows Server.*	***Practice 10**: Creating a Virtual Machine on the Cloud.*	***Practice 13:**Use a cloud monitoring tool to track resource usage.*
SO-6	*Types of hardware virtualization*	*Understanding Server Virtualization.*	*Virtualization and the Infrastructure Optimization Model*	*Why migrate -deciding on cloud migration.*	*Security Management in cloud.*

SO-7	*Full, para & partial virtualization.*	*Types of server virtualization*	*Benefits of Virtualization*	*The Seven-step model of migration into a cloud.*	*Identity and Access Management (IAM).*
SO-8	*Desktop virtualization.*	*Introduction to virtual machines*	*Data Centre Virtualization.*	*Migration Risks and Mitigation*	*Disaster Recovery.*
SO-9-10	***Practice 2:** Configure memory virtualization on a virtual machine.*	***Practice 5**:Create a basic virtual machine using any hypervisor (e.g., VirtualBox or VMware).*	***Practice 8:**Create and configure a virtual desktop (client) using Hyper-V.*	***Practice 11**:Uploading and Accessing Data from Cloud Storage.*	***Practice 14:** SDG Mini Project*
SO-11	*Software virtualization*	*Types of virtual machines*	*Achieving the Benefits of Datacenter Virtualization.*	*Enterprise cloud computing paradigm.*	*Backup.*
SO-12	*Memory virtualization*	*Characteristics.*	*Client Virtualization.*	*Relevant Deployment.*	*Pay-as-you-go vs. Reserved Instances.*
SO-13	*Storage virtualization*	*Steps to install virtual machines.*	*Achieving the Benefits of Client Virtualization.*	*Models for Enterprise Cloud Computing.*	*Performance Optimization in cloud.*
SO-14,15	*Practice 3: Data virtualization, Network virtualization.*	*Practice 6: Hypervisor concepts, Types of Hypervisor.*	Practice 9: Cloud Virtualization.	*Practice 12: Adoption and Consumption Strategies.*	*Practice 15:Creating automated backups*

Evaluation

Level of Thinking	***Continuous Learning Assessment (CLA)*** *(50 % weightage)*								***Final Exam*** *(50% Weightage)*	
	CLA – 1 (10%)		*CLA– 2 (10%)*		*CLA – 3 (20%)*		*CLA – 4 (10%)*			
	Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
Remember										
Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*20%*	*20%*	*20%*	*20%*
Apply										
Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Evaluate										
Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*
Total	*100%*		*100%*		*100%*		*100%*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*		*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map	✓	*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources

1	David Marshall, Wade A. Reynolds, Advanced Server Virtualization: VMware and MicrosoftPlatform in the Virtual Data Center, Auerbach.
2	Cloud Computing: Web-Based Applications That Change the Way You Work and CollaborateOnline - Michael Miller - Que 2008
3	Publications, 2006. Cloud Computing (Principles and Paradigms), Edited by RajkumarBuyya, James Broberg, AndrzejGoscinski, John Wiley & Sons, Inc. 2011.

Designers

Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu*	1	Dr Arul Leena Rose P JProfessor, Department of Computer Science FSH,SRMIST

Code	PCS25G34J	Title	Software Project Management	Category	G	Generic Elective	L	T	P	C
							1	0	2	2

Offering Department	Computer Science	Pre-requisite Courses	Software Engineering	Co-requisite Courses	NIL	Progressive Courses	NIL	Data Book / Codes/Standards	NIL

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	*Demonstrate an understanding of software project management principles*
CR-2	*Develop and implement project management strategies*
CR-3	*Estimate project costs and manage resources efficiently*
CR-4	*Plan, schedule, and monitor projects to mitigate risks*
CR-5	*Plan, schedule, and monitor projects to mitigate risks*

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment Sustainability	Ethical Practices	Individual & Team Work	Communication	Project Management	Life Long Learning
CO-1	*Understand and Explain Software Project Management*	✓	✓			3	70	65	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*2*
CO-2	*Develop Strategies for Effective Project Management*	✓	✓	✓		3	75	65	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-3	*Estimate and Manage Project Costs*	✓	✓	✓	✓	3	80	70	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-4	*Plan, Schedule, and Monitor Projects for Risk Management*	✓	✓	✓	✓	3	70	65	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-5	*Apply Software Management Metrics for Performance Evaluation*	✓	✓	✓	✓	3	85	75	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*

Title & Session Outcomes	*CO-1*	*CO-2*	*CO-3*	*CO-4*	*CO-5*
Duration (60 minutes)	**9**	**9**	**9**	**9**	**9**
SO-1	Metrics: Introduction	Risk Management: Introduction	*Inputs and start criteria for requirements gathering*	*Design andDevelopment Phases: Some differences in our chosen approach*	*Globalization issues in project management*
SO-2	*Metrics Strategy, What Shouldmeasure?*	Riskmanagementcycle	*Dimensions of requirements gathering*	*Salient features ofdesign*	*Challenges inbuilding global teams*
SO-3	*Understanding and Trying to minimizevariability*	*Risk identification: common tools and techniques*	*Skill sets requiredduring requirements phase*	*Skillsets for design and development*	*Challenges inbuilding global teams*
SO 4-5	*Practice 1:Define the project scope, objectives, deliverables, and stakeholders.*	*Practice 3: Develop a project schedule for a software development lifecycle using a Gantt chart*	*Practice 5:Identify at least five risks associated with a software project (technical, financial, legal, etc.).*	*Practice 7:Form a hypothetical project team for a software development project.*	*Practice 9:Develop a change request scenario where project requirements are modified mid-development*

SO-6	*Issues and Pitfalls in Metrics Programs*	*RiskQuantifications, Risk Monitoring*	*Challenges during the requirements management phase*	*Testing : Activities in Testing, Test Scheduling and Types of Testing*	*Effective management techniques for managing global teams*
SO-7	*Matrices implementation checklists andtools*	*Metrics in riskmanagement*	*What isEstimation? – 3 Phases of Estimation*	*Metrics for Testing*	*The effect of internet on project management*
SO 8-9	*Practice 2:Work Breakdown Structure (WBS) Creation*	*Practice 4:Estimate the cost of a given software project using the COCOMO model.*	*Practice 6:Select a software project and analyze its suitability for Agile and Waterfall methodologies*	*Practice 8:Given project progress data, calculate key EVM metrics: Planned Value (PV), Earned Value (EV), Cost Performance*	*Practice 10:SDG Mini Project*

Assessment

Level of Thinking		Continuous Learning Assessment (CLA) (100 % weightage)							
		CLA – 1 (20 %)		CLA – 2 (20 %)		CLA – 3 (40 %)		CLA – 4 (20%)	
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
1	Remember	20%	20%	15%	15%	15%	15%	20%	20%
2	Understand								
3	Apply	20%	20%	20%	20%	20%	20%	20%	20%
4	Analyze								
5	Evaluate	10%	10%	15%	15%	15%	15%	10%	10%
6	Create								
	Total	100 %		100 %		100 %		100%	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Case Studies	✓	No Poverty	
Emulations		Group Discussion		Zero Hunger	
Prototypes		Hands-on Practice	✓	Good Health & Well Being	
Hands-on Practice Tools	✓	Inquiry Learning	✓	Quality Education	✓
Mathematical Computing Tools		Interactive Lecture	✓	Gender Equality	
Field Visit		Leading Question	✓	Clean Water & Sanitation	
		Mind Map	✓	Affordable & Clean Energy	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources

1	*Ramesh Gopalaswamy: "Managing Global Projects ", Tata McGraw Hill,2013*
2	Watts Humphrey, "Managing the Software Process ", Pearson Education, New Delhi, 2000
3	*PankajJalote, "Software Project Management in practice", Pearson Education, New Delhi, 2002.*

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr. SweetyBakyarani E, Assistant Professor, Department of Computer Science, FSH, SRMIST

Code	PCS25G35J	Title	Responsible AI	Category	G	Generic Elective	L	T	P	C
							1	0	2	2

Offering Department	Computer Science	Pre-requisite Courses	Artificial Intelligence	Co-requisite Courses	NIL	Progressive Courses	NIL	Data Book / Codes/Standards	

Rationale (CR)	*The purpose of learning this course is to:*	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design,	Modern Tool Usage	Society & Culture	Environment	Ethical Practices	Individual & Team Work	Communication	Project Management	Life Long Learning
CR-1	*Learn ethical theories and how they apply to AI technologies.*																			
CR-2	*Understand responsible AI development and deployment.*																			
CR-3	*Identify and address ethical dilemmas in AI applications.*																			
CR-4	*Explore legal and societal impacts of AI.*																			
CR-5	*Gain insights into regulatory frameworks and AI governance.*																			
Outcomes (CO)	*At the end of this course, learners will be able to:*																			
CO-1	*Learn fundamental ethical theories, issues and its challenges*	✓	✓			3	80	75	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*2*
CO-2	*Understand the ethical harms and ethical initiatives in AI*	✓	✓			3	75	65	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-3	*Evaluate the ethical implications of AI in decision-making, privacy, and surveillance*	✓	✓			3	80	70	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-4	*Identify legal and societal challenges in AI adoption and governance.*	✓	✓	✓		3	75	75	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-5	*Demonstrate responsible AI development by integrating ethical frameworks into AI design.*	✓	✓	✓	✓	3	85	75	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*

Title & Session Outcomes	*CO-1*	*CO-2*	*CO-3*	*CO-4*	*CO-5*
Duration (60 minutes)	**9**	**9**	**9**	**9**	**9**
SO-1	*Understanding Ethics in AI*	*Ethical Initiatives in AI*	*Model process for Addressing ethical concern in AI system design*	*Robo ethic and Morality*	*Ethics in Science and Technology*
SO-2	*Definition of morality*	*Fairness and Bias mitigation*	*Transparency and explainability in Autonomous systems*	*Regulatory compliance and governance in AI systems*	*AI and Ethics opportunities*
SO-3	*Evolution of AI Ethics*	*AI's Role in workforce Automation*	*Autonomous AI and Ethical Decision-making*	*Algorithmic Bias and Fairness in AI*	*Ethics and professional responsibility*
SO 4-5	*Practice 1: Ethical Dilemmas in AI*	*Practice 2: Implement fairness and bias mitigation in AI models*	*Practice 3:Data privacy in AI-powered health systems*	*Practice 4:case study on ontology where ethics is at stake*	*Practice 5:Identification on optimization in AI affecting ethics SDG Mini Project*
SO-6	*Ethical challenges in AI Decision- making*	*Ethical harms and concerns*	*Data privacy and protection in AI systems*	*Moral Theories*	*Ethical issues in artificial intelligence*

SO-7	*AI's Role in workforce Automation*	*Sustainability and AI for social Good*	*Regulatory compliance and governance in AI systems*	*Ethics and professional responsibility*	*AI and Creativity*
SO 8-9	*Practice 2:Analyze where AI made an unethical decision*	*Practice 4: Healthcare robots, Autonomous Vehicles, warfare and weaponization*	*Practice 6:Algorithmic bias in facial recognition systems*	*Practice 8:Analyze the role of moral theories in Roboethics*	*Practice 10:SDG Mini Project*

Assessment									
Level of Thinking		***Continuous Learning Assessment (CLA)*** *(100 % weightage)*							
		CLA– 1		*CLA– 2*		*CLA– 3*		*CLA – 4*	
		(20%)		*(20%)*		*(40%)*		*(20%)*	
		Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
	Remember					*20%*			*15%*
	Understand	*20%*	*20%*	*20%*	*15%*		*15%*	*20%*	
	Apply					*20%*			*15%*
	Analyze	*20%*	*20%*	*20%*	*20%*		*20%*	*20%*	
	Evaluate					*10%*			*20%*
	Create	*10%*	*10%*	*10%*	*15%*		*15%*	*10%*	
Total		*100%*		*100%*		*100 %*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*	✓	*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map		*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
1	*y. Eleanor Bird, Jasmin Fox-Skelly, Nicola Jenner, Ruth Larbey, Emma Weitkamp and Alan Winfield ,"The ethics of artificial intelligence: Issues and initiatives", EPRS | European Parliamentary Research Service Scientific Foresight Unit (STOA) PE 634.452 – March 2020*
2	Patrick Lin, Keith Abney, George A Bekey," Robot Ethics: The Ethical and Social Implications of Robotics", The MIT Press- January 2014
3	*https://www.weforum.org/agenda/2016/10/top-10-ethical-issues-in-artificial-intelligence/*

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Mr. K V Srivallaban, Principal Consultant, Infosys Limited	1	Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu	1	Dr.S.KanchanaAssistant Professor, Department of Computer Science, SRM Institute of Science and Technology, Kattankulathur.

Code	PCS25G36J	Title	Security and Privacy in Cloud	Category	G	Generic Elective	L	T	P	C
							1	0	2	2

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	*The purpose of learning this course is to:*
CR-1	To Introduce Cloud Computing terminology, definition& concepts
CR-2	To understand the security design and architectural considerations for Cloud
CR-3	To understand the Identity, Access control in Cloud
CR-4	To follow best practices for Cloud security using various design patterns
CR-5	To be able to monitor and audit cloud applications for security

Outcomes (CO)	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Outcomes (PO)												
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design,	Modern Tool Usage	Society & Culture	Environment	Ethical Practices	Individual & Team Work	Communication	Project Management	Life Long Learning
CO-1	Understand the cloud concepts and fundamentals.	✓	✓			3	80	75	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*2*
CO-2	Explain the security challenges in the cloud.	✓	✓			3	75	65	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-3	Define cloud policy and Identity and Access Management.	✓	✓	✓	✓	3	80	70	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-4	Understand various risks and audit and monitoring mechanisms in the cloud.	✓	✓	✓	✓	3	75	75	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*
CO-5	Define the various architectural and design considerations for security in the cloud.	✓	✓	✓	✓	3	85	75	*3*	*3*	*3*	*3*	*3*	*2*	*1*	*3*	*3*	*2*	*3*	*3*

Title & Session Outcomes	*CO-1*	*CO-2*	*CO-3*	*CO-4*	*CO-5*
Duration (60 minutes)	**9**	**9**	**9**	**9**	**9**
SO-1	Overview of cloud security	Security design principles for Cloud Computing	Access control requirements for Cloud infrastructure	Introduction to Design Patterns	Proactive activity monitoring
SO-2	Security Services	Comprehensive data protection	User Identification	Cloud bursting	Incident Response
SO-3	Confidentiality, Integrity	End-to-end access control	Authentication and Authorization	Geo-tagging	Monitoring for unauthorized access
SO 4-5	Practice 1: Simulate a Cloud scenario using cloud Sim	Practice 3: Simulate a secure file sharing using a cloud Sim	Practice 5: Implementanyencryptionalgorithmtoprotecttheimages	*Practice 7: Implement an attribute-based access control mechanism*	*Practice 9: Develop a log monitoring system with incident management in the cloud*
SO-6	Basic of cryptography	Common attack vectors and threats	Roles-based Access Control	Secure Cloud Interfaces	malicious traffic, abuse of system privileges
SO-7	Conventional and public-key cryptography	Network and Storage	Multi-factor authentication	Cloud Resource Access Control	Events and alerts ,Auditing

SO 8-9	Practice 2: Simulate resource management using Cloud Sim	Practice 4: simulate log forensics using cloud sim	Practice 6: Implement a role-based access control mechanism in a specific scenario	Practice 8: Implement data anonymization techniques over the simple dataset	Practice 10: SDG Mini Project

Assessment									
Level of Thinking		***Continuous Learning Assessment (CLA)*** *(100 % weightage)*							
		CLA– 1 (20%)		*CLA– 2 (20%)*		*CLA– 3 (40%)*		*CLA – 4 (20%)*	
		Theory	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*	*Theory*	*Practice*
	Remember					*20%*			*15%*
	Understand	*20%*	*20%*	*20%*	*15%*		*15%*	*20%*	
	Apply					*20%*			*15%*
	Analyze	*20%*	*20%*	*20%*	*20%*		*20%*	*20%*	
	Evaluate					*10%*			*20%*
	Create	*10%*	*10%*	*10%*	*15%*		*15%*	*10%*	
	Total	*100%*		*100%*		*100 %*		*100%*	

Strategies					
Technology		***Pedagogy / Andragogy***		***Sustainable Development***	
Simulations	✓	*Case Studies*		*No Poverty*	
Emulations		*Group Discussion*	✓	*Zero Hunger*	
Prototypes		*Hands-on Practice*	✓	*Good Health & Well Being*	
Hands-on Practice Tools	✓	*Inquiry Learning*	✓	*Quality Education*	✓
Mathematical Computing Tools	✓	*Interactive Lecture*	✓	*Gender Equality*	
Field Visit		*Leading Question*	✓	*Clean Water & Sanitation*	
		Mind Map		*Affordable & Clean Energy*	
		Minute Paper			
		Peer Review			
		Problem Based Learning	✓		

Resources	
1	*RajKumarBuyya,JamesBroberg,andrzejGoscinski,"CloudComputing:",Wiley2013*
2	*Daveshackleford,"VirtualizationSecurity",SYBEXawileyBrand2013.*
3	*Mather,KumaraswamyandLatif,"CloudSecurityandPrivacy",OREILLY2011*

Designers					
Professional Experts		***Higher Institution Experts***		***Internal Experts***	
1	*Mr. K V Srivallaban, Principal Consultant, Infosys Limited*	*1*	*Dr. D I George Amalarthinam,Principal,Associate Professor and Head, Jamal Mohamed College, Trichirappalli, Tamil Nadu*	*1*	*Dr.T.Nathiya Assistant Professor, Department of Computer Science, SRMIST*

Code	PCS25P31L	Title	Internship	Category	P	. Project Work, Internship in Industry/Higher Technical Institutions	L	T	P	C
							0	0	0	2

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	The purpose of learning this course is to:
CR-1	Apply theoretical concepts to real-world industry challenges and professional practices.
CR-2	Enhance technical skills, problem-solving abilities, and workplace competencies relevant to the field.
CR-3	Demonstrate clear and professional communication through reports, presentations, and teamwork.
CR-4	Understand workplace ethics, professional responsibilities, and industry standards.
CR-5	Critically reflect on the internship experience to identify key learnings and areas for professional growth.

Outcomes (CO)	At the end of this course, learners will be able to:	Depth				Attainment			Program Outcomes (PO)											
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Problem Solving	Design & Development	Analysis, Design,	Modern Tool Usage	Society & Culture	Environment &	Ethical Practices & Social	Individual & Team Work	Communication	Project Management &	Life Long Learning
CO-1	Demonstrate the ability to apply theoretical concepts to practical industry scenarios.	✓	✓	✓	✓	3	85	75	3	3	3	3	3	3	3	3	3	3	3	3
CO-2	Develop problem-solving and analytical skills by assessing industry challenges and proposing evidence-based solutions.	✓	✓	✓	✓	3	85	75	3	3	3	3	3	3	3	3	3	3	3	3
CO-3	Exhibit proficiency in academic and professional communication through structured reports, documentation, and presentations.	✓	✓	✓	✓	3	85	75	3	3	3	3	3	3	3	3	3	3	3	3
CO-4	Understand and adhere to professional ethics, workplace discipline, and academic integrity in a real-world environment.	✓	✓	✓	✓	3	85	75	3	3	3	3	3	3	3	3	3	3	3	3
CO-5	Evaluate personal and professional growth through reflective analysis of the internship experience, identifying strengths, weaknesses, and areas for continuous learning.	✓	✓	✓	✓	3	85	75	3	3	3	3	3	3	3	3	3	3	3	3

*** Internship Training Selection: List of Industries/Research Centre's for Internship Training for students would be finalized by the Department Internship/Industrial Training Committee

LearningAssessment				
	Continuous Learning Assessment (50%weightage)		Final Evaluation (50%weightage)	
	Review–1	Review–2	Internship Report	Viva-Voce
ProjectWork/Internship	20%	30%	30%	20%

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. K V Srivallaban Principal Consultant Infosys Limited	1	Dr. D I George Amalarthinam ,Principal Associate Professor and Head of the Department of Computer Science, Jamal Mohamed College, Trichirappalli, Tamil Nadu, India	1	Dr.S.Kanchana Assistant Professor, Department of Computer Science, FSH, SRMIST

Semester – IV

Code	PCS25P41L	Title	Project Work	Category	P	. Project Work, Internship in Industry/Higher Technical Institutions	L	T	P	C
							0	0	20	10

Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

Rationale (CR)	The purpose of learning this course is to:
CR-1	Enables students to apply academic knowledge to solve real-world industrial problems.
CR-2	Encourages analytical thinking and innovation in addressing industry challenges.
CR-3	Strengthens students' technical expertise, project management, and teamwork capabilities.
CR-4	Provides exposure to industry practices, tools, and professional work culture.
CR-5	Equips students with critical thinking, adaptability, and employability skills for future career growth.

Outcomes (CO)	At the end of this course, learners will be able to:	Depth				Attainment			Program Outcomes (PO)											
		1 Conceive	2 Design	3 Implement	4 Operate	1 Level of Thinking	2 Expected Proficiency (%)	3 Expected Attainment (%)	1 Disciplinary Knowledge	2 Problem Solving	3 Design & Development	4 Analysis, Design,	5 Modern Tool Usage	6 Society & Culture	7 Environment &	8 Ethical Practices & Social	9 Individual & Team Work	10 Communication	11 Project Management	12 Life Long Learning
CO-1	Apply software engineering principles to design, develop, test, and deploy efficient and scalable software solutions.	3	3	3	3	3	85	80	3	3	3	3	3	3	3	3	3	3	3	3
CO-2	Analyze complex problems and implement optimized algorithms and data structures to enhance system performance.	3	3	3	3	3	85	80	3	3	3	3	3	3	3	3	3	3	3	3
CO-3	Utilize modern software tools, programming languages, and industry best practices to develop high-quality applications.	3	3	3	3	3	85	80	3	3	3	3	3	3	3	3	3	3	3	3
CO-4	Work effectively in teams, follow agile methodologies, and adhere to ethical and professional standards in software development.	3	3	3	3	3	85	80	3	3	3	3	3	3	3	3	3	3	3	3
CO-5	Stay updated with emerging technologies, frameworks, and trends to enhance career growth and innovation in the software industry.	3	3	3	3	3	85	80	3	3	3	3	3	3	3	3	3	3	3	3

***** Project Work Selection: Project Work Titles for students would be finalized by the Department Project Work Evaluation Committee.**

LearningAssessment				
	Continuous Learning Assessment (50%weightage)		Final Evaluation (50%weightage)	
	Review–1	Review–2	Project Report	Viva-Voce
ProjectWork/Internship	20%	30%	30%	20%

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Mr. K V Srivallaban Principal Consultant Infosys Limited	1	Dr. D I George Amalarthinam,Principal Associate Professor and Head of the Department of Computer Science, Jamal Mohamed College, Trichirappalli, Tamil Nadu, India	1	Dr.P. Muthulakshmi Professor, Department of Computer Science, FSH, SRMIST

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