

ACADEMIC CURRICULA

POSTGRADUATE DEGREE PROGRAMME

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY (M.Sc)

Two Years (Full-Time)

Learning Outcome Based Education

Choice Based Flexible Credit System

Academic Year

2021 - 2022



SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Chengalpattu District 603203, Tamil Nadu, India

DEPARTMENT OF COMPUTER SCIENCE

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	Proficiency: Understanding the principles of computing, mathematics, and basic sciences and apply the same to the development of applications across various disciplines of study and utility
PEO - 2	Analytical Ability: Developing skillfulness to identify and analyze user needs and take them into account in the selection, creation, evaluation, and administration of computer-based systems
PEO - 3	Continuous learning:Helps and supports to use current techniques, skills, and tools necessary for computing practices and imbibe the art of adaptive learning towards the technologies to come
PEO - 4	Demonstration Skill: An ability to communicate effectively with a range of audiences
PEO - 5	Social Connect: An understanding of professional, ethical, legal, security and social issues, responsibilities

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	H	H	M	H	M
PEO - 2	H	M	H	H	H
PEO - 3	M	H	M	H	H
PEO - 4	H	H	H	L	M
PEO - 5	L	H	M	H	H

H – High Correlation, M – Medium Correlation, L – Low Correlation

5. Consistency of PEO's with Program Learning Outcomes (PLO)															
	Program Learning Outcomes (PLO)														
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed	Multicultural Competenc	Ethical Reasoning	Community Engagemen	ICT Skills	Leadership Skills	Life Long Learning
PEO - 1	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
PEO - 2	H	H	H	H	H	L	M	L	M	H	M	M	H	H	M
PEO - 3	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PEO - 4	H	M	M	H	H	H	M	H	H	H	H	L	M	M	H
PEO - 5	M	M	H	H	M	H	M	H	H	H	M	M	H	M	M

H – High Correlation, M – Medium Correlation, L – Low Correlation

6. PG Programme Structure (Total Credits:80)														
1. Professional Core Courses (C) (8Courses)					2. Discipline Elective Courses (D) (3 Courses)									
Course Code	Course Title	Hours/Week				Course Code	Course Title	Hours/Week						
		L	T	P	C			L	T	P	C			
PIT21C101J	Java Programming	3	0	4	5	PIT21E101J	Web Technology	3	0	2	4			
PIT21C102J	Advanced Operating system	3	0	4	5	PIT21E102J	Digital Image Processing							
PIT21C103J	Software Engineering	3	0	4	5	PIT21E103J	Enterprise Resource Planning	3	0	2	4			
PIT21C201J	Advanced Java Programming	3	0	4	5	PIT21E201J	Computer Networks							
PIT21C202J	Data Mining and Data Warehousing	3	0	4	5	PIT21E202J	Mobile Application Development	3	0	2	4			
PIT21C203J	Object Oriented Analysis and Design	3	0	4	5	PIT21E203J	Network Protocols							
PIT21C301J	Python Programming	4	0	2	5	PIT21E301J	Big Data Analytics	3	0	2	4			
PIT21C302J	Open Source Technologies	4	0	2	5	PIT21E302J	Cloud Computing							
Total Learning Credits					40	Total Learning Credits					12			
3. Generic Elective Courses (G) (Any 1Course)														
Course Code	Course Title	Hours/Week				Course Code	Course Title	Hours/Week						
		L	T	P	C			L	T	P	C			
PIT21G301J	Social Media and Text Analytics	3	0	2	4	PIT21S101J	Data Visualization Tool	1	0	2	2			
PIT21G302J	Component Based Technology					PIT21S201J	Multimedia and Design	1	0	2	2			
PIT21G303J	Linux Based Latex					PIT21S301J	Web Development Using AngularJS and Mongo	3	0	2	4			
Total Learning Credits					4	Total Learning Credits					8			
5. Project Work, Internship In Industry / Higher Technical Institutions(P)														
Course Code	Course Title	Hours/Week				Course Code	Course Title	Hours/Week						
		L	T	P	C			L	T	P	C			
PIT21E311L	Miniproject	0	0	2	1	6.Ability Enhancement Courses (AE) (3 Courses)								
PIT21E411L	Project Work	0	0	2	12									
Total Learning Credits					13	Total Learning Credits					3			
					PCD21AE1T					Professional Skills and Problem Solving	1	0	0	1
					PCD21AE2T					GENERAL APTITUDE FOR COMPETITIVE EXAMINATIONS	1	0	0	1
					PCD21AE3T					Employability Skills	1	0	0	1
Total Learning Credits					13	Total Learning Credits					3			

Course Structure								
Semester	Professional Core Courses (PCC)	Discipline Electives Courses (DEC)	Generic Electives Courses (GEC)	Skill Enhancement Courses (SEC)	Ability Enhancement Courses (AEC)	Project Work, Internship (P)	Total Credits	Total Hours
Sem I	PCC-1(7) PCC-2 (7) PCC-3(7)	DEC-1 (5)		SEC 1 (3)	AEC 1 (1)		22	30
Sem II	PCC-4 (7) PCC-5 (7) PCC-6 (7)	DEC-2 (5)-		SEC 2 (3)	AEC 2 (1)		22	30
Sem III	PCC-7(6) PCC-8(6)	DEC-3(5)	GEC(5)	SEC3(5)	AEC3(1)	P (2)	24	30
Sem IV						P (24)	12	30
Total Credits	40	12	4	8	3	13	80	120

7. Implementation Plan

Semester - I					Semester - II						
Course Code	Course Title	Hours/Week			C	Course Code	Course Title	Hours/Week			C
		L	T	P				L	T	P	
PIT21C101J	Java Programming	3	0	4	5	PIT21C201J	Advanced Java Programming	3	0	4	5
PIT21C102J	Advanced Operating system	3	0	4	5	PIT21C202J	Data Mining and Data Warehousing	3	0	4	5
PIT21C103J	Software Engineering	3	0	4	5	PIT21C203J	Object Oriented Analysis and Design	3	0	4	5
PIT21E101J	Web Technology	3	0	2	4	PIT21E201J	Computer Networks	3	0	2	4
PIT21E102J	Digital Image Processing										
PIT21E103J	Enterprise Resource Planning										
PIT21S101J	Data Visualization Tool	1	0	2	2	PIT21E202J	Mobile Application Development	1	0	2	2
PCD21AE1T	Professional Skills and Problem Solving	1	0	0	1	PIT21S201J	Multimedia and Design				
Total Learning Credits					22	PCD21AE2T	GENERAL APTITUDE FOR COMPETITIVE EXAMINATIONS	1	0	0	1
						Total Learning Credits					22
Semester - III					Semester - IV						
Course Code	Course Title	Hours/Week			C	Course Code	Course Title	Hours/Week			C
		L	T	P				L	T	P	
PIT21C301J	Python Programming	4	0	2	5	PIT21E411L	Project Work	0	0	2	12
PIT21C302J	Open Source Technologies	4	0	2	5			4			
PIT21E301J	Big Data Analytics	3	0	2	4	Total Learning Credits					12
PIT21E302J	Cloud Computing										
PIT21E303J	Internet of Things										
PIT21G301J	Social Media and Text Analytics	3	0	2	4	Total Learning Credits :80					
PIT21G302J	Component Based Technology										
PIT21G303J	Linux Based Latex										
PIT21E311L	Miniproject	0	0	2	1						
PIT21S301J	Web Development using AngularJS and Mongo	3	0	2	4						
PCD21AE3T	Employability Skills	1	0	0	1						
Total Learning Credits					24						

8. Program Articulation Matrix																
Course Code	Course Name	Programme Learning Outcomes														
		Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed Learning	Multicultural	Ethical Reasoning	Community	ICT Skills	Leadership Skills	Life Long Learning
PIT21C101J	Java Programming	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
PIT21C102J	Advanced Operating system	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
PIT21C103J	Software Engineering	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
PIT21C201J	Advanced Java Programming	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
PIT21C202J	Data Mining and Data Warehousing	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
PIT21C203J	Object Oriented Analysis and Design	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
PIT21C301J	Python	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
PIT21C302J	Open Source Technologies	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
PIT21E101J	Web Technology	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PIT21E102J	Digital Image Processing	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PIT21E103J	Enterprise Resource Planning	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PIT21E201J	Computer Networks	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PIT21E202J	Mobile Application Development	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PIT21E203J	Network Protocols	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PIT21E301J	Big Data Analytics	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PIT21E302J	Cloud Computing	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PIT21E303J	Internet of Things	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PIT21G301J	Social Media and Text Analytics	H	H	H	H	H	L	M	L	M	H	M	M	H	H	M
PIT21G302J	Component Based Technology	H	H	H	H	H	L	M	L	M	H	M	M	H	H	M
PIT21G303J	Linux Based Latex	H	H	H	H	H	L	M	L	M	H	M	M	H	H	M
PIT21S101L	<i>Data Visualization Tool</i>	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
PIT21S201L	<i>Multimedia and Design</i>	H	H	H	H	H	L	M	L	M	H	M	M	H	H	M
PIT21S301J	<i>Web Development Using AngularJS and Mongo</i>	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PL21E311L	<i>Mini Project</i>	H	H	H	H	H	L	M	L	M	M	M	H	M	H	H
PL21E411L	<i>Project Work</i>	H	H	H	H	H	L	M	L	M	M	M	H	M	H	H
PCD21AE1T	<i>Professional Skills and Problem Solving</i>	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PCD21AE2T	GENERAL APTITUDE FOR COMPETITIVE EXAMINATIONS	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
PCD21AE3T	Employability Skills	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
	Program Average	H	H	H	H	H	M	M	M	M	M	M	H	H	H	H

H – High Correlation, M – Medium Correlation, L – Low Correlation

SEMESTER-I

Course Code	PIT21C101J	Course Name	JAVA PROGRAMMING	Course Category	C	Professional Core Course	L	T	P	C
							3	0	4	5

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

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 : <i>An overview of Java and Buzz words</i>	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 : <i>Understand the object oriented features in Java</i>	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed Learning	Multicultural Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
CLR-3 : <i>Create and understand the Java program structure</i>																		
CLR-4 : <i>Understand the Java packages and Interfaces</i>																		
CLR-5 : <i>Use the multithreading programming scenario</i>																		
CLR-6 : <i>Create applet and use AWT tools</i>																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	2	85	80	H	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-1 : <i>Understand the difference between C++ and Java</i>		3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-2 : <i>Develop Java program using JVM</i>		3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-3 : <i>Use the various kinds of packages and interfaces</i>		3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-4 : <i>Apply the Exception handling methods in Java program.</i>		3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-5 : <i>Identify applet and application programming</i>		3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-6 : <i>Understand the Java I/O classes and collections interfaces.</i>		3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-

Duration (hour)		21	21	21	21	21
S-1	SLO-1	<i>The Genesis of Java How java changed the internet- Java's magic: Byte Code</i>	<i>Introducing classes- Class fundamentals- Declaring Objects Assigning object Reference variables- Introducing method</i>	<i>Inheritance Basics Understanding Types of Inheritance: Single, Multilevel, Hierarchical Inheritance</i>	<i>Introduction to Java Thread model Creating a Thread by Extending Thread Class</i>	<i>Introduction to Event Handling - Understanding Action Event & Item Event Understanding Key Event & Mouse Event</i>
	SLO-2	<i>Introduction to Java Buzzword- Understanding Java Buzzwords Simple, Object Oriented, Robust, Multithreaded, Architecture</i>	<i>What are Constructors? What are the Characteristics of constructors? Understanding Types of Constructors -Using this Keyword</i>	<i>How does java support multiple inheritance? - using Super keyword What is Method Overriding?</i>	<i>Creating a Thread by implementing Runnable Interface Thread Class</i>	<i>Text Event, Window Event, Component Event- Introduction to Event Listener Interfaces Working with Action Listener &, Adjustment Listener</i>
S2	SLO-1	<i>Neutral, Interpreted and high performance, Distributed, Dynamic</i>	<i>Introduction to Garbage Collection</i>	<i>Understanding Dynamic method dispatch - Introduction to Abstract keyword</i>	<i>Creating multiple threads</i>	<i>Working with Container Listener,</i>
	SLO-2	<i>Evolution of Java</i>	<i>Using Finalize() method</i>	<i>Introduction with Abstract class</i>	<i>Assigning Thread priorities</i>	<i>Working with Key Listener & Mouse Listener</i>
S3	SLO-1	<i>Introduction to Object Oriented Concepts of Java Understanding Encapsulation, Polymorphism, Inheritance</i>	<i>Overloading methods- Overloading constructors Using objects as parameters- Argument Passing</i>	<i>Working with Abstract class and Method & Using final with inheritance Introduction to Package -</i>	<i>Applying Synchronization- Inter-thread communication Introduction to Legacy Classes</i>	<i>Item Listener, Component Listener</i>
	SLO-2	<i>Introduction to Lexical Issues of Java Understanding Whitespaces, Identifiers, Literals Comments, Separators, Keywords</i>	<i>Returning Objects- Recursion</i>	<i>Creating a Package Understanding Access Protection- Importing packages</i>	<i>Working with Vector class Examples using Vector class</i>	<i>Introduction AWT Controls Working with Label controls</i>

S4 – S7	SLO-1	Laboratory 1: <i>Learning to work with Java IDE and Writing Simple Conversion Programs</i>	Laboratory 4: <i>Classes and Objects</i>	Laboratory 7: <i>Inheritance, Method Overriding, Abstract classes and methods</i>	Laboratory 10: <i>Multithreading</i>	Laboratory 13: <i>Event Handling</i>
	SLO-2					
S8	SLO-1	<i>Introduction to Data types of Java, Understanding byte,short,int,long, float,double,chars, Boolean</i>	<i>Introducing Access Control</i>	<i>Introduction to Interfaces</i>	<i>Understanding Stack class</i>	<i>Working with Buttons controls</i>
	SLO-2	<i>What is variable?, Declaring a variable, dynamic initialization of variables, Scope and lifetime of variables</i>	<i>Understanding Static variables and methods</i>	<i>Defining an interface</i>	<i>Examples using Stack class</i>	<i>Working with Check Boxes</i>
S9	SLO-1	<i>Introduction to Operators, Working with Arithmetic, Relational, Logical, Bitwise, Conditional, Assignment operators</i>	<i>Understanding Final variables and methods Working with Nested Class</i>	<i>Implementing Interfaces How Interfaces are extended</i>	<i>Introduction to Legacy Interfaces Understanding Enumeration Interface</i>	<i>Working with Check Box Group controls Working with Choice controls controls</i>
	SLO-2	<i>What is Array?, Initialization of Arrays, Understanding Types of Arrays Introduction to Control Statements</i>	<i>Understanding Inner Class Introduction to String Class</i>	<i>What is Exception? Exception handling</i>	<i>Examples using Enumeration interface Introduction to Utility classes</i>	<i>Working with Lists controls Working with Text Field controls</i>
S10	SLO-1	<i>IF, IF the else statements</i>	<i>String array</i>	<i>Introduction to Exception handling</i>	<i>Working with String Tokenizer</i>	<i>Introduction to Layout Manager</i>
	SLO-2	<i>Working with Selection Statements ,All forms of if & Switch</i>		<i>Working with try and catch</i>		<i>Understanding Flow Layout</i>

S11-14	SLO-1	Laboratory 2: <i>Operators</i>	Laboratory 5: <i>Overloading Methods and Constructors</i>	Laboratory 8: <i>Packages and Interfaces</i>	Laboratory 11: <i>Legacy Classes and Interfaces</i>	Laboratory 14: <i>AWT Controls</i>
	SLO-2					
S-15	SLO-1	<i>Introduction to Iterative Statements,</i>	<i>Working with String Handling Methods</i>	<i>Using multiple catch clauses</i>	<i>Introduction Working with Date class-</i>	<i>Understanding Border Layout</i>
	SLO-2	<i>Working with while, do-while,</i>		<i>Working with Finally</i>	<i>Introduction Working with Gregorian Calendar</i>	<i>Understanding Grid Layout</i>
S-16	SLO-1	<i>for, for each statements</i>	<i>Command Line arguments</i>	<i>Throw and throws</i>	<i>Working with Date class- Working with Calendar</i>	<i>Byte Streams classes</i>
	SLO-2	<i>Introduction to Jump Statements-</i>		<i>finalize() method</i>	<i>Understanding Exception Types</i>	
S-17	SLO-1	<i>Working with break statements</i>	<i>Single line arguments</i>	<i>Understanding Built-in Exceptions</i>	<i>Working with Scanner Class</i>	<i>Character Streams classes</i>
	SLO-2	<i>continue and return statements</i>	<i>Double line arguments</i>	<i>Creating user defined Exceptions</i>	<i>Examples using utility classes</i>	
S18-21	SLO-1	Laboratory 3: <i>Arrays, Control Statements</i>	Laboratory 6: <i>String Class, Command Line Arguments</i>	Laboratory 9: <i>Exception Handling</i>	Laboratory 12: <i>Utility Classes</i>	Laboratory 15: <i>Layout Managers, Byte and Character Streams</i>
	SLO2					

Learning Resources	<p>1. Herbert Schildt (2007), <i>Java: The Complete Reference</i>, Tata McGraw-Hill, Seventh Edition, New Delhi.</p>	<p>1. Horstmann S., Gray Cornell (2001), <i>Core Java 2 Volume In, Fundamentals</i>, Addition Wesley, New York.</p> <p>2. Amold and Gosling, J. (2000), <i>The Java Programming Language</i>, Addition Wesley, 2nd Edition, New Delhi.</p> <p>3. Art Gittleman (2002), <i>Ultimate Java Programming</i>, Wiley Publications, New York.</p>
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Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%

	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
	Total	100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mr. M. D. Bakthavachalam Dr. P.J.Arul Leena Rose

Course Code	PIT21C102J	Course Name	Advanced Operating System	Course Category	C	Professional Core	L	T	P	C
							3	0	4	5

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

Course Learning Rationale (CLR):		Learning			Program Learning Outcomes (PLO)																	
The purpose of learning this course is to:		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
CLR-1 :	Utilize operating systems based on its features and utility	Level of Thinking (Bloom)	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	PSO - 1	PSO - 2	PSO - 3					
CLR-2 :	Utilize the Process Management functions of an Operating system				H	H	H	H	H	M	L	M	H	M	-	H	H	H	H	M		
CLR-3 :	Utilize the features of Memory Management concepts of an Operating system				H	H	H	H	H	M	L	M	H	M	-	H	H	H	H	M		
CLR-4 :	Analyze how Device Management part of an Operating system functions				H	H	H	H	H	M	L	M	H	M	-	H	H	H	H	M		
CLR-5 :	Utilize the File Management functions of an Operating system				H	H	H	H	H	M	L	M	H	M	-	H	H	H	H	M		
CLR-6 :	Analyze the practical operating systems and evaluate their utility				H	H	H	H	H	M	L	M	H	M	-	H	H	H	H	M		
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																				
CLO-1 :	Identify functions of an operating system, analyze the process management functions	2	80	70	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M			
CLO-2 :	Analyze CPU scheduling and synchronization process of an operating system	3	85	75	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M			
CLO-3 :	Analyze the need of Memory management functions of an operating system	3	75	70	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M			
CLO-4 :	Identify the significance of device management and file management's role of an operating system	3	85	80	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M			
CLO-5 :	Identify the essentials of inter process communication in an operating system, evaluate hypervisors	3	85	75	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M			
CLO-6 :	Analyze how operating systems are constructed, analyze the features and aspects of different operating environments	3	80	70	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M			

Duration (Hour)		21	21	21	21	21
S-1	SLO-1	Operating System Introduction, Structures - Simple Batch	Virtual Memory	Deadlocks –Introduction, Deadlocks - System Model, Dead locks Characterization	Operating System Security Issues	Introduction to Distributed systems
	SLO-2	Multi programmed structure, time-shared	Logical Address Space, Logical versus Physical Address Space	Methods for Handling Dead locks, Deadlock Prevention,	Software vulnerability,	Types of Distributed systems
S2	SLO-1	Parallel systems, Distributed Systems, Real-Time Systems	Swapping, Contiguous Allocation	Deadlock Avoidance	Physical Security	software Concepts,
	SLO-2	System components,	- Paging	Deadlock Detection, Methods	System Threats,	Elementary introduction to the terminologies within Modern Oss
S3	SLO-1	Operating-System services	Segmentation	Recovery from Deadlock methods	One Time Password	Parallel model
	SLO-2	System Calls,	Segmentation with Paging, Demand Paging	Process Management and Synchronization	Computer Security Classifications	Distributed model - Architectural model
S4 – S7	SLO-1	Laboratory 1: Virtual Machines,	Laboratory 4: Performance of Demanding Paging, Page Replacement	Laboratory 7: The Critical Section – Entry- exit, The Critical Section Problem, Rules	Laboratory 10: Introduction to the topic of Security in Operating Systems, System Access Threats, Intruders	Laboratory 13: Distributed model - Interaction model Distributed model-Fault models
	SLO-2	System Design and Implementation				
S8	SLO-1	Preliminaries of Operating System-managing users	Shell scripting shell syntax	Process - creating new process-	Process Synchronization	Signal
	SLO-2					
S9	SLO-1	Process and CPU Scheduling	Allocation of Frames, Thrashing	methods	Malicious Softwares, Counter measures,	Embedded model,
	SLO-2	Process concepts, Process concepts scheduling	File System Interface, File System Interface and Implementation	Solution to the Critical Section Problem	IDS Components, Firewalls	Real time systems
S10	SLO-1	Operation on processes, Cooperating Processes	Access methods,	Synchronization Hardware	Principles of Information Security	Operating systems models for Cloud

	SLO-2	Threads, Threads, and Interposes Communication	Protection	Mutex Locks	File System Access control	Other Operating System Models
S11-14	SLO-1	Laboratory 2: Interposes Communication, Scheduling Algorithm	Laboratory 5: Allocation methods, Directory Management	Laboratory 8: Semaphore Solution, Classical Problems of Synchronization	Laboratory 11: Access control policies, Information Security Definition	Laboratory 14: Operating systems models for various Real time systems, handling threads and semaphores to achieve synchronization among processes using POSIX standard functions
	SLO-2					
S15	SLO-1	Multiple -Processor Scheduling	Efficiency and Performance	Critical Regions,	Information Security measures	executing shell scripts.
	SLO-2	Real-Time Scheduling	Directory Implementation	Monitors	Generalized Security Architectures	Mobile systems OS
S16	SLO-1	managing systems	executing shell scripts.	counting maximum number of processes a system can handle at a time, handling system calls	Handling threads and semaphores to achieve synchronization among processes using POSIX standard functions	some POSIX signals (SIGINT, SIGILL, SIGFPE, SIGKILL, SIGHUP, SIGALRM, SIGABRT)
	SLO-2					
S17	SLO-1	Scheduling Criteria	Directory Structure	Authentication	Bufferoverflow attacks	Operating system models for Embedded systems
	SLO-2	file managements,	Free-space Management	Malware	Distributed System hardware	Goals of distributed system
S18-21		Laboratory 3: Memory Management,	Laboratory 6: Deadlock Avoidance	Laboratory 9: Program Threats	Laboratory 12: Distributed system –design issues	Laboratory 15: File System

Learning Resources	<p>1. Abraham Silberschatz, "Operating system concepts", 9th Edition.</p>	<ol style="list-style-type: none"> 1. Mukesh Singhal, Niranjan G.Shivaratri, "Advanced concepts in operating systems: Distributed, Database and multiprocessor operating systems", TMH, 2001 2. Pradeep K.Sinha, "Distributed operating system-Concepts and design", PHI, 2003. 3. Andrew S.Tanenbaum, "Modern operating system", PHI, 2003
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Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mr. M.D. Bakthavachalam Dr. P.J.Arul Leena Rose

Course Code	PIT21C103J	Course Name	SOFTWARE ENGINEERING	Course Category	C	Discipline Elective Course	L	T	P	C
							3	0	4	5

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

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Familiarize the software lifecycle models and software development process	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
CLR-2 :	Understand the various techniques for requirements, planning and managing a technology project	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed Learning	Multicultural Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning		
CLR-3 :	Examine basic methodologies for software design, development, testing, closure and implementation				L	H	-	H	L	-	-	-	L	L	-	H	-	-	-	-	-
CLR-4 :	Understand manage users expectations and the software development team				M	H	L	M	L	-	-	-	M	L	-	H	-	-	-	-	-
CLR-5 :	Acquire the latest industry knowledge, tools and comply to the latest global standards for project management				M	H	M	H	L	-	-	-	M	L	-	H	-	-	-	-	-
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:				3	80	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-
CLO-1 :	Identify the process of life cycle model and process project	3	85	75	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-		
CLO-2 :	Analyze and specify software requirements through a productive working Relationship with project stakeholders	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-		
CLO-3 :	Design the system based on Functional Oriented and Object Oriented Approach for Software Design.	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-		
CLO-4 :	Develop the correct and robust code for the software products	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-		
CLO-5 :	Perform by applying the test plan and various testing techniques	3	85	75																	

Duration(Hour)		21	21	21	21	21
S-1	SLO-1	Introduction to software Engineering	System Engineering	Introduction to Testing	Project Management Spectrum	Risk Management
	SLO-2	Characteristics of software	Components of System Engineering	Definition , Characteristics of Testing	Four P's	Reactive and Proactive Risk Strategies
S2	SLO-1	The Changing Nature of software	Requirements Engineering Tasks	Testing Strategies for Conventional Software	The People and the Product	Software Risks
	SLO-2	Legacy Software and Software myths	Process, Initiating and Eliciting requirements.	Unit testing and Integration testing	Role of People	Risk Identification and Risk Projection
S3	SLO-1	A Generic view of process Software Engineering	Building the Analysis Model	Validation Testing	The Process and the Project	Risk refinement
	SLO-2	A layered Technology	Analysis Modeling Approaches	Verification Vs Validation	Role of Process	Risk Mitigation
S4 –S7	SLO-1	Laboratory 1:Identifying Project Objective and Scope	Laboratory 4:Project Planning	Laboratory 7: Function Oriented Diagram	Laboratory 10:Test Case design for unit testing	Laboratory 13: Preparation of Timeline charts and Tracking the Scheduling
	SLO-2					
S8	SLO-1	A process framework	Data Modeling Concepts	System Testing	Metrics for Process and Projects-Estimation	Monitoring and Management
	SLO-2	Capability Maturity Model Integration	Example Diagram	Non-Functional testing	LOC, FP, Object Oriented.	Example
S9	SLO-1	Process Models	Scenario based Modeling	Debugging Process	Estimation	Quality Concepts
	SLO-2	Water fall , RAD model	USE-CASE Diagram	Testing Tactics	Estimation models	SQA Activities
S10	SLO-1	Iterative Process Models	Flow Oriented Modeling	White Box Testing, Basic-Path testing	The Project Planning Process	Software Reviews and FTR
	SLO-2	Incremental ,Prototype and Spiral	Data Flow Diagram	Cyclomatic complexity calculation	Resources	Statistical Quality Assurance
S11-14	SLO-1	Laboratory 2:Selection of Suitable software process Model of the suggested system	Laboratory 5:Performing Various Requirement Analysis	Laboratory 8:User's View Analysis	Laboratory 11:Test Case design for Integration testing	Laboratory 14: Estimation of Effort and Risk Identification
	SLO-2					
S-15	SLO-1	Prescriptive models	Design Engineering	Black Box Testing	Decomposition Techniques	The Software Configuration Management

	SLO-2	Phases of the model	Example	Equivalence Partitioning	calculations of Decomposition techniques	SCM Repository
S-16	SLO-1	Specialized Process Models	Software Design Concepts	BVA , Error Guessing	Empirical Estimation Models	Business Process Reengineering
	SLO-2	The Unified Process Model	Example Diagrams	Cause-Effect Graphing	COCOMO model	Reengineering Diagram and Example.
S-17	SLO-1	An agile view of Process	The Design Model	Testing for Specialized Environments	Project Scheduling Concepts	Reverse Engineering
	SLO-2	Case study on Best SDLC selection based on the Scenario	Examples for all designs	Preparation of Test case Plan and Report	Examples	Forward Engineering
S18-21	SLO-1	Laboratory 3:Problem Statement Preparation	Laboratory 6:Develop Software Requirement Specification Sheet (SRS)	Laboratory 9:Structure view diagram	Laboratory 12:Perforing Testing and Debugging for a sample code	Laboratory 15: Software Quality Assurance Components.
	SLO-2					

Learning Resources	<ol style="list-style-type: none"> 1. Roger, S. Pressman (2004), Software Engineering: A Practitioner Approach, McGraw Hill International Edition, Sixth Edition, New Delhi 2. Waman, S Jawadekar (2004), Software Engineering: Principles and Practice, McGraw Hill Education Pvt. Limited, New Delhi. 	<ol style="list-style-type: none"> 3. RohitKhurana (2011), Software Engineering-Principles and Practices, Vikas Publishing House Pvt. Ltd., Second Edition, New Delhi. 4. Chairperson, Counting Practices Committee, Valerie Marthaler, EDS, Troy, Michigan, Function Point Counting Practices Manual Release 4.1.1, The International Function Point User Group, April 2000. 5. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli (1991), Fundamentals of Software Engineering, Prentice Hall of India, New Delhi.
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Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mrs. A. Pavithra
		Mrs. P. Yogalakshmi

Course Code	PIT21E101J	Course Name	Web Technology	Course Category	D	Discipline Elective Courses	L	T	P	C
							3	0	2	4

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

CLR-1 :	To familiarize basics of Internet.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To create a simple web page.	Level of Thinking (Bloom)	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	PSO - 1	PSO - 2	PSO - 3		
CLR-3 :	To manage the Web designing.	L	H	H	L	H	H	H	-	-	M	M	L	-	H	-	-	-	
CLR-4 :	To understand scripting language like Java script.	L	H	H	L	H	H	H	-	-	M	M	L	-	H	-	-	-	
CLR-5 :	To understand scripting language like VB script.	L	H	H	L	H	H	H	-	-	M	M	L	-	H	-	-	-	
CLR-6 :	To learn JQUERY and its features.	L	H	H	L	H	H	H	-	-	M	M	L	-	H	-	-	-	
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	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	PSO - 1	PSO - 2	PSO - 3		
CLO-1 :	Know basics of web page and web site.	2	85	80	L	H	H	H	-	-	M	M	L	-	H	-	-	-	
CLO-2 :	Understand how web page is designed and how to modify its contents.	3	85	80	L	H	H	H	-	-	M	M	L	-	H	-	-	-	
CLO-3 :	Apply scripting language javascript.	3	85	80	L	H	H	H	-	-	M	M	L	-	H	-	-	-	
CLO-4 :	Apply vbscript for web designing	3	85	80	L	H	H	H	-	-	M	M	L	-	H	-	-	-	
CLO-5 :	Understand advanced scripting using JQUERY.	3	85	80	L	H	H	H	-	-	M	M	L	-	H	-	-	-	
CLO-6 :	Design a simple web page using HTML, scripting languages.	3	85	80	L	H	H	H	-	-	M	M	L	-	H	-	-	-	

Duration (Hour)		15	15	15	15	15
S-1	SLO-1	Introduction to Internet Concepts, Fundamental of Web	Layouts, Linking Documents	Syntax and Example for Operators, Functions in JS	XML Schema, XSLT	Filtering Selections and Arrays, Example using array in JQuery
	SLO-2	History of Web, Web development overview	Frames, Forms	Client side Java script, Server side java script	DOM,DOM structure mode	Example using Filtering selection and array
S-2	SLO-1	Domain Name System (DNS)	Projects in HTM	Client side Vs server side java script	XML quires and transformation	jQuery CSS - Introduction
	SLO-2	DHCP	Advantages of DHTML	Applications in Java Script	Example program using XML.	Advantages JQuery CSS
S-3	SLO-1	POP, HTTP	Introduction to DHTML	Java Script Security	Importance of XML	CSS Method
	SLO-2	HTTPS	CSS and its types	VB Script - Introduction	Sample Applications	Syntax, Examples
S-4-5	SLO-1	Laboratory1: Hyperlinks, Lists in HTML and Tables	Laboratory 4: Data types and variables, operators , Conditional Statements and Looping	Laboratory7: Handling Mouse Events, Develop Digital Clock & Calculator	Laboratory10: Data Types & Variables Procedures, Conditional, Looping in VB Script	Laboratory13: Obtaining and installing jQuery,
	SLO-2					
S-6	SLO-1	FTP - File Transfer Protocol, Other servers	Internal CSS, Inline CSS	Advantages of VBScript, Syntax of VBScript	JQUERY – Introduction, What Does jQuery Do?	Facutry() function, JQuery Effect() methods
	SLO-2	Internet Service Provider – ISP	External CSS CSS Class	Operators	Obtaining jQuery, Installing jQuery	Example using effect methods
S-7	SLO-1	Web Browser	CSS examples, Webpage1	Control statements	Filtering a Selection	The outer Width and outer Height Methods
	SLO-2	Introduction to HTML / DHTML.	CSS examples Webpage2	Looping statements	Searching within a Selection with find method.	Sliding Elements
S-8	SLO-1	Types of Web Servers	Java Script - Introduction	Functions in VBScript	Finding an Element's Siblings	Showing and Hiding Elements

	SLO-2	HTML Basic Tags	Advantages of Java Script	Examples using functions	Finding an Element's Siblings methods	Examples for Hiding elements
S9-10	SLO-1	Laboratory2: Forms	Laboratory5: Functions 4. Strings, Date and Time	Laboratory8: Web Page with forms and Validations, Authentication and Verifications	Laboratory11: Functions, Date, Time, Constants, Events, Methods,	Laboratory14: Events , Effects Examples for sliding
	SLO-2	Controls Frames with tags				
S-11	SLO-1	Rules of HTML	Java script Object model,	Simple applications using functions.	Searching Ancestors	Fading Elements, Examples for fading
	SLO-2	Text Formatting	Events and its types	XML – Introduction	Searching Ancestors Using the parents and parent Methods Events	Animation, Examples
S-12	SLO-1	Lists	Handling events	Commercial Benefits of XML	Filtering Selections	Custom Animation
	SLO-2	Adding Graphics to Html Document Tables	Types of operators, Expressions	Advantage with XML,	Arrays	Example for custom animation
S-13	SLO-1	Tags, Styles	Programming in XML	XML in Action	Basic Iteration	Selectors
	SLO-2	Java Script Object Model Hierarchy	Objects, Operators, Validation	Expressions	SMTP	Concept of IP Address
S 14-15	SLO-1	Laboratory3:	Laboratory6: Array and Math, Cookies	Laboratory9: Events Handling	Laboratory12: Error Handling	Laboratory15: Callback , HTML, CSS
	SLO-2	CSS – Format all web pages in the common format using CSS				

Learning Resources	<ol style="list-style-type: none"> 1. Margaret Levine Young, "Internet-The Complete Reference", McGraw Hill, 2nd Edition (For Unit I to III) 2. Jon Ducket, (2005), "Web Programming with HTML, CSS and JavaScript", Wiley Publishing. (For Unit IV to V) 	3. Web Resources
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Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr P.J.Arul Leena Rose Dr. S.P. Angelin Claret

Course Code	PIT21E102J	Course Name	DIGITAL IMAGE PROCESSING	Course Category	D	Discipline Elective Courses	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):	<i>The purpose of learning this course is to:</i>
CLR-1 :	<i>To become familiar with digital image fundamentals</i>
CLR-2 :	<i>To get exposed to simple image enhancement techniques in Spatial and Frequency domain</i>
CLR-3 :	<i>To learn concepts of degradation function and restoration techniques</i>
CLR-4 :	<i>To study the image segmentation and representation techniques</i>
CLR-5 :	<i>To learn about color image processing</i>

Learning		
1	2	3
Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
3	80	70
3	85	75
3	75	70
3	85	80
3	85	75

Program Learning Outcomes (PLO)														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
H	H	M	H	L	-	-	-	M	L	-	H	-	-	-

Course Learning Outcomes (CLO):	<i>At the end of this course, learners will be able to:</i>
CLO-1 :	<i>Have a thorough understanding of steps involved in Image Processing</i>
CLO-2 :	<i>Perform Image processing using MATLAB</i>
CLO-3 :	<i>Operate on images using the techniques of smoothing, sharpening and enhancement. Understand the restoration concepts and filtering techniques.</i>
CLO-4 :	<i>Apply Image Compression techniques</i>
CLO-5 :	<i>Learn the basics of segmentation, features extraction, and recognition methods for color models</i>

Duration (hour)		15	15	15	15	15
S-1	SLO-1	What is Digital Image Processing	Frequency Domain Overview	Introduction Constrained least squares	Wavelets	Gray scale morphology,
	SLO-2	Digital Image Processing Techniques	Filtering in the Frequency domain	Constrained least squares filtering	Wavelets in image processing,	Introduction to Segmentation
S-2	SLO-1	Origin Uses of DIP	Obtaining frequency domain	non-linear restoration	Image compression	Point, line
	SLO-2	Image Processing System	Frequency domain filters from spatial filters	Iterative non-linear restoration	Background	edge detection
S-3	SLO-1	Fundamental Steps in DIP	Generating filters directly in the frequency domain	Iterative non-linear restoration using the Lucy-Richardson algorithm	Inverse wavelet transform,	Line detection
	SLO-2	Components of Image Processing System	Sharpening frequency domain filters	Blind deconvolution	Coding redundancy	Line detection using the Hough transform
S 4-5	SLO-1	Laboratory 1: The MATLAB Desktop-Using Mat lab Editor Debugger- getting help-saving and Retrieving work session data	Laboratory 4: Computing and Visualizing the 2-D DFT in MATLAB	Laboratory 7: Non Linear filtering using convolutional masks	Laboratory 10: To perform the following morphological operations in an image. (a) erosion, (b) dilation (c) opening, (d) closing.	Laboratory 13: Image filtering in spatial and frequency domain.
	SLO-2					
S-6	SLO-1	Image Sampling and Quantization,	The image degradation	Color Image Processing	Irrelevant information	Thresholding,
	SLO-2	Relation Ship Between Pixels	restoration process	converting to other color spaces	Redundancy	region-based segmentation using the watershed transform
S-7	SLO-1	Image Sampling	A model of the image degradation	The basics of color image processing	Spatial redundancy	Segmentation
	SLO-2	Mathematical Tool used In DIP	Noise models	Other basics of color Spaces	jpeg Overview	The Use of Motion in Segmentation

S-8	SLO-1	Background	Restoration	Color transformation,	jpeg compression	Background-Representation
	SLO-2	Intensity transformation	Restoration in the presence of noise only	Spatial filtering of color images	Compression and Decompression	Boundary Descriptors
S 9-10	SLO-1	Laboratory 2: Experiment to illustrates the relationship among the intensities (gray levels) of an image and its Histogram.	Laboratory 5: Linear filtering using convolution. Highly selective filters	Laboratory 8: Morphological operations using a small structuring element on simple binary images	Laboratory 11: To perform image compression and decompression	Laboratory 14: Morphological operations in analyzing image structures.
	SLO-2					
S-11	SLO-1	Mathematical Tools	Periodic noise reduction	Working directly in a RGB vector space	Morphological image processor:-	Boundary descriptors
	SLO-2	Mathematical Tool used in DIP	Periodic noise reduction by frequency domain filtering	Wavelets:-Background	Morphological preliminaries	Analysis of image Structures
S-12	SLO-1	histogram processing and function Plotting	Modeling in degradation function	The fast wavelet transform	labeling connected components	regional descriptors
	SLO-2	Spatial filtering	Direct inverse	Working with wavelet	Dilation and erosion-combining	Use of Principal Components
S-13	SLO-1	Image processing toolbox	Direct inverse filtering	decomposition structures	dilation and erosion	Principal Components for Description
	SLO-2	standard spatial filters	Wiener filtering	The inverse wavelet transform	Morphological reconstruction	Relational Descriptors

S14-15	SLO-1	Laboratory 3: Experiment to show image rotation scaling, and translation	Laboratory 6: To perform the Two-dimensional Fourier transform operation in an image.	Laboratory 9: Edge detectors and their operation in noisy images	Laboratory 12: Perform Color Image Segmentation	Laboratory 15: Segmentation using region growing algorithms
	SLO-2					

Learning Resources	1. Rafael C.Gonzalez, Richard E.Woods, Steven L.Eddins, Image Processing, 3 rd Edition, Pearson, 2010.				3. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, Digital Image Processing using MATLAB, Pearson Education, Inc., 2011						
	2. Anil K. Jain, Fundamentals of Digital Image Processing, Pearson, 2002										
Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. S. P. Angelin Claret
		Dr. P.J.Arul Leena Rose

Course Code	PIT21E103J	Course Name	ENTERPRISE RESOURCE PLANNING	Course Category	D	Discipline Elective Courses	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	<i>Overview of enterprise systems</i>
CLR-2 :	<i>Overview of ERP software solutions-.</i>
CLR-3 :	<i>ERP Implementation</i>
CLR-4 :	<i>Maintenance of ERP</i>
CLR-5 :	<i>Extended ERP systems and ERP add-ons</i>
CLR-6 :	<i>Case study - ERP</i>

1	2	3
Level of Thinking	Expected Proficiency	Expected Attainment

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed Learning	Multicultural	Ethical Reasoning	Community	ICT Skills	Leadership Skills	Life Long Learning

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:
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CLO-1 :	<i>Have a thorough study about ERP</i>	2	85	80
CLO-2 :	<i>Have a look about ERP Software Solution</i>	3	85	80
CLO-3 :	<i>To implement ERP Software Solutions</i>	3	85	80
CLO-4 :	<i>To maintain ERP System</i>	3	85	80
CLO-5 :	<i>Knowledge about Extended ERP System and ADD-ONS</i>	3	85	80
CLO-6 :	<i>Case study – ERP in Cloud computing</i>	3	85	80

Duration (hour)		15	15	15	15	15
S-1	SLO-1	Overview of enterprise systems	Overview of ERP .	ERP Implementation	Maintenance of ERP-	Extended ERP systems and ERP add-ons
	SLO-2	Evolution	software solutions	Implementation	Organizational	CRM
S-2	SLO-1	Business Function	Small enterprise	Issues	Industrial impact;	Function of CRM
	SLO-2	Business Processes	Medium Enterprise	Planning Evaluation	Implementation.	Component of CRM
S-3	SLO-1	Integrated Management Information	Large enterprise	selection of ERP systems	Objective of ERP	Advantage of CRM
	SLO-2	Advantage of ERP Role of the Enterprise	vendor solutions Best business practices	Vendors Management Role of Vendors	Implementation life cycle Objectives of ERP	Features and Function of CRM Benefits of CRM
S 4-5	SLO-1	Laboratory 1: ERP System Basics	Laboratory 4: Study of ERP technologies and its ecosystem	Laboratory 7: Study of implementation life cycle	Laboratory 10: Study of industrial impact	Laboratory 13: Study of CRM
	SLO-2					
S - 6	SLO-1	Business Modeling Fundamental technology	BPR Evolution	Consultants	Phase of ERP	Supply Chain Management
	SLO-2	Basic ERP and its Concepts	Different Phase	Role of Consultants	Reason for ERP Failure	Evolution of SCM
S-7	SLO-1	ERP Architecture	Reengineering	Employee Reason	Methodology	Sharing data & gut instant
	SLO-2	Risk of ERP	Challenges faced by Reengineering Efforts	Dealing with Employee Reason	Framework	Improvement in the SCM
S-8	SLO-1	People issues	Business process Management -	Data Migration Process	Training	SCM Software and Hardware
	SLO-2	Process Risk	Introduction,	Migration Methods	Maintenance of ERP	Advantage and Disadvantage
S 9-10	SLO-1	Laboratory 2: Review on different ERP packages	Laboratory 5: Study of BPR	Laboratory 8: Study of Vendors and Consultants	Laboratory 11: Study of ERP issues	Laboratory 14: Study of SCM
	SLO-2					
S-11	SLO-1	Technology Risks	Project Schedule Creation,	Migration Issues	Success factors of ERP	Inventory Management in SCM

	SLO-2	<i>Implementation Issues</i>	<i>Policies</i>	<i>ERP implementation</i>	<i>Role of Success</i>	<i>Business analytics</i>
S-12	SLO-1	<i>Managing Risk on ERP Projects</i>	<i>Accounting and Finance</i>	<i>Methodology</i>	<i>Failure factors of ERP</i>	<i>Future trends in ERP systems</i>
	SLO-2	<i>Benefits of ERP</i>	<i>Implementation Strategy</i>	<i>Frame work</i>	<i>Role of Failure</i>	<i>web enabled</i>
S-13	SLO-1	<i>ERP and Related Technologies</i>	<i>Functional</i>	<i>Training</i>	<i>Implementation Strategy</i>	<i>Wireless technologies</i>
	SLO-2	<i>implementation of cross functional integrated ERP systems</i>	<i>Modules</i>	<i>People Organization in implementation</i>	<i>Methodology</i>	<i>Cloud computing.</i>
S 14-15	SLO-1	<i>Laboratory 3: Study of ERP Architecture</i>	<i>Laboratory 6: Study of different ERP modules</i>	<i>Laboratory 9: Study of ERP migration</i>	<i>Laboratory 12: Study of ERP methodology</i>	<i>Laboratory 15: Case study – ERP in Cloud computing</i>

Learning Resources	2. Alexis Leon, ERP demystified, second Edition Tata McGraw-Hill, 2008.	1. Sinha P. Magal and Jeffery Word, Essentials of Business Process and Information System, Wiley India, 2012 3. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008 4. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw- Hill, 2008. 5. MahadeoJaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009 Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India, 2006.

Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. S. P. Anglin Claret
		Mrs. A. Pavithra

Course Code	PIT21S101J	Course Name	DATA VISUALIZATION TOOL	Course Category	S	Skill Enhancement Elective	L	T	P	C
							1	0	2	2

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Analyze and visualize data	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-2 :	Navigate to data sources. Download data in proper format																		
CLR-3 :	Create visualizations that accurately represent the source dataset																		
CLR-4 :	Use Tableau to perform various types of analysis on data sets																		
CLR-5 :	Data visualizations that demonstrates an understanding of data																		
CLR-6 :	Use various methods for data visualization																		
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Design effective data visualizations in order to provide new insights	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Find and select appropriate data visualization in order to create a better understanding of the data	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Create Heat map, word cloud and different type of charts as visualization	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Cite data from other sources in visualizations and documentation	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Properly document and organize data and visualizations	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Create dashboard for data visualization	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (hour)		09	09	09	09	09
S1	SLO-1	Introduction to Tableau What is Tableau	Data Connection Details – Connecting to various data source	Top 10 Chart Types – Bar chart	Tableau maps – Geocoded Fields – Geographic Hierarchies and Ambiguity	Creating Dashboards- Creating a simple Dashboards – Tiled Placement
	SLO-2	Tableau User Interface –The data window	Adding multiple tables from the same database	Line / Area chart – Tableau forecasting	Custom Geocoding	Floating Placement, Associated Dashboard elements
S2 - S3	SLO-1	Laboratory-1: Shelves & Cards	Laboratory-7 Joining multiple tables from the same database	Laboratory-13 Pie chart	Laboratory-19 Background Maps and Layers	Laboratory-25 Advanced Dashboard elements – Layout Container, Blank Text , Image ,
	SLO-2					
	SLO-1	Laboratory-2: Basic Visualization	Laboratory-8 Modifying Tableaus	Laboratory-14 Bullet Group	Laboratory-20 Mapping and Mark types	Laboratory-26 Setting Dashboards and Element size
	SLO-2	Design using show me				
S4	SLO-1	Color,Size,Shapes and Label options – Choosing color options	Hiding, Renaming and Combining fields	Word cloud	Calculating fields, Table Calculations and Statistics – Creating Calculate fields	Distributing and Sharing your Visualization – Exporting worksheets and Dashboards-
	SLO-2	Setting Mark Size Text tables Mark Labels	Changing default field appearance	Interacting with the viewer - Filtering data, Basics of filtering,	Numeric calculations, String Manipulations,	Exporting Worksheet Data
S5 - S6	SLO-1	Laboratory-3: Basic Tableau Design Flow	Laboratory-9: Customizing your view of the data	Laboratory-15: Scatter plot	Laboratory-21: Custom Background Images	Laboratory-27: Webpage
	SLO-2					
	SLO-1	Laboratory-4: Choosing Mark Types	Laboratory-10: default field Assignments	Laboratory-16: Bubble Chart	Laboratory-22: Interactive filtering	Laboratory-28: Dashboards Actions
	SLO-2					
S7	SLO-1	Choosing shapes	Using Hierarchies , Groups and Sets	Quick filtering , Parameters – Creating parameters Displaying a parameters – Using a parameter in a worksheet	Logic Constructs, Creating Binned fields Table Calculations	Exporting Worksheet Image Exporting Dashboards Images

	SLO-2	Formatting Options	Extracting data, Data Blending Moving from text to production databases	Worksheet Actions – Filter Actions Highlight Actions	Reference Lines, Bands & Distributions Trend Lines	Using Tableau Reader Publishing to the Web
S8-S9	SLO-1	Laboratory-5: cross tab	Laboratory-11: Tree map	Laboratory-17: text table	Laboratory-23: Maps options Web map Services	Laboratory-29: Tiled Placement
	SLO-2	Laboratory-6: Box Plot	Laboratory-12: Saving and Sharing Metadata	Laboratory-18: URL Actions	Laboratory-24: Printing to PDF format	Laboratory-30: Date calculations

Learning Resources	1. George Peck," Tableau 8 : The Official Guide ",First edition, McGraw Hill Professional, 2013.,	1. Website: www.tableaureferenceguide.com
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Learning Assessment									
	Bloom's Level of Thinking	Continuous Learning Assessment (100% weightage)							
		CLA – 1 (20%)		CLA – 2 (20%)		CLA – 3 (30%)		CLA – 4# (30%)	
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	10%	10%	10%	10%	10%	10%	10%	10%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	20%	20%	20%	20%	20%	20%	20%	20%
	Total	100%		100%		100%		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr.S.Sabeen
		Dr.S.Kanchana

Course Code	PCD21AE1T	Course Name	Professional Skills and Problem Solving	Course Category	A	Ability Enhancement Course	L	T	P	C
							1	0	0	1

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Career Development Centre			Nil	

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)																
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
CLR-1:	<i>utilise success habits to enhance professionalism</i>																				
CLR-2:	<i>enable to solve problems and to crack competitive exams.</i>																				
CLR-3:	<i>understand and master the mathematical concepts to solve types of problem</i>																				
CLR-4:	<i>Identify a logically sound and well-reasoned argument</i>																				
CLR-5:	<i>expertise in communication and problem-solving skills</i>																				
CLR-6:	<i>develop problem solving skills with appropriate strategies</i>																				
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)																	
CLO-1:	<i>identify success habits and inculcate professional skills</i>	2	80	75	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CLO-2:	<i>grasp the approaches and strategies to solve problems with speed and accuracy</i>	2	80	70	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CLO-3:	<i>collectively solve problems in teams and groups</i>	2	75	70	H	H	H	H	H	H	H	M	H	M	H	H	H	H	H	H	H
CLO-4:	<i>construe and solve an argument through critical thinking</i>	2	80	75	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CLO-5:	<i>acquire communication and problem- solving skills</i>	2	80	70	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H	H	H
CLO-6:	<i>apply problem solving techniques and skills</i>	2	80	75	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H	H	H

Duration (hour)		3	3	3	3	3
S-1	SLO-1	Personal profiling	Creative problem solving method	Case study analysis	Emotional Intelligence	Communication skills
	SLO-2	USP& Personal branding	Techniques	Case study analysis	Personal & social competence	Communication skills
S-2	SLO-1	Assumption and strengthening of an argument	Weakening and Inference of an argument	Conclusion and paradox of an argument	Main idea and structure of a passage	Tone and Style of a passage
	SLO-2	Assumption and strengthening of an argument	Weakening and Inference of an argument	Conclusion and paradox of an argument	Main idea and structure of a passage	Tone and Style of a passage
S-3	SLO-1	Arithmetic: Simple equations	Profit, Loss & Discount	Average	Percentage	Mixtures & alligation
	SLO-2	Equation 1 and equation 2	Interest calculation	Average	Percentage	Mixtures & alligation
Learning Resources		1.Arun Sharma-Quantitative aptitude for CAT, Tata McGraw Hill 2.Dinesh Khattar-The Pearson Guide to QUANTITATIVE APTITUDE for competitive examinations.		3.Manhattan Prep - GRE Reading Comprehension and Essays 4. Seven habits of highly effective people- Steven Covey 5. Manhattan Prep – Critical Reasoning Skills and Techniques		

Learning Assessment					
Level	Bloom's Level of Thinking	Continuous Learning Assessment (100% weightage)			
		CLA-1 (20%) Theory	CLA-2 (20%) Theory	CLA-3 (30%) Theory	CLA-4 (30%) ## Theory
Level 1	Remember	10%	10%	30%	15%
	Understand				
Level 2	Apply	50%	50%	40%	50%
	Analyze				
Level 3	Evaluate	40%	40%	30%	35%
	Create				
Total		100 %	100 %	100 %	100 %

CLA-1, CLA-2 and CLA-3 can be from any combination of these: Online Aptitude Tests, Classroom Activities, Case Studies, Poster Presentations, Power-point Presentations, Mini Talks, Group Discussions, Mock interviews, etc.

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	
Experts from Industry	Internal Experts
1. <i>Ajay Zener, Director, Career Launcher</i>	1. <i>Dr P Madhusoodhanan, HoD, CDC, E&T, SRMIST</i> 2. <i>Dr M Snehathatha, Assistant. Professor, CDC, E&T, SRMIST</i>

SEMESTER – II

Course Code	PIT21C201J	Course Name	ADVANCED JAVA PROGRAMMING	Course Category	C	Professional Core Courses			
						L	T	P	C
						3	0	4	5

Pre-requisite Courses	Nil	Co-requisite Courses	Fundamentals of Java Programming			Progressive Courses	Nil				
			Computer Science		Data Book / Codes/Standards						
Course Offering	Department										

Course Learning Rationale (CLR):	<i>The purpose of learning this course is to:</i>
CLR-1 :	<i>This course is designed to teach the student how to write, test, and debug advanced-level Object-Oriented programs using Java with a heavy emphasis toward network and web programming.</i>
CLR-2 :	<i>Learn how to write, test, and debug distributed applications using Java</i>
CLR-3 :	<i>To work with Web and Application Servers like Apache Tomcat, Glassfish etc and understand the communication over HTTP protocol.</i>
CLR-4 :	<i>Develop web application using Java Servlet and Server Pages technology</i>
CLR-5 :	<i>Develop Enterprise applications using EJB</i>
CLR-6 :	<i>Learn the foundations of the MVC architecture</i>

Learning		
1	2	3
Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
3	80	70
3	85	75
3	75	70
3	85	80
3	85	75
3	80	70

Program Learning Outcomes (PLO)														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
L	H	M	H	L	-	-	-	L	L	-	H	-	-	-

Course Learning Outcomes (CLO):	<i>At the end of this course, learners will be able to:</i>
CLO-1 :	<i>Write distributed and Network applications using Java</i>
CLO-2 :	<i>To write java applications that communicate with diverse databases</i>
CLO-3 :	<i>Create Web applications using Servlets</i>
CLO-4 :	<i>Understand and implement session handling in web pages</i>
CLO-5 :	<i>Role of EJB in Server side programming</i>
CLO-6 :	<i>Develop a fully functional web applications with the MVC design pattern</i>

Duration (hour)		21	21	21	21	21
S-1	SLO-1	Remote method invocation : Overview of RMI	Servlet – Introduction	JSP Overview	EJB Architecture: Logical Architecture	Understanding the need for MVC
	SLO-2	Introduction to RMI	Background – Servlet	Why to Learn JSP	EJB overview	MVC overview
S-2	SLO-1	Developing an RMI Application	Types : Generic Servlet,	How JSP works	Software Architecture	Frameworks
	SLO-2	Setting up RMI	GenericServlet class	JSP Working Principle	EJB Architecture	Architecture
S-3	SLO-1	Architecture of an RMI Application RMI Architecture	HttpServlet HttpServlet class	Components of a JSP page JSP Architecture	EJB Session Beans EJB Stateless Bean	implementing MVC with request dispatcher Struts2 configuration
	SLO-2	RMI over IIOP.Database Access RMI Database	Servlet Life Cycle Life Cycle of a Servlet	JSP life Cycle Life Cycle of JSP	constraints on session beans EJB Stateful Bean	Struts2 Actions Create Actions
S 4-7	SLO-1	Laboratory 1: Create distributed applications using RMI	Laboratory4: Develop Web Applications Using Servlet	Laboratory 7: Web Applications using JSP	Laboratory 10: An EJB application that demonstrates Session Bean- Stateless Bean	Laboratory 13: MVC Architecture(i) Implementing MVC with Request Dispatcher(ii) Data Sharing Approaches
	SLO-2					
S-8	SLO-1	Overview of JDBC	Servlet Classes: Servlet	JSP API	Life Cycle with example	Struts2 Interceptors
	SLO-2	Presentation to JDBC connection	Servlet Classes	API	Life Cycle of EJB	Struts2 framework Interceptors
S-9	SLO-1	JDBC Drivers JDBC Driver types	ServletRequest	JSP : Scripting Elements JSP Syntax	EJB Entity Bean Entity Bean in EJB	Struts2 Result type Results and Result type
	SLO-2	Connecting to a Database Database connections	ServletResponse	JSP Implicit objects Pre- defined variables	When to use Entity Bean Use of Entity Bean	Struts2 File upload Create View files
S10	SLO-1	Statement Interfaces	ServletContext,	RequestDispatching: Anatomy of Request Processing	Entity Bean Life Cycle	Create Action Class

	SLO-2	JDBC statements, prepareStatement and CallableStatement	ServletContext Methods	JSP - Directives	Life Cycle of Entity Bean	Configuration File
S 11-14	SLO-1	Laboratory 2: Create applications which can demonstrate the use of JDBC for Database Connectivity.	Laboratory 5: Develop Web Applications Using ServletRequest, ServletResponse	Laboratory8: Include Directive JSP: include Action	Laboratory11: An EJB application that demonstrates Session Bean –Stateful Bean	Laboratory 14: Build a web application that collects the user's name and displays "Hello World" followed by the user name.
	SLO-2					
S-15	SLO-1	Using MetaData.	ServletConfig	Forwarding Requests	Message Driven Beans:	Struts2 Database Access
	SLO-2	Statement Objects	Methods of Servlet Interface	JSP Client Request	Create Message driven Beans	JPA/Hibernate integration
S-16	SLO-1	ResultSets	Single Thread Model	RequestDispatcher Object	EJB Annotations	Create Action using JSP file
	SLO-2	Result and ResultSets	Thread Model	JSP Server Response	Describe Meta data using Annotations	Action using JSP
S-17	SLO-1	Commit and Rollback Transaction Control	Session Tracking: Cookies Cookies	Model1 Vs Model2 JSP Model1 and Model2 Architectures	EJB – Access Database Database Using JDBC API	Create Main page using JSP file Main page creation
	SLO-2	JDBC - Exceptions Exception Handling	URL Rewriting, Hidden Fields, The Session API Session API	JSP Actions. Actions in JSP	EJB : exception Handling Exception Handling in EJB	Create View Create Configuration File
S18-21	SLO-1	Laboratory 3: Create student applications using JDBC Database Connectivity	Laboratory 6: Program that demonstrates the use of session management in Servlet.	Laboratory 9: Create a JSP based Web application which allows the user to edit his/her database Information.	Laboratory12: An EJB application that demonstrates Entity Bean.	Laboratory 15: creating our view which will be required to browse and upload a selected file.
	SLO-2					

Learning Resources	1. Elliotte Rusty Harold, (2013), "Java Network Programming", O'Reilly Publishers. (For Unit I to III)	2. Antonio Goncalves, (2010), "Beginning Java EE 6 Platform with GlassFish 3", Apress, Second Edition. (For Units IV to V)

Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Scientific Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mrs. A. Pavithra
		Mrs. P. Yogalakshmi

Course Code	PIT21C202J	Course Name	DATA MINING AND DATA WAREHOUSING	Course Category	C	Professional Core				L	T	P	C
										3	0	4	5

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

Course Learning Rationale (CLR):		The purpose of learning this course is to:			Learning			Program Learning Outcomes (PLO)																
CLR-1 :	CLR-2 :	CLR-3 :	CLR-4 :	CLR-5 :	CLR-6 :	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Understand and implement classical models and algorithms in data warehouses and data mining	Be familiar with mathematical foundations of data mining tools	Characterize the kinds of patterns that can be discovered by association rule mining	Master data mining techniques in various applications like social, scientific and environmental context.	Develop skill in selecting the appropriate data mining algorithm for solving practical problems.	Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments																			
						Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3	
CLO-1 :	Understand the functionality of the various data mining and data warehousing component					2	80	70	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M	
CLO-2 :	Appreciate the strengths and limitations of various data mining and data warehousing models					3	85	75	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M	
CLO-3 :	Explain the analyzing techniques of various data					3	75	70	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M	
CLO-4 :	Describe different methodologies used in data mining and data warehousing.					3	85	80	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M	
CLO-5 :	Compare different approaches of data warehousing and data mining with various technologies					3	85	75	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M	
CLO-6 :	Foundations of Software development: The ability to grasp the software development lifecycle and methodologies of software systems.					3	80	70	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M	

Duration (Hour)		21	21	21	21	21
S-1	SLO-1	Introduction to Data Mining	Association Analysis- Market basket analysis	Classification Techniques-introduction	CLUSTERING Analysis - Introduction	Introduction to Data Warehousing
	SLO-2	Data mining as the Evolution of information technology	Frequent Itemsets, closed itemsets, Association rules	-Supervised Vs Unsupervised classifications	Overview of clustering methods	Operational database systems versus Data warehouses
S-2	SLO-1	Data and large datasets	Methods of Frequent itemset mining	Decision tree induction Attribute selection measures Tree pruning	K- means method k-medoids method	Why have a separate data warehouse
	SLO-2	Kinds of Pattern in data mining	Apriori Algorithm	Scalability and decision tree induction	Hierarchical method	Data warehousing-Multi-tired architecture- Data warehouse models
S-3	SLO-1	Technology used in data mining	Generating Association Rules from frequent Itemset	Bayes' Classification method-Bayes theorem	Agglomerative vs Divisive Hierarchical clustering	Extraction, Transformation,
	SLO-2	Machine learning, and	Pattern Growth Approach	Naive Bayesian Classification	Hierarchical clustering	Loading- Meta data repository Architecture of DW
S4-7	SLO-1	Laboratory 1: Explore machine learning tool "WEKA" Downloading and/or installation of WEKA data mining toolkit	Laboratory 4: Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets	Laboratory 7: - Demonstrate performing classification on data sets	Laboratory 10: Demonstrate performing clustering of data sets	Laboratory 13: Creation of a Data Warehouse.
	SLO-2					
S8	SLO-1	Database systems	Vertical Data Format	Rule Bases Classification	BIRCH	Multi dimensional data model-Data cube
	SLO-2	Data warehouse	Mining and closed and Max Patterns	IF-Then Rules for classification	Chameleon method	Schemas for multidimensional data models
S9	SLO-1	Kinds of applications- Business Intelligence	Pattern Evaluation methods	Rule Extraction	Probabilistic Hierarchical clustering	Role of concept hierarchies
	SLO-2	Web search Engines	Pattern mining -	Rule Extraction from decision tree	Density based method-	OLAP
S10	SLO-1	DM versus Knowledge Discovery in Databases	Mining Multi level associations	Rule Induction	DBSCAN	OLAP operations

	SLO-2	Data Mining Issues in Mining methodology	Mining multidimensional associations	Metrics for evaluating classifier performance	OPTICS	Querying multidimensional databases
S11-14	SLO-1	Laboratory 2: Perform data preprocessing tasks	Laboratory5: Explore various options available in Weka for preprocessing data	Laboratory8: Explore various options available in Weka for preprocessing data	Laboratory 11: Load each dataset into Weka and run 1d3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.	Laboratory 14: create a query based on multidimensional databases
	SLO-2					
S15	SLO-1	User interaction, Efficiency and scalability Diversity of data types	Mining quantitative association rules	Cross validation	DENCLUE	Data warehouse design and uses
	SLO-2	Data preprocessing	Mining rare patterns and negative patterns	Holdout method	Grid based clustering methods	DW design process
S16	SLO-1	Data Mining Metric -	Constraint based frequent pattern mining	Bootstrap	STING	DW usages for Information processing
	SLO-2	Social Implications of Data Mining	Meta Rule	classification	CLIQUE	From OLAP to Multidimensional data mining
S17	SLO-1	Overview of Applications of Data Mining	Constraints based pattern generation	Classification by Back propagation	Evaluation of clustering methods	Data warehouse Implementations
	SLO-2	Data Objects and Attributes types	Graph Mining- Frequent sub-graph mining	Support vector machine	Measuring cluster quality	OLAP Server Architectures
S18-21	SLO-1					

	SLO-2	Laboratory 3: Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets	Laboratory6: Explore various options available in Weka for preprocessing data and apply unsupervised filters like Discretization, Resample filter, etc. on each dataset	Laboratory 9: Load each dataset into Weka and run 1d3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.	Laboratory 12: Load each dataset into Weka and run simple k-means clustering algorithm with different values of k (number of desired clusters). Study the clusters formed. Observe the sum of squared errors and centroids, and derive insights	Laboratory 15: Creation of a Data Warehouse.
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Learning Resources	1.Data mining and warehousing, S.Prabhu, N.Venatesan, New Age International, 2007	3.“Introduction to data mining” by Tan, Steinbach & Kumar (2006)
	2. Data Mining, Concepts and Techniques, Jiawei Han,Micheline Kambar, Jian Pie, 3 rd edition, 2011.	

Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Scientific Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. S. Kanchana
		Mrs. S. Parimala

Course Code	PIT21C203J	Course Name	OBJECT ORIENTED ANALYSIS AND DESIGN	Course Category	C	Professional Core	L	T	P	C
							3	0	4	5

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
CLR-1 :	Understanding Object Basics, Classes and Objects, Inheritance	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-2 :	How software objects are altered to build software systems that are more robust	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3	
CLR-3 :	Gaining enough competence in object-oriented analysis and design (OOAD) to tackle a Complete object oriented project.				H	H	M	-	-	-	-	-	-	H	H	-	-	M	H	H
CLR-4 :	Understanding the issues and options in reuse				H	H	H	H	H	-	M	-	H	H	-	-	M	H	H	
CLR-5 :	Using UML, a common language for talking about requirements, designs, and component Interfaces				H	H	H	-	-	-	-	-	H	M	-	-	M	H	H	
					H	M	M	M	M	M	M	-	H	H	-	M	M	H	H	
CLO-1 :	Student will be able to demonstrate the importance of modelling in the software development life cycle.	3	80	70	H	H	M	-	-	-	-	H	H	-	-	M	H	H		
CLO-2 :	Become familiar with the Unified modelling Language	3	85	75	H	H	H	H	-	M	-	H	H	-	-	M	H	H		
CLO-3 :	Understand the object-oriented approach to analyzing and designing systems and software solutions	3	75	70	H	H	M	H	H	-	M	-	H	H	-	-	M	H	H	
CLO-4 :	Employ the Unified modelling Language notations to create effective and efficient system designs.	3	85	80	H	H	H	-	-	-	-	H	M	-	-	M	H	H		
CLO-5 :	Understand the difference between writing programs for the software and doing analysis and design.	3	85	75	H	M	M	M	M	M	-	H	H	-	M	M	H	H		
CLO-6 :	Problem formulation and decomposition (analysis) and solution building (design) will be covered.	3	80	70	H	H	M	-	-	-	-	H	H	-	-	M	H	H		

Duration (Hour)		21	21	21	21	21
S-1	SLO-1	Object Oriented development	Simple Class Model	State Diagrams	Process Overview: Development Stages	Allocation of Subsystems
	SLO-2	Object Oriented Themes	Navigation of Class Models	State Diagram Behavior	Development Life Cycle	Management of Data Storage
S-2	SLO-1	Evidence for Usefulness of Object Oriented development	Advanced Class Modeling: Advanced Object Concepts	Advanced State Modeling: Nested State Diagrams	System Conception: Devising a System Concept	Handling Global Resources
	SLO-2	OO Modeling History	Class Concepts	Nested States	Elaborating a Concept	Choosing a Software Control Strategy
S3	SLO-1	Modeling Concepts: Modeling	Association Ends	Signal Generalization	Preparing a problem Statement	Handling Boundary Conditions
	SLO-2	Abstraction	N-ary Associations	Concurrency	Domain Analysis: Overview of Analysis	Setting Trade-off Priorities
S4 - 7	SLO-1	Laboratory 1: Develop an SRS document.	Laboratory 4 : Create a Domain model for business activities	Laboratory 7: Create a State diagram for an induction motor control	Laboratory 10 : Develop Stock maintenance system using collaboration diagram	Laboratory13 : Develop a Sequence diagram for Foreign Trading system
	SLO-2					
S8	SLO -1	The Three Models- Class Model	Aggregation	Sample State Model	Domain State Model	Common Architectural Styles
	SLO-2	State Model	Abstract Classes	Relation of Class & State Models	Domain Interaction Model	Architecture of the ATM System
S9	SLO-1	Interaction Model	Multiple Inheritance	Interaction Modeling: Use Case Models	Iterating the Analysis	Class Design: Overview of Class Design
	SLO-2	Relationships among Models	Kinds of Multiple Inheritance	Guidelines for Use Case Models	Application Analysis: Application Interaction Model	Bridging the Gap
S10	SLO-1	Overview of Unified Modeling Language	Metadata	Sequence Models	Application Class Model	Realizing Use Cases
	SLO-2	Introduction to UML diagrams	Reification	Guidelines for Sequence Models	Application State Model	Designing Algorithms –
S11 – 14	SLO-1	Laboratory 2: Inheritance Generalization	Laboratory 5 : State Model Develop a Class Model of a workstation	Laboratory 8: Design a state chart diagram for passport automation application	Laboratory 11 : Use Case Relationships Develop Conference management system using state chart diagram	Laboratory 14 : Develop ATM Banking System by using UML Diagram

	SLO-2	Create Class for Student Information system	Window Management System.			
S15	SLO-1	Class Modeling: Object	Constraints	Activity Models	Adding Operations	Recusing Downward
	SLO-2	Class Concepts	Derived Data	Guidelines for Activity Models	System Design: Overview of System Design	Refactoring
S16	SLO-1	Link	Packages	Advanced Interaction Modeling	Estimating performance	Design Optimization
	SLO-2	Association Concepts	State Modeling: Events	Use Case Relationships	Making a Reuse plan	Reification of Behavior
S17	SLO-1	Generalization	States	Procedural Sequence Models	Breaking a System into Subsystems	Adjustment of Inheritance
	SLO-2	Inheritance	Transitions & Conditions	Special Constructs for Activity Models	Identifying Concurrency	Organizing Class Design
S18-21	SLO-1	Laboratory 3:	Laboratory 6: Develop	Laboratory 9 :	Laboratory 12 : Develop a	Laboratory 15 : Develop E-
	SLO-2	Create inheritance for Student Information system	the Use Case model for the Library Management System	Prepare an activity diagram for computing a restaurant bill	sequence diagram for Online examination system	Book Management System using UML Diagram

Learning Resources	<ol style="list-style-type: none"> 1. OBJECT-ORIENTED ANALYSIS AND DESIGN With applications SECOND EDITION Grady Booch Rational Santa Clara, California, ADDISON-WESLEY 2. Object-Oriented Modeling and Design with UML , James Rumbaugh, 2005 3. Object-Oriented Analysis and Design , Ramnath, Sarnath, Dathan, Brahma,2011
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Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Scientific Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. S. Kanchana
		Mrs. S. Parimala

Course Code	PIT21E201J	Course Name	COMPUTER NETWORKS	Course Category	D	Discipline Elective Courses	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 : <i>Understand the evolution of computer networks using the layered network architecture</i>	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
CLR-2 : <i>Understand the addressing concepts and learn networks devices</i>	Level of Thinking Expected Proficiency Expected Attainment	80	70	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed Learning	Multicultural	Ethical Reasoning	Community	ICT Skills	Leadership Skills	Life Long Learning		
CLR-3 : <i>Design computer networks using subnetting and routing concepts</i>				L	H	H	H	H	M	-	H	M	H	-	H	H	-	M	-	M
CLR-4 : <i>Understand the error types , framing, flow control</i>				M	M	H	H	H	-	-	M	M	M	-	H	M	-	L		
CLR-5 : <i>Understand the various Medium Access Control techniques and also the characteristics of physical layer functionalities</i>				M	M	H	H	H	-	-	M	M	L	-	H	M	-	H		
CLR-6 : <i>Understand basic network administration</i>				L	L	H	H	H	M	-	M	L	H	M	H	M	-	-		
				H	H	H	H	H	L	-	M	H	L	L	H	-	L	-		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking	Expected Proficiency	Expected Attainment	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed Learning	Multicultural	Ethical Reasoning	Community	ICT Skills	Leadership Skills	Life Long Learning
CLO-1 : <i>Acquire the basics of computer network and its architecture</i>		3	80	70	L	H	H	H	H	M	-	H	M	H	-	H	H	-	M
CLO-2 : <i>Acquire the knowledge of various networks devices and addressing methods</i>		3	85	75	M	M	H	H	H	-	-	M	M	M	-	H	M	-	L
CLO-3 : <i>Ability to design the network routing methods</i>		3	75	70	M	M	H	H	H	-	-	M	M	L	-	H	M	-	H
CLO-4 : <i>Acquire the various error codes and framing concepts</i>		3	85	80	L	L	H	H	H	M	-	M	L	H	M	H	M	-	-
CLO-5 : <i>Ability to understand the physical layer functions and components</i>		3	75	70	H	H	H	H	H	L	-	M	H	L	L	H	-	L	-
CLO-6 : <i>Ability to design a computer network using a switch and router</i>		3	85	80	L	H	H	H	H	H	-	M	M	L	H	H	-	L	-

Duration (hour)		15	15	15	15	15
S-1	SLO-1	A Communications Model	Transmission Terminology	Asynchronous Transmission	Frequency Division Multiplexing Synchronous	Local Area Network Overview-Background
	SLO-2	A Data Communications Model- Networks	Frequency, Spectrum, And Bandwidth	Synchronous Transmission	Time Division Multiplexing	Topologies And Transmission Media
S-2	SLO-1	Operation of TCP and IP	Data And Signals- -	Error Correction-	Circuit-Switching Networks	IEEE 802 Reference Model
	SLO-2	TCP	Analog And Digital Transmission	Block Code Principles	Circuit-Switching Concepts	Logical Link Control- LLC-
S-3	SLO-1	UDP Overview	Transmission Impairments	Flow Control	Packet-Switching Principles	Protocol- BRIDGES
	SLO-2	TCP/IP Applications	Attenuation And Attenuation Distortion	Stop-And-Wait Flow Control	Advantage of Packet Switching	Functions Of A Bridge-
S 4-5	SLO-1	Laboratory 1: Familiarization with configuring and installing a LAN using packet tracer	Laboratory 4: To study different types of transmission media	Laboratory 7: Error Detecting Code Using CRC-CCITT (16-bit)-Java /C/C++ Program	Laboratory 10:Study of switches, bridges using Cisco packet tracer	Laboratory 13: Designing various topologies using cisco packet tracer
	SLO-2					
S-6	SLO-1	The OSI Model	Delay Distortion	Stop-And-Wait Flow Control Delay Distortion	Comparison Of Circuit Switching And Packet Switching X.25	Fixed Routing- The Spanning Tree Approach- Frame Forwarding-
	SLO-2	Role play and activity based learning for understanding OSI model Standardization within a Protocol	Noise Guided Transmission Media	Error Control	Frame Relay-Background	Electronic Mail

S-7	SLO-1	Architecture - Standardization within the OSI Framework Service Primitives and	Twisted Pair- Physical Description- Applications- Unshielded And Shielded Twisted Pair	Stop-And-Wait ARQ	Frame Relay Protocol Architecture- User Data Transfer	SMTP And MIME- Simple Mail Transfer Protocol (SMTP)
	SLO-2	Parameters- Traditional Internet- Based Applications Multimedia- Media Types	Coaxial Cable- Physical Description- Applications- Transmission Characteristics	Go-Back-N ARQ HDLC	Routing In Switched Networks	Basic Electronic Mail Operation
S-8	SLO-1	Multimedia Applications Standardization within a Protocol	Optical Fiber- Physical Description Applications- Transmission Characteristics	High-Level Data Link Control (HDLC)	Routing Strategies	SMTP Overview- Connection Setup-
	SLO-2	Architecture Standardization within the OSI Framework	Noise- Guided Transmission Media Wireless Transmission-	Basic Characteristics Frame Structure	Fixed Routing Flooding	Mail Transfer
S 9-10	SLO-1	Laboratory 2: Experimenting with network protocols for achieving communication between computers using packet tracer	Laboratory 5: Interconnection software for communication between two different network architectures-using packet tracer	Laboratory 8: Case study submission for: Sliding-Window Flow Control & Stop-And-Wait Flow Control	Laboratory 11: To configure network security using two routers by blocking ICMP ping request.- CISCO packet tracer	Laboratory 14 :To configure Internet Access/Implementation using CISCO packet tracer
	SLO-2					
S-11	SLO-1	Service Primitives Parameters	Antennas- Transmission Media control	Address Field- Data Field	Random Routing Switched Networks	Multipurpose Internet Mail Extensions (MIME) Benefits MIME
	SLO-2	Internet based	Wireless connection	Basic Characteristics data		Advantage MIME

S-12	SLO-1	Traditional Internet-Based Applications	Terrestrial Microwave- Physical Description- Applications	Control Field	Adaptive Routing	Messages transmission
	SLO-2	Introduction of network layers	Feature of Optical Fiber	Error - detection	Hub, switch	Request Messages
S-13	SLO-1	OSI reference model	Feature of Transmission Media	Error Correction- code	Repeater	Response Messages
	SLO-2	Layers in the OSI Model Comparison of Layers	Advantage coaxial cable	Over view of Frame work Advantage frame work	Gateway routers	Protocol Architecture Bridge Protocol Architecture
S 14-15	SLO-1	Laboratory 3:Creating a LAN using packet tracer	Laboratory 6: Using packet tracer to connect a network with different types of media connection	Laboratory 9: SIMULATION OF STOP AND WAIT PROTOCOL using NS/2 or any other tool	Laboratory 12: Case study submission for routing	Laboratory 15:Web programming using HTML
	SLO-2					

Learning Resources	1. "Data And Computer Communications" - William Stallings -Eighth Edition 2.BehrouzA.Forouzan,(2010), "Data Communications and Networking", 5 th Edition 3."DataCommunicationsandNetworking"BehrouzA.Forouzan,"5thedition,July1,2010,ISBN:9780073376226 4.WilliamStallings,(2010), "Data and Computer Communications", Ninth Edition
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Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
Total		100 %		100 %		100 %		100 %		100%	

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		Mrs. S. Parimala

Course Code	PIT21E202J	Course Name	Mobile Application Development	Course Category	D	Discipline Elective Course ...	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-1 :	Learn and apply software patterns for the development of the application models	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3	
CLR-2 :	Learn and work within the capabilities and limitations of mobile devices.				Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3	
CLR-3 :	Design, implement and deploy mobile applications using an appropriate software development environment.				Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3	
CLR-4 :	Understand the need for cross platform tools to build rich commercial mobile applications				Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3	
CLR-5 :	Develop, distribute and monetize the mobile applications				Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3	
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																			
CLO-1 :	Build mobile applications	3	80	70	H	H	M	-	-	-	-	-	H	H	-	-	M	H	H	
CLO-2 :	Use the reusability concepts to rebuild the existing applications for the present day need without losing the nature of the app's behavior	3	85	75	H	H	H	H	H	-	M	-	H	H	-	-	M	H	H	
CLO-3 :	Understand the concept of virtualization for running the code using emulators	3	75	70	H	H	M	H	H	-	M	-	H	H	-	-	M	H	H	
CLO-4 :	Experiment the application in the mobile device	3	85	80	H	H	H	-	-	-	-	-	H	M	-	-	M	H	H	
CLO-5 :	Handle data storage	3	85	75	H	M	M	M	M	M	M	-	H	H	-	M	M	H	H	
CLO-6 :	Simulate existing applications with rich UIs	3	80	70	H	H	M	-	-	-	-	-	H	H	-	-	M	H	H	

Duration (Hour)		15	15	15	15	15
S-1	SLO-1	What is mobile computing?	Mobile Development: Introduction, Advantages, Limitations	Android Overview	Understanding Activity	Animations
	SLO-2	History of mobile environments				
S-2	SLO-1	early mobile phones to smart phones and tablets	Features useful for mobile phones	Features, Architecture	Activity Lifecycle	OpenGL
	SLO-2	Development for mobile environments	Geolocation			
S-3	SLO-1	Differences from traditional application development	Offline applications	Android applications	Multi device support	Wireless Connections
	SLO-2					
S-4-5	SLO-1	Laboratory 1: Understanding the installation procedure of android environment	Laboratory 4: Animations and Graphics (2D/3D)	Laboratory 7: Android libraries	Laboratory 10: Intents	Laboratory 13: Location Aware Applications
	SLO-2					
S-6	SLO-1	Trends in mobile development	Offline storage	Android framework	Fragments	Data Syncing
	SLO-2					
S-7	SLO-1	Understanding emulator	Audio and Video	Android Kernal	MediaPlayer: Audio	Best Practices for the development of remarkable applications
	SLO-2	Knowledge about build tools				
S-8	SLO-1	Web applications and mobile applications	Framework: Phone Gap	Application stores and publishing	Image Capture	Mobile App Distribution
	SLO-2					
S-9-10	SLO-2	Laboratory 2: Understanding Virtualization and enabling it in the Operating system to support emulation process	Laboratory 5: Framework: HTML5	Laboratory 8: Android Ecosystem	Laboratory 11: MediaPlayer: Video	Laboratory 14: 1Monetization
	SLO-2					
	SLO-2					
S-11	SLO-1	Understanding SDK tools	Jquery Mobile Framework	Android Development Tools, SDK, Emulator	Color	Focusing on security
	SLO-2					
S-12	SLO-1	mobile websites	Comparison of framework	Android Activity Lifecycle	Font	Monetization Models
	SLO-2					
S-13	SLO-1	Google services for mobile applications	features and utilities	Android Layouts	Information Design Tools	Knowing Monetization tools
	SLO-2					
S-	SLO-2			Laboratory 9:	Laboratory 12:	Laboratory 15:

14-15	SLO-2	Laboratory 3: Installing Android and setup environment	Laboratory 6: Using HTML5 implement geolocation, cookies	Using Android implement Activity methods, Layout, TextView, Password, Button	Using Android implement MediaPlayer, Images ProgressBar, RatingBar	Using Color, Font, Intent
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Learning Resources	<ol style="list-style-type: none"> Ed Burnette, (2010) "Hello Android: Introducing Google's Mobile Development Platform", The Pragmatic Programmers, 3rd edition. (For Units I to III) Jeff McWherter and Scott Gowell, (2012), Professional Mobile Application Development", Wrox. (For Units IV to V) 	<ol style="list-style-type: none"> Charlie Collins, Michael Galpin and Matthias Kappler, (2012), "Android in Practice", DreamTech. James Dovey and Ash Furrow, (2012), "Beginning Objective C", Apress.
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Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Scientific Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. P.Muthulakshmi
		Mrs. E. Aarthi

Course Code	PIT21E203J	Course Name	Network Protocols	Course Category	D	Discipline Elective Courses	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to	Learning			Program Learning Outcomes (PLO)																
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
CLR-1 :	focus on the protocol performance, parameters, security, and state of the art implementations.																				
CLR-2 :	Understand network protocols and their specifications	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3		
CLR-3 :	Do security analysis, understand possible attacks and suggest defense mechanisms.																				
CLR-4 :	Evaluate the performance metrics of a protocol																				
CLR-5 :	Understand the utility and implementation scenario of the protocols																				
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																				
CLO-1 :	understand the need and methods of protocol design, analysis and modeling for suitable performance calibrations.	3	80	70	H	H	M	-	-	-	-	-	H	H	-	-	M	H	H		
CLO-2 :	understand the needs of protocol standards, RFCs	3	85	75	H	H	H	H	H	-	M	-	H	H	-	-	M	H	H		
CLO-3 :	Understand the need for protocol evaluation, simulation	3	75	70	H	H	M	H	H	-	M	-	H	H	-	-	M	H	H		

CLO-4 :	Analyze security issues	3	85	80	H	H	H	-	-	-	-	-	H	M	-	-	M	H	H
CLO-5 :	Understand the scalability issues	3	85	75	H	M	M	M	M	M	M	-	H	H	-	M	M	H	H
CLO-6 :	Understand the configuration issues	3	80	70	H	H	M	-	-	-	-	-	H	H	-	-	M	H	H

Duration (Hour)		15	15	15	15	15
S-1	SLO-1	Network Communication Architecture and Protocols	Application Layer Protocols	Overview of ISDN	Network Security Technologies and Protocols	Wide Area Network, WAN Protocols
	SLO-2	Introduction to Network Protocol	Protocol Layer	Introduction to ISDN	Network Security Technologies	WAN Protocols
S-2	SLO-1	OSI Network Architecture	Presentation Layer Protocols	Channels	AAA Protocols	Broadband and Access protocols
	SLO-2	OSI Layers	Session Layer Protocols	User Access Protocols	Tunneling Protocols	PPP protocols
S-3	SLO-1	Local Area Network and LAN Protocols	Virtual LAN Protocols	Wireless LAN Protocols	Metropolitan Area Network and MAN Protocol	Storage Area Network and SAN Protocols
	SLO-2					
S-4-5	SLO-1	Laboratory :1 Packet Tracer Simulation Tool:	Laboratory :4 Packet Tracer Simulation Tool:	Laboratory :7 Implementing inter host communication	Laboratory :10 Implementing OSPF algorithm	Laboratory :13 Implementing encryption algorithm
	SLO-2	Connecting user devices using network interface devices	Static Route configuration			
S-6	SLO-1	Definition and Overview of TCP/IP Protocols	Transport Layer Protocols	Network Management requirements	Security Protocols	Cisco Protocols
	SLO-2				Private key encryption	
S-7	SLO-1	TCP/IP Four Layers Architecture Model	Network Layer Protocols	Network monitoring	Data encryption system,	Ethernet Protocols
	SLO-2					
S-8	SLO-1	TCP/IP Four Layers Architecture Model	Data Link Layer Protocols	Network control	Public key encryption	Virtual LAN protocols
	SLO-2					
S-9-10	SLO-1	Laboratory :2 Packet Tracer Simulation Tool: LAN, WAN configuration	Laboratory :5 Packet Tracer Simulation Tool: DHCP Configuration	Laboratory :8 Packet Tracer Simulation Tool: Examining HTTP web traffic	Laboratory :11 Packet Tracer Simulation Tool: Frame Relay Configuration	Laboratory :14 Packet Tracer Simulation Tool: Implementing Compression algorithm
S-11	SLO-1	Network- Architecture Models: IBM SNA	Routing Protocols	SNMP V1, V2 and V3	RSA, Elliptic curve cryptography	Novell NetWare and Protocols
	SLO-2		Multicasting Protocols	MIBs		
S-12	SLO-1	Network Analyzer tool can be used to analyze speed	Multiprotocol Label Switching	Implementation Issues	Authentication mechanisms	IBM Systems Network Architecture
	SLO-2					

S-13	SLO-1	Comparison of the OSI and TCP/IP Reference Models	MPLS Comparison: Frame Relay and ATM	RMON	Web Security, Secured Routing Protocols	SAN Protocols
	SLO-2					
S-14-15	SLO-1	Laboratory :3 Packet Tracer Simulation Tool: Implementing Network Topologies	Laboratory :6 Network Analyzer tool can be used to analyze conversation	Laboratory :9 Network Analyzer tool can be used to analyze bandwidth usage	Laboratory :12 Network Analyzer tool can be used to monitor network traffic	Laboratory :15 Network Analyzer tool can be used to analyse site to site monitoring

Learning Resources	<ol style="list-style-type: none"> 1. Javvin, (2005), "Network Protocols" , Javvin Technologies Inc , II Ed. (For Unit I to III) 2. William Stallings, (2000), "Cryptography and Network Security", PHI. (For Unit IVto V) 	<ol style="list-style-type: none"> 3. Mani Subramanian, (2000), "Network Management–Principles and Practices", Addison Wesley. 4. William Stallings, (1999), "SNMP, SNMPV2, SNMPV3 and RMON1 and 2", 3rd Edition, Addison Wesley. William Stallings, (1999), "Data and Computer Communications", 5th Edition, PHI
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Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Scientific Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. P.Muthulakshmi
		Mrs. E. Aarthi

Course Code	PIT21S201J	Course Name	MULTIMEDIA AND DESIGN	Course Category	S	Skill Enhancement Course	L	T	P	C
							1	0	2	2

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

Program Learning Outcome(PLO)

Course Learning Rationale (CLR):	The purpose of learning this course is to:
CLR-1	<i>Formulate a working definition of interactive multimedia</i>
CLR-2	<i>Demonstrate competence in using the authoring program HyperStudio</i>
CLR-3	<i>Demonstrate the use of animation, digitized sound, video control, and scanned images</i>
CLR-4	<i>Demonstrate the use of Netscape to access the Course Home Page and Tips and Tricks</i>
CLR-5	<i>Use basic instructional design principles in the development</i>
CLR-6	<i>Implementation of Design concepts</i>

Learning		
1	2	3
Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)

Program Learning Outcomes (PLO)														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Scientific Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3
L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
L	H	M	H	L	-	-	-	L	L	-	H	-	-	-

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:			
CLO-1	<i>Understand Multimedia works</i>	3	80	70
CLO-2	<i>Create a multimedia component using various tools and techniques</i>	3	85	75
CLO-3	<i>Import graphics and textures created on other applications into a multimedia software program</i>	3	75	70
CLO-4	<i>Create a movie using simple animation</i>	3	85	80
CLO-5	<i>Create an effective interactive site for use on the internet</i>	3	85	75
CLO-6	<i>Do simple scripting for a file</i>	3	80	70

Duration (Hour)		09	09	09	09	09
S1	SLO-1	Understanding Photoshop Environment, Learning the usage of tools in tool bar with sample images	Testing Laboratory Mode Edge Mask	Using Retouching Tools in an Image ,	Understanding Flash Drawing spokes on a wheel and allow the wheel to rotate,	Automatic Slide show presentation and presentation with action script
	SLO-2					
S2 - S3	SLO-1	Laboratory 1 : sample images	Laboratory 4: Clone an Image	Laboratory 7: Adjusting color and tone for an Image	Laboratory 10: Motion Tweenin	Laboratory 13: : Marquee Selections Examples
	SLO-2					
S4	SLO-1	Understanding the usage of selection	Clone an Image	Apply readymade effects to image	Text and Shape Tweening,	Masking Effect
	SLO-2	Tools: Marquee Selections	Captain Kirk's Myophia Effect	using Filter menu	Moving a bus from one end to other end of stage	Water Masking
S5 - S6	SLO-1	Laboratory 2: Lasso Selections	Laboratory 5: Captain Kirk's Myophia Effect	Laboratory 8: Filter menu	Laboratory 11: Bouncing Ball	Laboratory 14: Water Masking
	SLO-2					
S7	SLO-1	Adjusting Brightness and Contrast	Apply antique framing for photo	Designing ID Card and Invitation Card using Layer	Moving an object	Creating buttons using action script
	SLO-2	Isolating image from complex image	Apply various transformations for the selection	Layer effects	text along a curved path	States of button
S8 - S9	SLO-1	Laboratory 3: , Multichannel color mode,	Laboratory 6: Mode Edge Mask	Laboratory 9: Gradients	Laboratory 12: Layer effects	Laboratory 15: Masking Effect
	SLO-2					

Learning Resources	1.Understanding Networked Multimedia, Fluckiger, Prentice Hall, (ISBN 0-13-190992-4) 2.Design for Multimedia Learning, Boyle, Prentice Hall, (ISBN 0-13-242215-8) 3.Multimedia Communication, Sloane, McGraw Hill, (ISBN 0-077092228)
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Learning Assessment									
	Bloom's Level of Thinking	Continuous Learning Assessment (100% weightage)							
		CLA – 1 (20%)		CLA – 2 (20%)		CLA – 3 (30%)		CLA – 4# (30%)	
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	10%	10%	10%	10%	10%	10%	10%	10%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	20%	20%	20%	20%	20%	20%	20%	20%
	Total	100%		100%		100%		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. P.Muthulakshmi
		Mrs. E. Aarthi

Course Code	PCD21AE2T	Course Name	GENERAL APTITUDE FOR COMPETITIVE EXAMINATIONS	Course Category	A	ABILITY ENHANCEMENT COURSE	L	T	P	C
							1	0	0	1

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Career Development Centre	Data Book / Codes/Standards		Nil	

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-1:	recapitulate fundamental mathematical concepts and skills																			
CLR-2:	provide context - based vocabulary enhancement																			
CLR-3:	sharpen logical reasoning through skilful conceptualization																			
CLR-4:	familiarize with basic grammatical and syntactical rules																			
CLR-5:	enable to solve problems and to crack competitive exams																			
CLR-6:	develop new strategies to enhance reading comprehension																			
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed Learning	Multicultural Competence	ICT Skills	Life Long Learning	PSO - 1	PSO - 2	PSO - 3	
CLO-1:	build a strong base in the fundamental mathematical concepts	2	80	75	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H	
CLO-2:	acquire strategies to build vocabulary	2	80	70	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H	
CLO-3:	apply the learn conditions towards solving problems analytically	2	75	70	H	H	H	H	H	H	H	H	M	H	M	H	H	H	H	

CLO-4:	<i>learn grammatical and syntactical rules</i>	2	80	75
CLO-5:	<i>grasp the approaches and strategies to solve problems with speed and accuracy</i>	2	80	70
CLO-6:	<i>improve reading comprehension strategies</i>	2	80	75

H	H	H	H	H	H	H	H	H	H	M	H	H	H	H
H	H	H	H	H	H	H	H	H	H	M	H	H	H	H
H	H	H	H	H	H	H	H	H	H	M	H	H	H	H

Duration (hour)		3	3	3	3	3
S-1	SLO-1	Logical Reasoning I	Vocabulary from inference to meaning	Numbers - I	Error Identification - I	Data Sufficiency
	SLO-2	Solving Problems	Vocabulary from inference to meaning	Numbers - I	Error Identification - I	Data sufficiency
S-2	SLO-1	Logical Reasoning - I	Cloze passage	Numbers - II	Error Identification - II	Data Interpretation
	SLO-2	Solving Problems	Cloze passage	Numbers - II	Error Identification - II	Data Interpretation
S-3	SLO-1	Logical Reasoning - I	Sentence Completion	Numbers - III	Sentence Correction - I	Sentence Correction - II
	SLO-2	Solving problems	Sentence Completion	Numbers - III	Sentence Correction - I	Sentence Correction - II
Learning Resources	1. Quantitative aptitude – r s agarwal 2. Quantitative aptitude – ARUN SARMA 3. ManhattanPrepGMAT Sentence Correction Guide–Avi Gutman			4. GRE Contextual.Vocabulary–Ken Springer		

Learning Assessment											
	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#		Theory	Practice
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		
Level 1	Remember Understand	30 %	-	30 %	-	30 %	-	30 %	-	30 %	-
Level 2	Apply Analyze	40 %	-	40 %	-	40 %	-	40 %	-	40 %	-
Level 3	Evaluate Create	30 %	-	30 %	-	30 %	-	30 %	-	30 %	-
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Scientific Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications etc.,

Course Designers		
Experts from Industry	Internal Experts	
1. Mr Nishith Sinha, dueNorth India Academics LLP, Dehradun, nsinha.alexander@gmail.com	1. <i>Dr.P.Madhusoodhanan SRMIST</i>	3. Dr. A Clement, SRMIST
2. Mr Ajay Zenner, Career Launcher, ajay.z@careerlauncher.com	2. Dr.M.Snehalatha SRMIST	4. Dr. J Jayapragash, SRMIST

be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	
Experts from Industry	Internal Experts
1. <i>Ajay Zener, Director, Career Launcher</i>	1. <i>Dr P Madhusoodhanan, HoD, CDC, E&T, SRMIST</i>
	2. <i>Dr M Snehalatha, Assistant. Professor, CDC, E&T, SRMIST</i>

SEMESTER – III

Course Code	PIT21C301J	Course Name	PYTHON PROGRAMMING	Course Category	C	Professional Core	L	T	P	C
							4	0	2	5

Pre-requisiteCourses	Nil	Co-requisiteCourses	Nil	ProgressiveCourses	Nil
Course OfferingDepartment	Computer Science	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):		Learning			Program Learning Outcomes (PLO)														
The purpose of learning this course is to:		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Describe the core syntax and semantics of Python programming language.	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-2 :	Discover the need for working with the strings and functions.																		
CLR-3 :	Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.																		
CLR-4 :	Indicate the use of regular expressions and built-in functions to navigate the file system.																		
CLR-5 :	Infer the Object-oriented Programming concepts in Python.																		
CLR-6 :	Understand Event Driven Programming																		
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																	
CLO-1 :	Develop, document, and debug modular python programs to solve computational problems	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Select a suitable programming construct and data structure for a situation.	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Use built-in strings, lists, sets, tuples and dictionary in applications.	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Define classes and use them in applications	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Use files for I/O operations.	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-

Duration (Hour)		18	18	18	18	18
S-1	SLO-1	An introduction to python programming,	Arrays, Array methods	Equality: Object Identity, Structural Equivalence	Errors and exceptions, Exception handling in Python	Docstrings,
	SLO-2	Structure of a Python program	Strings ,	Advanced list processing, List comprehension	Exception handling methods, Illustrate exception handling in Python	Method Definitions
S-2	SLO-1	understanding Python interpreter and Python Shell	String methods	Conversion of list to array, tuple, string	Introduction to modules,	The init Method,
	SLO-2	Datatypes	mutable strings,	Conversion of array, string, tuple, dictionary to list	Important modules in Python	Instance Variables
S3	SLO-1	Example program using all data types	Immutable strings	Tuples	Creating modules,	The str Method,
	SLO-2	Example program using variables,	String module,	tuple operation	accessing modules,	Accessors
S4	SLO-1	String literals,	Sum array of numbers	Tuple methods	Namespaces and its methods	Mutators
	SLO-2	Escape Sequences,	Functions	Introduction to dictionary,	<i>Locating modules</i> , dir(),	The Lifetime of Objects
S5-6	SLO-1	Laboratory 1: Write a Python code to display system information using pywhois	Laboratory 4: Make a simple calculator	Laboratory 7: Program to Transpose a Matrix Program for sorting using list Using a List to Find the Median of a Set of Numbers	Laboratory 10: Program using recursive function. Program to illustrate exception handling in Python	Laboratory 13: Program using classes and methods
	SLO-2					
S7	SLO-1	String Concatenation,	Function arguments	Operations	PYTHONPATH	Rules for Defining a Simple Class
	SLO-2	Variables	Anonymous functions,	Methods,	Packages,	Rational Number
S8	SLO-1	assignment statement,	Illustrate functions using python	Add, remove a key in dictionary	Creating packages	Arithmetic and Operator Overloading

	SLO-2	Program Comments	Set declaration	Accessing values	accessing packages	Comparison Methods,
S9	SLO-1	Doc Strings,	Set operation	Replacing Values,	Default (Keyword) Arguments,	Equality and the eq Method
	SLO-2	Numerical Datatypes,	Set methods	Traversing a dictionary	Functions as First-Class Data Objects	Input of Objects
S10	SLO-1	Character sets,	Introduction to Lists,	Introduction to file,	Mapping,	the try-except Statement
	SLO-2	Arithmetic expressions,	List literals	file creation	Filtering,	Inheritance
S11-12	SLO-1	Laboratory 2: The Magic 8 Ball is a toy used for fortune-telling or seeking advice.	Laboratory 5: Arrays and strings	Laboratory 8: Program on dictionary operations. Program on dictionary methods	Laboratory 11 Write a python program to define a module and import a specific function in the module to another program	Laboratory 14: Python Program for Operator overloading
	SLO-2					
S13	SLO-1	Understanding error messages	Basic list operations,	File operations,	Reducing	Hierarchies
	SLO-2	Logical operators	Replacing an Element in a List	Format operators	Using lambda to Create Anonymous Functions	Modeling
S14	SLO-1	Definite iteration : For loop,	List methods with illustration,	Directory functions,	Standard Libraries in Python	Polymorphic Methods
	SLO-2	Selection : if statement	Program to List Methods for Inserting Elements	File positions	Introduction to classes,	Abstract Classes
S15	SLO-1	if else statement,	Example program to Replace an Element in a List	Example program to access and manipulate files,	Design with Classes	The Costs of object oriented programming
	SLO-2	Example program using if and if else,	Sorting and searching a list,	Example program to read and write text and numbers	Objects	Benefits of Object-Oriented Programming
S16	SLO-1	Conditional iteration :while loop,	Aliasing,	Recursive functions,	Classes	Event-Driven Programming,
	SLO-2	Example program using while loop	mutator methods	Abstract functions	An example for class	Example for Event-Driven Programming
S17-18	SLO-1		Laboratory 6: Program to		Laboratory 12 : Programs to illustrate lambda functions with	Laboratory 15: Program using

	SLO-2	Laboratory 3: Check whether a number is prime or not, Python Program to Generate a Random Number	illustrate set operations and its methods. Program to illustrate list operations and its methods Program for list comprehension	Laboratory 9: Program to create and modify text file in Python Program for word count in text file.	mapping, filtering, reducing and substituting	polymorphism, abstract classes
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Learning Resources	Kenneth A. Lambert, (2011), "The Fundamentals of Python: First Programs", Cengage Learning
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Learning Assessment											
Bloom's Level of Thinking		Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#		Theory	Practice
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1. Mrs. E.Aarthi 2. Dr. P. Muthulakshmi

Course Code	PIT21C302J	Course Name	OPEN SOURCE TECHNOLOGIES	Course Category	C	Professional Core				L	T	P	C
										4	0	2	5

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
CLR-1:	Lean Open Source Software			Level of Thinking	Expected Proficiency	Expected Attainment	Engineering	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-		
CLR-2:	Designing web page using PHP							M	H	L	M	L	-	-	-	M	L	-	H	-	-	-	-	-
CLR-3:	MYSQL Database							M	H	M	H	L	-	-	-	M	L	-	H	-	-	-	-	-
CLR-4:	Database Applications using PHP with MYSQL							M	H	M	H	L	-	-	-	M	L	-	H	-	-	-	-	-
CLR-5:	PERL							H	H	M	H	L	-	-	-	M	L	-	H	-	-	-	-	-
CLR-6:	Advanced PERL							L	H	-	H	L	-	-	-	L	L	-	H	-	-	-	-	-
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:			Level of Thinking	Expected Proficiency	Expected Attainment	Engineering	Problem Analysis	Design & Analysis, Design, Modern Tool Usage	Society & Culture	Environment & Ethics	Individual & Team	Communication	Project Mgt. & Life Long Learning	PSO - 1	PSO - 2	PSO - 3							
CLO-1:	Create a web page using OSS.			2	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-			
CLO-2:	Design a web page using PHP			2	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-			
CLO-3:	Design a web page using PHP with MYSQL			2	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-			
CLO-4:	Web page with CMS			2	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-			
CLO-5:	Web page using PERL commands			2	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-			
CLO-6:	Understand Advanced PERL techniques			2	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-			

Duration (Hour)		18	18	18	18	18
S1	SLO-1	PHP BASICS	Advanced PHP with MYSQL	Database	Scalar variables	PEARL
	SLO-2	Introduction to PHP	Introduction to MYSQL	Database driven applications	Scalar operators	Advanced PERL
S2	SLO-1	Web Server	Exceptions	Sample applications	Functions	Directory Operations
	SLO-2	Examples	Introduction	Advanced PHP with AJAX	Escape sequences	Process Management
S3	SLO-1	Apache Web Server	Error Handling	Advanced PHP with SEO	Lists	Process Communication
	SLO-2	PHP-Data Types	Error Handling Functions	Advanced PHP with CMS	Arrays	String
S4	SLO-1	Variables	Predefined variables	AJAX - Introduction	Introduction to arrays	Sorting
	SLO-2	Constants	Cookies	SEO - Introduction	Types of Array	Smart Matching
S5 -6	SLO-1	Laboratory 1: COOKIES	Laboratory 4 : Sample Application using PHP MYSQL	Laboratory 7 : PHP with AJAX	Laboratory 10: String Operations in PERL	Laboratory 13: Process communication
	SLO-2					
S7	SLO-1	Operators	Cookies Functions	CMS - Introduction	Subroutines	Advanced PERL Techniques
	SLO-2	Expressions	Sessions	PHP with AJAX	Input Statements	File I/O
S8	SLO-1	Control Structures	Session Functions	AJAX Basics	Output Statements	Open a file
	SLO-2	Functions	COM	PHP with Ajax Database driven applications	Hashes	Read from file
S9	SLO-1	Function Types	DOM	PHP with SEO	Hash Functions	Write to file
	SLO-2	User Defined Functions	CURL	Basics SEO	Basic Input statement	File test
S10	SLO-1	Directory Functions	SOAP	Provokative SE Friendly URL's	Basic Output Statement	operators
	SLO-2	File System	Classes and Objects	Duplicate Content Content Management systems	Subroutines	PERL DBI
S11-12	SLO-1	Laboratory 2: SESSIONS	Laboratory 5: Exception Handling	Laboratory 8: Hash Implementation	Laboratory 11 : Sorting	Laboratory 14 : PERL Database Application
	SLO-2					

S13	SLO-1	Functions Arrays	Example for Classes and Objects	Introduction Advantages	Examples using Hashes	Database Independent
	SLO-2	Types of Arrays String Functions	Mail Functions Sample program using Mail Functions	Word Press - Introduction Blog - Introduction	Regular expressions	Perl - Sort Perl reverse sorting
S14	SLO-1	Date Functions	URL Functions	Simple webpage using CMS	Control structures	Complex sorting
	SLO-2	Time Functions	Introduction to PHP with MYSQL	BASIC PERL	Modules in PERL	PERL – OOPS
S 15	SLO-1	Mathematical Functions	PHP and MYSQL functions	Introduction to PERL	Example using Regular expressions	Object
	SLO-2	User Defined Functions	Database creation	Advantages of PERL	Example using control structure	Class
S16	SLO-1	Miscellaneous Functions	Table creation	Data	Example using Modules	Inheritance
	SLO-2	Other Functions	Sample Queries in MYSQL	Scalar Data	Example using File Tests	Encapsulation
S 17- 18	SLO-1	Laboratory 3: Shopping cart using PHP with MYSQL	Laboratory 6: String Functions	Laboratory 9: Array Implementation using PERL	Laboratory 12: Applications using Modules	Laboratory 15 : Advanced PERL techniques
	SLO-2					

Learning Resources	<p>1. Mehdi Achour, Friedhelm, Betz Antony Dovgal, Nuno Lopes, Hannes Magnusson, Georg Richter, Damien Seguy, Jakub Vrana And several others, (1997-2011), "PHP Manual (Download the manual from PHP official website www.php.net)", The PHP Documentation Group. (For Units I to III)</p> <p>2. Lee Babin,(2007), "Beginning Ajax with PHP From Novice to Professional", Apres., (For Units IV to V)</p>	<p>3. Jaimie Sirovich and Cristian Darie, (2007), "Professional Search Engine Optimization with PHP A Developer's Guide to SEO", Wiley Publishing, Inc., Indianapolis, Indiana.</p> <p>4. Randal L. Schwartz, Tom Phoenix, brian d foy, "Learning Perl, Fifth Edition</p>
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Learning Assessment											
Bloom's Level of Thinking		Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%

	Total	100 %	100 %	100 %	100 %	100%
# CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc., Course Designers						
Experts from Industry		Experts from Higher Technical Institutions			Internal Experts	
Mr. S. Karthik, IT Analyst, Tata Consultancy Services		Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai			Mrs.P.Yogalakshmi	
					Dr..S.Sabeen	

Course Code	PIT21E301J	Course Name	Big Data Analytics	Course Category	D	Discipline Elective Courses	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):		Learning			Program Learning Outcomes (PLO)																
Course Learning Rationale (CLR):		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
CLR-1 :	Understand the evolution of computer networks using the layered network architecture	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning		
CLR-2 :	Understand the addressing concepts and learn networks devices				L	H	-	H	L	-	-	-	L	L	-	H	-	-	-	-	-
CLR-3 :	Design computer networks using subnetting and routing concepts				M	H	L	M	L	-	-	-	M	L	-	H	-	-	-	-	-
CLR-4 :	Understand the error types, framing, flow control				M	H	M	H	L	-	-	-	M	L	-	H	-	-	-	-	-
CLR-5 :	Understand the various Medium Access Control techniques and also the characteristics of physical layer functionalities				M	H	M	H	L	-	-	-	M	L	-	H	-	-	-	-	-
CLR-6 :	Know the algorithms behind the protocols that helps data transfer				H	H	M	H	L	-	-	-	M	L	-	H	-	-	-	-	-
Course Learning Outcomes (CLO):		3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-		
CLO-1 :	Acquire the basics of computer network and its architecture	3	80	70	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-		
CLO-2 :	Acquire the knowledge of various networks devices and addressing methods	3	85	75	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-		
CLO-3 :	Design the network routing methods	3	75	70	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-		
CLO-4 :	Find the error type that may happen during data transportation	3	85	80	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-		
CLO-5 :	Understand the physical layer functions and components	3	85	75	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-		
CLO-6 :	Speak on the topology chosen for a architecting a network that an organization demands	3	80	70																	

Duration (hour)		15	15	15	15	15
S-1	SLO-1	Introduction to BigData platform	Null and Alternative Hypotheses.	History of Hadoop	Setting up a Hadoop Cluster	Applications on Big Data
	SLO-2		Type-I and Type-II Error Critical Region and Level of Significance			
S-2	SLO-1	Challenges of Conventional Systems	One tailed and two tailed tests	The Hadoop Distributed File System	Cluster specification -	Data processing operators in Pig
	SLO-2					
S-3	SLO-1	Intelligent data Analysis	Critical values of significant values	Components of Hadoop	Cluster Setup and Installation	Hive QL, Tables
	SLO-2					
S4-5	SLO-1	Laboratory 1 : Practice elementary mathematical operations and control statements	Laboratory 4 : Creating Various types of plots /charts from various data source	Laboratory 7 : Implementation of Linear regression with multiple regression	Laboratory 10: Implementation of classifier problem	Laboratory 13 : Implementation of decision tree
	SLO-2					
S-6	SLO-1	Nature of data	Tests of Significance for Large Samples	Analyzing the Data with Hadoop	Hadoop Configuration	Structure of Hbase
	SLO-2			Scaling Out- Hadoop Streaming		
S-7	SLO-1	Analytic process and tools	- Test of Significance for Single Proportion	Java interfaces to HDFS	Security in Hadoop	Hbase QL
	SLO-2		Test of Significance for Difference of Proportions	Java interfaces to HDFS		
S-8	SLO-1	Analysis Vs Reporting	Test of Significance for Single Mean	How Map Reduce Works	Administering Hadoop	Comparing hbase with Relational Database
	SLO-2	Modern Data analytic tools	Test of Significance for Difference of Means. Chi-Square Distribution	Anatomy of a Map Reduce Job run		
S9-10	SLO-1	Laboratory 2 : Operations on Matrices and Vectors	Laboratory 5 : Create subplots and color plots	Laboratory 8 : Implementation of Data preprocessing methods , Correlation matrix	Laboratory 11 : Implementation of K-Mean Clustering	Example 14 : Implementation of Random Forest
	SLO-2					

S-11	SLO-1	Parameter and Statistic	To test the goodness of fit.- To test the independence of Attributes. Student's "t" - Distribution	Failures	Administering Hadoop - HDFS	Structure of Zoo Keeper
	SLO-2			Job scheduling shuffle and sort		
S-12	SLO-1	Sampling Distribution-	Definition- Applications of Student's "t" – Distribution- To test for Single Mean- To test for Difference of Means	Task Execution –Map read and Map write anatomy	Monitoring	The Zoo keeper services
	SLO-2					
S-13	SLO-1	Meaning-Standard Error and its uses. Tests of Significance	F-Distribution- Definition- To Test for Equality of Two Population variances. Meaning of Resampling and its uses	Map reduce features	Maintenance	Case study
	SLO-2					
S14-15	SLO-1	Laboratory 3 : Vectorized operation on simple matrix operations	Laboratory 6 : Implement Linear regression problem	Laboratory 9 : Implementation of spam and non-spam classification problem.	Laboratory 12 : Implementation of K-Mean Clustering	Laboratory 15 : Implementation of CART
	SLO-2					

Learning Resources	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 4. Anand Rajaraman and Jeffrey David Ullman, (2012) "Mining of Massive Datasets", Cambridge University Press. 5. Viktor Mayer,Schonberger,Kenneth Cukier , "Big Data : A Revolution That Will Transform How We Live, Work and Think".

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

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mrs. P. Yogalakshmi Dr. P.J.Arul Leena Rose

Course Code	PIT21E302J	Course Name	CLOUD COMPUTING	Course Category	D	Discipline Specific Elective Course	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
CLR-1 :	Understand and Analyze the cost metrics, handle the security threats and construct different cloud delivery design models	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	understand the architecture of cloud	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-3 :	understand the need for virtualization																		
CLR-4 :	the concepts behind scheduling and load balancing that is happening across heterogeneous resources in the environment																		
CLR-5 :	justify the need for improved hardware and software infrastructures (servers, protocols, security algorithms)																		
CLR-6 :	know the commercial functioning of cloud computing																		
CLO-1 :	defend the need for cloud computing to run an online business																		
CLO-2 :	understand and figure out the necessities of middleware technologies	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	practically create a virtual environment (lab purpose using VMware)	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	implement crypto algorithms that may be used in the computing environment	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Learn cloud enabling technologies and its applications	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Commercial functioning	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		15	15	15	15	15
S-1	SLO-1	Introduction to Networking	Roles and Boundaries	Cloud Computing Applications: Cloud for Health care, Energy systems, Transportation systems	Cloud Usage Monitor ,Resource Replication ,Ready-Made environment	Fundamental Cloud Security: Threat Agents
	SLO-2	Data Communication	Cloud Characteristics	Manufacturing Industry, Government, Education and Mobile Communication	Specialized Cloud Mechanisms	Cloud Security Threats
S-2	SLO-1	Cloud computing	Cloud Delivery models	Cloud Computing Mechanisms: Logical Network Perimeter, Virtual server: Cloud Storage device	Load Balancer, SLA Monitor, Hypervisor, Resource Cluster	Single –sign on :Kerberos Identification
	SLO-2	Origin of Cloud Computing	Cloud Deployment models	Fundamental Cloud Architectures	Cloud Management Mechanisms: Remote Administration systems,	One-time Password, Basic Cloud data Security mechanisms
S-3	SLO-1	Basic Concepts of Cloud Computing	Cloud Enabling Technology and Applications	Design Approaches with case Study	SLA Management System	Advanced Cloud
	SLO-2	Basic Concepts and Terminology	Broadband Network and Internet Architecture	Design Methodology for IaaS Service	Resource Management System, Billing Management system	Mobile Cloud
S 4-5	SLO-1	Laboratory 1: Create a virtual machine	Laboratory 3: Create GAE Launcher	Laboratory 5:Encryption and Decryption of Text	Basic Terms and Conditions	Laboratory 8: Create a Warehouse Application in Sales force.Com
	SLO-2				Cloud Security mechanisms: Encryption :Hashing: Digital Signature	
S-6	SLO-1	Goals and Benefits	Data Center Technology, Virtualization Technology	Design Methodology for PaaS Service	Cost Metrics and Pricing Models: Business Cost Metrics, Cloud Usage cost metrics	Green Cloud
	SLO-2	Risks and Challenges	Web Technology ,Multitenant Technology	Study of SaaS Service Model	Service Quality Metrics ,SLA Guidelines	Media Cloud

S-7	SLO-1	Introduction to virtualization	Include –v Flag	Basis of SaaS	Security Cloud : CIA Concept	Specific Cloud Services Models
	SLO-2					
S-8	SLO-1	Types of Virtual Machines	Viewing your application	Advantages of SaaS	Types of Security Attacks	Introduction
	SLO-2					
S9-10	SLO-1	Laboratory 2: Install a C compiler in the virtual machine created using virtual box and execute Simple Programs	Laboratory :4 Client Server communication between two virtual machine instances, execution of chat application	Laboratory 6: Simple Experiments in Cloud Sim	Laboratory 7: Simple Experiments in Cloud Sim	Laboratory 9: Create a Warehouse Application in Sales force.Com using Apex prog Lang
	SLO-2					
S-11	SLO-1	Install virtual box	Implement two host operating systems onto a single virtual box	Brief Introductory part of software as a service	Security Policy Implementation	Resource allocation in cloud computing
	SLO-2					
S-12	SLO-1	Download Linux	Run the virtual machines	Saas : Unification Technologies	Security Policy Implementation : Policy Types	Introduction
	SLO-2					
S-13	SLO-1	How to install Virtual box	Open terminal in one VM, give ifconfig command	Saas :Integrated Products	Techniques to Secure Data	Importance of Cloud Computing
	SLO-2	How to install Linux os	Then ping the Ip of one machine in the other terminal ping 10.0.2.10	Saas product selection criteria	Cloud Encryption	Strategies for Resource Allocation
S14-15	SLO-1	Installing C environment	Then run the communication between the terminals	Saas Integration services	Symmetric Encryption	Resource Allocation Policies and Algorithms
	SLO-2	Install Linux using Virtual box	Create a cloudlet	Infrastructure as a Service	Cloud Security Alliance	Performance-based RAS

Learning Resources	<p>1. Thomas Erl, ZaighamMahmood,RichardoPuttini, "Cloud Computing: Concepts,Technology & Architecture", Fourth Printing, Prentice Hall/PearsonPTR, 2014,ISBN: 780133387520.</p> <p>2. ArshdeepBahga, Vijay Madiseti, "Cloud Computing: A Hands-On Approach", University Press, 2016, ISBN: 9780996025508.</p>	<p>3. K.Chandrasekaran, "Essentials of Cloud Computing", Chapman and Hall/CRC Press, 2014, ISBN 9781482205435.</p> <p>4. Thomas Erl, Robert Cope, Amin Naserpour, "Cloud Computing Design Patterns",Prentice Hall/Service Tech Press, Pearson, 2015, ISBN: 978-0133858563.</p>
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Learning Assessment											
Bloom's Level of Thinking		Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. P.Muthulakshmi Mrs. E. Aarthi

Course Code	PIT21E303J	Course Name	INTERNET OF THINGS	Course Category	D	Discipline Elective Course	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-1 :	Demonstrate the design, communication model and enabling technologies for IoT.	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning	
CLR-2 :	Explore the system management and domain for various applications of IoT																			
CLR-3 :	Categorize the various protocols that are used for developing IoT applications.																			
CLR-4 :	Deploy an IoT application and connect to the cloud.																			
CLR-5 :	Develop IoT application for real time scenario																			
CLR-6 :	Implementation of IoT application for real world problems																			
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																			
CLO-1 :	Apply the knowledge/understanding of mathematics, science, to the solution of complex problems applicable to the discipline	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-	
CLO-2 :	Design, implement, and evaluate a computer-based system, process, component, or program to meet desired solutions that meet the specified needs with suitable concern for the public health and safety, and the cultural, societal, and environmental considerations.	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-	
CLO-3 :	Create, select, and apply applicable techniques, resources, and modern engineering and IT tools to complex engineering activities with an understanding of the limitations.	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-	
CLO-4 :	Function successfully as an individual, and as a member or leader in assorted teams, and in multidisciplinary settings.	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-	

CLO-5 :	Prove knowledge and understanding of the engineering and management principles and apply the same to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Apprehend the importance of technology with the current scenario	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		15	15	15	15	15
S-1	SLO-1	Introduction	IoT Levels and Deployment Templates	IoT System Management	MQTT, Difference between MQTT and HTTP	Process, Domain level specifications
	SLO-2	Definition & Characteristics of IoT	level 0, level 1, level 2	Advantages of IoT system management	CoAP, Types of CoAP	Information, service, IOT level specifications
S-2	SLO-1	Physical design of IoT, Things in IoT	Level 3, level 4, level 5	Disadvantages of IoT system management	Request and Response methods, Pros and Cons of CoAP	Functional view specifications, operational view specifications
	SLO-2	IoT protocols	IOT Applications	Need of IoT system management	AMQP, Semantic, JSON-LD	Device & component Integration, Application development
S-3	SLO-1	Logical Design of IoT	Home Automation	Simple Network Management Protocol	Sensor network	IoT System for Weather Monitoring
	SLO-2	And its application	IOT enabled devices	Analysis of network management	Sensor network devices	Example: real-time weather monitoring
S4-5	SLO-1	Laboratory 1: Define and Explain Eclipse IoT Project	Laboratory 4: Demonstrate a smart object API gateway service reference implementation in IoT toolkit	Laboratory 7: Explain the application framework and embedded software agents for IoT toolkit.	Laboratory 10: Give overview of Zetta.	Laboratory 13: Smart Irrigation System
	SLO-2					
S-6	SLO-1	IoT Functional Blocks	Discuss Home automation problems	Introduction about IOT protocols	Man to machine communications	Purpose
	SLO-2	IoT Blocks	Real-time problems	Brief about IOT protocols	Its functionalities	Requirements
S-7	SLO-1	IoT Communication Model	Discuss cities problem	Architecture of 6LowPAN	Wireless networks	Process
	SLO-2	Interoperability in IoT	Framework problems	Embedded Systems	Comparisons of wired and wireless networks	Domain level specifications
S8	SLO-1	IoT Communication APIs	Discuss Industry problem	Network operator	Interoperability in IoT	Information, service, IOT level specifications

	SLO-2	Sensors	Discuss mapping proxy	Architecture of ipv6	Introduction to Arduino	Functional view specifications,
S9-10	SLO-1	Laboratory 2: List and summarize few Eclipse IoT Projects.	Laboratory 5: Write and explain working of an HTTP- to-CoAP semantic mapping proxy in IoT toolkit.	Laboratory 8: Explain working of Raspberry Pi.	Laboratory 11: Home Automation – Level 0	Laboratory 14: Weather Reporting Systems
	SLO-2					
S-11	SLO-1	and its types	Discuss Health & Lifestyle problem	Wifi	Arduino programming	operational view specifications
	SLO-2	Actuators and its types	Architecture of M2M	Bluetooth	Integration of sensors and actuators	Device & component Integration, Application development
S-12	SLO-1	Communication Protocols	Architecture of SDN	Physical Web	IoT Platforms	Introduction to Cloud Storage Models
	SLO-2			mDNS	Design Methodology	
S-13	SLO-1	Embedded Systems	NFV for IOT	DNS-SD	Purpose &	Amazon Web Services for IoT
	SLO-2	Its applications	Architecture of NFV	Data Protocols	Requirements	Discuss real-time example
S14-S15	SLO-1	Laboratory 3: Sketch the architecture of IoT Toolkit	Laboratory 6: Describe gateway as a service deployment in lot toolkit	Laboratory 9: Connect Rasberry Pi with your existing system components	Laboratory 12: Home Automation – Level 4	Laboratory 15: Air Pollution Monitoring System
	SLO-2					

Learning Resources	<ol style="list-style-type: none"> 1. ArshdeepBahga and Vijay Madiseti, (2015), "Internet of Things - A Hands-on Approach", Universities Press 2. Dieter Uckelmann et.al, (2011), "Architecting the Internet of Things", Springer 3. CunoPfister, (2011), "Getting Started with the Internet of Things", O'Reilly, 2011. 	<ol style="list-style-type: none"> 4. Adrian McEwen, Hakim Cassimally, (2014), "Designing the Internet of Things", Wiley 5. HonboZhou, (2012), "The Internet of Things in the Cloud: A Middleware Perspective ", CRC Press 6. Olivier Hersent, David Boswarthick, Omar Elloumi, (2012), "The Internet of Things – Key applications and Protocols", Wiley
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Learning Assessment											
Bloom's Level of Thinking		Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Total	100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

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Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mrs.Aarthi.E
		Mr. M. Ramesh

Course Code	PIT21G301J	Course Name	Social Media and Text Analytics	Course Category	G	Generic Elective Courses	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):		The purpose of learning this course is to,	Learning			Program Learning Outcomes (PLO)																	
CLR-1 :	CLR-2 :	CLR-3 :	CLR-4 :	CLR-5 :	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-1 :	Familiarize the software lifecycle models and software development process																						
CLR-2 :	Understand the various techniques for requirements, planning and managing a technology project																						
CLR-3 :	Examine basic methodologies for software design, development, testing, closure and implementation																						
CLR-4 :	Understand manage users expectations and the software development team																						
CLR-5 :	Acquire the latest industry knowledge, tools and comply to the latest global standards for project management																						
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																					
CLO-1 :	Identify the process of life cycle model and process project		3	80	70																		
CLO-2 :	Analyze and specify software requirements through a productive working Relationship with project stakeholders		3	85	75																		
CLO-3 :	Design the system based on Functional Oriented and Object Oriented Approach for Software Design.		3	75	70																		
CLO-4 :	Develop the correct and robust code for the software products		3	85	80																		
CLO-5 :	Perform by applying the test plan and various testing techniques		3	85	75																		

Duration (hour)		15	15	15	15	15
S-1	SLO-1	Getting Started with R and Social Media Analytics, Understanding Social Media	Visualizing data , Managing packages	Overview of Text Mining , What's Special About Text Mining?	Using Text for Prediction	Finding Structure in a Document Collection
	SLO-2	Advantages and Significance of Social Media	Data analytics - Analytics workflow	Structured or Unstructured Data	Recognizing that Documents Fit a Pattern	
S-2	SLO-1	Disadvantages and Pitfalls of Social Media	Machine learning techniques	Is Text Different from Numbers?	How Many Documents Are Enough?	Clustering Documents by Similarity
	SLO-2	Social media analytics	Supervised learning, Unsupervised learning	What Types of Problems Can Be Solved?	Document Classification , Learning to Predict from Text	Similarity of Composite Documents
S-3	SLO-1	A typical social media analytics workflow	Text analytics , Understanding Twitter, APIs	Document Classification, Information Retrieval	Similarity and Nearest-Neighbor Methods	k-Means Clustering , Hierarchical clustering
	SLO-2	Data access, Data processing and normalization, Data analysis and Insights, Opportunities and Challenges	Registering an application	Clustering and Organizing Documents	Document Similarity , Decision Rules	
S4 - 5	SLO-1	Laboratory 1 : Practice elementary mathematical operations and control statements	Laboratory 4 : Creating Various types of plots /charts from various data source	Laboratory 7 : Implementation of Linear regression with multiple regression	Laboratory 10: Implementation of classifier problem	Laboratory 13 : Implementation of decision tree
	SLO-2					
S-6	SLO-1	Getting started with R, Environment setup	Connecting to Twitter using R	Information Extraction	Decision Trees, Scoring by Probabilities	The EM Algorithm
	SLO-2	Data types	Extracting sample Tweets	Prediction and Evaluation	Linear Scoring Methods	

S-7	SLO-1	Data structures- Vectors	Trend analysis , Sentiment analysis	From Textual Information to Numerical Vectors	Evaluation of Performance - Estimating Current and Future Performance	What Do a Cluster's Labels Mean?
	SLO-2	Arrays, Matrices		Collecting Documents	Getting the Most from a Learning Method, Errors and Pitfalls in Big Data Evaluation	Applications, Evaluation of Performance
S-8	SLO-1	Lists	Key concepts of sentiment analysis –Subjectivity, Sentiment polarity	Document Standardization, Tokenization	Information Retrieval and Text Mining	Case Study: Market Intelligence from the Web
	SLO-2	DataFrames	Opinion summarization , Features	Lemmatization- Inflectional Stemming, Stemming to a Root	Is Information Retrieval a Form of Text Mining?	
S9-S10	SLO-1	Laboratory 2 : Operations on Matrices and Vectors	Laboratory 5 : Create subplots and color plots	Laboratory 8 : Implementation of Data preprocessing methods , Correlation matrix	Laboratory 11 : Implementation of K-Mean Clustering	Laboratory 14 : Implementation of Random Forest
	SLO-2					
S-11	SLO-1	Functions - Built-in functions	Sentiment analysis in R , Follower graph analysis	Vector Generation for Prediction, Multiword Features	Key Word Search , Nearest-Neighbor Methods	Mining Social Media , E-mail Filtering
	SLO-2	User-defined functions		Labels for the Right Answers, Feature Selection by Attribute Ranking	Measuring Similarity -Shared Word Count	
S-12	SLO-1	Controlling code flow - Looping constructs	Flickr Data Analysis , Accessing Flickr's data	Sentence Boundary Determination	Word Count and Bonus, Cosine Similarity	Emerging Directions
	SLO-2	Conditional constructs	Understanding Flickr data	Part-of-Speech Tagging	Web-Based Document Search - Link Analysis	
S-13	SLO-1	Advanced operations	Understanding interestingness – similarities	Word Sense Disambiguation	Document Matching	Summarization
	SLO-2	apply, lapply sapply,tapply,mapply	Are your photos interesting? - Preparing the data - Building the classifier	Phrase Recognition, Named Entity Recognition, Parsing, Feature Generation	Inverted Lists, Evaluation of Performance	Active Learning , Learning with Unlabeled Data
	SLO-1					

S14-15	SLO-2	Laboratory 3 : Vectorized operation on simple matrix operations	Laboratory 6 : Implement Linear regression problem	Laboratory 9 : Implementation of spam and non-spam classification problem.	Laboratory 12 : Implementation of K- Mean Clustering	Laboratory 15 : Implementation of CART
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Learning Resources	1. Raghav Bali, Dipanjan Sarkar, Tushar Sharma, (2017), "Learning Social Media Analytics with R", Packt Publishing.	2. Sholom M. Weiss, Nitin Indurkha, Tong Zhang, (2015), "Fundamentals of Predictive Text Mining", Second Edition, Springer London.
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Learning Assessment											
Bloom's Level of Thinking		Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
Total		100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mrs. Sweety Bakiarani
		Mr. M. Ramesh

Course Code	PIT21G302J	Course Name	Component Based Technology	Course Category	G	Generic Elective Courses	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Familiarize the software lifecycle models and software development process	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Understand the various techniques for requirements, planning and managing a technology project	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed Learning	Multicultural Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
CLR-3 :	Examine basic methodologies for software design, development, testing, closure and implementation																		
CLR-4 :	Understand manage users expectations and the software development team																		
CLR-5 :	Acquire the latest industry knowledge, tools and comply to the latest global standards for project management																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Identify the process of life cycle model and process project	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Analyze and specify software requirements through a productive working Relationship with project stakeholders	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Design the system based on Functional Oriented and Object Oriented Approach for Software Design.	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Develop the correct and robust code for the software products	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Perform by applying the test plan and various testing techniques	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-

Duration(Hour)		15	15	15	15	15
S-1	SLO-1	Introduction software components	Java Based Component Technology	Java and CORBA	Distributed COM	Connectors
	SLO-2	Inevitability of components	Threads	Enterprise service interfaces	Object reuse	Contexts
S-2	SLO-1	Objects Components and objects	Java Thread models	Java and XML	Interfaces and polymorphism Categories	EJB Containers
	SLO-2	Fundamental properties of component technology	Multithreading Garbage collection	Interface Definition Language	Interfaces and versioning	CCM Containers
S-3	SLO-1	Components are units of deployment	Java Beans Java Bean properties	Object Request Broker	Uniform data transfer Dispatch interfaces	CLR context and channels
	SLO-2	Modules	JSP and servlets	System Object Model Portable object adapter	Connectable objects	Tuple and object spaces Black box component framework
S 4-5	SLO-1	Lab 1: - Develop and implement interface program	Lab 4 :- Develop a java program that implements Multi-thread application	Lab 7 : Implement Customer Record using XML	Lab 10: Implement OLE	Lab 13: Develop an Application using .Net framework
	SLO-2					
S-6	SLO-1	Interfaces	Properties	CORBA component model	OLE Containers and servers	Directory objects
	SLO-2	Standardization and normalization	Interface Definition Language	Features of CORBA component	Active X controls	Container modes
S-7	SLO-1	Direct and Indirect interfaces	Introspection	CCM components	Features of Active X controls	Advanced applications based on compound documents
	SLO-2	Callbacks	JAR files	Containers	.Net components	Black Box and OLE
S-8	SLO-1	Examples of Callbacks and contracts	Object serialization	CORBA complaint implementations	Common language frameworks	Cross development environment
	SLO-2	Directory Services	Reflection	CORBA facilities	Assemblies	Component-oriented programming
S9 - 10	SLO-1	Lab 2 : Develop Java Bean Program	Lab 5: Develop Java servlet Program	Lab 8 : Develop Java Applet Program	Lab 11: Develop and implement an active control	Lab 14 : Develop an application based on Black Box and OLE
	SLO-2					

S-11	SLO-1	A client of the directory service	Enterprise JavaBeans	Application Server	App domains	Component design and implementation tools
	SLO-2	Proofing the directory services	Distributed Object models	Application objects	Contexts	Language support
S-12	SLO-1	Component Architecture	RMI	Meta-object facility	Reflection	Testing tools
	SLO-2	Benefits of component architecture	Brief about RMI	Assemblies	remoting	Examples on testing tools
S-13	SLO-1	Components	RMI-IIOP	Model driven architecture	Remoting applications	Assembly Tools
	SLO-2	middleware	RMI applications	XML	Domains	Examples on assembly tools
S14 - 15	SLO-1	Lab 3 : Develop Java jsp Program	Lab 6: Develop a program on Stock System using RMI	Lab 9 : Implement Web Services using XML	Lab 12 : Develop and implement an App domains	Lab 15 : Develop an EJB application simulating an ATM System.
	SLO-2					

Learning Resources	<ol style="list-style-type: none"> 1. Clemens Szyperski, "Component Software: Beyond Object-Oriented Programming", Pearson Education publishers, 2003. 1. Ed Roman, "Mastering Enterprise Java Beans", John Wiley & Sons Inc., 1999. 2. Mowbray, "Inside CORBA", Pearson Education, 2003. 3. Freeze, "Visual Basic Development Guide for COM & COM+", BPB Publication, 2001. 4. Hortsamann, Cornell, "CORE JAVA Vol-II" Sun Press, 2002.
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Learning Assessment											
Bloom's Level of Thinking		Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
Total		100 %		100 %		100 %		100 %		100%	

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		<i>Mr. M. Ramesh</i>

Course Code	PIT21G303J	Course Name	LINUX BASED LATEX	Course Category	D	Discipline Elective Course	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Familiarize the software lifecycle models and software development process	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Understand the various techniques for requirements, planning and managing a technology project	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed Learning	Multicultural Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
CLR-3 :	Examine basic methodologies for software design, development, testing, closure and implementation																		
CLR-4 :	Understand manage users expectations and the software development team																		
CLR-5 :	Acquire the latest industry knowledge, tools and comply to the latest global standards for project management																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed Learning	Multicultural Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
CLO-1 :	Identify the process of life cycle model and process project	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Analyze and specify software requirements through a productive working Relationship with project stakeholders	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Design the system based on Functional Oriented and Object Oriented Approach for Software Design.	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Develop the correct and robust code for the software products	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Perform by applying the test plan and various testing techniques	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-

Duration(Hour)		15	15	15	15	15
S-1	SLO-1	Introduction to Linux	Managing services	Study of Open	Signal concepts	Sockets
	SLO-2	Features of Linux	system startup files	Close, Read, Write	signal function	Elementary TCP Sockets
S-2	SLO-1	Linux distribution-	starting	Lseek, Dup,stat	kill and raise	TCP Echo Client/ Server
	SLO-2	operating systems	service management	fstat, and lstat	alarm and pause	Elementary UDP Sockets
S-3	SLO-1	Linux-History of Linux and Unix	service scripts	function	abort and sleep	UDP Echo Client/ Serve
	SLO-2	Open source software		File Types	Pipes	
S 4-5	SLO-1	Laboratory 1 : Working with Linux Server	Laboratory 4 : Creating presentation using Beamer tool	Laboratory 7 : Create a table, Brackets and tables in Latex.	Laboratory 10 :. Creating Package	Laboratory 13 : Calculus notation in Latex Document
S-6	SLO-1	Linux Software	FTP server	File Access Permissions	FIFO	gethostbyname& gethostbyadd
	SLO-2	The shell	The FTP user account	Study of Access	System V IPC	getservbyname&
S-7	SLO-1	Shell Scripts	Running vsftpd-	Link and Unlink	Message Queue	getservbyport
	SLO-2	Programming Shell	configuring vsftpd	Functions Reading Directories	Example Program	getaddrinfo
S-8	SLO-1	Configuration	vsftpd access controls-	Time and Date Routines	Semaphores	Syslogd Daemon
	SLO-2	Shell Configuration	web servers	Adding enumerate List	Example Program	syslog function
S 9-10	SLO-1	Laboratory 2 : Practice of Commands	Laboratory 5 : Create Latex basic Document.	Laboratory 8 : Add an elements in it.	Laboratory 11 : Adding Macros	Laboratory 14 : inetd Daemon
S-11	SLO-1	Linux files	apache web server	Setjmp and	Shared Memory	Broadcast Addresses
	SLO-2	Directories	apache configuration files	Longjmp Functions	Example Program	Unicast Versus Broadcast
S-12	SLO-1	archives	apache configuration and	fork	Introduction to creating slides,	Multicast Addresses

	SLO-2	Working with Commands	directives	Vfork	adding frames,	Multicasting
S-13	SLO-1	Introduction with Latex editor	apache configuration	wait	dividing the slide	Versus Broadcasting on LAN
	SLO-2	Working with Latex Editor	Tools.	waitpid.	into multiple columns	Multicasting on WAN
S 14 -15	SLO-1	Laboratory 3 : .Adding Mathematical Symbol in Latex Editor	Laboratory 6 : Text and document formatting	Laboratory 9: Add graphics in Latex Document	Laboratory 12 : Add Different blocks in presentation	Laboratory 15 : Form a Frame

Learning Resources	<ol style="list-style-type: none"> 1. Richard Petersen - Linux : The Complete Reference ,Sixth edition . 2. Richard Stevens .W & Stephen Rago (2005), Advanced Programming in the UNIX Environment, 2nd Edition, Pearson Education, New Delhi (UNIT 1,2 & 3). 3. Richard Stevens .W (1999), UNIX Network Programming, Volume II, Prentice Hall, New Delhi (UNIT IV&5). 4. Stephen A.Rago (1993), Unix System V Network Programming, Addison Wesley, New York.
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Learning Assessment											
Bloom's Level of Thinking		Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Total	100 %		100 %		100 %		100 %		100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mrs. Sweetly Bakiarani Dr. Sabeen

Course Code	PIT21E311L	Course Name	MINI PROJECT	Course Category	P	Project Work	L	T	P	C
							0	0	2	1

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering	Department Computer Science	Data Book / Codes/Standards	As required for the project work		

Course Learning Rationale (CLR):		The purpose of learning this course is to:			Learning			Program Learning Outcomes (PLO)																			
CLR-1 :	CLR-2 :	CLR-3 :	CLR-4 :	CLR-5 :	CLR-6 :	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15				
CLR-1 :	CLR-1 : To prepare the student to gain major design and or research experience as applicable to the profession	CLR-2 :	Apply knowledge and skills acquired through earlier course work in the chosen project	CLR-3 :	Make conversant with the codes, standards , application software and equipment	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning				
CLR-2 :	Carry out the projects within multiple design constraints	CLR-3 :	Incorporate multidisciplinary components	CLR-4 :	Acquire the skills of comprehensive report writing				L	H	-	H	L	-	-	-	L	L	-	H	-	-	-	-	-	-	
CLR-3 :	Design a system	CLR-4 :	Process or gain research insight into a defined problem	CLR-5 :	Solution to the problem as would be encountered in professional manner				3	80	70	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-	-
CLR-4 :	Problem solving - its impact on global, economic, environmental and social context.	CLR-5 :	Practice software project phases	CLR-6 :	Implementation				3	85	75	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-	-
CLR-5 :	Implementation	CLR-6 :							3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-	-
CLR-6 :									3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-	-

The assessment method for the project work consists of in-semester and end semester evaluations as detailed below:

	Continuous Learning Assessment (50% weightage)				Final Evaluation (50% weightage)	
	Regularity & Discipline	Review – 1	Review – 2	Review – 3	Project Report	Viva-Voce*
Mini Project	10%	10%	10%	20%	20 %	30 %

*Student has to be present for the viva voce for assessment. Otherwise it will be treated as non-appearance for the examination with final grade as 'Ab'

Course Code	PIT21S301J	Course Name	WEB DEVELOPMENT USING ANGULARJS AND MONGO	Course Category	S	Skill Enhancement Courses	L	T	P	C
							3	0	2	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Create single page applications and understand the functional behavior of dynamic web pages	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-2 :	Understand presentation components that look like HTML elements	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3	
CLR-3 :	Build corner to corner interactive components in dynamic web pages																				
CLR-4 :	Understand MVC framework/architecture of web programming/client-server architecture																				
CLR-5 :	Build synchronized objects across view and model components																				
CLR-6 :	Understanding JSON in DBs, helps building applications for large scale data storage																				

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CLO-1 :	Make use of expressions, do data binding with external components	3	90	90		H	L	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-2 :	Distinguish the role of MVC in creating dynamic web applications	3	90	90		H	M	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-3 :	Understand the role of reusability and data encapsulation in the form of objects	3	85	85		H	M	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-4 :	Distinguish RDBMS and schema design of MongoDB	4	90	90		H	M	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-5 :	Perform query operations using MongoDB	3	90	90		H	M	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-6 :	Understand and build logical relationships between documents using MongoDB	4	85	85		H	H	H	H	H	-	-	-	-	-	-	-	M	M	H

Duration (Hour)		15	15	15	15	15
S-1	SLO-1	Introduction of	Array Methods :indexOf, join	Angular JS	Angular JS Scope	Document with different types of values
	SLO-2	Need of Scripting Language	Array Methods: lasIndexOf, toString	Arrays	Angular JS Scope	i) <i>Document with Scalar Values</i>
S-2	SLO-1	Difference between client and server side scripting Script tag in HTML	Array Methods:reduce, reverse, Function Definition	Angular JS Expressions Modules	Understanding the scope Angular JS Filters	ii) Document with Documents as values iii) <i>Document with Array as values</i>
	SLO-2	client and server side scripting Java Script declaration	Array Methods:slice, some, sort Function Parameters	vs Java Script Expressions Creating a Module	Understanding the scope Adding Filters to Directives	ii) <i>Document with Documents</i> CRUD operation :Insert Operation i) <i>insertOne() and</i> ii) <i>insertMany() with examples</i>
S-3	SLO-1	Java script statements	Calling a Function	Adding a Controller	The filter Filter	Perform Query Operation for the following situations i) <i>Query on nested documents</i> ii) <i>Query an array</i>
	SLO-2	Comments and Variables	Return Statements	Adding a Directive	Filter an Array Based on User Input	ii) <i>Query an array of nested documents</i> iv) <i>Geospatial Queries</i> <i>Query Operation Examples</i>
S4-5	SLO-1	Laboratory 1: Java Script Input and Output	Laboratory 4 : Functions	Laboratory 7: Modules in Files	Laboratory 10: Sorting an Array based on Userinput	Laboratory 13: Update Operation: <i>updateOne(), updateMany()</i>
	SLO-2					
S-6	SLO-1	Java script Operators - Logical	Angular Environment set up – windows	Controllers in Files	using filters	<i>Working with CURD operations</i>
	SLO-2	Bitwise Arithmetic	Angular JS Framework	Using controllers	Custom Filters	<i>replaceOne(), findAndModify()</i> Update operation :Examples
S-7	SLO-1	Assignment operators	Angular JS Framework	controllers	Filters	Insert

	SLO-2	Java Script	Angular JS with HTML	Directives	Angular Service	Query
S-8	SLO-1	Datatypes	Angular JS with HTML	Angular JS Directives	Angular Service \$http Service, \$timeout Service, \$interval service	Delete Operation: deleteMany(), deleteOne()
	SLO-2	Conditional statements	Angular ng directives	Data Binding	Creating own services	iii)findOneAndDelete() Delete operation Examples
S9-10	SLO-1	Laboratory 2 : Java Script Operators and Conditions	Laboratory 5: Angular ng directives	Laboratory 8: data binding	Laboratory 11 : location service and timeout service	Laboratory 14: Aggregation in Mongodb: i)aggregate() method Aggregate expressions: i) \$sum ii) \$avg iii) \$min iv) \$max
	SLO-2					
S-11	SLO-1	Array Properties : index, input length	Angular JS Strings	AngularJS Controller	Introduction to entities of MongoDB: i)Databases i)Collections	Monitoring Deployment using Mongodb: i) <i>mongostat</i> ,
	SLO-2	Array Methods :concat, every	Angular JS Objects	Controller Methods	Database: i) <i>createDatabase()</i> method with example	iii)serverStatus, dbStats
S-12	SLO-1	Array Properties : prototype	Strings	Controller	Introduction to entities of MongoDB: iii)Documents	Monitoring Deployment using Mongodb: <i>mongotop</i>
	SLO-2	Array Methods forEach	Objects	Methods	Database: example	collStats
S-13	SLO-1	Looping Statements	Manipulating strings	Data binding: controllers	creating dbs	Creating different types of indexes ii) Perform Mongodb data <i>Export</i>
	SLO-2	Looping Statements	Manipulating numbers	external files	creating dbs	<i>Import</i> using shell as well as mongo compass
S14- 15	SLO-1	Laboratory 3 : Looping Statements	Laboratory 6: Manipulating strings and	Laboratory 9: Data binding: controllers and external files	Laboratory 12: creating dbs	Laboratory 15:Creating different types of indexes ii) Perform Mongodb data <i>Export</i> and <i>Import</i> using shell as well as mongo compass.
	SLO-2					

Learning Resources	1. Ken Williamson (2015), “Learning AngularJS: A Guide to AngularJS Development”, O’REILLY	1. URL: https://docs.angularjs.org/api 2.URL: https://docs.mongodb.com/manual/tutorial/								
Learning Assessment										
Bloom’s Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
	CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#		Theory	Practice
	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%
	Understand									
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze									
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%
	Create									
	Total	100 %		100 %		100 %		100 %		100%

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	<i>Mrs. Sweety Bakiarani</i>
		<i>Dr. S. Kanchana</i>

Course Code	PCD21AE3T	Course Name	Employability Skills	Course Category	A	Ability Enhancement Course	L	T	P	C
							1	0	0	1

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Career Development Centre			Nil	

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1:	<i>develop contextual approach to acquire new vocabulary</i>	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2:	<i>establish clear relationship between words</i>																		
CLR-3:	<i>identify problems</i>																		
CLR-4:	<i>learn the fundamental skills to solve problems</i>																		
CLR-5:	<i>acquire experience of attending group discussion and personal interview</i>																		
CLR-6:	<i>equipping students with necessary employability skills</i>																		
CLO-1:	<i>determine the accurate meanings of words</i>	2	80	75	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H
CLO-2:	<i>recognise parallel relationship between words</i>	2	80	70	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H
CLO-3:	<i>learn to solve problems</i>	2	75	70	H	H	H	H	H	H	H	H	M	H	M	H	H	H	H
CLO-4:	<i>understand and applies problem solving skills learned.</i>	2	80	75	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H
CLO-5:	<i>inculcate professional communication through Interviews & Group Discussions</i>	2	80	70	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H
CLO-6:	<i>acquire necessary skills for successful career</i>	2	80	75	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H

Duration (hour)		3	3	3	3	3
S-1	SLO-1	Time & work	Time, speed, distance	Permutation and combination	Probability	Geometry and Mensuration
	SLO-2	Solving problems	Solving problems	Solving problems	Solving problems	Solving problems
S-2	SLO-1	Perspective on Issues	Critical Reasoning	Synonyms	Antonyms	Word Analogy
	SLO-2	Perspective on Issues	Critical Reasoning	Synonyms	Antonyms	Word Analogy
S-3	SLO-1	Resume preparation	Group Discussion	Mock GD	Interview Techniques	Mock PI
	SLO-2	Resume preparation	Group Discussion	Mock GD	Interview Techniques	Mock PI
Learning Resources	5. Quantitative aptitude by Dinesh Khattar 6. Ramachandran and Karthik, From Campus to Corporate, India, PEARSON Publication, 2016.			7. Verbal Advantage – Ten Easy Steps to a Powerful Vocabulary – Charles Harrington Elster 8. Barron's GRE		

Learning Assessment											
	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#		Theory	Practice
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		
Level 1	Remember Understand	30 %	-	30 %	-	30 %	-	30 %	-	30 %	-
Level 2	Apply Analyze	40 %	-	40 %	-	40 %	-	40 %	-	40 %	-
Level 3	Evaluate Create	30 %	-	30 %	-	30 %	-	30 %	-	30 %	-
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Scientific Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications etc.,

Course Designers		
Experts from Industry	Internal Experts	
1.Mr. Ajay Zenne, Career Launcher, ajay.z@careerlauncher.com	1. Dr.P.Madhusoodhanan, SRMIST	2. Dr. A Clement, SRMIST
	3. Dr.M.Snehalatha, SRMIST	4. Dr.Jayapragash J, SRMIST
2.Mr.Pratap Iyer, Study Abroad Mentors, Mumbai, pratap.iyer30@gmail.com	5. Mr. Harinarayana Rao, SRMIST	6. Mr. P Priyanand, SRMIST
	7. Mrs. Kavitha Srisarann, SRMIST	

Semester - IV

Course Code	PIT21E411L	Course Name	PROJECT WORK	Course Category	P	Project Work	L	T	P	C
							0	0	24	12

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	
Course Offering	Department Computer Science	Data Book / Codes/Standards	As required for the project work			

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
CLR-1 :	CLR-1 : To prepare the student to gain major design and or research experience as applicable to the profession	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Apply knowledge and skills acquired through earlier course work in the chosen project	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-3 :	Make conversant with the codes, standards , application software and equipment																		
CLR-4 :	Carry out the projects within multiple design constraints																		
CLR-5 :	Incorporate multidisciplinary components																		
CLR-6 :	Acquire the skills of comprehensive report writing																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Learning			Program Learning Outcomes (PLO)														
CLO-1 :	Design a system	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Process or gain research insight into a defined problem	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Solution to the problem as would be encountered in professional manner	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Problem solving - its impact on global, economic, environmental and social context.	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Practice software project phases	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Implementation	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Assessment Component	Expected outcome	Type	Evaluators	Criteria or basis	Marks
Review – 0 Internship	Internship letter Submission Proposed Project title to be described. Abstract of the project.	Internal	Supervisor / Guide & Project Coordinator	Feasibility Study of the project	5
Review – I Project Proposal	A short presentation about the Problem statement Literature Survey System architecture Design Specifications	Internal	Supervisor/Guide	Clarity of the idea, Preliminary work done.	10
Review – II	Presentation on Techniques, Model/ Algorithm, Modules, coding Prototype of the project	Internal	Supervisor/Guide	Clarity of idea, Presentation	10
Review – III	Final presentation, Demonstration of Project.	Internal	Supervisor/Guide	Technical demonstration, Presentation	10
Report Submission	Submission of final project report	Internal	Project Coordinator	Regularity, Originality, Systematic progress	15
Project Report	Evaluation of Project Report	External	Examiner(s)/ Reviewer(s)	Presentation, Handling Q&A	20
Viva – Voce	Final Presentation	External			30

The assessment method for the project work consists of in-semester and end semester evaluations as detailed below:

	Continuous Learning Assessment (50% weightage)					Final Evaluation (50% weightage)	
	Review - 0	Review – 1	Review – 2	Review – 3	Report Submission	Project Report	Viva-Voce*
Project Work / Internship	5%	10%	10%	10%	15%	20 %	30 %

*Student has to be present for the viva voce for assessment. Otherwise it will be treated as non-appearance for the examination with final grade as 'Ab'