

ACADEMIC CURRICULA
UNDERGRADUATE DEGREE PROGRAMME

**Bachelor of Science in
Computer Science
Three Years /**

**Bachelor of Science (Honours) in
Computer Science
Four Years**

**Learning Outcomes Based Curriculum Framework
(LOCF)**

Choice Based Flexible Credit System

**Academic Year
2023-2024**



SRM
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University u/s 3 of UGC Act, 1956)

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

2. Department Mission Statement	
Stmnt - 1	To provide a great platform to learn and practice technologies to meet the growing demands in the industries
Stmnt - 2	To be distinguished as an renowned department for learning, experimenting and continuing research
Stmnt - 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
Stmnt - 4	To make the learners recognize the need for engaging themselves in continuing professional development
Stmnt - 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. Program Specific Outcomes (PSO)	
PSO - 1	Graduates will acquire a comprehensive knowledge and sound understanding of fundamentals of IT.
PSO - 2	Graduates will develop practical, analytical and programming skills.
PSO - 3	Graduates will be prepared to acquire a range of general skills, to solve problems, to evaluate information, to develop software tools, to communicate with society effectively and learn independently.

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

6. 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.
	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
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

1. Programme Structure

1. Discipline Specific Core Courses (C) (20 Courses)							3. Generic Elective Courses (G) (9 Courses)						
Course Code	Course Title	Hours/ Week				C	Course Code	Course Title	Hours/ Week				C
		L	T	P	O				L	T	P	O	
USA23101J	Programming for Problem Solving	3	0	3	2	4	ULT23G01J	Tamil-I					
USA23102J	Digital Logic Fundamentals	3	0	3	2	4	ULH23G01J	Hindi-I	2	0	2	2	3
UMS23101T	Discrete Mathematical Structures	4	0	0	2	4	ULF23G01J	French-I					
USA23201J	Object Oriented Programming	3	0	3	2	4	ULT23G02J	Tamil-II					
USA23202J	Fundamentals of Data Structures and Algorithms	3	0	3	2	4	ULH23G02J	Hindi-II	2	0	2	2	3
UMS23202T	Mathematical Foundation	4	0	0	2	4	ULF23G02J	French-II					
USA23301J	Programming in Java	3	0	3	2	4	UCS23G01J	Office Automation Tool	3	0	2	2	4
USA23302J	Database Management System	3	0	3	2	4	UCS23G02J	HTML Programming	3	0	2	2	4
UMS23303T	Numerical Methods	4	0	0	2	4	UCS23G03J	Introduction to Data Science	3	0	2	2	4
UCS23401J	Enterprise Java Programming	3	0	3	2	4	UCS23G04J	Computer Vision Fundamentals	3	0	2	2	4
USA23402J	Operating Systems	3	0	3	2	4	UCS23G05J	R Programming	3	0	2	2	4
UMS23404T	Resource Management Techniques	4	0	0	2	4	UCS23G06J	Fundamentals of Computer Graphics	3	0	2	2	4
UCS23501J	Internet Programming	3	0	3	2	4	UCS23G07T	Software Project Management	4	0	0	2	4
UCS23502J	Design and Analysis of Algorithms	3	0	3	2	4	Total Learning Credits						34
USA23503T	Software Engineering	4	0	0	2	4	4. Skill Enhancement Courses(S) (5 Courses)						
UCS23601J	Python Programming	3	0	3	2	4	Course Code	Course Title	Hours/ Week				C
USA23602J	Computer Networks	3	0	3	2	4			L	T	P	O	
USA23603T	Research Methodology	4	0	0	2	4	UCD23S01L	Quantitative Aptitude and Logical Reasoning	0	0	2	2	1
USA23701J	Object Oriented Analysis and Design	3	0	3	2	4	UCD23S02T	Verbal Ability and Skill Development	2	0	0	2	2
UCS23801T	Distributed Systems	4	0	0	2	4	UCS23S03L	Advanced Excel for Data Analytics	0	0	2	2	1
Total Learning Credits						80	UCS23S04J	Content Management Software	1	0	2	2	2
2. Discipline Specific Elective Courses (D) (5 Courses)							UCS23S05J	Data Visualization Tool	1	0	1	2	1
Course Code	Course Title	Hours/ Week				C	Total Learning Credits						7
		L	T	P	O		5. Ability Enhancement Courses (AE) (4 Courses)						
UCS23D01J	Artificial Intelligence	3	0	2	2	4	Course Code	Course Title	Hours/ Week				C
UCS23D02J	Cloud Computing								L	T	P	O	
UCS23D03J	Service Oriented Architecture	3	0	2	2	4	ULE23AE1T	English	4	0	0	2	4
UCS23D04J	Machine Learning						ULT23AE1J	Applied Tamil – I					
UCS23D05J	Web development using NodeJS and Mongo	3	0	3	2	4	ULH23AE1J	Applied Hindi – I	1	0	2	2	2
UCS23D06J	Web development using AngularJS and Mongo						ULF23AE1J	French for Specific Purpose-I					
UCS23D07J	Cryptography and Network security	3	0	2	2	4	ULT23AE2J	Applied Tamil – II					
UCS23D08J	Multimedia Systems						ULH23AE2J	Applied Hindi – II	1	0	2	2	2
UCS23D09J	Multicore Architectures	3	0	2	2	4	ULF23AE2J	French for Specific Purpose-II					
UCS23D10J	Soft Computing						UES23AE1T	Environmental Studies	3	0	0	2	3
Total Learning Credits						20	Total Learning Credits						11

6.Value Addition Course (V) (4 Courses)						
Course Code	Course Title	Hours/ Week				C
		L	T	P	O	
UCD23V01T	Universal Human Values	2	0	0	2	2
UEN23V01L	Communication Skills	0	0	4	2	2
UCD23V02T	Industry Oriented Employ ability Skills for Science	2	0	0	2	2
UCD23V05T	Career Readiness and professional skills	2	0	0	2	2
Total Learning Credits						8
7.Internship/Apprenticeship / Project/ Community Outreach (IAPC) (6 Courses)						
Course Code	Course Title	Hours/ Week				C
		L	T	P	O	
UCS23P01L	Internship - I	0	0	0	0	1
UCS23P02L	Internship – II	0	0	0	0	1
UCS23P03L	Internship – III	0	0	0	0	2
UCS23P04L	Mini Project	0	0	4	2	2
UCS23P05L	Project Phase-I	0	0	8	2	4
UCS23P06L	Project Phase-II	0	0	12	2	6
Total Learning Credits						16

8.Mandatory Courses(M) (2 Courses)						
Course Code	Course Title	Hours/ Week				C
		L	T	P	O	
UNS23M01L	NSS	0	0	0	0	0
UNC23M01L	NCC					
UNO23M01L	NSO					
UYG23M01L	YOGA					
UMI23M01L	My India Project	0	0	0	0	0
Total Learning Credits						

As SRMIST strongly encourages the use of SWAYAM (Study Web of Active Learning by Learning by Young and Aspiring Minds) platform, the students are encouraged to choose at least one core/ elective course from SWAYAM on the recommendation of the faculty advisor and the credits will be transferred

Structure of UG Courses in Computer Science
Distribution of different Courses in each semester with their credits for B.Sc. Computer Science

Semester	Discipline Specific Core Courses (CC)	Discipline Specific Elective (DSE)	Ability Enhancement Courses (AEC)	Skill Enhancement Course (SEC) Value Addition Course (V)	Generic Elective (GEC)	Internship /Project	Total Credits
Semester I	CC-1 CC-2 CC-3 (12)	-	AEC-1 (4)	SEC-1 (1) VAC-1 (2)	GE-1 (Language-I) (3)	-	22
Semester II	CC-4 CC-5 CC-6 (12)	-	AEC-2 (3)	SEC-2 (2) VAC-2 (2)	GE-2 (Language-II) (3)		22
Semester III	CC-7 CC-8 CC-9 (12)		AEC-3 (2)	SEC-3 (1) VAC-3 (2)	GE-3 (Office) (4)	INT-1 (1)	22
Semester IV	CC-10 CC-11 CC-12 (12)		AEC-4 (2)	SEC-4 (2) VAC-4 (2)	GE-4 (HTML) (4)		22
Semester V	CC-13 CC-14 CC-15 (12)	DSE-1 (4)		SEC-5 (1)	GE-5 (DS) (4)	INT-2 (1)	22
Semester VI	CC-16 CC-17 CC-18 (12)	DSE-2 (4)			GE-6 (PYTHON) (4)	MINP ROJE CT (2)	22
Semester VII	CC-19 (4)	DSE-3 (4)			GE-7 (R) GE-8 (CG) (8)	INT-3 PP1 (6)	22
Semester VIII	CC-20 (4)	DSE-4 DSE-5 (8)			GE-9 (SPM) (4)	PP2 (6)	22
Total Credits	80	20	11	15	34	16	176

2. IMPLEMENTATION PLAN

Semester - I						
Course Code	Course Title	Hours/ Week			O	C
		L	T	P		
ULT23G01J	Tamil-I	2	0	2	2	3
ULH23G01J	Hindi-I					
ULF23G01J	French-I					
ULE23AE1T	English	4	0	0	2	4
USA23101J	Programming for Problem Solving	3	0	3	2	4
USA23102J	Digital Logic Fundamentals	3	0	3	2	4
UMS23101T	Discrete Mathematical Structures	4	0	0	2	4
UCD23S01L	Quantitative Aptitude and Logical Reasoning	0	0	2	2	1
UCD23V01T	Universal Human Values	2	0	0	2	2
	Total Hours	18	0	10		28
	Total Learning Credits					22

Semester - II						
Course Code	Course Title	Hours/ Week			O	C
		L	T	P		
ULT23G02J	Tamil-II	2	0	2	2	3
ULH23G02J	Hindi-II					
ULF23G02J	French-II					
UES23AE1T	Environmental Studies	3	0	0	2	3
USA23201J	Object Oriented Programming	3	0	3	2	4
USA23202J	Fundamentals of Data Structures and Algorithms	3	0	3	2	4
UMS23202T	Mathematical Foundation	4	0	0	2	4
UCD23S02T	Verbal Ability and Skill Development	2	0	0	2	2
UEN23V01L	Communication Skills	0	0	4	2	2
UNS23M01L	NSS	0	0	0	0	0
UNC23M01L	NCC					
UNO23M01L	NSO					
UYG23M01L	YOGA					
	Total Hours	17	0	12		29
	Total Learning Credits					22

Semester - III						
Course Code	Course Title	Hours/ Week			O	C
		L	T	P		
USA23301J	Programming in Java	3	0	3	2	4
USA23302J	Database Management System	3	0	3	2	4
UMS23303T	Numerical Methods	4	0	0	2	4
ULT23AE1J	Applied Tamil – I	1	0	2	2	2
ULH23AE1J	Applied Hindi – I					
ULF23AE1J	French for specific purpose-I					
UCS23G01J	Office Automation Tool	3	0	2	2	4
UCS23S03L	Advanced Excel for Data Analytics	0	0	2	2	1
UCS23P01L	Internship - I	0	0	0	0	1
UCD23V02T	Industry Oriented Employability Skills for Science	2	0	0	2	2
	Total Hours	16	0	12		28
	Total Learning Credits					22

Semester - IV						
Course Code	Course Title	Hours/ Week			O	C
		L	T	P		
UCS23401J	Enterprise Java Programming	3	0	3	2	4
USA23402J	Operating Systems	3	0	3	2	4
UMS23404T	Resource Management Techniques	4	0	0	2	4
ULT23AE2J	Applied Tamil – II	1	0	2	2	2
ULH23AE2J	Applied Hindi – II					
ULF23AE2J	French for specific purpose-II					
UCS23G02J	HTML Programming	3	0	2	2	4
UCS23S04J	Content Management Software	1	0	2	2	2
UCD23V05T	Career Readiness and Professional Skills	2	0	0	2	2
UMI23M01L	My India Project	0	0	0	0	0
	Total Hours	17	0	12		29
	Total Learning Credits					22

Semester - V						
Course Code	Course Title	Hours/ Week				C
		L	T	P	O	
UCS23501J	Internet Programming	3	0	3	2	4
UCS23502J	Design and Analysis of Algorithms	3	0	3	2	4
USA23503T	Software Engineering	4	0	0	2	4
UCS23D01J	Artificial Intelligence	3	0	2	2	4
UCS23D02J	Cloud Computing					
UCS23G03J	Introduction to Data Science	3	0	2	2	4
UCS23S05J	Data Visualization Tool	1	0	1	2	1
UCS23P02L	Internship - II	0	0	0	0	1
	Total Hours	17	0	11		28
	Total Learning Credits					22

Semester - VI						
Course Code	Course Title	Hours/ Week				C
		L	T	P	O	
UCS23601J	Python Programming	3	0	3	2	4
USA23602J	Computer Networks	3	0	3	2	4
USA23603T	Research Methodology	4	0	0	2	4
UCS23D03J	Service Oriented Architecture	3	0	2	2	4
UCS23D04J	Machine Learning					
UCS23G04J	Computer Vision Fundamentals	3	0	2	2	4
UCS23P04L	Mini Project	0	0	4	2	2
	Total Hours	16	0	14		30
	Total Learning Credits					22

Total Learning Credits

132

Semester - VII						
Course Code	Course Title	Hours/ Week			O	C
		L	T	P		
USA23701J	Object Oriented Analysis and Design	3	0	3	2	4
UCS23D05J	Web development using NodeJS and Mongo	3	0	3	2	4
UCS23D06J	Web development using AngularJS and Mongo					
UCS23G05J	R Programming	3	0	2	2	4
UCS23G06J	Fundamentals of Computer Graphics	3	0	2	2	4
UCS23P03L	Internship - III	0	0	0	0	2
UCS23P05L	Project Phase - I	0	0	8	2	4
	Total Hours	12	0	18		30
	Total Learning Credits					22

Semester – VIII						
Course Code	Course Title	Hours/ Week			O	C
		L	T	P		
UCS23801T	Distributed Systems	4	0	0	2	4
UCS23D07J	Cryptography and Network security	3	0	2	2	4
UCS23D08J	Multimedia Systems					
UCS23D09J	Multicore Architectures	3	0	2	2	4
UCS23D10J	Soft Computing					
UCS23G07T	Software Project Management	4	0	0	2	4
UCS23P06L	Project Phase-II	0	0	12	2	6
	Total Hours	14	0	16		30
	Total Learning Credits					22

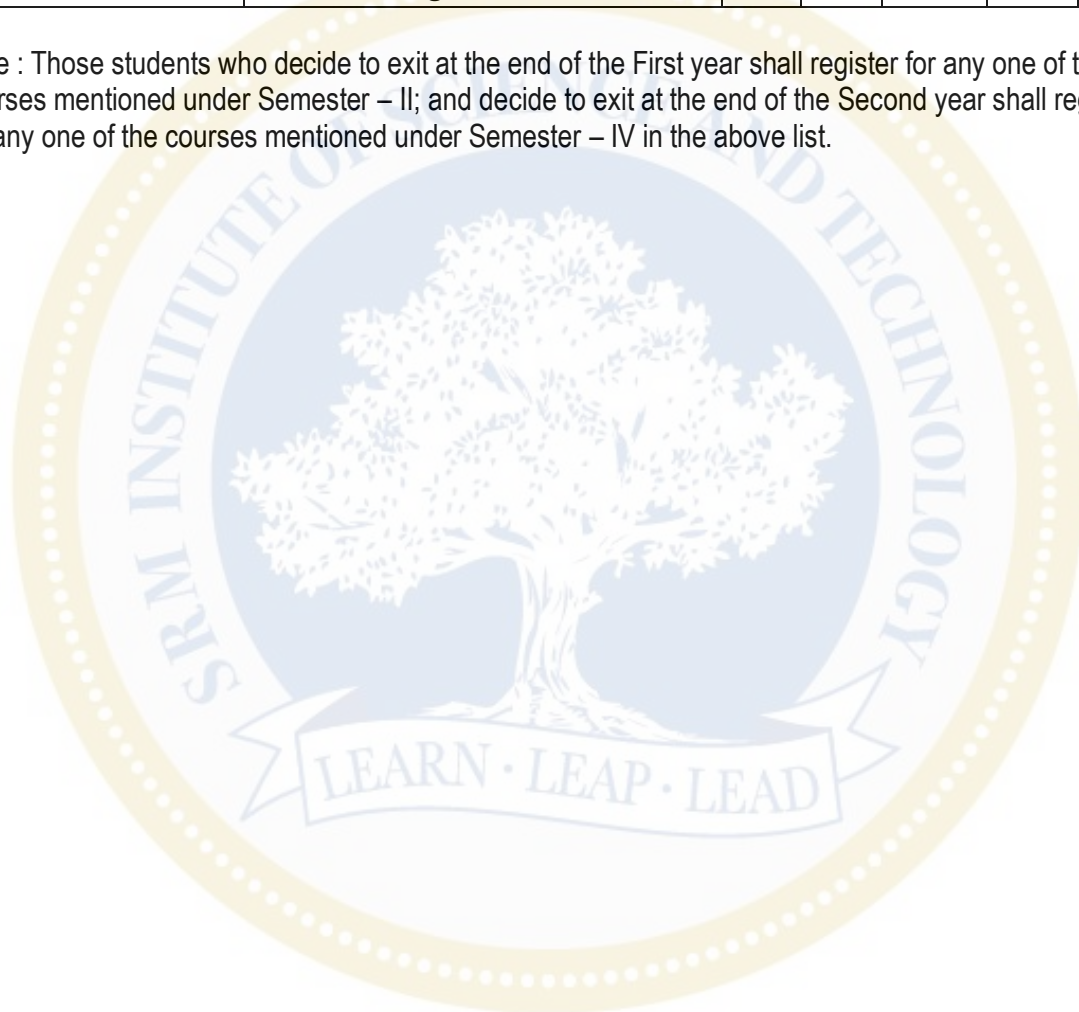
Total Learning Credits

176

Courses for earning Additional Credits

Course Code	Course Title	Hours/ Week				
		L	T	P	O	C
Semester – II						
UCD23P01L	Internship Report– I	0	0	8	0	4
UCD23P02L	Project Work – I					
UCD23P03L	Apprenticeship – I					
Semester – IV						
UCD23P04L	Internship Report– II	0	0	8	0	4
UCD23P05L	Project Work – II					
UCD23P06L	Apprenticeship – II					
	Total Learning Credits	0	0	8	0	4

Note : Those students who decide to exit at the end of the First year shall register for any one of the courses mentioned under Semester – II; and decide to exit at the end of the Second year shall register for any one of the courses mentioned under Semester – IV in the above list.



1. 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 Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
USA23101J	Programming for Problem Solving	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
USA23102J	Digital Logic Fundamentals	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UMS23101T	Discrete Mathematical Structures	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
USA23201J	Object Oriented Programming	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
USA23202J	Fundamentals of Data Structures and Algorithms	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UMS23202T	Mathematical Foundation	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
USA23301J	Programming in Java	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
USA23302J	Database Management System	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
UMS23303T	Numerical Methods	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
UCS23401J	Enterprise Java Programming	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
USA23402J	Operating Systems	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
UMS23404T	Resource Management Techniques	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
UCS23501J	Internet Programming	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
UCS23502J	Design and Analysis of Algorithms	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
USA23503T	Software Engineering	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
UCS23601J	Python Programming	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
USA23602J	Computer Networks	H	H	H	H	H	L	M	L	M	H	M	M	H	H	M
USA23603T	Research Methodology	H	H	H	H	H	L	M	L	M	H	M	M	H	H	M
USA23701J	Object Oriented Analysis and Design	H	H	H	H	H	L	M	L	M	H	M	M	H	H	M
UCS23801T	Distributed Systems	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23D01J	Artificial Intelligence	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23D02J	Cloud Computing	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23D03J	Service Oriented Architecture	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23D04J	Machine Learning	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23D05J	Web development using NodeJS and Mongo	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23D06J	Web development using AngularJS and Mongo	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23D07J	Cryptography and Network security	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23D08J	Multimedia Systems	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
UCS23D09J	Multicore Architectures	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
UCS23D10J	Soft Computing	H	H	H	H	H	M	H	M	M	M	H	H	H	M	M
ULT23G01J	Tamil-I	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULH23G01J	Hindi-I	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULF23G01J	French-I	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULT23G02J	Tamil-II	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULH23G02J	Hindi-II	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULF23G02J	French-II	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23G01J	Office Automation Tool	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23G02J	HTML Programming	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23G03J	Introduction to Data Science	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23G04J	Computer Vision Fundamentals	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23G05J	R Programming	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H

1. 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 Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
UCS23G06J	Fundamentals of Computer Graphics	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23G07T	Software Project Management	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCD23S01L	Quantitative Aptitude and Logical Reasoning	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCD23S02T	Verbal Ability and Skill Development	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23S03L	Advanced Excel for Data Analytics	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23S04J	Content Management Software	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23S05J	Data Visualization Tool	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULE23AE1T	English	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULT23AE1J	Applied Tamil – I	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULH23AE1J	Applied Hindi – I	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULF23AE1J	French for specific purpose-I	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULT23AE2J	Applied Tamil – II	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULH23AE2J	Applied Hindi – II	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
ULF23AE2J	French for specific purpose-II	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UES23AE1T	Environmental Studies	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCD23V01T	Universal Human Values	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UEN23V01L	Communication Skills	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCD23V02T	Industry Oriented Employability Skills for Science	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCD23V05T	Career Readiness and Professional Skills	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23P01L	Internship-I	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23P02L	Internship- II	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23P03L	Internship-III	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23P04L	Mini Project	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23P05L	Project Phase-I	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UCS23P06L	Project Phase-II	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UNS23M01L	NSS	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UNC23M01L	NCC	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UNO23M01L	NSO	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UYG23M01L	YOGA	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
UMI23M01 L	My India Project	H	H	H	H	H	L	M	L	M	M	H	H	M	H	H
	Program Average	H	H	M	H	M	L	L	L	M	M	M	H	M	M	M

SEMESTER –I

Course Code	ULT23G01J	Course Name	Tamil - I	Course Category	G	Generic Elective Course	L	T	P	O	C
							2	0	2	2	3

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Tamil	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:	மரபிலிருந்துமாற்றம்பெற்றபுதுக்கவிதைமரபின்சிந்தனைகளைஅறியச்செய்தல்
CLR-2:	புதுக்கவிதையின்வழிமனிதவாழ்வியல்விழுமியங்களைத்தெரியச்செய்தல்
CLR-3:	சிறுநிலக்கியங்கள், காப்பியங்கள்கற்பிக்கும்தமிழ்ச்சமூகத்தின்வாழ்வியலைஅறியச்செய்தல்
CLR-4:	நவீனதமிழ்இலக்கியவளர்ச்சிவரலாற்றைப்புரியச்செய்தல்
CLR-5:	மொழிப்பயிற்சிவழிமொழியின்பல்வேறுநுட்பங்களைத்தெரியச்செய்தல்

1	2	3
Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
2	75	60
2	80	70
2	70	65
2	70	70
2	80	70

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	PSO -1	PSO -2	PSO-3	
H	L	H	M	H	H	L	M	H	M	L	H	-	-	-
H	M	H	L	M	H	L	H	M	L	H	H	-	-	-
H	L	H	M	H	H	M	H	L	H	M	H	-	-	-
H	M	H	L	H	M	M	H	H	L	H	H	-	-	-
H	M	H	H	M	H	L	M	H	L	H	H	-	-	-

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:
CLO-1:	புதுக்கவிதைஉருவாக்கித்தந்தபுதியசிந்தனைக்களங்களைஅறிந்துகொள்ளுதல்
LLO-2:	நவீனகவிதைகள்வழிமாற்றம்பெற்றுவரும்மானுடவிழுமியங்களைத்தெரிந்துகொள்ளுதல்
CLO-3:	தமிழ்ச்சமூகத்தின்இடைக்காலவாழ்வியல்முறைகளைஉணர்ந்துகொள்ளுதல்
CLO-4:	நவீனஇலக்கியவரலாறுவழிதமிழ்க்கல்விவரலாறு, சமூகவரலாறுபெற்றவளர்ச்சிநிலைகளைத்தெரிந்துகொள்ளுதல்
CLO-5:	மொழியின்நுட்பங்களைஅறிந்துமொழிஆளுமையோடுசெயல்படஅறிந்துகொள்ளுதல்

Duration (hour)	12	12	12	12	12
S-1	SLO-1 தமிழ்இலக்கியத்தின்வளர்ச்சிப்போக்குகள்	நவீனகவிதைதோற்றம்	தமிழரின்வீரமரபு	சிறுநிலக்கியத்தோற்றம்	தமிழ்உரைநடைமரபில்உ.வே.சா.
	SLO-2 இலக்கியஉத்திகள்	நவீனகவிதைவரலாறு	போர்விழுமியங்கள்	சிறுநிலக்கியவகைமை	ராஜவைத்தியம்
S-2	SLO-1 தமிழ்க்கவிதைமரபு	நவீனகவிதைசெல்நெறிகள்	பரணிஅறிமுகம்	சிறுநிலக்கியங்கள்	வைத்தியர்களின்சிறப்பு
	SLO-2 காலந்தோறும்கவிதையின்கரு	செல்நெறிகளில்கோட்பாடுகள்	பரணிஇலக்கியங்கள்	முதன்மைச்சிறுநிலக்கியங்கள் -	கழனியூரன் - அறிமுகம்
S-3	SLO-1 காலந்தோறும்கவிதையின்கட்டமைப்பு	கவிதைமொழி	கவிங்கத்துப்பரணி 477,490	பிள்ளைத்தமிழ் -உலா - தூது	சிறுதெய்வவழிபாடு
	SLO-2 தற்காலஇலக்கியம்	நவீனகவிஆளுமைகள்	தலைவனின்வீரம்	புதுக்கவிதையில்சமூகம்	பொன்காத்தஜயனார்
S-4	SLO-1 புதுக்கவிதைஉருவாக்கம்	பெண்கவிஞர்கள்	தமிழ்இலக்கியமரபில்தூது	புதுக்கவிதையும்இதழ்களும்	விருந்து - கள்ளர்செயல்கள்

	SLO-2	புதுக்கவிதைவளர்ச்சிநெறிகள்	கவிதையில்நாட்டுப்புறவடிவம்	தாதுஇலக்கியங்கள்	மணிக்கொடிஇதழ்	பிழைநீக்கிஎழுதுதல்
S-5	SLO-1	பாரதியார் - புதுக்கவிதையின்அடையாளம்	இளம்பிறை - அம்மா	தமிழ்விடுதாது (184 - 186)	எழுத்துஇதழ்	எழுத்துப்பிழை
	SLO-2	பாரதியார்பன்முகஆளுமைத்திறன்	பெண்களின்கல்விநிலை	தமிழின்பெருமை	வானம்பாடிஇதழ்	தொடர்பிழை
S-6	SLO-1	பாரததேசம்	பெண்அடக்குமுறை	செய்யுள்மரபில்கலம்பகம்	சிறுகதைதோற்றம்	உயர்திணை, அஃறிணை
	SLO-2	பாரததேசத்தின்வளம்	ப. கல்பனா - கீரல்விழுந்தமாலைக்காலங்கள்	கலம்பகஇலக்கியங்கள்	சிறுகதைவளர்ச்சி	பிறமொழிச்சொற்கள்வரலாறு
S-7	SLO-1	வெள்ளிப்பனிமலையின்மீதுலவ்வோம்...	ஆண்பெண்சமத்துவம்	நந்திக்கலம்பகம்-வானுறுமதியை (110)	சிறுகதை - வரலாறு	பிறமொழிச்சொற்களைநீக்கிஎழுதுதல்
	SLO-2	ஆம்நூற்றாண்டுக்கவிதைமரபில்பாரதிதாசன்	விளிம்புநிலைவாழ்வியல்	கையறுநிலை	சிறுகதைஆசிரியர்கள்	ஷ. ஜ. ஸ. ஹமாற்றொலிகள்
S-8	SLO-1	பாரதிதாசன் - அழகின்சிரிப்பு	திருநங்கைகுணவதி - சமூகப்பார்வை	குறவஞ்சிஅறிமுகம்	இதழ்களும்சிறுகதையும்	தமிழ்இலக்கணநுட்பங்கள்
	SLO-2	ஆல் - ஆயிரம்கிளைகள்கொண்டஅடிமரம்	திருநற்களும்சாதனைகளும்	குறவஞ்சிஇலக்கியங்கள்	புதினம்தோற்றம்	இலக்கணமும்பயன்பாடும்
S-9	SLO-1	இயற்கையின்அழகியல்	புலம்பெயர்வாழ்வியல்	குற்றாலக்குறவஞ்சி - ஆடுமரவீனுமணி (3)	தொடக்கக்காலப்புதினங்கள்	தமிழில்சொல்வகைகள்
	SLO-2	வானம்பாடியில்மு.மேத்தா	ஸர்மிளாஸெய்யித் - புராதனஊர்	மலையும்வாழ்வும்	புதினம்வளர்ச்சி	சொல்லும்பயன்பாடும்
S-10	SLO-1	மு.மேத்தா - கவிதையின்தனித்தன்மைகள்	புலம்பெயர்வாழ்வின்வலியும்நம்பிக்கையும்	காப்பியஇலக்கணம்	புதினத்தின்வகைமை	பெயர்ச்சொற்கள்
	SLO-2	மனிதனைத்தேடி - கவிதை	காலந்தோறும்கவிதைவடிவில்மாற்றங்கள்	காப்பியவகைமைகள்	புதினஆசிரியர்கள்	பெயர்ச்சொற்கள்அறிதல்
S-11	SLO-1	மனிதநேயம்	ஹைக்கூ, லிமரைக்கூ, சென்ரியூ - தேர்ந்தெடுத்தகவிதைகள்	சிலப்பதிகாரம் - அறிமுகம்	தமிழ்இலக்கியத்தில்உரைநடைக்கூறுகள்	வினைச்சொற்கள்
	SLO-2	தமிழ்க்கவிதையில்சுற்றுச்சூழலியல்	ஹைக்கூ - மு.முருகேஷ்	கட்டுரைக்காதை	உரைநடையின்தோற்றம்	வினைச்சொற்கள்அறிதல்
S-12	SLO-1	பழனிபாரதியின்காடு	லிமரைக்கூ - ஈரோடுதமிழன்பன்	ஊழ்வினை	தமிழில்உரைநடை	தமிழில்பெயரடை, வினையடை
	SLO-2	இயற்கையும்சமூகசமத்துவவாழ்வியலும்	சென்ரியூ - மாமதயானை	கோவலனின்முற்பிறப்புரலாறு	உரைநடைவளர்த்தஅறிஞர்கள்	பெயரடை, வினையடைஅறிதல்

Learning Resources	1. முல்லைக்காடு, தொகுப்பும்பதிப்பும் - தமிழ்த்துறை ஆசிரியர்கள், எஸ்.ஆர்.எம். அறிவியல்மற்றும் தொழில்நுட்பக்கல்விநிறுவனம், காட்டாங்குளத்தூர், 603203, 2023
	2. வல்லிக்கண்ணன், புதுக்கவிதைதோற்றமும் வளர்ச்சியும், ஆழிபதிப்பகம், சென்னை, 2018
	3. கா. சிவத்தம்பி, தமிழில்சிறுகதைதோற்றமும் வளர்ச்சியும், என்.சி.பி.எச்., சென்னை, 2013
	4. தமிழ்இணையக்கல்விக்கழகம் - http://www.tamilvu.org/
	5. மதுரைதமிழ்இலக்கியமின் தொகுப்புத்திட்டம் - https://www.projectmadurai.org/

	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	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
	Understand										
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
	Analyze										
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	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	Expert from Higher Technical Institutions	Internal Experts
1. Dr. P.R.Subramanian, Director, Mozhi Trust, Thiruvanniyur, Chennai – 600 041.	1. Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language & Literature, Pondicherry University, Pondicherry	1. Dr. B.Jaiganesh, Associate Professor & Head, Dept. of Tamil, FSH, SRMIST, KTR.
		2. Dr. R. Ravi, Assistant Professor and Head, Dept. of Tamil, FSH, SRMIST, VDP.
		3. Mr. G. Ganesh, Assistant Professor, Dept. of Tamil, FSH, SRMIST, RMP.
		4. Dr. T.R.Hebzibah beulah Suganthi, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.
		5. Dr. S.Saraswathy, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.

Course Code	ULH23G01J	Course Name	HINDI-I	Course Category	G	Generic Elective Course	L	T	P	O	C
							2	0	2	2	3

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	HINDI	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 :	To Communicate in Hindi without any inhibition	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To appreciate the Hindi Language in its various forms																		
CLR-3 :	To analyze the different writing styles																		
CLR-4 :	To display moral and social values in the field of social Responsibility and Integrity																		
CLR-5 :	To be willing listeners and Translators-where need be																		
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	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	PSO -1	PSO -2	PSO-3
CLO-1 :	To Understand the Philosophy of life and living through Stories	2	75	80	H	H	H	M	L	H	L	M	L	L	H	M	-	-	-
CLO-2 :	To Examine Travelogue writing and Sketch	2	80	90	H	H	H	M	L	H	H	M	L	L	H	M	-	-	-
CLO-3 :	To Identify Irony and essay based writing	2	75	95	H	H	M	L	H	H	M	H	M	M	H	H	-	-	-
CLO-4 :	Evaluate the various social issues depicted in the prose	2	80	90	H	H	L	H	M	H	L	H	H	M	H	H	-	-	-
CLO-5 :	To Understand the basic and fundamental principal of Translation	2	85	90	M	H	M	H	L	H	H	L	H	M	H	H	-	-	-

Duration (hour)	12	12	12	12	12
S-1	SLO-1 Kahani	Rekhachitra & Yatravitrant	Nibandh	Natak	Anuvad& Paribhashik Shabdavali
	SLO-2 Avdharna	Avdharna	Nibandh Ki Avdharna	Avdharna	Arth
S-2	SLO-1 Swarup	Swaroop	Swarup	Natak Ka Swarup	Paribhasha
	SLO-2 Paribhasha	Bhumika	Paribhasha	Paribhasha	Swarup
S-3	SLO-1 Kahani Ke Tatva	Mahatva	Mahatva	Tatva	Prakar
	SLO-2 Kahani Ka Mahatva	Uddeshya	Uddeshya	Prakar	Mahatva
S-4	SLO-1 Pariksha- Premchand	Gisha- Rekhachitra	Kutaj- Nibandh Hajari Prashad Divedi	Uddeshya	Uddeshya
	SLO-2 Kahani Ka Parichay	Lekhika Parichay	Lekhika Parichay	Rangmanch Ka Parichay	Anuvad Ka Prayojan
S-5	SLO-1 Visleshan	Path Ka Vishleshan	Path Ka Mahatva	Natak Ka Mahatva	Anuvad Ka Prayog
	SLO-2 Emandari Ka Mahatva	Guru Shishya Ka Sambandh	Viprit Parishthitiyon Me Jeevan Ki Ash	Prayojan	Shrot Bhasha Ka Gyan
S-6	SLO-1 Honhari Ka Parichay	Guru Ke Prati Smarpan Bhavana	Manav Ki Akankshayen	Andher Nagri-(Natak) Bhartendu Harishchand	Lakshya Bhasha Ka Gyan
	SLO-2 Uddeshya	Path Ka Mahatva	Shangharshil Jeevan	Lekhik Parichay	Anuvad Ka Dayitva
S-7	SLO-1 Malbe Ka Malik- Mohan Rakesh	Thele Par Himalay (Yatravitrant)	Sangharsh Ka Parinam	Natak Ka Visleshan	Anuvad Ka Abhyash
	SLO-2 Lekhik Parichay	Lekhik Parichay	Bholaram Ka Jeev-(Vyangya) Harishankar Parshai	Natak Abhinay	Angreji Se Hindi
S-8	SLO-1 Batware Ka Yatharth Varnan	Yatravitrant Ka Mahatva	Vyangya Ki Avadharna	Laich Ka Dushparinam	Hindi Se Angreji
	SLO-2 Tatkalin Parishthiti Ka Varnan	Yatra Ka Yatharth Chitran	Mahatva	Shishya Ki Agyanta	Anuvad Priyojna Karya
S-9	SLO-1 Apni Mitti Se Lagav	Path Ka Visleshan	Lekhik Parichay	Guru Shishya Sambandh	Punrikshan
	SLO-2 Rajnitik Vidwesh Ka Parinam	Himalay Ka Varnana	Path Ka Vihleshan	Hashya Vyangy Se Avagat Karana	Vividh Prayog

S-10	SLO-1	Propkar Ki Bhavana	Himalay Ka Lok Jeevan	Madhyavargi Parivar Ki Sthiti	Durdrishtihin	Paribhashik Shabdavali
	SLO-2	Kahani Path	Lok Samasya	Sarkari Tantra Ka Khokhla Rup	Mahattakankshi Ka Dushparinam	Ati Mahtvapurn Shabd
S-11	SLO-1	Kahani Ka Vishleshan	Uddeshya	Pauranik Katha Ka Chitran	Guru Ki Avagya Ka Dushparinam	Takaniki Shabdavali Ka Mhatva
	SLO-2	Prasho Ki Charcha	Prashna Abhyash	Sanvedanshil Bhavana	Tatkalin Samajik Vyavastha Ki Charcha	Hindi Se Angrezi Shabd
S-12	SLO-1	Prashn Abhyash	Path Pricharcha	Paricharcha	Paricharcha	Angrezi Se Hindi Shabd
	SLO-2	Kahani Ka Uddeshya	Mahatvapurn Bibduon Ki Charcha	Prashana Abhyash	Prashnabhyash	Shabdavali Ki Avshyakta

Learning Resources	Edited Book: “SAMANYA HINDI”, SRIJONLOK PUBLICATION, 2023, New Delhi.					
	1.	KABIR – HAZARI PRASAD DWEDI				
	2.	SURDAS – RAM CHANDRA SHUKL				
	3.	BHAKTI ANDOLAN AUR SURDAS KA KAVYA – MANAGER PANDEY				
	4.	BIHARI – VISHVNATH PRASAD MISHR				
	5.	Aadhunik Vigyapan aur Jansampark – Taresh Bhatia				

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	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
	Understand										
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
	Analyze										
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	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
Shri. Santosh Kumar Editor : Srijanlok Magazine Place: Vashishth Nagar, Ara – 802301	1. Prof.(Dr.) S.Narayan Raju, Head, Department of Hindi,CUTN, Tamilnadu	1. Dr.S Preeti. Associate Professor & Head, SRMIST
		2. Dr. Md.S. Islam Assistant Professor, SRMIST
		3.Dr. S. Razia Begum, Assistant Professor, SRM IST
		4. Dr.Nisha Murlidharan Assistant Professor, VDP,SRM IST

Course Code	ULF23G01J	Course Name	French-I		Course Category	G	Generic Elective Course										L	T	P	O	C		
																	2	0	2	2	3		
Pre-requisite Courses		Nil		Co-requisite Courses	Nil		Progressive Courses	Nil															
Course Offering Department			French			Data Book / Codes/Standards			Nil														
Course Learning Rationale (CLR):		The purpose of learning this course is to:				Learning			Program Learning Outcomes (PLO)														
CLR-1 :	Extend and expand their savoir-faire through the acquisition of current scenario					1 Level of Thinking (Bloom)	2 Expected Proficiency (%)	3 Expected Attainment (%)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French								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	PSO -1	PSO -2	PSO-3
CLR-3 :	Make them learn the basic rules of French Grammar.								H	M	H	H	M	H	H	L	M	M	H	L	-	-	-
CLR-4 :	Develop strategies of comprehension of texts of different origin								M	H	L	H	H	M	H	M	L	L	H	M	-	-	-
CLR-5 :	Strengthen the language of the students both in oral and written								H	H	L	M	H	M	L	H	M	M	H	H	M	-	-
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:				2	75	80	H	M	H	H	M	H	L	M	M	H	L	-	-	-	
CLO-1 :	To acquire knowledge about French language					2	80	90	M	H	L	H	H	M	H	M	L	L	H	M	-	-	-
CLO-2 :	To strengthen the knowledge on concept, culture, civilization and translation of French					2	85	75	H	H	L	M	H	M	L	H	M	M	H	H	-	-	-
CLO-3 :	To develop content using the features in French language					2	75	80	H	L	M	H	M	H	H	M	L	H	M	L	-	-	-
CLO-4 :	To interpret the French language into other language					2	80	75	M	H	H	L	M	M	H	H	M	L	H	M	-	-	-
CLO-5 :	To improve the communication, intercultural elements in French language					2																	
Duration (hour)		12		12		12		12		12		12											
S-1	SLO-1	Contacts	Les verbes du premier groupe		Qu'est-ce qu'ils font ?		Portraits		Les verbes du deuxième groupe –														
	SLO-2	Emma la championne	Les exemples		Les exemples		Un casting		Les exemples														
S-2	SLO-1	Les nombres à partir de 31	La liaison		Où est mon sac		Les exemples		Les pronoms personnels toniques														
	SLO-2	Les activités	Les activités		Les exemples		Les activités		Les exemples														
S-3	SLO-1	Les pays	Entrer en contact		Quelques objets		Le Petit Spirou		Les verbes faire et lire														
	SLO-2	les nationalités	Les activités		Les exemples		Les activités		Les exemples														
S-4	SLO-1	Les jours de la semaine	Présenter et se présenter		Les professions		L'aspect physique		Les Sons														
	SLO-2	Les jours	Les activités		La fiche d'identité		Les activités		Les exemples														
S-5	SLO-1	Les mois de l'année	Demander et dire la date		La formation du féminin (2)		Le caractère		Décrire l'aspect physique														
	SLO-2	Les activités	Les activités		La phrase interrogative partielle		Les exemples		Décrire le caractère														
S-6	SLO-1	Les animaux domestiques	une rencontre.		Qu'est-ce que c'est ?		les états d'âme		Demander et dire l'heure														
	SLO-2	Les activités	Les activités		Qui est-ce ?		Les activités		Les exemples														

S-7	SLO-1	La famille (1)	Contacts	C'est / Il est (1)	Les prépositions de lieu (1)	Elle est comment ?
	SLO-2	Les activités	Les activités	Les exemples	Les exemples	Les exemples
S-8	SLO-1	La formation du féminin (1)	Emma la Championne	La phrase négative (1)	La famille (2)	Portraits
	SLO-2	Les activités	Les activités	Les exemples	Les activités	Les exemples
S-9	SLO-1	Les adjectifs possessifs	Mots et expressions	Les verbes aller et venir	La formation du féminin	Mots et Expressions
	SLO-2	Les exemples	Les activités	L'élision	Les activités	Les activités
S-10	SLO-1	La phrase interrogative	Grammaire -	Les formules de politesse	La formation du pluriel (2)	Grammaire.
	SLO-2	Les exemples	Les exemples	Demander des informations personnelles	Les activités	Les exemples
S-11	SLO-1	Les activités	Communication	C'est qui ?	Il y a	Les activités
	SLO-2	Les nombres	Les activités	Qu'est-ce qu'ils font ?	Les activités	Communication
S-12	SLO-1	intonation et est-ce que	Les verbes du ER –groupe	Mots et Expressions	Les articles contractés	Les activités
	SLO-2	Les exemples	Les exemples	Grammaire – Communication	Les exemples	Les exemples

Learning Resources	Theory:	
	1.	“ Nouvelle Génération-AI” Méthode de français, Marie-Noëlle COCTON, P.DAUDA, L.GIACHINO, C.BARACCO, Les éditions Didier, Paris, 2018.
	2.	Cahier d'activités avec deux discs compacts.
	3.	https://www.fluentu.com/blog/french/french-grammar
	4.	https://www.elearningfrench.com/learn-french-grammar-online-free.html
	5.	https://www.lawlessfrench.com/grammar
	6.	https://blog.gymglish.com/2022/12/15/basic-french-grammar

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	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
	Understand										
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
	Analyze										
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	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	Expert from Higher Technical Institutions	Internal Experts
1. Mr. Kavaskar Danasegarane Process Expert Maersk Global Service Center Pvt. Ltd	1. Dr. C.Thirumurugan Professor, Department of French, Pondicherry University	1. Mr. Kumaravel K. Assistant Professor & Head, SRMIST, KTR
2.Mr. Sharath Raam Prasad Character Designer, Animaker Company Pvt.		2. Mrs. Abigail, Assistant Professor, SRMIST, VDP

Course Code	ULE23AE1T	Course Name	English	Course Category	AE	Ability Enhancement course	L	T	P	O	C
							4	0	0	2	4

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Department of English, FSH, SRMIST			Data Book / Codes/Standards	Nil

Course Learning Rationale (CLR):	The purpose of learning this course is to:
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CLR-1 :	Develop an understanding and sensibility of human consciousness through gender inclusive curriculum
CLR-2 :	Enhance the abilities of deeper understanding to stay with integrity with the fellow human beings
CLR-3 :	Develop the overall language competency of the learner
CLR-4 :	Develop proficient language skills
CLR-5 :	Learn to express the thoughts clearly, develop logical arguments and enhance the overall communication skills.

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:
CLO-1 :	Analyze different literary texts to identify the representation of issues related to gender, and class
CLO-2 :	Apply critical thinking skills to analyze and respond to academic texts.
CLO-3 :	Critically evaluate and discuss contemporary issues through online articles.
CLO-4 :	Refine their general writing skills
CLO-5 :	Improve their language application skills

Learning

1	2	3
Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
2	75	60
2	80	70
2	70	65
2	70	70
2	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	PSO -1	PSO -2	PSO-3
H	M	M	L	-	M	-	M	H	L	H	L	-	-	-
M	H	L	-	-	-	-	M	M	H	H	M	-	-	-
M	M	M	-	L	L	-	H	M	H	H	L	-	-	-
H	M	L	-	M	H	-	-	-	-	H	L	-	-	-
H	H	-	M	-	M	-	L	L	M	H	M	-	-	-

Duration (hour)	12	12	12	12	12
S-1	SLO-1	Introduction to the poetry and the poet- Sukirtharani	Introduction to Short stories. Introducing the short story writer Katherine Mansfield.	Introduction to Creative Writing. Explaining the elements of creative writing.	Building the discourse- The significance of conversation and the key elements of discourse are the points of discussion in this class hour.
	SLO- 2	Reading and recitation of the poem -Debt	Reading the story- The Doll's House	Stand-up comedy show -translate the audio content in English. (any regional language)	Art of conversation in digital and verbal discourse- Lee Mockobe's A Powerful Poem of what it means to be a Transgender. TEDX TALK- POEM RECITATION
S-2	SLO-1	Analysis and Critical interpretation of the poem.	Explaining the story through depiction of characters and representation of injustices.	Students- groups -Students belonging to States other than Tamilnadu	Reflecting on the style and the tone of the poem.
	SLO- 2	Introduction to the poet Kalki Subramaniam.	Analysis and critical interpretation of the short story Doll's House.	Practice the writing activity -creative ways of engaging in translation.	Practicing conversation
S-3	SLO-1	Reading and recitation of the poem	Introduction to the writer Haruki	Correction of errors- attempting to	Introducing Content writing in Social Media- the

S-4		Phallus I cut.	Murakami.	translate.	importance of content writing.	the various works.
	SLO- 2	Analysis and Critical interpretation of the poem.	Reading the Confessions of a Shinawaga monkey.	Identifying equivalent terms to certain regional words - learn the art of translation.	.BLOG WRITING - Subtleties Of Workplace Inclusion: Mental Health And Queer Community- Salik Ansari.	Reviewing -recorded -posted in the social media pages of SRMIST
S-5	SLO-1	Introduction to the poet Imtiaz Dharker	Discussion and analysis of the Confessions of a Shinawaga monkey.	Introducing famous art works and the contexts of creation. Salvador Dali- The Face of War Pablo Picasso- Guernica Edward Munch- The Scream Pieter Bruegel- The Tower of Babel	writer's conversation with the readers - the blog in other blog articles..	Thoughtful conversation with your team member post the same in the official social media page of SRMIST.
	SLO- 2	Reading and reciting the poem Purdah 1	Introduction to Crystal Wilkinson	creative and/ or thoughtful writing - contemporary themes of modern day relevance	Practice blog writing	Choosing the team based on the abilities that are comfortable to match the peer members
S-6	SLO-1	Analysis and Critical interpretation of the poem- Purdah 1	Reading Endangered Species: Case 47401.	Students -writing abilities- building stories- a visual treat of variety of pictures.	Apprehending Life by reading the texts of influence- Chimamanda Ngozi Adiche's Notes on Grief- A BRIEF NOTE, We should all be Feminists- An Essay.	Choosing the topics for a thoughtful conversation
	SLO- 2	Reading and reciting the poem Purdah 2	Discussion and analysis of Endangered Species: Case 47401.	Elements of writing	Discussion- essay by the author -subjective depiction of life. Understand -subjective opinions -perspectives	Planning and preparation for the script of conversation with a team member
S-7 – S-8	SLO-1	Analysis and Critical interpretation of the poem- Purdah 2	Introduction to C.S Lakshmi also known as Ambai.	Incorporate the elements of story in story writing.	Class discussion	Drafting , editing and revising the script of conversation and enacting the conversation with the team members
	SLO- 2	Introduction to the poet Arundathi Subramanian	Reading the short story- In a Forest, A Deer.	Practice -write stories -pictures given or shown .	Practising the task multiple times with all the students in the classroom.	Enactment -proper rehearsal -final performance -conversation- whole performance should be recorded.
S-9	SLO-1	Reading and reciting the poem- Home	Discussion and Analysis of In a Forest, A Deer.	A writing task to write a script is introduced in the classroom.	Interposing opinions in famous interviews-	The recording should be posted in the official media page and social handles of SRMIST.
	SLO- 2	Analysis and Critical interpretation of the poem- Home	Retrospecting the writing styles of the authors- Katherine Mansfield, Haruki Murakami, Crystal Wilkinson and Ambai.	creative scripts inspiring from the dialogues of their favourite films by changing the scenario to their own wish according to their own whims and fancies.	Interposing opinions in famous interviews- FII Interviews: Tasveer Co-Founder And Filmmaker Rita Meher On The Seattle Legislation, Minority Rights And The Fight Against Oppression- INTERVIEW	work for this social post - reflect on their experience of learning communicative English course and the testimonial has to be recorded and posted in the social media pages of SRMIST..
S-10	SLO-1	Recollection of study of the writing styles and intentions of the poets prescribed in the syllabus.	Revision- The Doll's House	Creative writing -writing news reports. recreated with new characters, places, scenes, incidents.	Students -enact as interviewer and interviewee and practice building the discourse.	Involving the students for the project work. Introducing what is project work and inculcating the interest -Giving instructions to do the project works -
	SLO- 2	Revision of the poems Debt and Phallus I cut	Revision- Confessions of a Shinawaga Monkey	Watch debate shows - summarising the arguments Enhance -descriptive writing skill.	Certain role plays like celebrity personalities, political personalities -conduct the interview and be the interviewer and interviewee.	Discussion of ideas and generation of creative ideas
S 11 - S 12	SLO-1	Revision of the poems Purdah 1 and 2	Revision- Endangered Species: Case 47401	Practice the improvement of writing skill.	The art of conversation and the ability to build a discourse	1. Assignment on any piece of creative writing (OR) 2. Presentation- Mastering the art of Public Speaking. (OR)

						3. Project on compiling the real life influential events on gender inclusive issues and a presentation of the same. Interview Scripting /Blog writing.
	SLO- 2	Revision of the poem Hiome.	Revision- In a Forest, A Deer.	Repetitive practice and continuous assessment -writing skills-master the writing skill.	The evaluation and assesment of the conversation - constructive feedbacks to the students.	Students can opt any of the project from the given choice.

Learning Resources	1. Horizon- English Text Book – Compiled and Edited by the faculty of English Departement, FSH, SRMIST, 2020 2. English Grammar in Use by Raymond Murphy 3. Raymond Murphy, Intermediate English Grammar, Cambridge University Press, 2007 4. R.P. Bhatnagar, English for Competitive Examinations, Trinity Press, 3rd Edition,2016 5. http://www.apitudetests.org/verbal-reasoning-test 6. https://www.assessmentday.co.uk/apitudetests_verbal.htm
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Level	Blooms 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	Practical	Theory	Practical	Theory	Practical	Theory	Practical	Theory	Practical
1	Remember	30%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
3	Evaluate	30 %	-	30%	-	30%	-	30 %	-	30%	-
	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
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Course Code	USA23101J	Course Name	PROGRAMMING FOR PROBLEM SOLVING	Course Category	C	Discipline Specific Core Courses															L	T	P	O	C
						3	0	3	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 :	Introduction to programming language.					1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
CLR-2 :	Understanding basic element of programming language.																								
CLR-3 :	Use and implement data structures like arrays and structures to obtain solutions.																								
CLR-4 :	Customizing functions and procedures to encourage reusability																								
CLR-5 :	Establish interaction between stored files and the application code																								
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:					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	
CLO-1 :	Evaluation of programming language					2	85	80	M	H	H	M	M	M	-	M	L	L	-	H	-	M	M		
CLO-2 :	Choose operators, control structures to solve the problem optimally					3	85	80	M	L	L	M	M	M	-	H	M	H	-	H	-	M	M		
CLO-3 :	Analyze the problem thoroughly and choose the prebuilt functions/ customize functions to solve the problem					3	85	80	M	M	M	M	M	M	-	H	M	H	-	H	-	L	L		
CLO-4 :	Able to use dynamic memory allocation concepts for problems that demand					3	85	80	M	M	M	H	M	M	-	H	M	H	-	M	-	M	L		
CLO-5 :	Defend the need for files storage and the access privilege modes					3	85	80	L	M	M	M	H	H	-	M	H	M	-	M	-	L	M		
Duration (hour)		18		18		18		18		18		18													
S-1	SLO-1	Evolution of Programming Languages	Relational and logical Operators	Understanding contiguous memory allocation	Formal and Actual Parameters		File Types: text and binary, File operations: basics																		
	SLO-2	Problem solving through programming	Character and Numbers: Manipulation	Array : Advantages and Limitations	Functions: Returning values		File permissions and access privileges, Changing permissions																		
S-2	SLO-1	Writing algorithms/pseudo codes	Expressions with pre / post increment operator	String Basics	Advantages of using Functions		Writing contents to file , Reading file contents, Appending an existing file																		
	SLO-2	Drawing flowcharts	Expression with conditional and assignment operators	String Declaration and Initialization	Passing Array to Function		Difference: Append and write																		
S-3	SLO-1	Evolution of C language	Ternary operator	Understanding String Functions: gets(), puts(), getchar(), putchar(), printf()	Call by Value		Writing contents to file, Reading file contents																		
	SLO-2	Program structure	L value and Rvalue in expression	String Functions: atoi, strlen, strcat, strcmp	Call by Reference (An introduction on pointers shall be effective)		fscanf(),fprintf()																		
S-4-6	SLO-1	Lab 1: Algorithm, Flow Chart, Pseudo code	Lab 4: Operators and Expressions	Lab 7: Arrays : Multi dimensional	Lab 10: Functions		Lab 13: File: reading and writing																		
	SLO-2																								
S-7	SLO-1	Need for file header files	Operator precedence	String Functions: sprintf, sscanf, strrev, strcpy, strstr, strtok	Nested functions		fscanf(),fprintf(),fseek(),ftell(),																		
	SLO-2	Need for linkers and loaders	Type conversion	Need for tokenization	Functions: advantages and limitations		fputc(),																		
S-8	SLO-1	Input and output statements: scanf,printf	Control Statements : sequential, branching, looping and jump	Need for user-defined data types	Pointers and address operator		fgetc(),fputs(),fgets()																		

	SLO-2	Variables and identifiers	If, if ..else, else if ladder	Structures	sizeof Pointer Variable and Pointer Operator	fputw(),fgetw(),
S-9	SLO-1	Expressions	nested if, switch case	Unions	Pointer Declaration and dereferencing pointers	feof(), remove(),ferror()
	SLO-2	Single line and multiline comments	for loop	Accessing members of the structure	void Pointers and sizeof void Pointers	End_of_file in file handling
S 10-12	SLO-1	Lab 2: Input and Output Statements	Lab 5: Control Statements	Lab 8: Strings, structures and union	Lab 11: Pointers	Lab 14: File Handling fputw(),fgetw(), remove();
	SLO-2	Constants, Keywords	while loop	Accessing members of the structure	Function and call by reference	Processor Directives
S-13	SLO-1	Literals, Bitwise and sizeof operator	do while	Structure and arrays	Functions and Returning array(use of pointers)	Predefined macros and macros
	SLO-2	Scope and lifetime of variables, Comma, Arrow and Assignment operator	goto, break, continue, exit: Jump statements	Structure and arrays	Structures and pointers :dynamic creation of data structures(list)	conditional compilation
S-14	SLO-1	Storage clauses, Increment and decrement operator	Understanding jump statements with branch and iterative statements	Nested structures	Incrementing Pointers, Constant Pointers	Processor Directives
	SLO-2	Data types classification: Basic, derived, user-defined Arithmetic operators	Array Basic ,manipulating one dimensional arrays with indices, Array Declaration, Initialization Methods: sort, append, reverse,	Functions declaration and definition, Function prototypes, Defining and calling functions	Pointers and strings, Function Pointers, Array of Function Pointers	#pragma
S-15	SLO-1	Numeric Data types: int, float, long, double Non-Numeric Data types: char and	traverse, Manipulating two dimensional arrays with indices, Problems: matrix manipulations	Prebuilt and user defined functions, Multiple functions, Recursion , recursive Functions, Scope of variables across functions	Null Pointers, Using sizeof(), malloc, calloc() File Handling, Open(),close()	, Creating include and macros
	SLO-2	Lab 3: Data Types	Lab 6: Arrays – One Dimensional	Lab 9: Functions	Lab 12: Pointers	Lab 15: Creating Macros

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

Learning Resources	1. Zed A Shaw, (2015), “Learn C the Hard Way: Practical Exercises on the Computational Subjects You Keep Avoiding (Like C)”, Addison Wesley	3. ebook: Bharat Kinariwala, TepDobry, Programming in C, 4. http://www.c4learn.com/learn-c-programming-language/
	2. W. Kernighan, Dennis M. Ritchie, (1996), “The C Programming Language”, 2 nd Edition. PrenticeHall of India	

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	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 %	

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	SABEEN S

Course Code	USA23102J	Course Name	DIGITAL LOGIC FUNDAMENTALS			Course Category	C	Discipline Specific Core Courses					L	T	P	O	C
													3	0	3	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:*

CLR-1 :	<i>To learn the concepts of basics of Digital Logics</i>
CLR-2 :	<i>To impart in-depth knowledge of Logic Gates</i>
CLR-3 :	<i>Understand the principles of Boolean Algebra</i>
CLR-4 :	<i>Basic knowledge of Combinational Circuits and it Applications</i>
CLR-5 :	<i>Basic knowledge of sequential Circuits and it Applications</i>

Course Learning Outcomes (CLO): *At the end of this course, learners will be able to:*

CLO-1 :	<i>Have a thorough Understanding of the Fundamentals of Digital Logic and it Fundamentals</i>
CLO-2 :	<i>Understand the concepts of logic gates and its uses</i>
CLO-3 :	<i>Real time applications of Boolean Algebra</i>
CLO-4 :	<i>Design and implementation knowledge of Combinational Circuits</i>
CLO-5 :	<i>Design and implementation knowledge of Sequential Circuits</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 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	CT Skills	Professional Behavior	Life Long Learning
H	M	H	-	-	-	-	-	H	H	-	L	M	M	M
H	M	H	M	H	-	-	-	M	M	-	L	M	M	M
M	H	H	M	H	-	-	-	M	M	-	L	M	M	M
M	H	H	-	H	-	-	-	M	M	-	L	M	M	M
M	H	H	M	H	-	-	-	M	M	-	L	M	M	M

Duration (hour)		18	18	18	18	18
S-1	SLO-1	Number System and its types	Minterms and Maxterms	Combinational Logic - Introduction	Sequential Circuit - Introduction	Counters – Introduction
	SLO-2	Base conversions	Sum of Products	Designing of a Logic Circuit Diagram	Latches	A Basic Design Counter
S-2	SLO-1	Binary codes and its types	Product of Sums methods	Adders : Quarter, Half and Full Adders	Flip Flops - Introduction	Classification of Counters
	SLO-2	Code conversions	Conversions of SOP to POS	Subtractors: Half, Full Subtractors	RS Flip Flop	Asynchronous Counters
S-3	SLO-1	Basics of Logic Gates and Derived Gates	Simplifying Boolean Expressions using theorems	Design of Adder Circuits	JK Flip Flop	Synchronous Counters
	SLO-2	Truth Tables	Derivation of a Boolean Functions	Design of Subtractor Circuits	D Flip Flop	Syn Vs Asyn Counters
S-4-6	SLO-1	Lab1 : Verification of Basic Gates and Derived Gates	Lab 4: Verifications of Distributive Law	Lab 7: Half Adder and Full Adder	Lab 10: Implementation of DeMultiplexer	Lab 13: Ring Counters
	SLO-2					
S-7	SLO-1	Universality of NAND Gate	Karnaugh Map - Introduction and its uses	Multiplexer	T - Flip Flop	Ripple Counters
	SLO-2	Universality of NOR Gate	Types of K-Map	Implementation of a Boolean expression using a Multiplexer	Edge Triggered	MOD Counters
S-8	SLO-1	Duality of Logic Gate Representation	Rules for constructing K-Map	De Multiplexer	Master Slave Flip Flop	UP DOWN Counters
	SLO-2	Boolean Algebra - Introduction	Two and Three Variable K-Map	Encoder	Registers Architecture	Ring Counter

S-9	SLO-1	Logical Operations AND OR NOT	Four Variable K-Map	Decoder	Shift Registers	Shift Counters
	SLO-2	Hierarchy of Logic Circuits	Simplifying Boolean Expressions using K-Map	Decimal -to- BCD encoder	Register with parallel load	Decade
S 10-12	SLO-1	Lab2:NAND as Universal Gate	Lab 5-Simplifying Boolean Expressions using theorems	Lab 8:Half Subtractor and Full Subtractor	Lab 11: Implementation of Shift Registers and Serial Transfer	Lab 14: Implementation of DOWN Counter
	SLO-2	NOR as Universal Gate				
S-13	SLO-1	Evaluating Logic Circuits	Don't Care conditions	Parity Generator	Four-bit Serial in Serial Out Shift register	Memory – Introduction
	SLO-2	Implementing Circuits from Boolean Expressions	Determination Prime Implicant Method	Parity Checker	Shift Registers Operations	Basic terms and ideas
S-14	SLO-1	Boolean Functions	Boolean Arithmetic - Introduction	Checksum	Serial-to-Parallel Shift Register	Magnetic Memories
	SLO-2	Duality Principle, Complements	Binary Addition	Code Conversions	Design of Serial to Parallel	Memory Addressing
S-15	SLO-1	Laws and Theorems	Binary Subtractions	Programmable Array Logic	Parallel-to-Serial Shift Register	Types of ROM
	SLO-2	Laws of Intersection, Union, Absorption, Involution, Demorgan's Theorems	Various Representation of Binary Numbers	Programmable Logic Array	Design of Parallel to serial	Types of RAM
S 16-18	SLO-1	Lab 3:Laws of Boolean Expressions	Lab 6: Implementation of Binary Addition and Subtraction	Lab 9: Implementation of Multiplexer	Lab 12: Four Bit Binary Shift Counters	Lab 15: Implementation of DOWN Counter
	SLO-2					

Learning Resources	1.	AnanthiSheshasaayee, J.G. Sheshasaayee, <i>Digital Logic Fundamentals</i> , Margham Publications, 2005	3.	Leach.D.P&Malvino.A.P, (2002), <i>"Digital Principles and Applications"</i> , Fifth Edition, TM.
	2.	Vijayendran. V, (2003), <i>"Digital Fundamentals"</i> , S.V. Publishers	4.	MorisMano.M,(2001), <i>"Digital Logic and Computer Design"</i> , Forth Edition,

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	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 %		-	

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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	MR.M.RAMESH

Course Code	UMS23101T	Course Name	DISCRETE MATHEMATICAL STRUCTURES	Course Category	C	Discipline Specific Core Courses				
						L	T	P	O	C
						4	0	0	2	4

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Mathematics and Statistics	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 :	To provide a strong foundations in discrete mathematics	Level of Thinking (Bloom)	2	3	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 :	To apply mathematical techniques for solving real life problems																				
CLR-3 :	Apply Boolean algebra, truth table, logic gates, in computer science and communication.																				
CLR-4 :	To enable the use of logical, graphical and algebraic techniques wherever relevant.																				
CLR-5 :	Understanding of computer science through the applications of Discrete Mathematics																				
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																			
CLO-1 :	Problem solving in sets and relations. Gaining knowledge,solving the simple problems using elementary concepts.	3	85	80			L	M	H	H	M	M	M	M	L	L	H	-M	L	L	L
CLO-2 :	Understand the concepts of Graphs terminology Sub graphs, Acyclic, Euler path, Hamiltonian Path	3	80	75			H	H	M	M	H	M	M	M	L	L	L	-M	L	L	L
CLO-3 :	Logical knowledge through the Statements, connectives, arguments, validity of arguments and Normal forms using truth tables	3	85	80			H	H	L	M	M	M	M	M	L	L	H	-M	L	L	L
CLO-4 :	Gain the knowledge about Trees , Labeled Trees, Binary trees ,Rooted Trees , Spanning Trees Minimal Spanning Trees	3	85	80			M	H	H	M	L	M	M	M	L	L	H	-M	L	L	L
CLO-5 :	Apply the concepts of Boolean Algebra in real world problems related to Computer Science	3	85	80			L	H	H	M	M	M	M	M	L	L	H	-M	L	L	L

	Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module4	Learning Unit / Module 5
Duration (hour)	12	12	12	12	12
S-1	SLO-1 Introduction to Sets – simple examples.	Logic	Graphs and Their Representation-	Trees	Sets concepts
	SLO-2 Properties of setsTypes of sets	Basic explanation	Basic Graph terminology	Basic Definitions	Partition of a set
S-2	SLO-1 Venn diagram.	Statements- simple compound	Simple Problems	Basic properties of Trees	Relation concepts
	SLO-2 Problems using Venn diagrams	Symbolic representation	Drawings of Graphs	properties of Trees	matrix representation of relation
S-3	SLO-1 Relation definitions	Connectives explanation .	Special Families of Graphs	Labeled Trees	Simple problems
	SLO-2 Problems on Relations	conjunction, disjunction, negation	Simple Problems	Labeled Trees	Hasse diagrams for partial
S 4	SLO-1 Types of relation	Simple problems	Incidence graphs	Problems based on the concepts	More problems using Hasse diagrams
	SLO-2 Problems on relations	Problems using Truth Tables	Simple Problems	Undirected Trees	Lattices as posets
S-5	SLO-1 Equivalence relation-basic explanation	Tautology, contradiction	Adjacency Matrices	Simple Problems	Problems on Lattices as posets
	SLO-2 Simple problems	Problems using Truth tables	Problems using	Binary trees	Definition of Lattices-
S 6	SLO-1 Reflexive basic explanation	logical equivalence,	vertex Degrees matrices	Rooted Trees and Branches	Properties of Lattices
	SLO-2 Simple problems	Simple truth table problems	Isomorphism of Graphs	Rooted Trees and Branches	Introduction to Boolean Algebra- basic definitions.
S-7	SLO-1 Symmetric, Transitive basic explanation	Tautological implications	Simple Problems	Spanning Trees	Axiomatic definition of boolean Algebra, logic gates.

	SLO-2	Simple problems	Simple problems	Sub graphs	Simple problems	Postulates of Boolean algebra.
S-8	SLO-1	Function	Arguments- validity of arguments	Acyclic Graphs	Spanning Trees	Postulates of Boolean algebra.
	SLO-2	Comparison of Relation and functions	Simple problems	Simple Problems	Simple problems	Problems using the postulates of Boolean Algebra
S-9	SLO-1	Types of functions	Normal forms	Digraphs	Minimal Spanning Trees	Problems using the basic concepts
	SLO-2	Simple problems	Minterms and maxterms	Problems using Graphs	Simple Problems	Properties of Boolean algebra
S-10	SLO-1	One- one, injective, surjective, one to many, many to one functions with example	Maxterms with examples	Euler path and circuits	Problems based on Minimal Spanning Trees	Simple Boolean algebra problems
	SLO-2	Simple problems	Problems using Truth tables	Eulerian cycles	Kruskal's Algorithm	Expression of a Boolean function By Truth table method.
S-11	SLO-1	composite of two functions	Principal disjunctive normal form	Euler path and Circuits	Rooted Tree	Boolean function in canonical form by Truth table method.
	SLO-2	composite of two functionsSimple problems	Problems using Truth tables	Hamiltonian Path and Circuits.	binary Treeand Simple Problems	DNF by Truth table method
S-12	SLO-1	composite of three functions	Principal conjunctive normal form	Problems using Hamiltonian Path	Expression of Trees	CNF by Truth table method
	SLO-2	Simple problems	Problems using Truth tables	Simple Problems	Simple Problems	Simple problems

Learning Resources	Theory: 1. Discrete Mathematics with Graph Theory and Combinatorics by T.Veerajan, McGraw Hill Education(India) Pvt Limited, 2007 2. Dr. A. Singaravelu, Allied Mathematics, 7 th edition, A. R. Publications, 2015.
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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	30%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level 3	Evaluate	30%	-	30%	-	30%	-	30%	-	30%	-
	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 Academic	Internal Experts
1.Dr.V. Prakash, Dr. Ambedhkar Government Arts college, Chennai (AcademicExpert)	1.Dr.L.Sivakami,SRMIST
2.Dr.M.Vasantha,ICMR,Chennai(IndustrialExpert)	2.Dr.S.LakshmiPriya,SRMIST

Learning Resources	1. Abhijit Guha, <i>Quantitative Aptitude for Competitive Examinations</i> , Tata McGraw Hill, 5th Edition 2. Dr. Agarwal R.S, <i>Quantitative Aptitude for Competitive Examinations</i> , S. Chand and Company Limited, 2018 Edition 3. Archana Ram, <i>Place Mentor: Tests of Aptitude for Placement Readiness</i> , Oxford University Press, Oxford, 2018	4. Edgar Thrope, <i>Test of Reasoning for Competitive Examinations</i> , Tata McGraw Hill, 6th Edition 5. Singh O.P., <i>Art of Effective Communication in Group Discussion and Interview</i> , S Chand & Company, 2014 6. Bhatnagar R P, <i>English for Competitive Examinations</i> , Trinity Press, 2016
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Learning Assessment					
Level	Bloom's Level of Thinking	Continuous Learning Assessment (100% weightage)			
		CLA – 1 (20%)	CLA – 2 (20%)	CLA – 3 (30%)	CLA – 4 (30%)#
		Practice	Practice	Practice	Practice
Level 1	Remember	30%	30%	30%	10%
	Understand				
Level 2	Apply	30%	30%	30%	50%
	Analyze				
Level 3	Evaluate	40%	40%	40%	40%
	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, Extempore, 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	Experts from Higher Technical Institutions	Internal Experts
Mr. M. Ponmurugan, Executive PMOSS, Cognizant Technology Solutions India Pvt. Limited, Chennai	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita Vishwa Vidyapeedam, Coimbatore	Dr. Sathish K, HOD, Department of Career Guidance Cell, FSH, SRMIST
		Ms. Deepalakshmi S, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST

Course Code	UCD23V01T	Course Name	Universal Human Values	Course Category	V	Value Addition Course	L 2	T 0	P 0	O 2	C 2
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Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Career Guidance Cell	Data Book / Codes/Standards	-		

Course Learning Rationale (CLR):		The purpose of learning this course is to:					Learning			Program Learning Outcomes (PLO)														
CLR-1 :	Help the students to understand need of value education, appreciate the essential complementarity between 'values' and 'skills' and to ensure sustained happiness and prosperity which are the core aspirations of all human beings,						1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Help students initiate a process of dialog within themselves to know what they really want to be' in their life and profession.						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 :	Help students to understand the meaning of happiness and prosperity for a human being. Understanding holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.																							
CLR-4 :	Help students on right understanding of the Human reality and the rest of existence, harmony at all the levels of human living, and live accordingly.																							
CLR-5 :	Highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.																							
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																						
CLO-1 :	Evaluate the significance of value inputs in formal education and start applying them in their life and profession						3	80	70	M	-	-	H	-	-	-	-	-	M	-	-	H	H	
CLO-2 :	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.						3	80	75	-	M	-	H	-	L	-	-	-	-	-	-	H	H	
CLO-3 :	Analyze the value of harmonious relationship based on trust and respect in their life and profession						3	85	70	-	-	-	H	-	-	-	M	L	-	-	-	H	H	
CLO-4 :	Examine the role of a human being in ensuring harmony in society and nature.						3	85	80	-	-	-	H	-	-	L	-	L	L	-	L	M	H	H
CLO-5 :	Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.						3	85	75			L	H	L	-	-	-	-	-	-	M	H	H	

Duration (hour)		6	6	6	6	6
S-1	SLO	Right Understanding, Relationship and Physical Facility	Understanding Human being as the Co-existence of the Self and the Body	Harmony in the Family – the Basic Unit of Human Interaction	Understanding Harmony in the Nature	Natural Acceptance of Human Values
S-2	SLO	Understanding Value Education	Distinguishing between the Needs of the Self and the Body	Trust – the Foundational Value in Relationship	Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature	Definitiveness of (Ethical) Human Conduct
S-3	SLO	Self-exploration as the Process for Value Education	The Body as an Instrument of the Self	Respect – as the Right Evaluation	Exploring the Four Orders of Nature	A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order
S-4	SLO	Continuous Happiness and Prosperity – the Basic Human Aspirations	Understanding Harmony in the Self	Other Feelings, Justice in Human-to-Human Relationship	Realizing Existence as Co-existence at All Levels	Competence in Professional Ethics
S-5	SLO	Happiness and Prosperity – Current Scenario	Harmony of the Self with the Body	Understanding Harmony in the Society	The Holistic Perception of Harmony in Existence	Holistic Technologies, Production Systems and Management Models-Typical Case Studies
S-6	SLO	Method to Fulfill the Basic Human Aspirations	Programme to ensure self-regulation and Health	Vision for the Universal Human Order	Exploring Co-existence in Existence	Strategies for Transition towards Value-based Life and Profession

Learning Resources	1. Gaur R.R., Sangal R., Bagaria G.P., 2019 (2nd Revised Edition), A Foundation Course in Human Values and Professional Ethics, Excel Books, New Delhi.	3. A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak.
	2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.	4. A N Tripathy, 2003, Human Values, New Age International Publishers.

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

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

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

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
-	-	Dr. Supraja P, UHV University Coordinator, SRMIST
		Dr. Sathish K, HOD, Department of Career Guidance Cell, FSH, SRMIST
		Dr. Sweeti Bakyarani E, Department of Computer Science, FSH, SRMIST

SEMESTER II

Course Code	ULT23G02J	Course Name	Tamil – II	Course Category	G	Generic Elective Course	L	T	P	O	C
							2	0	2	2	3

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Tamil	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 :	சங்கஇலக்கியங்கள்வழிதொன்மைஅக, புறவாழ்வியலைஅறியச்செய்தல்	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	தமிழ்ச்சமூகத்தின்அறவியல்குறித்துதெரியச்செய்தல்	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	PSO -1	PSO -2	PSO -3
CLR-3 :	பக்திஇலக்கியங்கள்போதித்தமனிதமாண்புகளைஉணர்ச்செய்தல்				H	L	H	M	H	H	L	M	H	M	L	H	-	-	-
CLR-4 :	பண்டைத்தமிழ்ச்சமூகத்தின்தொல்இலக்கியங்கள்வளர்ச்சிபெற்றவரலாற்றைப்புரியச்செய்தல்				H	M	H	L	M	H	L	H	M	L	H	H	-	-	-
CLR-5 :	சிறுகதைகள்சொல்லும்வாழ்வியல்நெறி, மொழியின்நுட்பங்கள்ஆகியவற்றைத்தெரியச்செய்தல்				H	L	H	M	H	H	M	H	L	H	M	H	-	-	-

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	பண்டைத்தமிழ்ச்சமூகத்தின்அக, புறவாழ்வியலின்அறவியல்குறித்துதெரியச்செய்தல்	2	75	60	H	L	H	M	H	H	L	M	H	M	L	H	-	-	-
CLO-2 :	தமிழ்ச்சமூகம்அறத்தைவலியுறுத்தியசமூகம்என்பதன்வழிமானுடஅறத்தைத்தெரிந்துகொள்ளுதல்	2	80	70	H	M	H	L	M	H	L	H	M	L	H	H	-	-	-
CLO-3 :	பக்திஇலக்கியம்மூலம்இறைத்தந்தவங்களைஅறிந்துமானுடஒற்றுமைமேம்பாட்டைஅறிந்துகொள்ளுதல்	2	70	65	H	L	H	M	H	H	M	H	L	H	M	H	-	-	-
CLO-4 :	தொல்தமிழ்ச்சமூகம்இலக்கியம், அரசியல், அறம், பக்திஆகியவற்றில்தழைத்தோங்கியதைத்தெரிந்துகொள்ளுதல்	2	70	70	H	M	H	L	H	M	M	H	H	L	H	H	-	-	-
CLO-5 :	வாழ்வியலின்நெறிகளைச்சொல்லும்கதைகளைப்படைக்கும்திறனோடுமொழிஆளுமையையும்அறிந்துகொள்ளுதல்	2	80	70	H	M	H	H	M	H	L	M	H	L	H	H	-	-	-

Duration (hour)	12	12	12	12	12
S-1	SLO-1	காலந்தோறும்தமிழ்அகத்திணைமரபு	சங்கமருவியகாலம்	பல்லவர்காலம்	பண்டைக்காலத்தமிழகம்
	SLO-2	அகஇலக்கியத்தின்கட்டமைப்பு/ உள்ளடக்கம்	அறமும்வாழ்வியலும்	பல்லவர்காலஇலக்கியங்கள்	தமிழ்ச்சிறுகதையும்தமிழ்ச்சமூகவாழ்வியலும்
S-2	SLO-1	எட்டுத்தொகைநூல்களும்பகுப்புமுறையும்	உலகப்பொதுமறை - திருக்குறள்	பக்தியும்தமிழும்	முச்சங்கம் - அறிமுகம்
	SLO-2	ஐங்குறுநூறு (375)	திருக்குறளின்கட்டமைப்பு	பக்திஇலக்கியத்தோற்றநிலை	முச்சங்கவரலாறு
S-3	SLO-1	உடன்போக்கும்நற்றாய்புலம்பலும்	திருக்குறள்வான்சிறப்பு (2)	சைவசமயஇலக்கியங்கள்	பத்துப்பாட்டும்எட்டுத்தொகையும்
					ந.பிச்சமூர்த்தி - வேப்பமரம்

	SLO-2	ஐங்குறுநூறு (391)	மழையும்வாழ்வம்	சைவக் குரவர்நால்வர்	சங்ககாலமக்களின்வாழ்வியல்	மரபும்நம்பிக்கைகளும்
S-4	SLO-1	உடன்போக்கும்தமிழர்பறவையியல்அறிவும்	திருக்குறள் - புலவிநுணுக்கம்	தேவாரம் - திருஞானசம்பந்தர் - பாடல் - 2834	எட்டுத்தொகைநூல்களின்வரலாறு	தமிழருவிமணியன் - ஒற்றைச்சிறகு
	SLO-2	குறுந்தொகை (02)	ஊடலின்அழகியல்	தேவாரம் - திருநாவுக்கரசர் - பாடல் - 4262	எட்டுத்தொகைநூல்களின்கட்டமைப்பு	உறவின்மேன்மை
S-5	SLO-1	இயற்கைப்புணர்ச்சியும்தலைவிநலம்பாராட்டலும்	நீதிஇலக்கியங்கள்	திருவாசகம்அறிமுகம்	பத்துப்பாட்டுநூல்களின்வரலாறு	ஆர். சூடாமணி - மூடநம்பிக்கை
	SLO-2	குறுந்தொகை (03)	நாலடியார்	மாணிக்கவாசகர்பாடல் - ஆனந்தபரவசம் - பாடல் 10	பத்துப்பாட்டும்தமிழர்வாழ்வியலும்	சமூகத்தில்மூடநம்பிக்கைகள்
S-6	SLO-1	தலைவனின்மேன்மைத்தன்மையும்இயற்கையும்	வைகலும் - பாடல் (39)	வைணவசமயம்	பதினெண்கீழ்க்கணக்குநூல்கள்	மூடநம்பிக்கைகளின்சிக்கல்கள்
	SLO-2	அகநானூறு (238)	நிலையாமையும்அறமும்	வைணவசமயவளர்ச்சிப்போக்கு	பதினெண்கீழ்க்கணக்கும்தமிழர்அறமரபும்	கிருஷ்ணாடாவின்ஸி - காலாஅருகேவாடா
S-7	SLO-1	இயற்கையும்அகவாழ்வுச்சித்திரிப்பும்	தமிழர்மருத்துவம்	நாலாயிரத்திவ்யப்பிரபந்தம்	நீதிஇலக்கியங்கள்	மனிதவாழ்வில்மருத்துவம்
	SLO-2	நள்ளியின்கொடைத்திறம்	நீதிஇலக்கியத்தில்மருந்துநூல்கள்	குலசேகராழ்வார்பாடல்- 678	நீதிஇலக்கியங்களின்பன்முகத்தன்மைகள்	பாரம்பரியமருத்துவம்
S-8	SLO-1	கலித்தொகைப்பாடல் -(11)	சிறுபஞ்சமூலம் (64)	ஆண்டாள்பாடல் - 574.	காப்பியஇலக்கணம்	மொழிப்பயிற்சி
	SLO-2	அறம்பொருள்இன்பம்சிறப்பு	ஈகையின்சிறப்பு	திருமழிசைஆழ்வார்பாடல் - கணிகண்ணன்	காப்பியத்தின்போக்குகள்	சொற்களைஉருவாக்குதல்
S-9	SLO-1	சூழலியலும்மனிதவாழ்வம்	பழமொழிநானூறுஅறிமுகம்	தமிழில்இஸ்லாமியஇலக்கியங்கள்	காப்பியங்களின்வகைமை	எழுத்துகளில்இருந்துசொற்களைக்கண்டுபிடித்தல்
	SLO-2	தமிழர்புறமரபு	பழமொழிநானூறு - தனித்தன்மைகள்	இஸ்லாமியஇலக்கியங்களின்கொடை	ஐம்பெருங்காப்பியங்களின்தனித்தன்மைகள்	படம்பார்த்துக்கதைஎழுதுதல்
S-10	SLO-1	புறநானூறு (107) பாரியும்மாரியும்	பழமொழிநானூறு (184)	சீறாப்புராணத்தின்அமைப்பு	தமிழ்ச்சமூகமும்சமயத்தத்துவங்களும்	படம்பார்த்துக்கவிதைஎழுதுதல்
	SLO-2	புறநானூறு (110) பாரியின்வள்ளத்தன்மை	பழமொழியும்அறிவுரையும்	விடமீட்டப்படலம் (10 பாடல்கள்)	சமயத்தத்துவங்களும்வாழ்வியல்விழுமியங்களும்	கற்பனைத்திறன் - வளர்த்தல்
S-11	SLO-1	புறநானூறு (112) கையறுநிலை	பண்டைக்காலப்போரும்வாழ்வும்	கிறித்தவசமயஇலக்கியங்கள்	சைவத்திருமுறை - அறிமுகம்	கற்பனையும்படைப்பும்
	SLO-2	சிறுபாணாற்றுப்படை (84-115)	புறஇலக்கியங்கள்	கிறித்தவஇலக்கியங்களின் தமிழ்க்கொடை	பன்னிருதிருமுறை - வரலாறு	தமிழில்வாசகம்
S-12	SLO-1	கடையெழுவள்ளல்களின்சிறப்புகள்	களவழிநாற்பது (40)	கிறித்துவின்அருள்வேட்டல் - திரு.வி.க	நாலாயிரத்திவ்வியப்பிரபந்தம் - அறிமுகம்	விளம்பரத்திற்குவாசகம்எழுதுதல்
	SLO-2	பட்டினப்பாலை (40-50) அட்டில்சாலைகளின்நிலை	போர்க்களமும்யானைப்படையும்	அலகிலொளி - 5 பாடல்கள்	வைணவஆழ்வார்கள்வரலாறு	வாசகம்எழுதுமுறைகள்

Learning Resources	1. கொன்றை, தொகுப்பும்பதிப்பும் - தமிழ்த்துறைஆசிரியர்கள், தமிழ்த்துறை, எஸ்.ஆர்.எம். அறிவியல்மற்றும்தொழில்நுட்பக்கல்விநிறுவனம், காட்டாங்குளத்தூர், 603203, 2023 2. தமிழண்ணல், புதியநோக்கில்தமிழ்இலக்கியவரலாறு, மீனாட்சிபுத்தகநிலையம், மதுரை, 2017 3. மு. அருணாசலம், தமிழ்இலக்கியவரலாறு, நூற்றாண்டுமுறை (9ஆம்நூ. முதல் 16 வரை), திபார்க்கர், சென்னை, 2005 4. தமிழ்இணையக்கல்விக்கழகம் - http://www.tamilvu.org/ 5. மதுரைதமிழ்இலக்கியமின்தொகுப்புத்திட்டம் - https://www.projectmadurai.org/
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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	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
Level 2	Apply Analyze	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
Level 3	Evaluate Create	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	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	Expert from Higher Technical Institutions	Internal Experts
1. Dr. P.R.Subramanian, Director, Mozhi Trust, Thiruvanniyur, Chennai – 600 041.	1. Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language & Literature, Pondicherry University, Pondicherry	1. Dr. B.Jaiganesh, Associate Professor & Head, Dept. of Tamil, FSH, SRMIST
		2. Dr. R. Ravi, Assistant Professor and Head, Dept. of Tamil, FSH, SRMIST, VDP.
		3. Mr. G. Ganesh, Assistant Professor, Dept. of Tamil, FSH, SRMIST, RMP.
		4. Dr. T.R.Hebzibah beulah Suganthi, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.
		5. Dr. S.Saraswathy, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.

Course Code	ULH23G02J	Course Name	HINDI-II	Course Category	G	Generic Elective Course	L	T	P	O	C
							2	0	2	2	3

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	HINDI	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 :	They get to learn Ancient ,Medieval,and Modern poetry	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To understand the Significance of poems of great poets like Kabir, Tulsidas, Bihari and Dhananand	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	PSO -1	PSO -2	PSO-3
CLR-3 :	To Enhance and Enrich their knowledge through poetry				H	H	H	M	L	H	L	M	L	L	H	M	-	-	-
CLR-4 :	Media based understanding for employability				H	H	M	L	H	H	M	H	M	M	H	H	-	-	-
CLR-5 :	Job Oriented writing skills				H	H	L	H	M	H	L	H	H	M	H	H	-	-	-
					M	H	M	H	L	H	H	L	H	M	H	H	-	-	-
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	To provide a brief Introduction of Hindi poetry(Bhaktikal,Reetikal and Aadhunikkal)	2	75	80															
CLO-2 :	To Discuss the origin and development of various forms of poetry in Hindi	2	80	90															
CLO-3 :	Focus on Evaluating the social changes through poetry	2	75	95															
CLO-4 :	To Examine Transcreation in advertisement	2	80	90															
CLO-5 :	To guide the students in the learning of the technical aspect of the Hindi Language, this would help them in the field administration	2	85	90															

Duration (hour)	12	12	12	12	12
S-1	SLO-1	BHAKTI KALIN KAVITA	RITI KALIN KAVITA	ADHUNIK KAVITA	VIGYAPAN
	SLO-2	BHAKTIU KALIN KAITA KI AVADHARNA	AVADHARNA	AVADHARNA	AWADHARNA
S-2	SLO-1	SWARUP	SWARUP	SWARUP	ARTH
	SLO-2	MAHATVA	RITI KAL VIBHAJAN	MAHATVA	PARIBHASHA
S-3	SLO-1	UDDESHYA	MAHATVA	UDDESHYA	SWARUP
	SLO-2	BHAKTIKAL KI PRASANGIKTA	UDDESHYA	MATHLI SHARAN GUPT- NAR HO NA NIRASH KARO MAN KO	VIGYAPAN KE PRAKAR
S-4	SLO-1	DOHE- KABIRDAS	DOHE- BIHARI	KAVI PARICHAYA	VIGYAPAN KI VISHESHTAYEN
	SLO-2	SANT PARICHAY	KAVI PARICHAYA	KAVITA KA VISLESHAN	VIGYAPAN MANG
S-5	SLO-1	DOHE KA VISLESHAN	DOHE KA VISLESHAN	ASHAVADI DRISHTIKON	VIGYAPAN KA PRABHAV
	SLO-2	GURU KA MAHATVA	KANAK KA MAHATVA	SANGHARSH KI AOR PRERNA	VIGYAPAN MAHATVA
S-6	SLO-1	GURUTVA SE ISHVARATVA KI AOR	VIPRIT SWABHAV KI CHARCHA	SURYAKANT TRIPATHI NIRALA- VAR DE	VIGYAPAN KI BHASHA
	SLO-2	GURUTVA SE ISHVARATVA KI AOR	PRAKRITI KA ATAL RUP	KAVI PARICHAYA	VIGYAPAN AUR BAZAR
S-7	SLO-1	BAHYA ADAMBAR KA VIRODH	YAMAK ALANKAR KA PRAYOG	KAVITA KA VISLESHAN	VIGYAPAN AUR ROZGAR
	SLO-2	MURTI POOJA KA VIRODH	SNEH KE MAHATVA KI CHARCHA	SARSHWATI KE PATRI SAMARPAN	PRINT VIGYAPAN
S-8	SLO-1	GHARELU VASHTUON KI UPYOGITA	BIHARI KI KAVYA SHAILI KA MAHATVA	BHAKTI KI BHAVANA	ELECTRONIC VIGYAPAN
					PARIBHASHIK SHABDAVALI

	SLO-2	AHNKAR KA PARITYAG	DOHE- GHANANAND	NAGARJUN-- AKAL AUR USKE BAD	VIGYAPAN PARIYOJANA	AVADHARNA
S-9	SLO-1	DOHE- TULSHIDAS	KAVI PARICHAYA	AKAL KA VASHTAVIK CHITRAN	VIGYAPAN AUR SAMAJ	SHABDAVALI KI AVSHYAKTA
	SLO-2	PAROPKAR KI BHAVANA	DOHE KA VISLESHAN	AKAL KE PURVA KA CHITRAN	VIGYAPAN KI VYAPAKTA	KARYALYIN SHABDAVALI
S-10	SLO-1	DAYA KA MAHATVA	SNEH KI SARLTA KA VARNAN	AKAL KE BAD KA CHITRAN	VIGYAPANLEKHAN KALA	E EK DIN EK SHABD
	SLO-2	ISHVAR KI MHATTA	PREM KA MAHATVA	KATTIS- BADRINARAYAN	VIGYAPAN AUR JAGRUPA	HINDI SE ANGREJI SHABD
S-11	SLO-1	MADHUR VAHAN KI UPYOGITA	NAYIKA KE PRATI SMARPAN	SAMBAND VICCHED KI PARICHARCHA	UDDESHYA	ANGREJ SE HINDI SHABD
	SLO-2	RAM KI MAHIMA	GHANANAND KI KAVYA SHAILI KA MAHATVA	SWARTH NIHIT BHAVANA	VIGYAPAN KI SPASTTA	ABHYASH KARYA
S-12	SLO-1	DHOHA PARICHARCHA	DHOHA PARICHARCHA	KAVYA PARICHARCHA	VIGYAPANPARICHARCHA	PARICHARCHA
	SLO-2	PRASHNAABHYASH	PRASHNAABHYASH	PRASHNAABHYASH	PRASHNAABHYASH	PRASHNAABHYASH

Learning Resources	Edited Book: ""SAMANYA HINDI", SRIJONLOK PUBLICATION, 2023, New Delhi. 1. KABIR – HAZARI PRASAD DWEDI 2. SURDAS – RAM CHANDRA SHUKL 3. BHAKTI ANDOLAN AUR SURDAS KA KAVYA – MANAGER PANDEY 4. BIHARI – VISHVNATH PRASAD MISHR 5. Aadhunik Vigyapan aur Jansampark – Taresh Bhatia
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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	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
	Understand										
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
	Analyze										
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	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
Shri. Santosh Kumar Editor : Srijanlok Magazine Place: Vashishth Nagar, Ara – 802301	1. Prof.(Dr.) S.Narayan Raju, Head, Department of Hindi,CUTN, Tamilnadu	1. Dr.S Preeti. Associate Professor & Head, SRMIST
		2. Dr. Md.S. Islam Assistant Professor, SRMIST
		3.Dr. S. Razia Begum, Assistant Professor, SRM IST
		4. Dr.Nisha Murlidharan Assistant Professor, VDP,SRM IST

Course Code	ULF23G02J	Course Name	French-II	Course Category	G	Generic Elective Course	L	T	P	O	C
							2	0	2	2	3

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	French	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 :	Strengthen the language of the students both in oral and written	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Express their sentiments, emotions and opinions, reacting to information, situations																		
CLR-3 :	Make them learn the basic rules of French Grammar.																		
CLR-4 :	Develop strategies of comprehension of texts of different origin																		
CLR-5 :	Enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French																		

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
CLO-1 :	To acquire knowledge about French language	2	75	80	H	M	H	H	M	H	H	L	M	M	H	L	-	-	-
CLO-2 :	To strengthen the knowledge on concept, culture, civilization and translation of French	2	80	90	M	H	L	H	H	M	H	M	L	L	H	M	-	-	-
CLO-3 :	To develop content using the features in French language	2	75	80	H	H	L	M	H	M	L	H	M	M	H	H	-	-	-
CLO-4 :	To interpret the French language into other language	2	75	90	H	L	M	H	M	H	H	M	L	H	M	L	-	-	-
CLO-5 :	To improve the communication, intercultural elements in French language	2	80	75	M	H	H	L	M	M	H	H	M	L	H	M	-	-	-

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Temps libre	Le pronom indéfini on	Vendre	Il faut	Les gallicismes
	SLO-2	Les activités quotidiennes	Les activités	Les exemples	C'est / Il est	Les activités
S-2	SLO-1	Les exemples	Les adjectifs interrogatifs	Acheter	Le verbe devoir	Les pronoms personnels COI
	SLO-2	Les activités	Les activités	Les exemples	Les activités	Les exemples
S-3	SLO-1	Les moments de la journée	Les prépositions avec les noms géographiques	Les aliments	Le verbe pouvoir	Le pronom y
	SLO-2	Les exemples	Les activités	Les exemples	Le verbe savoir	Les exemples
S-4	SLO-1	Les matières scolaires	Les verbes prendre et sortir	Les emballages	Le verbe vouloir	Des pronoms compléments
	SLO-2	Les exemples	Les activités	Les exemples	Les sons	Les activités
S-5	SLO-1	Les activités	Les sons	Les quantités	Demander et dire le prix	Les nombres ordinaux
	SLO-2	Les loisirs	Les activités	Les exemples	Les activités	Les exemples
S-6	SLO-1	Les exemples	Parler de ses goûts	Les commerces	Faire des achats	Les verbes écrire et voir
	SLO-2	Les activités	Les activités	Les activités	Expliquer une recette de cuisine	Les activités
S-7	SLO-1	La fréquence	Parler de ses préférences	les commerçants	Les activités	Le E caduc ou instable
	SLO-2	Les exemples	Les activités	Les exemples	Les courses	Les exemples

S-8	SLO-1	Les activités	Parler de sa routine	L'impératif	Les activités	Présenter ses vœux
	SLO-2	Les verbes pronominaux	Les activités	Les activités	Vendre et acheter	Présenter ses souhaits
S-9	SLO-1	Les exemples	A la recherche d'un cadeau –.	Les articles partitifs	Mots et expressions	Présenter ses félicitations
	SLO-2	Les activités	Les activités	Les exemples	Grammaire	inviter à une invitation
S-10	SLO-1	Les pronoms personnels COD	Temps libre	Très ou beaucoup (de)	Communication	répondre à une invitation
	SLO-2	Les exemples	Les activités	Les exemples	Tout le monde s'amuse	Les exemples
S-11	SLO-1	Les activités	Mots et expressions	Le pronom en (la quantité)	Les sorties	Écrire un message amical
	SLO-2	Les adjectifs démonstratifs	Les activités	Les exemples	Les saisons	Les exemples
S-12	SLO-1	Les exemples	Grammaire –Communication	La phrase négative (2)	Les fêtes	Parler au téléphone
	SLO-2	Les activités	Les activités	Les exemples	Les messages	Un coup de fil

Learning Resources	Theory:	
	1.	“ Nouvelle Génération-AI” Méthode de français, Marie-Noëlle COCTON, P.DAUDA, L.GIACHINO, C.BARACCO, Les éditions Didier, Paris, 2018.
	2.	Cahier d'activités avec deux discs compacts.
	3.	https://www.fluentu.com/blog/french/french-grammar
	4.	https://www.elearningfrench.com/learn-french-grammar-online-free.html
	5.	https://www.lawlessfrench.com/grammar
	6.	https://blog.gymglish.com/2022/12/15/basic-french-grammar

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	30%	30%	30%	30%	20%	20%	20%	20%		30%	-
	Understand											
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%		50%	-
	Analyze											
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%		20%	-
	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	Expert from Higher Technical Institutions	Internal Experts
1. Mr. Kavaskar Danasegarane Process Expert Maersk Global Service Center Pvt. Ltd	1. Dr. C.Thirumurugan Professor, Department of French, Pondicherry University	1. Mr. Kumaravel K. Assistant Professor & Head, SRMIST, KTR
2.Mr. Sharath Raam Prasad, Character Designer, Animaker Company Pvt.		2. Mrs. Abigail, Assistant Professor, SRMIST, VDP

Course Code	UES23AE1T	Course Name	ENVIRONMENTAL STUDIES	Course Category	AE	Ability Enhancement Courses	L 3	T 0	P 0	O 2	C 3
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Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Computer Science	Data Book / Codes/Standards			

Course Learning Rationale (CLR):		The purpose of learning this course is to:			Learning			Program Learning Outcomes (PLO)														
CLR-1 :	To create awareness on Environment and Renewable and Non-renewable resources				1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To understand about ecosystem and Biodiversity																					
CLR-3 :	To understand the natural and anthropogenic impact of the environmental pollution																					
CLR-4 :	To create awareness on different environmental problems																					
CLR-5 :	To create awareness on various Environment Protection acts and the impact of human population on environment																					
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:			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
CLO-1 :	Applying knowledge on Renewable and Non-renewable resources				2	80	65	L	H	L	M	L	H	L	L	L	H	L	M	-	-	M
CLO-2 :	Understanding about ecosystem and Biodiversity				2	80	70	M	H	L	M	L	H	L	L	L	H	L	M	-	-	M
CLO-3 :	Gathering knowledge on impact of environmental pollution				2	80	70	L	H	L	M	L	H	M	M	M	H	L	M	-	-	M
CLO-4 :	Understanding of different environmental problems				2	80	70	M	H	L	M	L	H	M	M	M	H	L	M	-	-	M
CLO-5 :	Having knowledge on various Environment Protection acts and the impact of human population on environment problems				2	80	65	M	H	L	M	L	H	L	M	L	H	L	M	-	-	M

Duration (hour)		9	9	9	9	9
S-1	SLO-1	Multidisciplinary nature of environmental studies	Energy flow in the ecosystem	Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity	Disaster management- Nature Floods, Earthquakes	Environment Protection Act
	SLO-2	Definition, Scope and Importance of Environmental Studies	Energy flow in the ecosystem	Environmental Pollution- Definition		Air (Prevention and Control of Pollution) Act
S-2	SLO-1	Need for public awareness.	Ecological succession	Causes, Effects and Control Measures of Air Pollution	Cyclones Landslides	Water (Prevention and control of Pollution) Act
	SLO-2	Institutions in Environment	Food chains, Food webs and Ecological pyramids			Wildlife Protection Act
S-3	SLO-1	People in Environment	Ecosystem, Introduction, Types, Characteristic features, Structure and functions	Causes, Effects and Control Measures of Water Pollution	Social Issues and the Environment: From Unsustainable to Sustainable Development	Forest Conservation Act
	SLO-2	Introduction to natural resources- Associated Problems	Forest ecosystem			Issues involved in enforcement of environmental legislation
S-4	SLO-1	Renewable and Nonrenewable resources	Grassland ecosystem	Causes, Effects and Control Measures of Soil Pollution	Urban problems related to energy	Public awareness
	SLO-2	Forest resources	Desert ecosystem		WaterConservation	
S-5	SLO-1	Water Resources	Aquatic ecosystems (ponds, lakes, streams)	Causes, Effects and Control Measures of Marine pollution	Rain Water Harvesting, Watershed	Human Population and the Environment:Population growth, variation

	SLO-2	Mineral Resources	Aquatic ecosystems (rivers, estuaries, oceans)			among nations
S-6	SLO-1	Food Resources	Biodiversity and its conservation-genetic, species and ecosystem diversity	Causes, Effects and Control Measures of Noise Pollution	Environmental Ethics: Issues and Possible Solutions	Population explosion – Family Welfare Programme
	SLO-2	Energy Resources	Biogeographical classification of India			Environment and human health
S-7	SLO-1	Land Resources	Value of Biodiversity	Causes, Effects and Control Measures of Thermal Pollution	Climate change & Global warming	Human Rights
	SLO-2	Role of an individual in conservation of natural resources	Biodiversity at Global, National and Local Levels			Value Education
S-8	SLO-1	Equitable use of resources for sustainable lifestyles	India as a Mega Diversity Nation	Causes, Effects and Control Measures of Nuclear hazards	Acid rain & Ozone layer depletion	HIV/AIDS
	SLO-2	Concept of an ecosystem	Hot-spots of biodiversity			
S-9	SLO-1	Structure and Functions of an ecosystem	Threats to biodiversity: habitat loss, poaching of wildlife man-wildlife conflicts	Solid Waste Management Causes, Effects and Control Measures of Urban and Industrial Waste	Nuclear Accidents and Nuclear Holocaust	Women and Child Welfare
	SLO-2	Producers, consumers and decomposers	Endangered and endemic species of India	Role of Individuals In Pollution Prevention	Wasteland Reclamation	Role of Information Technology in Environment and human health

Learning Resources	Theory:
	1. Bharucha Erach, (2013), Textbook of Environmental Studies for Undergraduate Courses (Second edition). Telangana, India: Orient BlackSwan.
	2. Basu Mahua, Savarimuthu Xavier, (2017), SJ Fundamentals of Environmental Studies. Cambridge, United Kingdom: Cambridge University Press
	3. R.Jeyalakshmi (2014), Text book of Environmental Studies, Devi publications, Chennai.
	4. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380013, India, Email:mapin@icenet.net (R)

Learning Assessment											
Level	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	40%	-	40%	-	40%	-	40%	-	40%	-
	Understand										
Level 2	Apply	30%	-	30%	-	30%	-	30%	-	30%	-
	Analyze										
Level 3	Evaluate	30%	-	30%	-	30%	-	30%	-	30%	-
	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 Academic	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr.N.Banu, Assistant Professor Bharathi Womens College (Autonomous), Chennai	1. Dr. P. Parthipan, Assistant Professor, Department of Biotechnology, FSH, SRMIST
		2.Dr. D. Sankari, Professor and Head, Department of Biotechnology, FSH, SRMIST

Course	USA23201J	Course	OBJECT ORIENTED PROGRAMMING	Course	C	Discipline Specific Core Courses	L	T	P	O	C
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Code			Name			Category												3	0	3	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 :		Introduction to object oriented programming.				Level of Thinking (Bloom)	1	2	3	Fundamental Knowledge	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :		Utilize method overloading and operator overloading for real-time application development programs																							
CLR-3 :		Utilize inline, friend and virtual functions and create application development programs																							
CLR-4 :		Utilize exceptional handling and collections for real-time object oriented programming applications																							
CLR-5 :		Create programs using object oriented approach and design methodologies for real-time application development																							
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																							
CLO-1 :		Understanding the object oriented programming				3		80	70	H	H	M	M	M	M	M	H	M	M	L	M	M	L	L	
CLO-2 :		Construct programs using method overloading and operator overloading				3		85	75	M	H	M	M	H	M	M	M	M	H	L	M	M	L	L	
CLO-3 :		Create programs using inline, friend and virtual functions, construct programs using standard templates				3		75	70	M	M	M	M	M	M	M	H	H	H	L	M	M	L	L	
CLO-4 :		Construct programs using exceptional handling and collections				3		85	80	M	M	M	M	M	M	M	H	H	H	L	M	M	L	L	
CLO-5 :		Construct programs using object oriented concepts				3		85	75	M	M	M	M	M	M	M	H	H	H	L	M	M	L	L	
Duration (hour)		18		18		18				18				18				18							
S-1	SLO-1	Comparison of Procedural and Object Oriented Programming		Constructor Types: Default and Parameterized constructor		Inheritance and its types				Introduction to Files				Templates : Introduction											
	SLO-2	List of OOPS languages and its features		Example Programs		Inheritance: Single				Classes For File Stream Operations				Types of templates											
S-2	SLO-1	Features: Classes, Objects, Inheritance, Polymorphism, Encapsulation		Constructor Types: Copy and Static, Private.		Inheritance: Multiple, Example program				Types of files, Opening and Closing a File, Example Program				Class Templates Example for class templates											
	SLO-2	Data Hiding, Message Passing, Reusability		Example Programs		Inheritance: Multilevel				Detecting End Of File				Function templates											
S-3	SLO-1	I/O Operations, Data Types		Destructor		Example program				Example program				Introduction to STL – Containers and Iterators											
	SLO-2	Variables, Constants and Type Conversion, Operators, Special operators		Static Data members, Static member functions, Example program		Visibility of access specifier				Read and write functions- character and string				Simple example for STL, Example program											
S4-6	SLO -1	Lab 1: I/O operations and operators		Lab 4: Parameterized Constructor and Constructor Overloading		Lab 7: Inheritance				Lab 10 : Simple file programs				Lab13 :Templates											
	SLO -2																								
S7	SLO-1	Control Structures		Overloading Concept in OOP		Inheritance : Hierarchical				File Open Modes				Exceptional Handling: Types of exceptional handling											
	SLO-2	Examples of Control Structures		Overloading types		Example program				Example program				Exceptional Handling :Try and Catch,											

						Example program
S-8	SLO-1	Functions and types	Function Overloading: Different parameter with same data type	Inheritance : Hybrid	File Pointer Manipulations	Exceptional Handling : Standard exceptions
	SLO-2	Function declaration and definition	Example Program	Example program	Example Program	Example program
S-9	SLO-1	Passing arguments, returning values,default arguments, Constant arguments	Function Overloading: Different parameter with different argument types,Example Program	Constructors and destructors in inheritance, Example Program	Sequential Input and Output Operations	Exceptional Handling: Multilevel exceptional
	SLO-2	Call by value , Call by reference,Return by reference, Inline Functions	Function Overloading: Different parameter with different return values,Example Program	Constructors and types of inheritance, Example program	Functions to handle file pointer, Example Program	throw and throws, Example program
S-10-12	SLO-1	Lab 2: Control structures and Functions	Lab 5 : Function Overloading	Lab 8 : Multiple ,Multilevel Inheritance	Lab 11 : Working with files	Lab 14 :Multilevel exceptional programs
	SLO-2					
S-13	SLO-1	Class and Objects	Operator Overloading Concept, Types of operator overloading	Virtual Base Classes	Reading a class object, Example Program	Exceptional Handling: finally
	SLO-2	Access specifier	Operator Overloading: Unary Operators, Example program	Example Program	Random Access –Updating a File	User defined exceptions
S-14	SLO-1	Visibility of access specifier Example program	Operator Overloading: binary Operators	Abstract Classes, Example Program	Example program	Programs for user defined exceptions, Example program
	SLO-2	Friend Function Example program	Example program	Virtual Functions, Example Program	Error Handling in File Operations	Exception Handling class, Example program
S-15	SLO-1	Inline functionsExample program	Operator Overloading: Assignment Operator	this pointer	Example program	User defined exceptional class
	SLO-2	Constructor, Destructor Example program	Example program	Example Program	Command Line Arguments, Example program	Example Programs using CPP
S-16-18	SLO-1	Lab 3: Classes and Objects	Lab 6 : Operator Overloading	Lab 9 : Abstract classes and Virtual Functions	Lab 12: command line arguments program	Lab 15:User defined Exceptions and simple CPP application.
	SLO-2					

Learning Resources	1. E Balagurusamy, <i>Object Oriented Programming in C++, 7th ed., Tata McGraw-Hill , 2017</i> 2. Reema Thareja, <i>Object Oriented Programming with C++, 1st ed., Oxford University Press, 2015</i> 3. R S Salaria, <i>Mastering Object Oriented Systems Development Programming in C++", 6th ed., Khanna Publishing,2016</i>	4. Robert Lafore, <i>Object-Oriented Programming in C++, 4th ed., SAMS Publishing, 2008</i> 5. Sourav Sahay, <i>Object Oriented Programming with C++, 2nd ed., Oxford University Press, 2017</i>
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Learning Assessment											
Level	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	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. Sivakumar

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Course Code	USA23202J	Course Name	Fundamentals of Data Structures and Algorithms	Course Category	C	Discipline Specific Core Courses					L	T	P	O	C
											3	0	3	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):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Utilize the different data types; Utilize searching and sorting algorithms	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Utilize linked list in developing applications	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-3 :	Utilize stack and queues in processing data for real-time applications																		
CLR-4 :	Utilize tree data storage structure for real-time applications																		
CLR-5 :	Utilize algorithms to find shortest data search in graphs for real-time application development																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Identify linear and non-linear data structures. Create algorithms for searching and sorting	2	80	70	M	M	M	H	M	M	M	H	M	H	L	M	L	L	M
CLO-2 :	Create the different types of linked lists and evaluate its operations	2	85	75	M	M	M	M	L	M	M	H	M	H	L	H	L	L	M
CLO-3 :	Construct stack and queue data structures and evaluate its operations	2	75	70	M	L	M	L	M	M	M	H	M	H	L	H	L	L	M
CLO-4 :	Create tree data structures and evaluate its types and operations	2	85	80	M	H	M	M	M	M	M	H	M	M	L	H	L	L	M
CLO-5 :	Create graph data structure, evaluate its operations, implement algorithms to identify shortest path	2	85	75	M	M	M	L	M	M	M	H	M	H	L	H	L	L	M

Duration (hour)	18	18	18	18	18
S-1	SLO-1 Introduction to theory of data structures	Introduction to stack	Tree Traversals-In order, preorder	Introduction to sorting	Graph Terminology
	SLO-2 Data representation	Representation of stack through array	Tree Traversals-Post order	Different types of sorting	Representation of graph-Arrays
S-2	SLO-1 Abstract Data type	Representation of stack through linked list	Binary Search Tree	Bubblesort	Representation of graph-Linked list
	SLO-2 Classification of data types	Operations on stack	Threaded Binary Search Tree	Example	Graph Traversal-BFS
S-3	SLO-1 Asymptotic Notation	Disadvantages of Stack, Polish notations	Binary Search Tree: Construction	Insertion Sort	Example
	SLO-2 Algorithm Analysis, Recursion	Applications-Evaluation of Expression, Tower of Hanoi, Infix to Postfix expression	Binary Search Tree: Insertion, Searching	Quicksort Example	Graph Traversal
S-4-6	SLO-1 Lab 1: Recursion	Lab 4: Implementation of stack and its applications	Lab 7: Implement all the three type of Tree Traversals	Lab 10: Implementation of Bubble and Insertion sort	Lab 13: Implementation of Graph using Array
	SLO-1 Introduction to Data structures	Queue	Applications of trees	Selection sort	
S-7	SLO-2 Data Structures and its uses	Representation of Queue using Arrays and Linked list	Applications of BST	Example	DFS, Topological Sorting
S-8	SLO-1 Linear and Non Linear Data Structures	Operations on Queue	Expression trees	Mergesort	BFS - Topological Sorting
	SLO-2 Operations on data structure	Circular Queue	Example	Example	Example
S-9	SLO-1 Array types	Double ended Queue	AVL Tree	Radix sort	Minimum spanning tree-Prims

	SLO-2	Array operations, Applications of arrays Dynamic memory allocation	Priority Queue, Reversing a Queue using another queue, Applications of Queue	AVL Tree Rotations, Applications of AVL tree	Heap Sort Example, Comparison of sorts	Minimum Spanning Tree – Kruskal's
S10-12	SLO-1	Lab 2: Arrays	Lab 5: Queue implementation using array and pointers	Lab 8: Implementation of BST Heap Data Structure	Lab 11: Implementation of Quick sort and mergesort	Lab 14: Implementation of shortest path algorithm
	SLO-2					
S-13	SLO-1	Introduction to lists	Introduction to non-linear data structures	Minimum Heap Construction	Introduction to searching, Linear search	Algorithm Design And Analysis
	SLO-2	Linked list operations	Tree ADT and Terminologies	Example	Binary search	Greedy Algorithms
S-14	SLO-1	Types of Linked Lists	Tree Terminologies	Minimum Heap Deletion Construction	Comparison of different search	Backtracking
	SLO-2	Linked list vs. Arrays	Tree Representation	Example	Define Hashing, Hash functions	Example
S-15	SLO-1	Application of linked list, Performance Analysis and Measurement of algorithm	Tree Types and Operations	Maximum Heap Construction	Hashing: Collision avoidance Hashing: Separate chaining,	Divide And Conquer
	SLO-2	Efficiency of algorithm, Time complexity and space complexity	Binary Tree Representation, Properties of binary tree	Maximum Heap Deletion Construction Applications of Heaps and AVL trees	Open addressing, Advantages of Hashing	Example
S16-18	SLO-1	Lab 3: Implementation of Linked List	Lab 6: Implementation of binary tree using Arrays	Lab 9: Implementation of Min and Max Heap	Lab 12: Linear search and Binary search	Lab 15: Implementation of minimum spanning tree
	SLO-2					

Learning Resources	1. Seymour Lipschutz, (2014), "Data Structures with C", McGraw Hill Education, Special Indian Edition 2. SRD Group, (2013), "Data structures using C", McGraw Hill, 2nd Edition, 3. R.F. Gilberg, B.A. Forouzan, (2005), "Data Structures", Thomson India, 2nd Edition, 4. A.V. Aho, J.E. Hopcroft, J.D. Ullman, (2003), "Data structures and Algorithms", 1st Edition, Pearson Education 5. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education 6. Reema Thareja, (2011), "Data Structures Using C", 1st Edition, Oxford Higher Education
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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	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. R. Aruna Rani

Course	UMS23202T	Course Name	Mathematical Foundation	Course	C	Discipline Specific Core Courses	L	T	P	O	C
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Code				Category			4	0	0	2	4
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Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Mathematics and Statistics	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 :	To apply the basic concepts and theorems of matrices	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-2 :	To learn the concepts of polynomial equations, reciprocal equations and approximation of roots.	Thinking Proficiency Attainment	3	85	80	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
CLR-3 :	To learn the basic concepts of differentiation, successive differentiation and partial differentiation					L	M	H	H	H	M	L	M	M	L	M	M	L	L	L
CLR-4 :	To learn the basic concepts of integration and to apply Bernoulli's formula and reduction formula.					H	H	L	M	L	M	M	M	H	L	M	M	L	L	L
CLR-5 :	To understand how a function is transformed by Laplace and inverse Laplace methods and how they are related.					L	H	M	H	L	M	M	M	M	L	H	M	L	L	L

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom) Expected Proficiency (%) Expected Attainment (%)	3	85	80	L	M	H	H	H	M	L	M	M	L	M	M	L	L	L
CLO-1 :	Gaining knowledge in basic concepts of matrix method.	3	80	75	H	H	L	M	L	M	M	M	H	L	M	M	L	L	L	L
CLO-2 :	Gaining knowledge in the concepts of polynomial equations and reciprocal equations and applying Horner's and Newton's methods for finding roots	3	85	80	M	H	M	M	H	M	M	M	H	L	M	M	L	L	L	L
CLO-3 :	Understanding the concepts of differentiation and to solve the problems of Radius of curvature and Euler's theorem	3	85	80	H	H	L	M	M	M	M	M	H	L	M	M	L	L	L	L
CLO-4 :	Understanding the concepts of integration and to evaluate reduction formula.	3	85	80	H	H	L	M	M	M	M	M	H	L	M	M	L	L	L	L
CLO-5 :	Getting the knowledge of Laplace and Inverse Laplace transformation and their application.	3	85	80	H	H	L	M	M	M	M	M	H	L	M	M	L	L	L	L

Duration (hour)	Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
S-1	SLO-1 Definition and types of matrix	12 Introduction to algebraic equations	12 Introduction to Differentiation	12 Introduction to integration	12 Introduction to Laplace Transforms
	SLO-2 Examples of types of matrix.	Types of algebraic equations	Solving basic problems	Basic problems on integration	Basic properties
S-2	SLO-1 Symmetric matrix	Relation between roots and coefficients of equation	More examples	Integration of polynomial functions	Problems on Laplace Transforms
	SLO-2 Skew symmetric matrix	Simple problems	More examples	Integration of polynomial functions	Problems on Laplace Transforms
S-3	SLO-1 Hermitian matrix	Problems on irrational roots	Minima of functions of single variable	Integration of irrational functions	Problems based on Shifting property
	SLO-2 Skew hermitian matrix	Problems on complex roots	Maxima of functions of single variable	Integration of irrational functions	Solving problems of type $L[e^{at} f(t)]$
S 4	SLO-1 Orthogonal matrix	Reciprocal equations-Definition	Minima and maxima of functions of single variable	Integration of irrational functions	Solving problems of type $L[tf(t)]$
	SLO-2 Unitary matrix	Solving Reciprocal equation of degree four with like and unlike signs for its coefficients-Type I	Minima and maxima of functions of single variable	Integration of irrational functions	Problems based on Derivative methods
S-5	SLO-1 Eigen values of a matrix	Solving reciprocal equation of odd degree with like signs for its coefficients-Type II	More examples on maxima and minima	Integration by the method of partial fractions type I	Solving problems of type $L[tf(t)]$
	SLO-2 Eigen values of a matrix	Solving reciprocal equation of odd degree with like signs for its coefficients-Type II	More examples on maxima and minima	Integration by the method of partial fractions type I	Solving problems of type $L[t^n f(t)]$

S-6	SLO-1	Eigen vectors of a matrix	Solving reciprocal equation of odd degree with unlike signs for its coefficients-Type III	Introduction to curvature	Integration by the method of partial fractions type II	Solving problems of type $L[e^{at}tf(t)]$
	SLO-2	Eigen vectors of a matrix	Solving reciprocal equation of odd degree with unlike signs for its coefficients-Type III	Radius of curvature	Integration by the method of partial fractions type II	Solving problems of type $L[e^{at}tf(t)]$
S-7	SLO-1	Eigen values and eigen vectors of a matrix	Solving reciprocal equation of even degree with unlike signs for its coefficients and the middle term is absent-Type IV	Problems based on radius of curvature	Integration by the method of partial fractions type III	Solving problems of type $L[e^{at}tf(t)]$
	SLO-2	Eigen values and eigen vectors of a matrix	Solving reciprocal equation of even degree with unlike signs for its coefficients and the middle term is absent-Type IV	Problems based on radius of curvature	Integration by the method of partial fractions type III	Solving problems of type $L[e^{at}tf(t)]$
S-8	SLO-1	Eigen values and eigen vectors of a matrix	Problems based on Type I and II	Problems based on radius of curvature	Bernoulli's formula	Solving problems of type $L\left[\frac{f(t)}{t}\right]$
	SLO-2	Eigen values and eigen vectors of a matrix	Problems based on Type III and IV	Problems based on radius of curvature	Simple problems	Solving problems of type $L\left[\frac{f(t)}{t}\right]$
S-9	SLO-1	Cayley Hamilton theorem	Newton-Raphson method.	Partial differentiation-Introduction	Reduction formula for $\int \sin^n x dx$	Introduction of Inverse Laplace transforms
	SLO-2	Problems based on Cayley Hamilton theorem	Problems on Newton-Raphson method.	Simple problems	Reduction formula for $\int \sin^n x dx$	Simple problems
S-10	SLO-1	Problems based on Cayley Hamilton theorem	Problems on Newton-Raphson method.	Euler's theorem	Reduction formula for $\int \cos^n x dx$	Basic problems on Inverse Laplace Transforms
	SLO-2	Problems based on Cayley Hamilton theorem	Problems on Newton-Raphson method.	Problems on Euler's theorem	Reduction formula for $\int \cos^n x dx$	Basic problems on Inverse Laplace Transforms
S-11	SLO-1	Cramer's rule	Horner's method	Problems on Euler's theorem	Reduction formula for $\int_0^{\frac{\pi}{2}} \sin^n x dx$	Finding inverse Laplace transforms by the method of partial fractions
	SLO-2	Problems based on Cramer's rule.	Problems on Horner's method	Problems on Euler's theorem	Reduction formula for $\int_0^{\frac{\pi}{2}} \sin^n x dx$	Finding inverse Laplace transforms by the method of partial fractions
S-12	SLO-1	Problems based on Cramer's rule.	Problems on Horner's method	Problems on Euler's theorem	Reduction formula for	Finding inverse Laplace transforms by the method of partial fractions

					$\int_0^{\frac{\pi}{2}} \cos^n x dx$	
	SLO-2	Problems based on Cramer's rule.	Problems on Horner's method	<i>Problems on Euler's theorem</i>	Reduction formula for $\int_0^{\frac{\pi}{2}} \cos^n x dx$	Finding inverse Laplace transforms by the method of partial fractions

Learning Resources	TEXT BOOKS: 1. Dr.A.Singaravelu, <i>Allied Mathematics</i> , 7 th edition, A.R.S.Publications, 2015 2. , P.R.Vittal, <edition>, Margham Publications, <year of publication>
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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%)		TheoryPractice	
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		
Level 1	Remember	30%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level 3	Evaluate	30%	-	30%	-	30%	-	30%	-	30%	-
	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 Academic	Internal Experts
1.Dr.V. Prakash, Dr. Ambedkar Government Arts college, Chennai (AcademicExpert)	1.Dr.S.Lakshmi priya,SRMIST
2.Dr.M.Vasantha,ICMR,Chennai(IndustrialExpert)	2.Dr.L.Sivakami,SRMIST

Course Code	UCD23S02T	Course Name	Verbal Ability and Skill Development	Course Category	S	Skill Enhancement Course	L	T	P	O	C
							2	0	0	2	2

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

Course Learning Rationale (CLR):		The purpose of learning this course is to:			Learning			Program Learning Outcomes (PLO)														
CLR-1 :	Critically evaluate basic mathematical concepts related to mixtures and alligations, Numbers, time and work				1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Use their logical thinking and analytical abilities to solve reasoning problems				Thinking (Bloom)	Proficiency (%)	Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modelling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behaviour	Life Long Learning
CLR-3 :	Develop soft skills relating to the need for job recruitment																					
CLR-4 :	Provide students with the necessary skills to generate and interpret data sufficiency, problems on Chain Rule, Pipes and Cisterns, Boats and streams,																					
CLR-5 :	Enable students to understand problems on graphs and also increase their ability in language skills																					

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 :	Understand the concepts of mixtures and alligations, Numbers, time and work and to approach questions in a simpler and innovative method	3	80	70
CLO-2 :	Establish a student's interest and awareness in seating arrangements, mathematical operations, logical reasoning	3	80	75
CLO-3 :	Acquire soft skills that will help for applying jobs	3	85	70
CLO-4 :	Demonstrate various principles involved in aptitude problems	3	85	80
CLO-5 :	Ability to solve problems on reasoning and to interpret English language	3	85	75

Duration (hour)	6	6	6	6	6
S-1	SLO-1 Time and Distance – Introduction	Seating Arrangements (Circular and table) Introduction	Resume Building - Introduction	Chain Rule, Pipes and Cistern – Introduction	Functions and Graphs Introduction
	SLO-2 Time and Distance – Problems	Seating Arrangements (Circular and table) – Problems	Resume Building	Chain Rule, Pipes and Cistern – Problems	Functions and Graphs – Problems
S-2	SLO-1 Time & Work- Introduction	Mathematical Operations – Basic Problems	Group Discussions - Introduction	Data Sufficiency – Introduction	Comprehension
	SLO-2 Time & Work – Problems	Mathematical Operations – Tricky Problems	Group Discussions – Mock GD	Data Sufficiency – Problems	Comprehension – Practise session
S-3	SLO-1 Alligation or Mixture – Introduction	Data Arrangements - Introduction	Group Discussions - Activity 1	Logarithms – Introduction	Idioms and Idiomatic Expressions – Introduction
	SLO-2 Alligation or Mixture - Problems	Data Arrangements – Problems	Group Discussions - Activity 1	Logarithms – Problems	Idioms and Idiomatic Expressions – Practise Session
S-4	SLO-1 Numbers – Basic Problems	Logical Deductions – Introduction	Group Discussions - Activity 2	Boats and Streams – Basic Problems	Cause and Effect - Introduction
	SLO-2 Numbers – Tricky Problems	Logical Deductions – Problems	Group Discussions - Activity 2	Boats and Streams – Tricky Problems	Cause and Effect – Practise Session
S-5	SLO-1 Problems on Trains – Introduction	Letter and Symbol Series – Basic Problems	Leadership Skills Introduction	True Discount – Introduction	Theme detection – Introduction
	SLO-2 Problems on Trains – Problems	Letter and Symbol Series – Tricky Problems	Leadership Skills	True Discount – Problems	Theme detection – Activity
S-6	SLO-1 Races and Games – Basic Problems	Input Output Tracing Introduction	How to Handle Criticism and Feedback	Geometry and Mensuration Introduction	Ordering of words _ Introduction
	SLO-2 Races and Games – Tricky Problems	Input Output Tracing – Problems	How to Handle Criticism and Feedback	Geometry and Mensuration – Problems	Ordering of words – Practise Session

Learning Resources	1. James Barrett & Tom Barrett - Ultimate aptitude tests: over 1000 practice questions for abstract visual, numerical, verbal, physical, spatial and systems tests, Kogan Page, London, 2018. Fourth edition 2. Kathy A. Zahler & Over Drive, Inc (Distributor) Conquering GRE verbal reasoning and analytical writing, McGraw-Hill Education, New York, 2020 Second Edition 3. Archana Ram, Place Mentor: Tests of Aptitude for Placement Readiness, Oxford University Press, Oxford, 2018 4. David Bartlett, The art of general practice: soft skills to survive and thrive, Scion, Banbury, 2018, eBook, 2018 5. Zolt Nagy, Soft skills to advance your developer career: actionable steps to help maximize your potential, A press, Berkeley, CA, 2019, eBook, 2022
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Learning Assessment					
Level	Bloom's Level of Thinking	Continuous Learning Assessment (100% weightage)			
		CLA – 1 (20%)	CLA – 2 (20%)	CLA – 3 (30%)	CLA – 4 (30%)#
		Theory	Theory	Theory	Theory
Level 1	Remember	30%	20%	30%	30%
	Understand				
Level 2	Apply	30%	50%	30%	30%
	Analyze				
Level 3	Evaluate	40%	30%	40%	40%
	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	Experts from Higher Technical Institutions	Internal Experts
Mr. M. Ponmurugan, Executive PMOSS, Cognizant Technology Solutions India Pvt. Limited, Chennai	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita Vishwa Vidyapeedam, Coimbatore	Dr. Sathish K, HOD, Department of Career Guidance Cell, FSH, SRMIST Dr. Muthu Deepa M, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST

Course Code	UEN23V01L	Course Name	COMMUNICATION SKILLS	Course Category	S	Value Addition Course	L	T	P	O	C
							0	0	4	2	2

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Department of English, FSH, SRMIST	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 :	Develop fluency in spoken English by practicing and engaging in various speaking activities.	1 2 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
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		pronunciation skills	between the two groups and the activity should be practiced.	learners about the right usage in order to avoid common errors.	and evaluated.	switching from Tamil to English and vice –versa.
S-6	SLO-1	Introducing to the audios of TED TALK American Speakers. Listening to the native speakers of English Language through TED TALKS.	Identify the key arguments in a passage -introductory point, lead point, supportive argument statement, concluding point and the common connecting word between all the key words in the passage.	Practicing how to avoid common errors.	Teaching effective writing by learning to avoid common errors in concord, preposition, conjunction, relative pronouns, question tags.	Reading of the third letter -Mr. Mathrubootham is fully supporting all new technologies
	SLO-2	Introducing to the audios of TED TALK British Speakers. Listening to the native speakers of English Language through TED TALKS.	encouraged to identify the key arguments in other passages on their own.	The learners are introduced to collocations for quick choice of learning how to speak in short time and how to speak effectively.	Practicing effective writing by learning to avoid common errors in concord, preposition, conjunction, relative pronouns, question tags.	Mathrubootham's frustration over the failure of technologies and the language that he positively uses to denote hopelessness over technologies.
S-7 – S-8	SLO-1	American and British styles can be differentiated.	Guiding the act of reading through scanning and skimming by model reading of the passages by the instructor.	Practice collocations	common errors in tenses, direct and indirect speech and syntax structure.	Reading of the fourth letter in the classroom and discussion Pizza maavu: Welcome to Mr. Mathrubootham food recipe website,
	SLO-2	The recognition of different accents should be practiced by speaking after listening.	scanning and skimming activities	Idioms and phrases	Practicing effective writing by learning to avoid common errors in tenses, direct and indirect speech and syntax structure.	Mathrubootham's love for food and the miscommunication about food.
S-9	SLO-1	Learning advanced pronunciation and vocabulary through various computer applications like Woodpecker.	Loud reading and slow mind reading	A speaking task to learn- collocations, idioms and phrases, vocabulary and phonetic pronunciation	Teaching how to write statement of purpose for admission to higher educations, and practicing the same.	Analysing the text for regional relevance and National significance.
	SLO-2	imitate the different sounds and accents - repeat it after listening to any of the videos from the library based on individual interest.	Pauses, pronunciation, comprehension and fluency can be checked for improvement at this stage through repetitive practices.	Their speaking activity is to be recorded and played again to rectify the errors and highlight the problematic areas in speaking.	Teaching how to write a story by looking at a picture. Developing the writing skill through word ladders.	Appreciating the aesthetics of the comic element and the embodiment of humour in the narrative in the letter
S-10	SLO-1	Repeat listening to the same time frames and move from 02.01 to 03.00	Students -groups -checking the comprehension skills. Analyse the text of a passage.	Automating vocabulary through engaging the students in various activity games like solving crossword puzzle and playing scattergories.	Introduction to blog writing and steps to become an effective blog writer.	importance of bringing in the Indianized way of speaking the English Language in order to depict the character called Mathrubootham.
	SLO-2	Choosing any particular time frame and practicing it.	Brainstorming the comprehension skills-questioning the key points in the passage.	Engaging the students to play the games in order to learn the vocabulary.	Encourage the readers to create their own blogs and post articles on a regular basis.	relatable characters of both formal and informal everyday life experiences.
S 11 - S 12	SLO-1	Interested students can complete listening and reflecting the complete audio listening practice and speaking.	Cross check with misunderstanding if any and rectify- match the question and answers.	Spur of the moment speech.:	Selecting any news article and learning the writing style in it.	Talk about their favourite letter from the letters of Mathrubootham by recollecting the appreciation of the text according to their perception and understanding.
	SLO-2	Group activities and games can be conducted to test the listening skills by responding to the speech given by other students	Passages for reading comprehension are to be given for practice that tests their reading skills.	Prepared speech : Giving a speaking task to the students to speak on their own choice	Students are given chances to write reports on various topics.	Enabling the students to share their appreciation of any of their favourite lines form the books they have read.

Learning Resources	1. Horizon- English Text Book – Compiled and Edited by the faculty of English Departement, FSH, SRMIST, 2020 2. English Grammar in Use by Raymond Murphy 3. Raymond Murphy, <i>Intermediate English Grammar</i>, Cambridge University Press, 2007 4. R.P. Bhatnagar, <i>English for Competitive Examinations</i>, Trinity Press, 3rd Edition, 2016
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5.	http://www.aptitudetests.org/verbal-reasoning-test
6.	https://www.assessmentday.co.uk/aptitudetests_verbal.htm

Learning Assessment					
Level	Bloom's Level of Thinking	Continuous Learning Assessment (100% weightage)			
		CLA – 1 (20%)	CLA – 2 (20%)	CLA – 3 (30%)	CLA – 4 (30%) #
		Practice	Practice	Practice	Practice
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 – 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
Krishna Raj Sutherland Krishna.Raj1@sutherlandglobal.com	Dr. J Mangayarkarasi Associate Professor and Head, Dept. of English Ethiraj College for Women Chennai jimbwilson97@gmail.com	1. Dr. Shanthichitra, Professor, & Head, Department of English, FSH, SRMIST
Ann Mariya Thomson RA2232105010015 II M.A English Literature CSH, SRM IST az1160@srmist.edu.in	Dr. K S Antonysamy Associate Professor and Head, Dept. of English Loyola College Chennai antonysamyks@loyolacollege.edu	2. Dr. Pushpanjali Sampathkumar, Assistant Professor, Department of English, FSH, SRMIST 3. Dr. Anchal Sharma, Prof & Hod EFL SRMIST NCR Campus 4. Dr T Sridevi, Assistant Professor English, FSH Ramapuram SRM 5. Dr Shanmuga Priya, Assistant Professor SRMIST Trichirapalli Campus

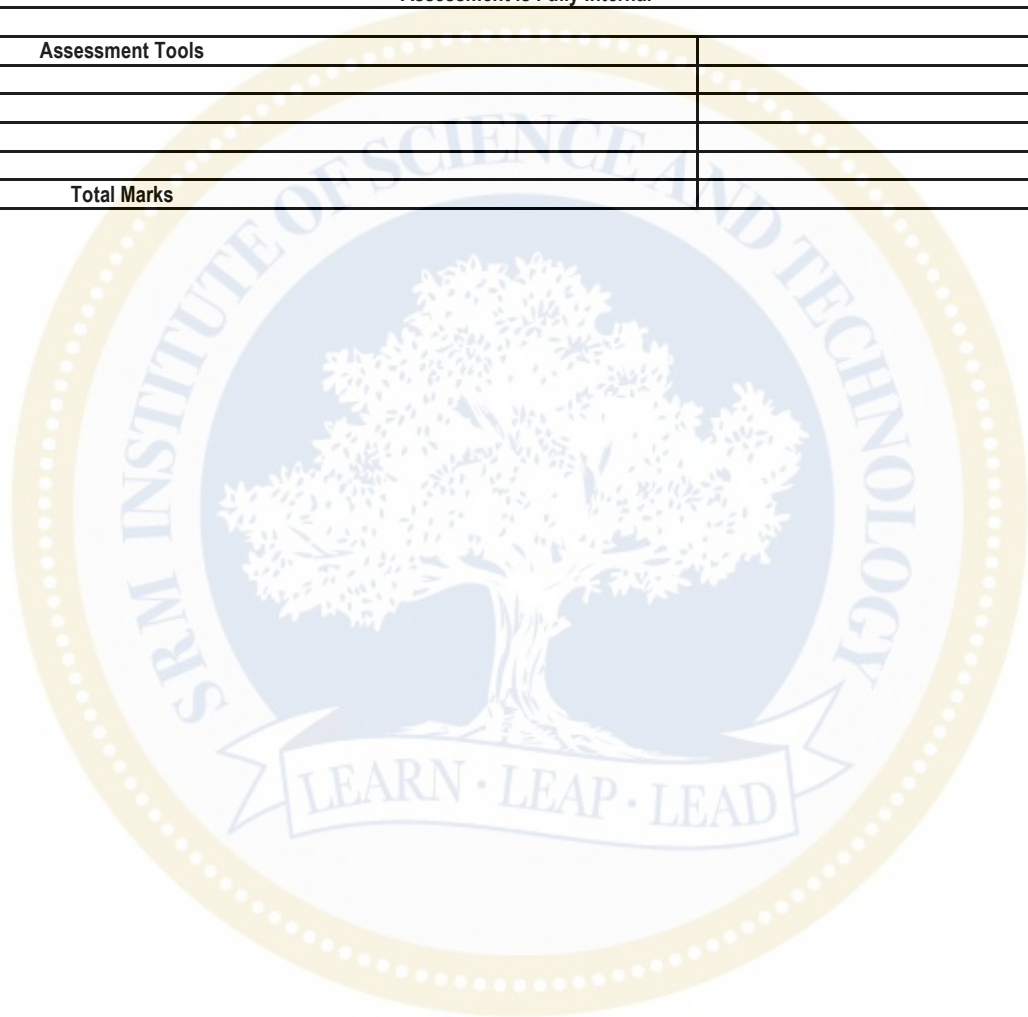
Course Code	UNS23M01L	Course Name	NSS	Course Category	M	Mandatory Courses	L	T	P	O	C
	UNC23M01L		NCC								
	UNO23M01L		NSO								
	UYG23M01L		YOGA								
							0	0	0	0	0

Pre-requisite Courses	Nil	Co-requisite	Nil	Progressive Courses	Nil
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		Courses		
Course Offering Department	NSS/NCC/NSO/YOGA	Data Book / Codes/Standards	Nil	

Assessment is Fully Internal

Learning Assessment	
Assessment Tools	Marks
Continuous Learning Assessment –I (CLA-I)	20 Marks
Continuous Learning Assessment –II (CLA-II)	30 Marks
Continuous Learning Assessment –III (CLA-III)	30 Marks
Continuous Learning Assessment –IV (CLA-IV)	20 Marks
Total Marks	100 Marks



SEMESTER –III

Course Code	USA23301J	Course Name	PROGRAMMING IN JAVA	Course Category	C	Discipline Specific Core Course	L	T	P	O	C
							3	0	3	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 :	An overview of Java and Buzz words	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Understand the object oriented features in Java																		
CLR-3 :	Create and understand the Java program structure																		
CLR-4 :	Understand the Java packages and Interfaces																		
CLR-5 :	Use the multithreading programming scenario																		

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 :	Understand the difference between C++ and Java	2	85	80	H	H	M		H	-	-	M	M	L	-	I	-	-	-
CLO-2 :	Develop Java program using JVM	3	85	80	L	H		H		-	-	M	M	L	-	H	-	-	-
CLO-3 :	Use the various kinds of packages and interfaces	3	85	80	L	H		H	H	-	-	M	M	L	-	H	-	-	-
CLO-4 :	Apply the Exception handling methods in Java program.	3	85	80	L	H		H	H	-	-	M	M	L	-	H	-	-	-
CLO-5 :	Identify applet and application programming	3	85	80	L	H	H		H	-	-	M	M	L	-	H	-	-	-

Duration (hour)		18	18	18	18	18
S-1	SLO-1	Basic concepts in OOP.: Major principles - encapsulation, abstraction, inheritance, polymorphism.	Constructors- Characteristics of constructors	Method Overriding	Introduction to Java Thread model- Creating a Thread by Extending Thread Class	Introduction to Event Handling - Understanding Action Event & Item Event
	SLO-2	Benefits of OOP. Applications of OOP	Types of Constructors -Using this Keyword	Dynamic method dispatch - Abstract keyword	Creating a Thread by implementing Runnable Interface	Understanding Key Event & Mouse Event
S2	SLO-1	The Genesis of Java How java changed the internet- Java's magic: Byte Code	Introduction to Garbage Collection, Using Finalize () method	Abstract class	Thread Class -Creating multiple threads	Text Event, Window Event, Component Event-
	SLO-2	Introduction to Java Buzzword- Understanding Java Buzzwords	Overloading methods	Working with Abstract class and Method	Assigning Thread priorities	Introduction to Event Listener Interfaces Working with Action Listener &, Adjustment Listener
S3	SLO-1	Understanding Encapsulation, Polymorphism, Inheritance	Overloading constructors Using objects as parameters- Argument Passing	Dynamic Binding	Applying Synchronization- Inter-thread communication	Working with Container Listener Working with Key Listener & Mouse Listener
	SLO-2	Introduction to Lexical Issues of Java Understanding Whitespaces, Identifiers.	Returning Objects- Recursion	Using final with inheritance	Introduction to Legacy Calsses	Item Listener, Component Listener

		Literals Comments, Separators, Keywords	Introducing Access Control			
S4 – S6	SLO-1	Laboratory 1: Basic Java Programs	Laboratory 4: Classes and Objects	Laboratory 7: Inheritance, Method Overriding, Abstract classes and methods	Laboratory 10: Multithreading	Laboratory 13: Event Handling
	SLO-2					
S7	SLO-1	Data types - byte, short, int, long, float, double, chars, Boolean	Static variables and methods	Introduction to Package	Vector class	Introduction AWT Controls Working with Label controls
	SLO-2	Variable- Declaring a variable, dynamic initialization of variables, Scope and lifetime of variables	Final variables and methods Working with Nested Class	Creating a Package	Stack class	Working with Buttons controls
S8	SLO-1	Introduction to Operators, Working with Arithmetic, Relational, Logical, Bitwise, Conditional, Assignment operators	Inner Class, String Class	Understanding Access Protection- Importing packages	Introduction to Legacy Interfaces Understanding Enumeration Interface	Working with Check Boxes
	SLO-2	Array- Initialization of Arrays, Types of Arrays	String array	Introduction to Interfaces	Introduction to Utility classes	Working with Check Box Group controls Working with Choice controls controls
S9	SLO-1	Introduction to Control Statements IF, IF the else statements	String Handling Methods	Defining an interface	Working with String Tokenizer	Working with Lists controls Working with Text Field controls
	SLO-2	Selection Statements, All forms of if & Switch		How Interfaces are extended		Introduction to Layout Manager
S10-12	SLO-1	Laboratory 2: Operators	Laboratory 5: Overloading Methods and Constructors	Laboratory 8: Packages and Interfaces	Laboratory 11: Legacy Classes and Interfaces	Laboratory 14: AWT Controls
	SLO-2					
S-13	SLO-1	Iterative Statements,	Command Line arguments, finalize() method	Implementing Interfaces	Introduction Working with Date class	Flow Layout
	SLO-2	Working with while, do-while, for, for each statements		Introduction to Exception handling	Introduction Working with Gregorian Calendar	Border Layout
S-14	SLO-1	Jump Statements- break statements, continue and return statements	Single line arguments, Double line arguments	try and catch	Working with Date class- Working with Calendar	Grid Layout
	SLO-2	Introducing classes- Class fundamentals	Inheritance Basics	multiple catch clauses ,Finally ,Throw and throws	Working with Gregorian Calendar- Working with Random Class	Byte Streams classes
S-15	SLO-1	Declaring Objects- Assigning object Reference variables-	Types of Inheritance: Single, Multilevel, Hierarchical Inheritance	Exception Types	Working with Scanner Class	Introduction to I/O Streams
	SLO-2	Introducing method	using Super keyword	Built-in Exceptions ,Creating user defined Exceptions	utility classes	Character Streams classes
S16-18	SLO-1	Laboratory 3: Arrays, Control Statements	Laboratory 6: String Class, Command Line Arguments	Laboratory 9: Exception Handling	Laboratory 12: Utility Classes	Laboratory 15: Layout Managers, Byte and Character Streams
	SLO2					

Learning Resources	1. Herbert Schildt (2007), Java: The Complete	1. Horstmann S., Gray Cornell (2001), Core Java 2 Volume In, Fundamentals, Addison Wesley, New York.
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	Reference, Tata McGraw-Hill, Seventh Edition, New Delhi.	2. Arnold and Gosling, J. (2000), The Java Programming Language, Addison Wesley, 2 nd Edition, New Delhi. 3. Art Gittleman (2002), Ultimate Java Programming, Wiley Publications, New York.
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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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelamarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. Angelin Claret S P

Course Code	USA23302J	Course Name	DATABASE MANAGEMENT SYSTEM	Course Category	C	Discipline Specific Core Course	L	T	P	O	C										
							3	0	3	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 the fundamentals of Database Management Systems, Architecture and Languages			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Conceive the database design process through ER Model and Relational Model			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 :	Design Logical Database Schema and mapping it to implementation level schema through Database Language Features																				
CLR-4 :	Familiarize queries using Structure Query Language (SQL) and PL/SQL																				
CLR-5 :	Familiarize the Improvement of the database design using normalization criteria and optimize queries																				
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																			
CLO-1 :	Acquire the knowledge on DBMS Architecture and Languages			3	80	70	H	M	L	L	-	-	-	-	L	L	L	H	-	-	-
CLO-2 :	Apply the fundamentals of data models to model an application's data requirements using conceptual modeling tools like ER diagrams			3	85	75	H	H	H	H	H	-	-	-	H	H	H	H	-	-	-
CLO-3 :	Apply the method to convert the ER model to a database schema based on the conceptual relational model			3	75	70	H		H	M	H	-	-	-	M	H	L	H	-	-	-
CLO-4 :	Apply the knowledge to create, store and retrieve data using Structure Query Language (SQL) and PL/SQL			3	85	80	H	H		H		-	-	-	M	M	L	L	-	-	-
CLO-5 :	Apply the knowledge to improve database design using various normalization criteria and optimize queries			3	85	75	H	H	L	M	L	-	-	-	M	M	M	L	-	-	-
Duration (hour)		18		18		18		18		18		18									
S-1	SLO-1	What is Database Management System	Design process	Application of SQL Commands (Structure Creation, alternation)		Relational Model - Codd Rules		Transaction Management Transaction Concept													
	SLO-2																				
S-2	SLO-1	Advantage of DBMS over File Processing System	Entity Relation Model and ER diagram	Defining Constraints-Primary Key, Foreign Key, Unique, not null, check, IN operator		Normalization – 1Nf, 2NF, 3NF, BCNF, 4NF and 5NF		Transaction States													
	SLO-2																				
S-3	SLO-1	Introduction and applications of DBMS, Views of data and Data Independence	Case study for ER Diagram	Aggregate Functions Built-in Functions-Numeric, Date, String Functions- SQL: Joins Basics		PL/SQL: variable declaration and control structures		Concurrency Control: Lock based Protocols Two Phase Control Commit Protocol													
	SLO-2																				
S 4-6	SLO-1	Lab 1: Data Definition Language Commands on sample exercise	Lab4 Inbuilt functions in SQL on sample Exercise.	Lab 7 : Join Queries on sample exercise. Demonstration for all Join Commands with SQL queries		Lab 10: PL/SQL Conditional and Iterative Statements		Lab:13 Authenticating the user (Users Credential ability)													
	SLO-2																				
S-7	SLO-1	: SQL Data types and Schemas, Database system Architecture	Keys, Attributes and Constraints	Left Inner and Right Outer Joins with suitable examples		PL/SQL: Query Processing and Stored Procedure		Deadlock concepts in Database													

	SLO-2	Database Users and Administrators			PL/SQL: Exceptional Handling	
S-8	SLO-1 SLO-2	Roles of Database Administrator	Mapping Cardinality	Inner and Outer Joins with suitable examples	PL/SQL Cursor	Recovery mechanism- Recovery Concepts, Deferred update technique,
S-9	SLO-1 SLO-2	Overview of SQL, Comparison of Data Models, DDL (Data Definition Language) Command	Extended ER - Aggregation Generalization and Specialization, ER Diagram Issues	Correlated sub queries	PL/SQL: Functions and statements to handle Cursor	Recovery mechanism - Immediate update technique, Shadow paging, check point
S 10-12	SLO-1 SLO-2	Lab 2: SQL Data Manipulation Language Commands	Lab:5 SQL Queries and Set operation SQL	Lab8: Correlated Subqueries	Lab 11: PL/SQL Exceptional Handling	Lab 14: Implementation by Using Tools Frontend (VB 10.0) and Backend (Oracle12g)
S-13	SLO-1 SLO-2	SQL : Data Manipulation Commands	SQL Queries and SQL: Set Operations	Pitfalls in Relational database	PL/SQL: Trigger PL/SQL: Application Programs	Implementation by Using Tools Frontend (VB 10.0) and Backend (Oracle12g)
S-14	SLO-1 SLO-2	SQL: Data Control Commands	Conversion of ER to Relational Table	Functional Dependency	ISAM, B-trees Introduction	Mandatory Access control and Multilevel Security
S-15	SLO-1 SLO-2	SQL: Transaction Control Commands	SQL: Nested Queries	definition, trivial and non-trivial FD	File Organization, Indexing Methods – Primary, Secondary, Multilevel Indices	Database security and Authorization Need for Database security
S 16-18	SLO-1	Lab 3: SQL Data Control Language Commands and Transaction control commands to the sample exercises	Lab 6: Nested Queries on sample exercise * Construction of Relational Table from the ER Diagram	Lab9: Decomposition using FD-dependency preservation,	Lab 12: PL/SQL Trigger	Lab 15 Project: : i)Employee payroll processing system ii)Student Marksheet processing system iii)Banking system

Learning Resources	1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, Database System ConceptsII, Sixth Edition, Tata McGraw Hill,2011. 2. RamezElmasri, Shamkant B. Navathe, Fundamentals of Database SystemsII, Sixth Edition, Pearson Education,2011. 3. C.J Date,AKannan,SSwamynathan, An Introduction to Database Systems, Eight Edition, Pearson Education,2006. 4. Rajesh Narang, Database Management Systems, 2 nd ed., PHI Learning Private Limited,2011.	5. Martin Gruber, Understanding SQL, Sybex,1990 6. SharadMaheshwari,Introduction to SQLandPL/SQL,2 ^d ed.,LaxmiPublications,2016. 7. RaghuramaKrishnan,JohannesGehrke,Database Management Systems,3rdEdition,McGrawHill Education,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, Tech Talks, Mini-Projects, Case-Studies, Self-Study, Conf. Paper etc.

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts

Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mrs. Ramla M
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Course Code	UMS23303T	Course Name	Numerical Methods	Course Category	C	Discipline Specific Core Course	L	T	P	O	C
							4	0	0	2	4

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Mathematics and Statistics	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):		The purpose of learning this course is to:		
CLR-1 :	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems.			
CLR-2 :	Apply numerical methods to obtain approximate solutions to mathematical problems			
CLR-3 :	Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations			
CLR-4:	Analyze and evaluate the accuracy of common numerical methods.			
CLR-5:	Understand and solve problems on numerical differentiation, numerical integration& Milne's predictor-correctorr method			

Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:		
CLO-1 :	Gain knowledge about Bisection, Regula falsi Newton's method			
CLO-2 :	Appreciate the concepts of simultaneous equations			
CLO-3 :	Understand the basic ideas about Interpolation and extrapolation			
CLO-4 :	Acquire the knowledge on Numerical solutions of Ordinary differential equations of first and second order			
CLO-5 :	Understand and solve the problems on Euler's and Improved Euler's Method - Modified Euler's Method, Runge-Kutta method of second and fourth order – Milne's predictor corrector method			

Learning			Program Learning Outcomes (PLO)															
1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	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	-	-	L	-	-	-	-	-	-	-	-	-	-	-
			L	M	-	-	-	-	-	-	-	-	-	H	-	-	-	-
			-	-	-	-	-	-	-	-	-	-	-	H	-	-	-	-
			M	-	-	H	-	-	-	-	L	-	-	-	-	-	-	-
3	85	80	-	H	-	-	L	-	-	-	-	M	-	-	-	-		

Duration (hour)		Learning Unit / Module 1 12	Learning Unit / Module 2 12	Learning Unit / Module 3 12	Learning Unit / Module 4 12	Learning Unit / Module 5 12
S-1	SLO-1	Basic concepts of the algebraic equation	Numerical solution of simultaneous equations	Finite difference operator - introduction	Numerical differentiation -Introduction	Numerical solution of ordinary differential equation
	SLO-2	Basic concepts of the transcendental equations	solution of simultaneous linear algebraic equations	Forward and Backward difference operator	Newton's forward difference formula to get the derivative	Point wise methods
S-2	SLO-1	Finding of the range of the given equation	Gauss elimination method	Relation between the operators	Newton's backward difference formula to get the derivative	Solution by Taylor series method
	SLO-2	Bisection method explained	Direct method explanation	Relation between d and delta	First derivative using Stirling's formula	Taylor series method for simultaneous first order differential equations

S-3	SLO-1	Solving Bisection method based problems with two decimal places	Problems solved based on Gauss elimination method	Newton-Gregory forward interpolation definition	Problems solved based on First derivative Stirling's formula	Taylor series method for simultaneous second order differential equations
	SLO-2	Problems solved based on Bisection method	Gauss elimination method with unique solution	Newton-Gregory forward difference table explanation	Problems solved based on second derivative Stirling's formula	Problems solved based on Taylor series method
S-4	SLO-1	Bisection method based problems upto three decimal places	Gauss elimination method with negative roots	Newton-Gregory forward interpolation concept	Problems solved based on First and second derivative using Stirling's formula	Problems solved based on Taylor series method
	SLO-2	Bisection method based problems upto four decimal places	Computation of the inverse of a matrix using Gauss elimination method	Expression of any value y in terms of y_n and the corresponding backward differences of y_n	Numerical integration basic concept	Euler's method
S-5	SLO-1	Problems solved based on the above concept	Computation of the inverse of a matrix using Gauss elimination method	Newton - Gregory forward interpolation table based problems	A general quadrature formula for equidistant ordinates	Improved Euler's method
	SLO-2	Successive approximation method	More problems solved by this method	Newton-Gregory backward interpolation concept explanation	Numerical integration using Trapezoidal rule	Modified Euler's method
S-6	SLO-1	The condition for the convergence method	More problems solved by this method by Gauss elimination method	Newton-Gregory backward interpolation based problems solved	Trapezoidal rule formula given	Problems solved based on Modified Euler's method
	SLO-2	Order of convergence of an iterative method	Jacobi method of iteration (Gauss-Jacobi Method)	Problems solved based on the above two concept	Geometrical interpretation of Trapezoidal rule	Problems solved based on Euler's method
S-7	SLO-1	Problems solved based on Successive approximation method	Difference between the above methods	Newton's divided difference formula	Truncation error in Trapezoidal rule	Problems solved based on Improved Euler's method
	SLO-2	Regular falsi method Introduction	Iterative methods	Problems solved based on Newton's divided difference formula	Problems solved based on Trapezoidal rule	Runge-Kutta method
S-8	SLO-1	Basic concepts of Regular falsi method	Jacobi method of iteration (Gauss-Jacobi Method)	Problems solved based on Newton's divided difference formula	Simpson's 1/3 rule -introduction	second -order Runge-Kutta method
	SLO-2	Regular falsi method method by MATLAB	Convergence condition for Gauss-Jacobi Method	Lagrange's interpolation formula for uneven intervals	Difference between Trapezoidal rule Simpson's 1/3 rule	Concept- based Simple Problems on second -order Runge-Kutta method
S-9	SLO-1	Problems solved based on Regular falsi method by two decimal places	Gauss-Jacobi Method based problems up to two decimal places	Lagrange's interpolation formula for even intervals - difference	Truncation error in Simpson's 1/3 rule	Two decimal places based simple problems on second -order Runge-Kutta method
	SLO-2	Problems solved based on Regular falsi method by three decimal places	Gauss-Jacobi Method based problems up to three decimal places	Problems solved based on the Lagrange's interpolation	Truncation error in Simpson's rules	four decimal places based simple problems on second -order Runge-Kutta method
S-10	SLO-1	Problems solved based on Regular falsi method by four decimal places	Gauss-Jacobi Method based problems up to three decimal places	Problems solved based on Lagrange's interpolation	Problems solved based on Trapezoidal rule and Simpson's 1/3 rule	Problems solved based on second -order Runge-Kutta method
	SLO-2	More problems based on Regular falsi method	Problems solved based on the above concept	Lagrange's inverse interpolation formula for uneven intervals	Problems solved based on Trapezoidal rule and Simpson's 1/3 rule	Problems solved based on second -order Runge-Kutta method
S-11	SLO-1	Problems solved based on Regular falsi method	Gauss Seidel iteration method.	Lagrange's inverse interpolation formula for even intervals - explanation	Numerical integration using Simpson's 3/8 rule	Runge-Kutta method of fourth order
	SLO-2	Newton-Raphson	Introduction and formula explanation	Problems solved based on the Lagrange's inverse	Truncation error in Simpson's 3/8 rule	Formula given for Runge-Kutta method of

		method.Introduction		interpolation		fourth order
S-12	SLO-1	Geometrical meaning of Newton-Raphson method.	Procedure and difference between the above two methods explanation	Problems solved based on the Lagrange's inverse interpolation	Problems solved based on Simpson's 3/8 rule	Problems solved based on fourth -order Runge-Kutta method
	SLO-2	Criterion for the convergence in the above method and problems solved	Finding the solution by Gauss Seidel iteration method.	More Problems solved based on the Lagrange's forward and inverse interpolation	Problems solved based on the above three methods	Problems solved based on fourth -order Runge-Kutta method

Learning Resources	Book for study: 1. Numerical methods, Dr.P. Kandasamy, Dr. K.Thilagavathy, Dr. K.Gunavathy, S Chand and Company Reprint 2020 Books for References: 1. Kandasamy P, Thilagavathy. K and G. Gunawathy, Numerical Methods, S.Chand& Sons, 3rd Revised Edition, 2013 2. Isaacson E. and Keller, H.B., "Analysis of Numerical Methods" Dover Publication, 1994 3. Philips G.M and Taylor P.J., "Theory and Applications of Numerical Analysis", Academic Press, 1996
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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	30%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level 3	Evaluate	30%	-	30%	-	30%	-	30%	-	30%	-
	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 Academic	Internal Experts
1. Dr.V.Prakash, Dr.Ambedkar Government arts college, Chennai (academic Expert)	2. Dr. S.Lakshmi priya, Assistant Professor, Department of mathematics & Statistics, FSH, SRM IST, Kattankulathur
3. Dr. M. Vasantha, ICMR, Chennai (Industrial Expert)	4. Dr.L.SIVAKAMI, Assistant Professor, Department of mathematics & Statistics, FSH, SRM IST, Kattankulathur

Course Code	ULT23AE1J	Course Name	Applied Tamil – I	Course Category	AE	Ability Enhancement Courses (AE)	L	T	P	O	C
							1	0	2	2	2

Pre-requisite Courses		Nil		Co-requisite Courses		Nil		Progressive Courses		Nil																
Course Offering Department		Tamil				Data Book / Codes/Standards		Nil																		
Course Learning Rationale (CLR):		The purpose of learning this course is to:						Learning		Program Learning Outcomes (PLO)																
CLR-1:							Level of Thinking (Bloom) Expected Proficiency (%) Expected Attainment (%)	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-2:								1	2	3	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	PSO -1	PSO -2	PSO-3		
CLR-3:								2	75	60	H	L	H	M	H	H	L	M	H	M	L	H	H	-	-	-
CLR-4:								2	70	65	H	L	H	M	H	H	M	H	L	H	M	H	-	-	-	
CLR-5:								2	70	70	H	M	H	L	H	M	M	H	H	L	H	H	-	-	-	
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:						2	80	70	H	M	H	H	M	H	L	M	H	L	H	H	-	-	-	
CLO-1:							2	75	60	H	L	H	M	H	H	L	M	H	M	L	H	H	-	-	-	
CLO-2:							2	80	70	H	M	H	L	M	H	L	H	M	L	H	H	-	-	-		
CLO-3:	வாய்மொழி மரபின் கூறுகள் வழி,மக்களின்வாழ்வியல்விழுமியங்களைஅறிந்துகொள்ளுதல்						2	70	65	H	L	H	M	H	H	M	H	L	H	M	H	-	-	-		
CLO-4:							2	70	70	H	M	H	L	H	M	M	H	H	L	H	H	-	-	-		
CLO-5:							2	80	70	H	M	H	H	M	H	L	M	H	L	H	H	-	-	-		
Duration (hour)		9		9		9		9		9		9		9		9		9		9		9		9		
S-1	SLO-1																									
	SLO-2																									
S-2	SLO-1																									
	SLO-2																									
S-3	SLO-1																									
	SLO-2																									
S-4	SLO-1																									
	SLO-2																									
S-5	SLO-1																									
	SLO-2																									
S-6	SLO-1																									
	SLO-2																									

Course Code	ULH23AE1J	Course Name	APPLIED HINDI-I	Course Category	AE	Ability Enhancement Courses (AE)	L 1	T 0	P 2	O 2	C 2
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Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	HINDI	Data Book / Codes/Standards			Nil

Course Learning Rationale (CLR): The purpose of learning this course is to:

CLR-1 :	Explain and appreciate the Constant moral values of India
CLR-2 :	Focus on Evaluating the social changes through prose
CLR-3 :	To Display moral and social values in the field of religion and communal Unity
CLR-4 :	To make translation of good literature and any relevant document from the Hindi Language to English and vice –versa
CLR-5 :	To help the learners to tackle Administrative terminology

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
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	PSO -1	PSO -2	PSO -3
H	H	H	M	L	H	L	M	L	L	H	M	-	-	-
H	H	H	M	L	H	H	M	L	L	H	M	-	-	-
H	H	M	L	H	H	M	H	M	M	H	H	-	-	-
H	H	L	H	M	H	L	H	H	M	H	H	-	-	-
M	H	M	H	L	H	H	L	H	M	H	H	-	-	-

Course Learning Outcomes (CLO): At the end of this course, learners will be able to:

CLO-1 :	Understand the various forms of Prose and different aspects of social issues	2	75	80
CLO-2 :	To create an awerness on Ramayanan	2	80	90
CLO-3 :	To Examine the accuracy in Translation	2	75	95
CLO-4 :	To Provide technical writing skills	2	80	90
CLO-5 :	To evaluate the nuance in essays	2	85	90

Duration (hour)	9	9	9	9	9
S-1 SLO-1	KAHANI	NIBANDH	BAL RAMAYAN	ANUVAD	PARIBHASHIK SHABDAVALI
SLO-2	AVDHARNA	VDHARNA	HATHA VASHTU	AVDHARNA	RTH
S-2 SLO-1	ARTH	RTH	VADHPURI MEN RAM	ARTH	ARIBHASHA
SLO-2	SWARUP	WARUP	RAM KE ADARSH KE PRATI PRERIT KARNA	SWARUP	WARUP
S-3 SLO-1	PARIBHASHA	ARIBHASHA	AMAYAN KE PRATI RUCHI JAGANA	PARIBHASHA	RAKAR
SLO-2	KAHANI KE TATVA	IAHABHARAT KE SAMAY KA BHARAT-	AMAYAN KA SAMAJ MEN MAHATVA	PRAKAR	VADHARNA

			HALKRISHNA BHATT			
S-4	SLO-1	UDDESHYA	EKHAK PARICHAYA	OKJEEVAN KE PRATI JAGRUP KARNA	MAHATVA	RAYOJAN
	SLO-2		ATH KA VISLESHAN	JANGAL AUR JANKPUR	UDDESHYA	DDESHYA
S-5	SLO-1	ANTASH MAN KI JAGRITI	DDESHYA	GURU KE PRATI ADAR BHAV	ANUBAD PRAKRIYA	MAHATVA
	SLO-2	EIDGAH – KAHANI PREMCHAND	AMAJIK SAMRASTA	IRTA KE BHAV KO JAGANA	VIVIDH PRAYOG	RAYOG
S-6	SLO-1	KAHANI KA PARICHAYA	PAURANIK KAHANIYO SE AVAGAT KARANA	VIDHARM KA PRATIFAL	HINDI SE ANGREZI ANUVAD	DDESHYA
	SLO-2	KAHANI VISLESHAN	MAHABHARAT EVAM RAMAYAN KE SAMAJ KI TULNA	VAN JEVAN SE AVAGAT KARANA	ANGREZI SE HINDI ANUVAD	AKANIKI SHABDAVALI KA MHATVA
S-7	SLO-1	BAL MANOVIGYAN	BABUL AUR KAKTASH-RAMDARASH MISHRA	SITA KE ADARSH CHARITRA SE AVAGAT KARANA	NUVAD KA PRAYOJAN	HINDI SE ANGREZI SHABD
	SLO-2	ASMANTA KA CHITRAN	LEKHAK PARICHAY	RAM KE CHARITRA SE AVAGAT KARANA	NUVAD KA PRAYOG	ANGREZI SE HINDI SHABD
S-8	SLO-1	DIP SE DIP JALE- USHA YADAV	PATH KA VISLESHAN	VIRTA KE BHAV JAGANA	HROT BHASHA KA GYAN	EK DIN EK SHABD
	SLO-2	SAPNE KE LIYE SANGHARSH	MANVATA KO JIVIT RAKHANE KI PRERNA	PATH KA VISLESHAN	LAKSHYA BHASHA KA GYAN	SHABDON KA VISLESHAN
S-9	SLO-1	SAMASYA KA SMADHAN JAD MEN HOTA HAI	AAJ KE SANDARBH ME MAHABHARAT KI UPYOGITA	PATH PRICHARCHA	ANUVAD KA DAYITVA	PATH PRICHARCHA
	SLO-2	PRASHNABHAYASH	PRASHNABHAYASH	PRASHNABHAYASH	ANUVAD KA ABHYASH	PRASHNABHAYASH

Learning Resources	Edited Book: "PRAYOJAN MULOKE HINDI", SRIJONLOK PUBLICATION, 2023, New Delhi. 1. Srijanlok Literary Magazine, Ara (Bihar – 802301) 2. https://hindisamay.com/ 3. https://ncert.nic.in/textbook.php?fhbr1=0-12 4. Prayojan mulak Hindi, Dr. Sontakke https://rajbhasha.gov.in/hi/ol_clause	PUNRIKSHAN
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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	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
Level 2	Apply Analyze	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
Level 3	Evaluate Create	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	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
Shri. Santosh Kumar	1. Prof.(Dr.) S.Narayan Raju, Head, Department of Hindi,CUTN, Tamilnadu	1. Dr.S Preeti. Associate Professor & Head, SRMIST

Editor : Srijanlok Magazine Place: Vashishth Nagar, Ara – 802301		
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Course Code	ULF23AE1J	Course Name	French for Specific purpose-I	Course Category	AE	Ability Enhancement Courses (AE)	L	T	P	O	C
							1	0	2	2	2

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	French		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 :	Strengthen the language of the students both in oral and written
CLR-2 :	Express their sentiments, emotions and opinions, reacting to information, situations
CLR-3 :	Make them learn the basic rules of French Grammar.
CLR-4 :	Develop strategies of comprehension of texts of different origin
CLR-5 :	Enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French

1	2	3
Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
2	75	80
2	80	90
2	75	80
2	75	90
2	80	75

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	PSO -1	PSO -2	PSO-3
H	M	H	H	M	H	H	L	M	M	H	L	-	-	-
M	H	L	H	H	M	H	M	L	L	H	M	-	-	-
H	H	L	M	H	M	L	H	M	M	H	H	-	-	-
H	L	M	H	M	H	H	M	L	H	M	L	-	-	-
M	H	H	L	M	M	H	H	M	L	H	M	-	-	-

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:
CLO-1 :	To acquire knowledge about French language
CLO-2 :	To strengthen the knowledge on concept, culture, civilization and translation of French
CLO-3 :	To develop content using the features in French language
CLO-4 :	To interpret & Translate the French language into other language
CLO-5 :	To improve the communication, intercultural elements in French language

Duration (hour)	9	9	9	9	9
S-1	SLO-1	TP de chimie	Le jour des examens	L'impératif négatif	Comprendre une lettre de motivation Comprendre la structure d'un rapport de stage

	SLO-2	Les exemples	Les activités	-Le passé composé avec être	Les exemples	Trouver des mots clés-
S-2	SLO-1	- Un TP au laboratoire-	Le sms à la française -	Les exemples	Repérer le présent	Les activités
	SLO-2	Les exemples	Les activités	Le passé composé des verbes pronominaux	Les activités	Comprendre un texte technique-
S-3	SLO-1	Comprendre un TP	Les examens	-La recherche de stage -	, le passé composé et	Les activités
	SLO-2	Les exemples	Les activités	Les exemples	Les activités	Les exemples
S-4	SLO-1	-Suivre un protocole expérimental -	-Donner des conseils	Les activités	le futur dans un texte	Relever des arguments dans un texte-
	SLO-2	Les activités	Les exemples	Le stage en France	Les exemples	Les activités
S-5	SLO-1	Lire des équations chimiques -	-Écrire et comprendre un sms -	Les activités	- Le rapport de stage et le domaine des carburants -	Les exemples
	SLO-2	Les activités	Comprendre une interdiction	Le CV français	Les activités	Les activités
S-6	SLO-1	Identifier des formules chimiques à l'oral	Les activités	Les exemples	Le stage	Les activités
	SLO-2	Les exemples	-Donnez des consignes -	La lettre de motivation-	Les exemples	Les pronoms COI
S-7	SLO-1	- L'infinitif pour exprimer un ordre ou	Les exemples	Comprendre une offre de stage	La méthode du plan détaillé-	Les exemples
	SLO-2	Les activités	Comprendre	Les exemples	Les activités	Les exemples
S-8	SLO-1	un conseil (dans les consignes) -	Les exemples	Les activités	Les exemples	Les activités
	SLO-2	Les exemples	et parler d'actions passées-	Comprendre et réaliser un CV	Le contenu du rapport de stage	Quelques verbes et leur préposition
S-9	SLO-1	La nominalisation	Les exemples	Les activités	Les exemples	Les activités
	SLO-2	Les exemples	L'impératif des verbes pronominaux	Les exemples	Les activités	Les exemples

Learning Resources	Theory:
	1. “Tech French” French for Science and Technology, Ingrid Le Gargasson, Shariva Naik, Claire chaize, Les éditions Didier, India, 2011.
	2. https://www.fluentu.com/blog/french/french-grammar
	3. https://www.elearningfrench.com/learn-french-grammar-online-free.html
	4. https://www.lawlessfrench.com/grammar
	5. https://blog.gymglish.com/2022/12/15/basic-french-grammar

Learning Assessment			
Level	Bloom's	Continuous Learning Assessment(50% weightage)	Final Examination (50% weightage)

	Level of Thinking	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	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
	Understand										
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
	Analyze										
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	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	Expert from Higher Technical Institutions	Internal Experts
1. Mr. KavaskarDanasegarane Process Expert Maersk Global Service Center Pvt. Ltd	1. Dr. C.Thirumurugan Professor, Department of French, Pondicherry University	1. Mr. Kumaravel K. Assistant Professor & Head, SRMIST, KTR
2.Mr. Sharath Raam Prasad, Character Designer, Animaker Company Pvt.		2. Mrs. Abigail, Assistant Professor, SRMIST, VDP

Course Code	UCS23G01J	Course Name	Office Automation Tool		Course Category	G	Generic Elective Course															L	T	P	O	C											
Pre-requisite Courses		Nil		Co-requisite Courses		Nil		Progressive Courses		Nil																	3	0	2	2	4						
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 the Basic of Microsoft Word Documents																		1	2	3																
CLR-2 :	Understand the concepts of Formatting and Editing Documents																		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)																
CLR-3 :	Understand the concepts of Formatting and Editing Spreadsheets																																				
CLR-4 :	Design a presentation with transitions and animations																																				
CLR-5 :	Understand the various types of charts and actions																																				
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																																			
CLO-1 :	Acquire the basics of Microsoft Word Documents																		2	85	80																
CLO-2 :	Acquire the knowledge of formatting and editing documents																		3	85	80																
CLO-3 :	Design slide design, layout and animation options																		3	85	80																
CLO-4 :	Understand the various types of slide transitions and designs																		3	85	80																
CLO-5 :	Understand the various types of tables and design																		3	85	80																
																			Fundamental 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				

Duration (hour)		15	15	15	15	15
S-1	SLO-1	Introduction to MS Office	Setting Page style	Introduction to Spreadsheet	Introduction to Functions	Introduction to MsAccess
	SLO-2	Working with Documents	Layout settings	Opening & Saving Spreadsheet	Text Functions	Steps to create a blank database
S-2	SLO-1	Opening & Saving files	Border & Shading	Menus & toolbars, Basic Functions	Date & Time Functions	Table Creation
	SLO-2	Editing text documents	Header & footer	Spread sheet addressing - Rows, Columns & Cells	Logical Functions – IF, AND, OR, Not	Data types
S-3	SLO-1	Formatting page & setting	Setting Footnotes & Endnotes	Referring Cells & Selecting Cells	Vlookup&Hlookup functions	Primary Key & Indexes
	SLO-2	Converting files to different formats	Inserting page break, Column break and Line break	Entering Data, Find & Replace	Name Manager	Inserting Data
S4-5	SLO-1	Lab 1: Creating, Opening and Basic	Lab 4: Inserting Header and Footer	Lab 7 : Prepare a Payslip for an	Lab 10 : Working with Functions &	Lab 13 :Create a database with MsAccess
	SLO-2	Formatting in a Word Document	to the document & Creating Page Breaks	Employee with Basic Formulas	Pivot Table, Pivot Charts	
S-6	SLO-1	Importing & Exporting documents	Creating sections & frames	Format Cells & Fill Option	Pivot Table	Table Design
	SLO-2	Using Tool bars, Ruler & Icons	Anchoring	Conditional Formatting	Pivot Charts	Table Properties
S-7	SLO-1	Formatting Documents	Wrapping	Introduction to Charts	Get External Data	Query Wizard
	SLO-2	Setting Font styles	Creating Tables	Column Chart	Number conversions	Query Design
S-8	SLO-1	Font selection	Table settings	Line Chart	Formulas	Form Design
	SLO-2	Type face	Borders	Bar Chart	Sort	Form Wizard & Navigation
S9-10	SLO-1	Lab 2: Modifying Font, Text Alignment, Paragraph Indentation and Bullets and Numbering in a Word Document	Lab 5: Create an Employee Salary Slip Table using Table Setting and Border Options	Lab 8 : Chart Types	Lab 11 :Data Validation & Consolidate	Lab 14 :Create a table with sample design and report generation
	SLO-2					
S11	SLO-1	Setting Paragraph style	, Alignments	Pie Chart	Filter	Report Design
	SLO-2	Bullets &Numbering	Insertion,	Doughnut Chart	Advanced Filter	Report Wizard
S12	SLO-1	Using templates	deletion	Scatter Chart	Text to columns	Import data to MS Access
	SLO-2	Watermarking	Merging,	Page Setup	Remove Duplicates	Export data from MS Access
S13	SLO-1	Changing back ground color	Splitting	Header	Data Validation	Report Navigation
	SLO-2	Word art	Sorting, and Formula	Footer	Consolidate	Sample queries
S14-15	SLO-1	Lab 3: Creating an advertisement pamphlet	Lab 6:Create your class time table	Lab 9: Number conversion in excel	Lab 12:Sorting table in excel	Lab 15: export data from ms access to excel

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	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 Higher Technical Institutions	Internal Experts
Experts from Industry		
Mr. Navarathnamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelananarayanan., Professor, School of Computer Science and Engineering, VIT Chennai	Mr.U.Udayakumar, Assistant Professor
		Mr.A.Vignesh, Assistant Professor

Course Code	UCS23S03L	Course Name	ADVANCED EXCEL FOR DATA ANALYTICS	Course Category	S	Skill Enhancement Course	L	T	P	O	C
Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Nil	0	0	2	2	1
CourseOfferingDepartment	ComputerScience	DataBook/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 :	Categorize data in an easy-to-navigate manner	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Do basic and complex mathematical functions	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 :	Turn lots of data into helpful graphics and charts.																		
CLR-4 :	Analyze data and make forecasting predictions																		
CLR-5 :	Create, build, and edit pixilated images																		
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		

CLO-1 :	Construct formulas, including the use of built-in functions, and relative and absolute references.			2	85	80	H	M	M	M	-	-	-	-	M	-	-	-	H	H	H
CLO-2 :	Enter and edit data.			3	85	80	H	M	M	M	-	-	-	-	M	-	-	-	H	H	H
CLO-3 :	Indicate the names and functions of the Excel interface components.			3	85	80	H	H	H	H	-	-	-	-	M	-	-	-	H	H	H
CLO-4 :	Create and modify charts			3	85	80	H	H	H	H	-	-	-	-	M	-	-	-	H	H	H
CLO-5 :	Preview and print worksheets.			3	85	80	H	M	M	M	-	-	-	-	M	-	-	-	H	H	H

Duration (Hour)		6	6	6	6	6
S-1	SLO-1	Laboratory1: Working with formulas and functions	Laboratory2: IF function Nested IF, IF with AND OR NOT	Laboratory3: LookUp Functions V-Lookup	Laboratory4: Data Validation Methods of data validation	Laboratory5: Protecting a worksheet by Password
	SLO-2				Setting data validation rules	Protecting part of a worksheet
S-2	SLO-1	Laboratory6: Sorting a database	Laboratory7: Filtering a database AutoFilter	Laboratory8: Subtotals: Display Subtotal at a single level	Laboratory 9: Pivot table: Format a Pivot table Report	Laboratory10: Create a graph using Pivot data
	SLO-2	Simple Sort Multilevel sort	Number, Text or Date Filter	Displaying nested subtotals	Top/Bottom Report	Slicer
S-3	SLO-1	Laboratory11: Conditional formatting Using Cells	Laboratory12: What if Analysis tools:	Laboratory13: Links between different Worksheets	Laboratory14: Creating Hyperlinks	Laboratory15: Working with charts: Creating charts using chart tools
S-4	SLO-1	Laboratory16: Merging Workgroups	Laboratory17: Tracking changes	Laboratory18: Formatting charts	Laboratory 19: Charts for My data	Laboratory20: Chart Templates
S-5	SLO-1	Laboratory21:: Adding titles and values in charts	Laboratory22:: Sparklines	Laboratory 23: Customize Sparklines	Laboratory24: Change the style of Spark lines	Laboratory25: Creating a Macro
S-6	SLO-1	Laboratory26: Recording a macro	Laboratory27: Running a macro using menu command	Laboratory28: Writing a macro	Laboratory 29: Assigning a macro to a button	Laboratory30: Functions Description

Learning Resources		1 RituArora,(2018),“AdvanceExcel”TrainingGuide,BPBPublications			
Learning Assessment					
Level	Bloom’s Level of Thinking	Continuous Learning Assessment (100% weightage)			
		CLA-1 (20%)	CLA-2 (20%)	CLA-3 (30%)	CLA-4 (30%) #
		Practice	Practice	Practice	Practice
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 – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

#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 Code	UCS23P01L	Course Name	INTERNSHIP - I	Course Category	IAPC	Internship/Apprenticeship / Project/ Community Outreach	L	T	P	O	C
							0	0	0	0	1

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,
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CLR-1 :	Demonstrate skills learnt in the real time environment.
CLR-2 :	Explore the different industries that are using IT
CLR-3 :	Enhance the skills in the system aspects
CLR-4 :	Understanding the professional connections with the knowledge learnt
CLR-5 :	Applying the skills in problem solving

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:
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		1	2	3
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
CLO-1 :	To get an insight of an industry and organization/company	3	80	70
CLO-2 :	To gain valuable skills and knowledge	3	85	75
CLO-3 :	To make professional connections and enhance networking	3	75	70
CLO-4 :	To get experience in a field to allow the student to make a career transition	3	85	80
CLO-5 :	To get an inside view of an industry and organization/company	3	85	75

Learning	Program Learning Outcomes (PLO)
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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 Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
L	H	-	H	L	-	-	-	L	L	-	H	-	H	H
M	H	L	M	L	-	-	-	M	L	-	H	-	H	H
M	H	M	H	L	-	-	-	M	L	-	H	-	H	H
M	H	M	H	L	-	-	-	M	L	-	H	-	H	H
H	H	M	H	L	-	-	-	M	L	-	H	-	H	H

Students can choose a company of their own interest for internship for a period of minimum four weeks to learn about the application of IT in real time environment. In the first week of July, all the students have to give a presentation about their observations made by them in internship. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

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

Course Code	UCD23V02T	Course Name	Industry Oriented Employability Skills for Science	Course Category	V	Value Addition course	L	T	P	O	C
							2	0	0	2	2

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Demonstrate various principles involved in solving mathematical concepts related to permutation and combination and probability and interpret data	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Learn the basic mechanics of grammar and develop resume-building practice and presentation skills in students																		
CLR-3 :	Understand the object oriented features																		
CLR-4 :	Prepare students for job interviews																		
CLR-5 :	Instill confidence in students and develop the necessary skills to face interview																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	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
CLO-1 :	Understand the concepts of permutation and combinations, probability and approach questions in a simpler and innovative method	3	80	70	M	M	M	M	M	H	L	M	H	M	M	H	M	M	M
CLO-2 :	Understand the different parts of speech and use them in sentences appropriately and also the importance of resume preparation	3	85	75	M	M	M	M	M	H	L	M	M	M	H	L	M	M	H
CLO-3 :	Understand the importance of object oriented features	3	85	80	H	M	M	M	M	H	L	M	M	M	M	M	M	M	H
CLO-4 :	Face interviews confidently	3	85	80	M	M	H	M	M	H	L	M	M	M	M	M	M	M	H
CLO-5 :	Develop their domain skills	3	85	80	M	M	H	M	M	H	L	M	M	M	M	M	M	M	H

Duration (hour)		6	6	6	6	6
S-1	SLO-1	Permutation and Combination – Introduction	Change of voice	Object Oriented Programming - Introduction	Overloading & Overriding – Introduction	Time Complexity – Introduction
	SLO-2	Permutation and Combination – Problems	Change of voice	Introduction to Monolithic, POP, Structures, OOP	Overloading & Overriding	Time Complexity
S-2	SLO-1	Probability – Introduction	Change of speech	Translators – Introduction	Virtual Functions & Abstract Class – Introduction	Stacks & Queue - Applications
	SLO-2	Probability – Problems	Change of speech	Translators	Virtual Functions & Abstract Class	Stacks & Queue - Applications
S-3	SLO-1	Data Sufficiency – Introduction	Resume Writing - Introduction	Class – Introduction	Dangling Pointer – Introduction	Linked List & Operations – Introduction

	SLO-2	Data Sufficiency – Problems	Resume Writing - Introduction	Class	Dangling Pointer	Linked List & Operations
S-4	SLO-1	Puzzles - Selections	Resume Writing - Session 1	Object Abstraction – Introduction	Garbage Collector – Introduction	Types of Trees & BST – Introduction
	SLO-2	Puzzles - Selections	Resume Writing - Session 1	Object Encapsulation	Garbage Collector	Types of Trees & BST
S-5	SLO-1	Puzzles - Distribution	Types of Interviews - Group / Stress / HR	Polymorphism, Inheritance and Dynamics Binding – Introduction	Algorithm and Data Structures - Introduction	AVL Tree Operations – Introduction
	SLO-2	Puzzles - Distribution	Types of Interviews - Group / Stress / HR	Polymorphism, Inheritance and Dynamics Binding	Logical Thinking & Arrays	AVL Tree Operations
S-6	SLO-1	Cubes & Cuboids	Presentations - Introduction	Function Execution Sequence - Introduction	Structures & Pointers – Introduction	Introduction to P, NP, NP-Hard & NP-Complete Problems
	SLO-2	Cubes & Cuboids	Presentations - Activity	Stack & In Line Functions - Introduction	Structures & Pointers	Introduction to P, NP, NP-Hard & NP-Complete Problems

Learning Resources	1. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata McGraw Hill, 5th Edition 2. Scott Bennett, The Elements of Resume Style: Essential Rules for Writing Resumes and Cover Letters That Work, AMACOM, 2014 3. Raymond Murphy, Intermediate English Grammar, Cambridge University Press, 2007	4. Greg Perry, Dean Miller, C Programming Absolute Beginner, Que Publishing, 3rd Edition 5. Cay S. Horstmann, Core Java Fundamentals, Volume 1, 11th Edition, Prentice Hall, 2018 6. Langsam, Augenstein, Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.
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Learning Assessment					
Level	Bloom's Level of Thinking	Continuous Learning Assessment (100% weightage)			
		CLA-1 (20%)	CLA-2 (20%)	CLA-3 (30%)	CLA-4 (30%) #
Level 1	Remember	Theory	Theory	Theory	Theory
	Understand	10%	10%	30%	30%
Level 2	Apply	50%	50%	40%	40%
	Analyze				
Level 3	Evaluate	40%	40%	30%	30%
	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	Experts from Higher Technical Institutions	Internal Experts
Mr. M. Ponmurugan, Executive PMOSS, Cognizant Technology Solutions India Pvt.Limited, Chennai	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita Vishwa Vidyapeedam, Coimbatore	Dr. Sathish K, HOD, Department of Career Guidance, FSH, SRMIST Dr. Muthu Deepa M, Assistant Professor, Department of Career Guidance, FSH, SRMIST

SEMESTER-IV

Course Code	UCS23401J	Course Name	ENTERPRISE JAVA PROGRAMMING	Course Category	C	Discipline Specific Core Course	L	T	P	O	C
							3	0	3	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 :	This module aims to introduce the students to some concepts of advanced programming and practice on reusing components.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	The course covers Graphical User Interface (GUI) networking, and database manipulation	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 :	To work with Web and Application Servers like Apache Tomcat, Glassfish etc and understand the communication over HTTP protocol.																		
CLR-4 :	Enterprise application using JavaBeans I																		
CLR-5 :	Develop web application using Java Servlet and Server Pages technology																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLO-1 :	Advanced technology in Java such as Internationalization, and Remote method Invocation	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	To write sophisticated Java applications	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	To use Java language for writing well-organized, complex computer programs with both command-line and GUI	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Develop a JSP code to create a Web site	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Construct Web Application using Servlets	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-

Duration (hour)	18	18	18	18	18
S-1	SLO-1 Remote method invocation : Overview of RMI	Result Sets	Methods of Servlet Interface	Request Dispatching: Anatomy of Request Processing	When to use Entity Bean
	SLO-2 Introduction to RMI	Result and Result Sets	Single Thread Model	JSP - Directives	Use of Entity Bean
S2	SLO-1 Developing an RMI Application	Commit and Rollback	Thread Model	Forwarding Requests	Life Cycle of Entity Bean
	SLO-2 Setting up RMI	Transaction Control	Session Tracking: Cookies	JSP Client Request	Message Driven Beans:
S3	SLO-1 RMI Architecture	JDBC - Exceptions	Cookies	Request Dispatcher Object	Create Message driven Beans
	SLO-2 Architecture of an RMI Application	Exception Handling	URL Rewriting, Hidden Fields, The Session API	JSP Server Response	EJB Annotations
S4 – S6	SLO-1 Laboratory 1: Create distributed applications using RMI	Laboratory 4: 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				
S7	SLO-1 RMI over IIOP.Database Access	Servlet – Introduction	JSP Overview	JSP Model1 and Model2 Architectures	Describe Meta data using Annotations
	SLO-2 RMI Database	Background – Servlet	Why to Learn JSP	Actions in JSP	EJB – Access Database

S8	SLO-1	Overview of JDBC	Types : Generic Servlet,	How JSP works	EJB Architecture: Logical Architecture	Database Using JDBC API
	SLO-2	Presentation to JDBC connection	Generic Servlet class	JSP Working Principle	EJB overview	Exception Handling in EJB
S9	SLO-1	JDBC Drivers	HttpServlet	Components of a JSP page	Software Architecture	Understanding the need for MVC
	SLO-2	JDBC Driver types	HttpServlet class	JSP Architecture	EJB Architecture	MVC overview
S10-12	SLO-1	Laboratory 2: Create applications which can demonstrate the use of JDBC for Database Connectivity.	Laboratory 5: Develop Web Applications Using ServletRequest, ServletResponse	Laboratory 8: Include Directive JSP: include Action	Laboratory 11: 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-13	SLO-1	Connecting to a Database	Servlet Life Cycle	JSP life Cycle	EJB Session Beans	frameworks
	SLO-2	Database connections	Servlet Classes	JSP API	EJB Stateless Bean	Architecture
S-14	SLO-1	Statement Interfaces	Servlet Request	JSP : Scripting Elements	constraints on session beans	implementing MVC with request dispatcher
	SLO-2	JDBC statements, prepare Statement and Callable Statement	Servlet Response	JSP Syntax	EJB Stateful Bean	Spring IOC
S-15	SLO-1	Using Metadata.	Servlet Context,	JSP Implicit objects	Life Cycle of EJB with example	Spring MVC
	SLO-2	Statement Objects	Servlet Config	Pre- defined variables	Entity Bean in EJB	Spring controller
S16-18	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.	Laboratory 12: An EJB application that demonstrates Entity Bean.	Laboratory 15: creating our view which will be required to browse and upload a selected file.
	SLO2					

Learning Resources	Elliotte Rusty Harold, (2013), "Java Network Programming", O'Reilly Publishers. (For Unit I to III) . Antonio Goncalves, (2010), "Beginning Java EE 6 Platform with GlassFish 3", Apress, Second Edition. (For Units IV to V)
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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		
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Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. P J Arul Leena Rose

Course Code	USA23402J	Course Name	OPERATING SYSTEMS	Course Category	C	Discipline Specific Core Course	L	T	P	O	C
							3	0	3	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 :	Utilize operating systems based on its features and utility	Level of Thinking (Bloom)	Fundamental Knowledge
CLR-2 :	Utilize the Process Management functions of an Operating system	Expected Proficiency (%)	Application of Concepts
CLR-3 :	Utilize the features of Memory Management concepts of an Operating system	Expected Attainment (%)	Link with Related Disciplines
CLR-4 :	Analyze how Device Management part of an Operating system functions		Procedural Knowledge
CLR-5 :	Utilize the File Management functions of an Operating system		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

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Learning	Program Learning Outcomes (PLO)
		1 2 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
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 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

Duration (hour)	18	18	18	18	18
S-1	SLO-1 Introduction Operating Systems (OS): Operating System overview	Process concept : Introduction	Process Synchronization - Background	Deadlocks -	Memory management:
	SLO-2 Operating system as a resource management	Process states : Process creation and process termination	The Critical section problem	System model	Introduction
S-2	SLO-1 Operations, Assembler, Compiler, loader, linker	Process state transition diagram	Two process Solutions	Deadlock characterization	Logical, physical address space
	SLO-2 Evolution of Operating Systems ,serial processing and batch processing	Operation on process	Multi process Solutions	Necessary conditions	Comparison of Logical, physical Address
S-3	SLO-1 Batch: Simple, Multiprogramming	Symmetric multiprocessing	Synchronization hardware	Resource Allocation Graph	Swapping

	SLO-2	Multiprocessor, Time Sharing, parallel systems		solution	Methods for handling deadlocks	Organization : physical and logical organization
S -4-6	SLO-1	Lab 1: Comparison between various Operating Systems	Lab 4: Simulation of FCFS CPU scheduling algorithm Usage	Lab 7: Write a procedure for timer interrupt handler	Lab 10: Program to implement Bankers Algorithm	Lab 13: multiple partition (dynamic Memory allocation method)
	SLO-2					
S-7	SLO-1	Distributed (client-server, peer-to-peer),	Concurrent process-	Semaphores –	Deadlock Prevention -	Memory allocation method
	SLO-2	Real-Time (hard, soft Clustering (symmetric, asymmetric, parallel)) , Network,)	Usage	Usage	Mutual exclusion, Hold and Wait No Preemption, Circular Wait	Single partition allocation
S-8	SLO-1	Microkernel: Architecture, Kernel mode, user mode, Monolithic, differences	CPU Scheduling: Process Scheduler (long, short, medium term)	Semaphores – Implementation	Deadlock Avoidance – Safe state	Multiple partition memory management
	SLO-2	System Call Types	Scheduling criteria	Binary semaphores	Resource Allocation Graph Algorithm	contiguous (fixed, dynamic)
S-9	SLO-1	process control: fork(), exit(), wait()	CPU utilization, throughput, time: (a) turnaround (b) waiting (c) response	Classic Problems of Synchronization - The Bounded Buffer problem	Banker's Algorithm -	Contiguous Types: memory protection, allocation, fragmentation , partitioned
	SLO-2	file manipulation: open(), close()	Scheduling Types: FCFS, SJF	The Readers - Writers Problem	Safety Algorithm	Compaction
S-10-12	SLO-1					
	SLO-2	Lab 2: Booting process in GNU/Linux OS	Lab 5: Priority CPU scheduling algorithm	Lab 8: classical inter process communication problem (Producer consumer)	Lab 11: Program to implement memory allocation with pages	Lab 14 : Simulation of FIFO page replacement algorithm Paging
S-13	SLO-1	File operations	Priority	The Dining philosophers problem	Resource request algorithm	Paging
	SLO-2	read(), write()	Round Robin Scheduling	Examples	Examples	Segmentation
S-14	SLO-1	Operating System services	Other Scheduling Types	Critical Regions: Race condition	Deadlock Detection -	Page Replacement Algorithms
	SLO-2	System Programs:	Real Time Scheduling	and process synchronization	introduction	Types of Replacement algorithms
S-15	SLO-1	file management	multilevel queue	Implementation of Critical region	Single instance of each resource type	, Examples
	SLO-2	status information	multilevel feedback queue	Mutual Exclusion Algorithm: Peterson , Monitors	Several instances of a Resource type	Demand paging
S-16-18	SLO-1					
	SLO-2	Lab 3: Multi-thread Programming	Lab 6: Simulation of Round Robin CPU scheduling algorithm	Lab 9: Write a procedure to make message passing in inter process communication	Lab 12: Simulation of FIFO page replacement algorithm	Lab 15: Simulation of optimal page replacement algorithm

Learning Resources	1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating systems, 9 th ed., John Wiley & Sons, 2013	3. Andrew S. Tanenbaum, Herbert Bos, Modern Operating systems, 4 th ed., Pearson, 2015
	2. William Stallings, Operating Systems-Internals and Design Principles, 7 th ed., Prentice Hall, 2012	4. Bryant O'Hallaxn, Computer systems- A Programmer's Perspective, Pearson, 2015

Learning Assessment											
Level	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	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 %	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. Sudha M R

Course Code	UMS23404T	Course Name	Resource Management Techniques	Course Category	C	Discipline Specific Core Course	L 4	T 0	P 0	O 2	C 4
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Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Mathematics and Statistics	Data Book / Codes/Standards	Graph sheet needed		

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	To provide foundations in Operations Research	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To apply basic concepts of Linear programming problems	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	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
CLR-3 :	To learn and understand Operations research approach to various applications	3	85	80	L	H	M	M	M	M	M	M	H	L	H	M	L	L	L
CLR-4 :	To provide a set of algorithms for solving sequencing problems	3	80	75	H	H	M	M	H	M	M	M	M	L	L	M	L	L	L
CLR-5 :	To employ appropriate methods of Game theory	3	85	80	H	H	L	-	M	M	M	M	H	L	-	M	L	L	L
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	3	85	80	M	H	M	M	L	M	M	M	H	L	H	M	L	L	L
CLO-1 :	To recognize the scope and models of Operations research methods for decision making process.	3	85	80	L	H	M	H	M	M	M	M	M	L	H	M	L	L	L
CLO-2 :	To apply Operations research techniques for solving real life problems	3	80	75	H	H	M	M	H	M	M	M	M	L	L	M	L	L	L
CLO-3 :	To know optimization through various transportation and assignment problems	3	85	80	H	H	L	-	M	M	M	M	H	L	-	M	L	L	L
CLO-4 :	To schedule jobs through machines using the prescribed algorithm	3	85	80	M	H	M	M	L	M	M	M	H	L	H	M	L	L	L
CLO-5 :	To calculate saddle point, strategy and value of the game by various methods	3	85	80	L	H	M	H	M	M	M	M	M	L	H	M	L	L	L

	Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
Duration (hour)	12	12	12	12	12
S-1	SLO-1 Introduction to Operations Research(O.R)	Introduction to Linear Programming Problem (LPP)	Transportation Problems(TP) - Examples, Definitions – decision variables, supply and demand constraints	Sequencing Problems: Introduction	Game theory: Definitions, Examples
	SLO-2 Scope of O.R	Mathematical formulation of LPP	Mathematical formulation of TP	Assumptions made while solving Sequencing	Characteristics of Game theory

					problem	
S-2	SLO-1	Some O.R. Models	Basic assumptions to formulate LPP	Balanced and Unbalanced TP	Total elapsed time, Idle time, No passing Rule	Pure Strategies: Maximin -Minimax Principle
	SLO-2	Iconic Models, Analogue Models	Procédure for forming a LPP model	Methods for finding Initial basic feasible solution	Procedure for sequencing n jobs on 2 machines	Saddle point and value of the game
S-3	SLO-1	Mathematical Models	Formulation of LPP Model	North West Corner Rule	Sequencing n jobs on 2 machines	Mixed Strategies: Games without saddle points
	SLO-2	Static Models ,Dynamic Models	Formulation of LPP Model	North West Corner Rule	Sequencing n jobs on 2 machines	Solving 2x2 games
S 4	SLO-1	Deterministic Models, Stochastic Models	Graphic method of solving LPP	Row Minima Method	Sequencing n jobs on 2 machines	Solving 2x2 games
	SLO-2	Classification of Models	Graphic method Special Cases: Infeasibility	Column Minima Method	Procedure for sequencing n jobs on 3 machines	Matrix oddment method for 3x3 games
S-5	SLO-1	Characteristics of O.R.	Graphic method Special Cases: Unboundedness	Least Cost Method	Sequencing n jobs on 3 machines	Matrix oddment method for nxn games
	SLO-2	Principles of Modelling	Graphic method Special Cases: Redundancy	Least Cost Method	Sequencing n jobs on 3 machines	Matrix oddment method for nxn games
S 6-7	SLO-1	General methods for solving O.R. Models	Graphic method Special Cases	Vogel's Approximation Method(VAM)	Procedure for sequencing n jobs on m machines	Dominance property
	SLO-2	Main phases of O.R: Formulation of the problems:	Graphic method Special Cases	VAM Computational details	Sequencing n jobs on m machines	Dominance property: Computational details
S-8	SLO-1	Construction of a mathematical model	Advantages of LPP	VAM Computational details	Sequencing n jobs on m machines	Dominance property: Computational details
	SLO-2	Solving the model constructed	Limitations of LPP	Unbalanced Transportation Problem	Sequencing n jobs on m machines: computational details	Dominance property: Computational details
S 9	SLO-1	Controlling and updating	General Linear Programming Problem	Unbalanced Transportation Problem	Sequencing n jobs on m machines: computational details	Graphical method for 2x3 games
	SLO-2	Testing the model and its solution, Implementation	Types of Solutions	Maximization case in Transportation Problem	Processing of 2 jobs on n machines	Graphical method for 2xn games
S 10	SLO-1	Role of O.R in industry	Canonical form of LPP	Assignment Problem(AP): Examples, Definitions – decision variables, supply and demand constraints	Processing of 2 jobs on n machines: Computational details	Graphical method for 2xn games
	SLO-2	Role of O.R. in Various fields	Standard form of LPP	Mathematical formulation of AP, Balanced and Unbalanced AP	Processing of 2 jobs on n machines: Computational details	Graphical method for 3x2 games
S-11	SLO-1	O.R and decision making	Simplex Algorithm Introduction	Assignment Algorithm: Hungarian Method	Processing of 2 jobs on n machines: Computational details	Graphical method for mx2 games
	SLO-2	Role of computers in O.R.	Simplex method: non-degenerate basic solution, degenerate basic solution	Hungarian Method: Computation details	Processing of 2 jobs on n machines: Computational details	Graphical method for mx2 games
S-12	SLO-1	Role of computers in O.R.	Simplex method: basic feasible solution	<u>Solving Unbalanced AP</u>	Processing of 2 jobs on n machines: Computational details	Graphical method for 2xn and mx2 games
	SLO-2	Limitations of O.R.	Simplex Algorithm: Computational details	Maximization case in AP	Graphical method	Limitations of game theory

Learning Resources	Theory: 1. Resource Management Techniques by Prof.V.Sundaresan, K.S.Ganapathy Subramanian, K. Ganesan. 2. Operations Research: An Introduction.H.A. Taha 3. Linear Programming. K.G. Murthy
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4. Operations Research. KantiSwarup, Gupta, P.K. and Manmohan

	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	30%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level 3	Evaluate	30%	-	30%	-	30%	-	30%	-	30%	-
	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 Academic

1.Dr.V. Prakash, Dr. Ambedkar Government Arts college, Chennai (AcademicExpert)

2.Dr.M.Vasanth, ICMR, Chennai (IndustrialExpert)

Internal Experts

1. Dr.L.Sivakami, SRMIST

2.Dr.S.Lakshmi Priya, SRMIST

Course Code	ULT23AE2J	Course Name	Applied Tamil – II	Course Category	AE	Ability Enhancement Courses (AE)	L	T	P	O	C
							1	0	2	2	2

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Tamil	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	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-1 :																		
-2 :																		
-3 :																		
-4 :																		
-5 :	கணித்தமிழின் பல்வேறு நுட்பங்களைத் தெரியச் செய்தல்																	
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																	
CLO																		
	2	75	60	H	L	H	M	H	H	L	M	H	M	L	H	-	-	-

9					
SLO-2					

Learning Resources	1. https://www.tamilvu.org/ , 1997. 2. https://www.tamilvu.org/ , 2009. 3. https://www.tamilvu.org/ , 1961 4. https://www.tamilvu.org/ , 2020. 5. https://www.tamilvu.org/
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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	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
	Understand										
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
	Analyze										
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	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	Expert from Higher Technical Institutions	Internal Experts
1. Dr. P.R.Subramanian, Director, Mozhi Trust, Thiruvannamiyur, Chennai – 600 041.	1. Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language & Literature, Pondicherry University, Pondicherry	1. Dr. B.Jaiganesh, Associate Professor & Head, Dept. of Tamil, FSH, SRMIST, KTR
		2. Dr. R. Ravi, Assistant Professor and Head, Dept. of Tamil, FSH, SRMIST, VDP.
		3. Mr. G. Ganesh, Assistant Professor, Dept. of Tamil, FSH, SRMIST, RMP.
		4. Dr. T.R.Hezbibah beulah Suganthi, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.
		5. Dr. S.Saraswathy, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.

Course Code	Course Name	Course Category	AE	L	T	P	O	C
ULH23AE2J	APPLIED HINDI-II	AE	Ability Enhancement Courses (AE)	1	0	2	2	2

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	HINDI	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 :	To find and analyze different types of Cinema	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To Discover the print Media in the present World	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	PSO -1	PSO -2	PSO-3
CLR-3 :	Writing report for Employability				H	H	H	M	L	H	L	M	L	L	H	M	-	-	-
CLR-4 :	Writing Reviews and Create Job Oriented learning				H	H	M	L	H	H	M	H	M	M	H	H	-	-	-
CLR-5 :	To Acquire technical words for various job Prospects				H	H	L	H	M	H	L	H	H	M	H	H	-	-	-
					M	H	M	H	L	H	H	L	H	M	H	H	-	-	-
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	To Understand the History and Documentary in Hindi Cinema	2	75	80															
CLO-2 :	To Comprehend Media Studies	2	80	90															
CLO-3 :	To Evaluate report Writing	2	75	95															
CLO-4 :	Enhance their Writing Skills in Media Studies	2	80	90															
CLO-5 :	To Understand and usage of technical words in Hindi	2	85	90															

Duration (hour)	9	9	9	9	9
S-1	SLO-1 HINDI CINEMA	MEDIA AUR HINDI BHASHA	REPORTARJ LEKHAN	FILM REVIEW& VIGYAPAN	PARIBHASHIK SHABDAVALI
	SLO-2 CINEMA KI AVDHARNA	AVDHARNA	AVDHARNA	ARTH	RTH
S-2	SLO-1 UDBHAV	SWARUP	SWARUP	PARIBHASHA	ARIBHASHA
	SLO-2 VIKASH	MAHATVA	DDESHYA	SWARUP	WARUP
S-3	SLO-1 DOCUMENTRI MOVE KI AVDHARNA	MEDIA MEN BHASHA KA PRAYOG	MAHATVA	AWADHARNA	RAKAR
	SLO-2 COMERCIAL MOVE KI AVDHARNA	UTTARDAYITVA	REPORTARJ LEKHAN KE PRATI RUCHI JAGANA	FILM REVIEW KA MAHATTVA	VADHARNA
S-4	SLO-1 PRAYOJAN	PRINT MEDIA	REPORTAJ KI BHUMIKA	VIGYAPAN AUR BAZAR	RAYOJAN
	SLO-2 UDDESHYA	ELECTRONIC MEDIA	PRAYOJAN	VIGYAPAN AUR ROZGAR	DDESHYA
S-5	SLO-1 MAHATVA	MEDIA KI JIMMEDARI	PRAYOG	PRINT VIGYAPAN	MAHATVA
	SLO-2 PRAKAR	SMACHAR LEKHAN	UTTARDAYITVA	VIGYAPAN KI BHASHA	RAYOG
S-6	SLO-1 PRISHTHBHUMI	REPORTER KE GUN	RIPOTARJ LEKHAN	AWADHARNA	DDESHYA
	SLO-2 KARYASHALA	SAHAJTA	PUNRIKSHAN	ARTH	AKANIKI SHABDAVALI KA MHATVA
S-7	SLO-1 DOCUMENTRY KI VIDHI	NISPAKSHTA	LEKHAN VIDHI	PARIBHASHA	HINDI SE ANGREZI SHABD
	SLO-2 DOCUMENTRY AUR COMERCIAL MOVE MEN ANTAR	PEET PATRAKARITA	SAMAJIK DAYRA	SWARUP	ANGREZI SE HINDI SHABD
S-8	SLO-1 COMERCIAL KI VIDHI	UTTARDAYITVA	SAHITYA ME RIPOTARJ LEKHAN	VIGYAPAN KE PRAKAR	EK DIN EK SHABD
	SLO-2 MOVE VISLESHAN	BHASHA GYAN	PARIYOJNA KARYA	VIGYAPAN KI VISHESHTAYEN	SHABDON KA VISLESHAN
S-9	SLO-1 PARICHARCHA	PARICHARCHA	PARICHARCHA	VIGYAPAN MANG	PATH PRICHARCHA
	SLO-2 PRASHNABHYASH	PRASHNABHYASH	PRASHNABHYASH	VIGYAPAN KA PRABHAV	PRASHNABHAYASH

Learning Resources	Edited Book: "PRAYOJAN MULO K HINDI", SRIJONLOK PUBLICATION, 2023, New Delhi. 1. Film Banti Hai aur Banati Bhi hai, Lekhika – Sonal, Neolit Publication
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	2. https://navbharattimes.indiatimes.com/entertainment/movie-review/articlelist/2325387.cms?curpg=3
	3. https://epustakalay.com/book/4858-hindi-patrakarita-by-dr-krishnbihari-mishra/
	4. https://hindisamay.com/
	5. https://rajbhasha.gov.in/hi/hindi-vocabulary

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%	20%	20%	20%	20%	30%	-
Level 2	Apply Analyze	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
Level 3	Evaluate Create	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	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
Shri. Santosh Kumar Editor : Srijanlok Magazine Place: Vashishth Nagar, Ara – 802301	1. Prof.(Dr.) S.Narayan Raju, Head, Department of Hindi, CUTN, Tamilnadu	1. Dr.S Preeti. Associate Professor & Head, SRMIST
		2. Dr. Md.S. Islam Assistant Professor, SRMIST
		3.Dr. S. Razia Begum, Assistant Professor, SRM IST
		4. Dr.Nisha Murlidharan Assistant Professor, VDP,SRM IST

Course Code	ULF23AE2J	Course Name	French for Specific purpose-II	Course Category	AE	Ability Enhancement Courses (AE)				
						L	T	P	O	C
						1	0	2	2	2

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	French	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 :	Strengthen the language of the students both in oral and written
CLR-2 :	Express their sentiments, emotions and opinions, reacting to information, situations
CLR-3 :	Make them learn the basic rules of French Grammar.
CLR-4 :	Develop strategies of comprehension of texts of different origin
CLR-5 :	Enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French

1	2	3
Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
2	75	80
2	80	90
2	75	80
2	75	90
2	80	75

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	PSO -1	PSO -2	PSO-3
H	M	H	H	M	H	H	L	M	M	H	L	-	-	-
M	H	L	H	H	M	H	M	L	L	H	M	-	-	-
H	H	L	M	H	M	L	H	M	M	H	H	-	-	-
H	L	M	H	M	H	H	M	L	H	M	L	-	-	-
M	H	H	L	M	M	H	H	M	L	H	M	-	-	-

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:
CLO-1 :	o enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French
CLO-2 :	To strengthen the knowledge on concept, culture, civilization and translation of French
CLO-3 :	To develop content using the features in French language
CLO-4 :	To interpret the French language into other language
CLO-5 :	To improve the communication, intercultural elements in French language

Duration (hour)	9	9	9	9	9
S-1	SLO-1	TOEIC	Les quantificateurs	Les prépositions de lieu	Les verbes irréguliers
	SLO-2	Qu'est-ce que c'est/	le génitif	Les activités	le futur et
S-2	SLO-1	À qui est-il destiné ?	Les adjectifs	Les prépositions de temps -	le conditionnel
	SLO-2	Les compétences évaluées	et pronoms possessifs	Les activités	les modaux
S-3	SLO-1	Le nom	les pronoms	les temps et	La suggestion
					Les activités

	SLO-2	Le pluriel des noms	Les pronoms personnels	Les activités	le conseil	l'emphase
S-4	SLO-1	Les indéénombrables	les pronoms compléments	les aspects-	Les exemples	Les exemples
	SLO-2	Les noms composés	Les activités	Les activités	le reproche	Les activités
S-5	SLO-1	L'adjectif	pronoms réfléchis	Le présent simple	Les activités	l'impératif
	SLO-2	Les comparatifs	Les activités	Les activités	L'obligation	Les activités
S-6	SLO-1	les superlatifs	les adverbess	Le présent be+ing	la permission	la voix passive
	SLO-2	les articles définis (the)	Les activités	Les activités	l'interdiction	Les exemples
S-7	SLO-1	les articles indéfinis (a, an)	La place de l'adverbe dans la phrase	Les exemples	La capacité	les subordonnées relatives
	SLO-2	Les exemples	Les activités	Le prétérit simple - Le prétérit be+ V-ing	l'incapacité	Les activités
S-8	SLO-1	Les adjectifs	L'ordre des adverbess	Les exemples	les verbes à particule	Les subordonnées circonstancielles
	SLO-2	Les exemples	Les activités	- Le présent perfectbe+ing	les verbes suivis de V-ing	Les activités
S-9	SLO-1	pronoms possessifs (this et that)	les prépositions-	Le pastperfect simple -	d'un infinitif avec sans to	A ne pas confondre
	SLO-2	Les activités	Les exemples	Le past perfect be + ving -	Les exemples	Les activités

Learning Resources	Theory:
	1. “Réussir le nouveau TOEIC” Détails des épreuves, méthodologie, grammaire, et vocabulaire, Studyrnara.
	2. https://www.fluentu.com/blog/french/french-grammar
	3. https://www.elearningfrench.com/learn-french-grammar-online-free.html
	4. https://www.lawlessfrench.com/grammar
	5. https://blog.gymglish.com/2022/12/15/basic-french-grammar

Learning Assessment											
Level	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	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
	Understand										
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
	Analyze										
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	Create										

	Total	100 %	100 %	100 %	100 %	100 %
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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	Expert from Higher Technical Institutions	Internal Experts
1. Mr. KavaskarDanasegarane Process Expert Maersk Global Service Center Pvt. Ltd	1. Dr. C.Thirumurugan Professor, Department of French, Pondicherry University	1. Mr. Kumaravel K. Assistant Professor & Head, SRMIST, KTR
2.Mr. Sharath Raam Prasad Character Designer, Animaker Company Pvt.		2. Mrs. Abigail, Assistant Professor, SRMIST, VDP



Course Code	UCS23G02J	Course Name	HTML PROGRAMMING			Course Category	C	Generic Elective Course																	
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 :	To develop the skill & knowledge of Web page design					Level of Thinking (Bloom)	1	2	3	Fundamental Knowledge	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To Demonstrate the basics in web design																								
CLR-3 :	To analyze the web page and identify its elements and attributes.																								
CLR-4 :	To build dynamic web pages using Cascading Style sheets.																								
CLR-5 :	To create a webpage using HMTL and CSS																								
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:					Expected Proficiency (%)	80	70	Problem Analysis	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-1 :	Define the principle of Web page design																								
CLO-2 :	Visualize the basic concept of HTML.																								
CLO-3 :	Recognize the elements of HTML																								
CLO-4 :	Introduce basics concept of CSS.																								
CLO-5 :	Introduce the basics of XML					Expected Attainment (%)	85	75	Design & Development	M	H	M	M	L	-	-	-	M	L	-	H	-	-	-	
CLO-1 :	Define the principle of Web page design																								
CLO-2 :	Visualize the basic concept of HTML.																								
CLO-3 :	Recognize the elements of HTML																								
CLO-4 :	Introduce basics concept of CSS.																								
CLO-5 :	Introduce the basics of XML																								
Duration (Hour)		15		15		15		15		15															
S-1	SLO-1	Basic principles involved in developing a web site		HTML Anchor		HTML Label tag in the form		The URI		Creating page Layout and Site Designs.															
	SLO-2	Planning process		HTML Image		HTML Password field control		CSS Selectors		HTML Classes															
S-2	SLO-1	Five Golden rules of web designing		HTML List		HTML Radio button control		Pseudo-Element		Class attribute in HTML															
	SLO-2	Designing navigation bar		HTML Ordered List		Checkbox control		Pseudo-Class Selectors		Defining an HTML class															
S-3	SLO-1	Page design		HTML Unordered List		Submit button control		Inheritance		Mutiple classes															
	SLO-2	Home Page Layout		HTML Description List		HTML <fieldset> control		Cascade		Same class with Different Tag															
S 4-5	SLO-1	Laboratory 1: Acquaintance with elements, Tags and basic structure of HTML files		Laboratory 4: Designing of webpage-Working with List.		Laboratory 7: Designing of webpage- working with Frames		Laboratory 10: Acquaintance with creating style sheet, CSS properties and styling.		Laboratory 13: Program to create a Simple List Box using HTML and CSS															
	SLO-2																								
S6	SLO-1	Design Concept.		HTML Table		HTML form example		Text Manipulation		HTML ID attribute															
	SLO-2	Brief History of Internet		HTML Table tags		HTML frame tag		Font Manipulation		HTML List Box															
S-7	SLO-1	What is World Wide Web		HTML table example		Create vertical frames		The font-style Property		Create simple listbox															

	SLO-2	Why create a web site	HTML Table with border	Create Horizontal frames	The font-variant Property	Add javascript to HTML
S-8	SLO-1	Web Standards	HTML Table with cellpadding	Concept of CSS	The font-weight Property	Styling XML
	SLO-2	What is HTML	HTML Table width	HTML style using CSS	The font-size Property	XML Document
S 9-10	SLO-1	Laboratory 2:Designing of webpage – Using basic and advanced text formatting.	Laboratory 5: Designing of webpage-Working with Tables.	Laboratory 8: Designing with cascading style sheet-Internal style sheet	Laboratory 11:Program to use ID Attribute in CSS document	Laboratory 14: Write an XML to accept student details [Name, ID, Branch and CGPA]. Write an XSL to display the list of students in descending order of their CGPA.
	SLO-2					
S11	SLO-1	HTML Documents, Basic structure of an HTML document	HTML Table with colspan,rowspan,caption	3 ways to apply CSS,Inline CSS,Internal CSS,External CSS	The font Shorthand Property,Liquid Design,The CSS BOX model	Creating XML Schema,The display propertyCross browser compatability,
	SLO-2	Creating an HTML document, HTML text Editor, HTML Building blocks	Styling HTML table even and odd cells,HTML forms,Usage of HTML forms	Basics of CSS Anatomy and Structure,CSS Rules	Styling Lists,Background Property,Position property	Bugs in Microsoft Internet Explorer,Installing Multiple Versions of Internet Explorer
S12	SLO-1	HTML Tags, HTML Attributes, HTML Elements	HTML form syntax,form tags,	Including CSS in a document,CSS Comments	Styling Web Documents for Handheld Devices,Styling Tables	Additional CSS Resources,Creating the Web Site,Saving the site
	SLO-2	HTML Formatting,	HTML <form>elemnt,HTML <input> element	Datatypes and keywords,Length and measurement options	Table elements	Working on the web Site,Creating web site structure
S-13	SLO-1	HTML Heading,HTML Paragraphs	HTML text field control	Integer and real numbers	Grouping table data	Creating Titles for web pages
	SLO-2	HTML Phrase tag	HTML Textarea tag in the form	CSS Colors	Other table styles	Themes-Publishing web sites.
S14-15	SLO-1	Laboratory 3: Designing of webpage - working with Hyperlink.	Laboratory 6: Designing of webpage- working with Forms and Controls	Laboratory 9: Designing with cascading style sheet-External style sheet	Laboratory 12: Program to illustrate the Box Model by implementing the various properties.	Laboratory 15: Create a college website using HTML and CSS

Learning Resources	1. A beginner's guide to HTML ,NCSA,14th May,2003 2. HTML, XHTML, and CSS Bible, 5ed,Steven M. Schafer,Wiley India	3. Beginning CSS: Cascading Style Sheets for Web Design ,Ian Pouncey, Richard York 4.Creating a Web Page and Web Site,Murray,Tom/Lynchburg
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Learning Assessment											
Level	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	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr V Saravanan, FSH, SRMIST, RPM
		Dr(Mrs) V.Poornima, SRMIST, RPM

Course Code	UCS23S04J	Course Name	CONTENTMANAGEMENTSOFTWARE	Course Category	S	Skill Enhancement Course	L	T	P	O	C
							1	0	2	2	2

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
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Course Offering Department	Computer Science	Data Book/Codes/Standards	Nil
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Course Learning Rationale (CLR):		The purpose of learning this course is to,			Learning			Program Learning Outcomes (PLO)														
CLR-1 :	Joomla Overview				1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	How to install Joomla, Architecture of Joomla				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 :	Utilizing Control panel of Joomla																					
CLR-4 :	Utilizing Toolbar, Menus, Content Menu of Joomla																					
CLR-5 :	Utilizing Components Menu, Extensions Menu of Joomla																					
	Utilizing Menus, Modules of Joomla																					
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																				
CLO-1 :	Install Joomla, Overview of Joomla Architecture				3	80	70	H	H	M	-	-	-	-	-	H	H	-	-	M	H	H
CLO-2 :	Working with Control Panel to access the functions of Joomla through clickable icons.				3	85	75	H	H	H	H	H	-	M	-	H	H	-	-	M	H	H

CLO-3 :	Toknowaboutthevarious toolbaroptionsinJoomla. Createcustommenusforyourwebsite.	3	75	70
CLO-4 :	StudyingthemenuspresentunderJoomlacontent,ComponentMenu,Banners.ToknowaboutExtensionManager, ModuleManager, PluginManager,Template Manager.	3	85	80
CLO-5 :	CreatingMenus, addingmenuitems, Modifyingmenuitems,Creatingsubmenus. CreatingModules inJoomla.	3	85	75

H	H	M	H	H	-	M	-	H	H	-	-	M	H	H
H	H	H	-	-	-	-	-	H	M	-	-	M	H	H
H	M	M	M	M	M	M	-	H	H	-	M	M	H	H

Duration (Hour)		9	9	9	9	9
S-1	SLO-1	OverviewofJoomla	Manage mediafiles	Workingwithextensionmanager	WorkingwithBreadcrumbmodule inJoomla	AddtemplateinJoomla
	SLO-2	RealworldexamplesofJoomla	Managemenus	Displaythelocationandfunction ofmodules	WorkingwithRandomImage Module	CreatetemplateinJoomla
S-2- S-3	SLO-1 SLO-2	Laboratory1: SystemRequirementsforJo omla	Laboratory4: CreatingMenusforwebsite	ab7: Workingwithmodules, ImplementationofTemplates	Laboratory 10: Joomla GlobalSettings, Mediasettings	Laboratory13: TemplateManager
S-4	SLO-1	CreatestoreDatabase	Workingwithdetailstab	Setdefaultlanguageforyour website.	Workingwithdebugsettings	Createcontactdetailssofthe Company
	SLO-2	JoomlaAdminPanel	WorkingwithPagedisplay, metadata.	JoomlaTranslations	Workingwithmediamanager	UseNewsfeedinJoomla RealWorldApplications.
S-5-S-6	SLO-1 SLO-2	Laboratory 2: UsingToolbar options, CreatingStoreDatabase	Laboratory5: ContentMenuin Joomla	Laboratory8: Workingwithplugin Manager	Laboratory 11: ConfigureJoomla sitewithpersonalsettings	Laboratory14: Addingforums, web Links.
S-7	SLO-1	Howtocretearticlepage	AddNewArticleusingArticle manager	CreateMenuusinJoomlausing MenuManager	WorkingwithJoomlamedia settings	Createcorporateintranetsand Extranets
	SLO-2	Createstandardpages	Createcategoriesforthearticle usingcategorymanager	AddNewMenuItems	WorkingwithJoomlaLanguage Manager	Createon-linemagazines
S-8-S-9	SLO-1 SLO-2	Laboratory3: CreateaTemplate	Laboratory6: ComponentmenuinJoomla	Laboratory9: ModulesinJoomla	Laboratory12: JoomlaLanguageManager	Laboratory 15: Creation of WebsitesandPPersonalhomepages
LearningResources		1. StephenBurge, "Joomla3Explained: Yourstep-by-stepGuidetoJoomla3", Independentlypublished 2. EricTiggeler, "Joomla3Beginner'sGuide", 2 nd Edition, PacktPublishers 3. TimPlummer, "LearningJoomla3ExtensionDevelopment", 3 rd Edition, PacktPublishers			URL: https://www.tutorialspoint.com/joomla/joomla_overview.htm	

Learning Assessment

Level	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%	30%	30%	15%	15%
Level 2	Apply Analyze	50%	50%	50%	50%	40%	40%	50%	50%

Level 3	Evaluate	40%	40%	40%	40%	30%	30%	35%	35%
	Create								
	Total	100 %	100 %	100 %	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 Higher Technical Institutions	Internal Experts
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. V. Raja

Course Code	UCD23V05T	Course Name	Career Readiness and Professional Skills	Course Category	V	Value Addition Course	L	T	P	O	C
							2	0	0	2	2

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
CLR-1 :	Enable students to understand reasoning skills and mathematical concepts	1	1
CLR-2 :	Prepare students for job interviews	2	2
CLR-3 :	Learn structured query language (SQL) to an intermediate/advanced level	3	3
CLR-4 :	Learn the benefits of Python as a scripting language		4
CLR-5 :	Develop life-long skills students can use to seek jobs, internships and make career changes		5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	
CLO-1 :	Solve the problems on reasoning	3	M
		80	M
		75	M

CLO-2 :	Face interviews confidently	3	80	75
CLO-3 :	Understand the importance and major issues of database security and the maintenance of data integrity.	3	75	70
CLO-4 :	Utilise essential programming components including variables, conditional logic, loops, and functions to create simple programmes.	3	75	70
CLO-5 :	Assist students in choosing a career path during their course	3	75	70

M	M	H	M	M	M	L	L	M	M	M	M	M	H	H
M	M	H	H	M	M	L	M	M	M	M	M	M	M	H
M	M	H	H	M	M	L	M	M	M	M	M	M	M	H
M	M	H	H	M	M	L	M	M	M	M	M	M	M	H

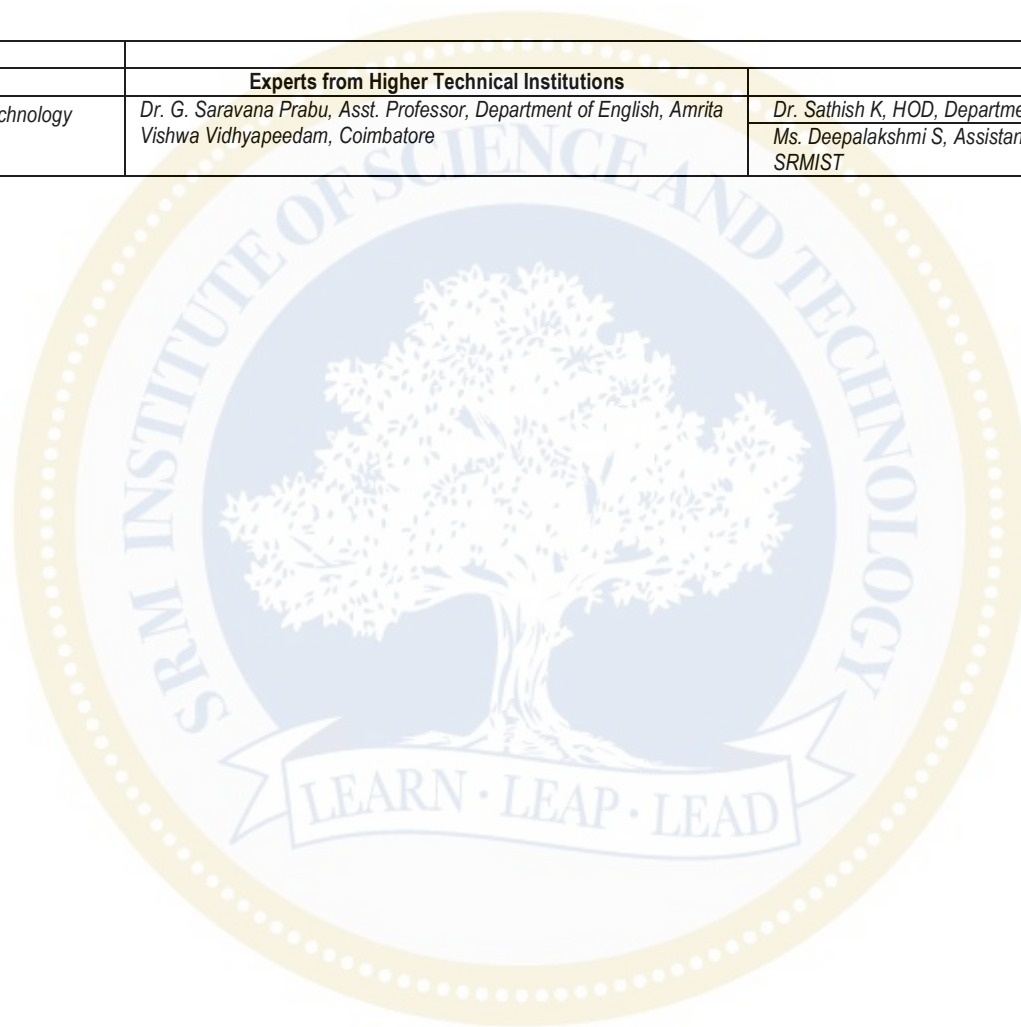
Duration (hour)	6	6	6	6	6
S-1	SLO-1	Partnership	Self-Image and Self-Presentation	SQL - Introduction to SQL	SQL – Joins
	SLO-2	Partnership related solving problems	Etiquettes	SQL Statement Classes	SQL – inner joins –Join Syntax
S-2	SLO-1	Cryptarithmic	Interview Skills - Introduction	Introduction to Databases	Introducing Python
	SLO-2	Cryptarithmic – solving problems	Do's and Don'ts during Interview	SQL - Databases & RDBMS	Introducing Python Object Types
S-3	SLO-1	Ordering, Ranking	Mock Interview – Session 1	SQL data types - Introduction	Python - Data Types & Operators
	SLO-2	Grouping	Mock Interview – Session 2	SQL data types	Python's Core Data Types
S-4	SLO-1	Venn Diagrams concepts	Mock Interview – Session 3	SQL - Syntax	Introduction to Functions
	SLO-2	Venn Diagrams solved questions	Mock Interview – Session 4	SQL – Data Type Syntax	Why use Functions
S-5	SLO-1	Types of Paragraph	HR Round – Practice Session	SQL – Commands Introduction	Python – Functions basic
	SLO-2	Paragraph Forming Questions	HR personal Interview –Mock-Session	SQL - DDL, DML Commands	Coding functions
S-6	SLO-1	Types of Sentences	Email Etiquettes	SQL - Subqueries	Introduction to Classes
	SLO-2	Ordering of Sentences	Email Drafting – Do's and Don'ts	Non-correlated Subqueries	Why Use Classes?

Learning Resources	1. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata McGraw Hill, 5th Edition 2. Dr. Agarwal.R.S, Quantitative Aptitude for Competitive Examinations, S. Chand and Company Limited, 2018 Edition 3. Edgar Thrope, Test of Reasoning for Competitive Examinations, Tata McGraw Hill, 6th Edition	4. Bhatnagar R P, English for Competitive Examinations, Trinity Press, 2016 5. C. J. Date, A. Kannan, S. Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006. 6. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.
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Learning Assessment					
Level	Bloom'sLevel of Thinking	Continuous Learning Assessment (100% weightage)			
		CLA-1 (20%)	CLA-2 (20%)	CLA-3 (30%)	CLA-4 (30%)#
Level 1	Remember	20%	10%	25%	25%
	Understand				
Level 2	Apply	50%	50%	50%	50%
	Analyze				
Level 3	Evaluate	30%	40%	25%	25%
	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	Experts from Higher Technical Institutions	Internal Experts
Mr. M. Ponmurugan, Executive PMOSS, Cognizant Technology Solutions India Pvt. Limited, Chennai	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita Vishwa Vidhyapeedam, Coimbatore	Dr. Sathish K, HOD, Department of Career Guidance, FSH, SRMIST
		Ms. Deepalakshmi S, Assistant Professor, Department of Career Guidance, FSH, SRMIST



Course Code	UMI23M01L	Course Name	My India Project	Course Category	M	Mandatory course	L	T	P	O	C
							0	0	0	0	0

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

(Assessment Method – Fully Internal)

Assessment Tools	Marks
Review – I (Activities)	50
Review – II (Project report and Presentation)	50
Total	100

SEMESTER-V

Course Code	UCS23501J	Course Name	INTERNET PROGRAMMING				Course Category	C	Discipline Specific Core Course																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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	SLO-2	cat, more, less commands	Operators in PHP	Arrays in PHP	Table constraints,	mysql_fetch_query,
S9	SLO-1	Managing directories	Casting operators and miscellaneous operators And Operator precedence	Storing data in arrays in PHP	Queries using where, logical operators	mysql_fetch_row, mysql_result
	SLO-2	mkdir, rmdir, cd and pwd commands	Introduction to control flow statements in PHP	Manipulating and sorting arrays in PHP	special operators used in queries	mysql_fetch_array
S10-S12	SLO-1	Laboratory2: Working with files and directory command	Laboratory 5: Operators and control flow statements	Laboratory 8: Working with strings and arrays in PHP	Laboratory 11 : Working with database and tables.	Laboratory 14 : Form validation , Connecting with MYSQL data using PHP functions
	SLO-2	File operations	Working with if and switch statements	File handling in PHP	Aggregate functions,	Insertion of data in MYSQL table with PHP
S-13	SLO-1	Find,cp,mv,rm and ln commands	Iterative statements: while, for, for each...	Modes of file opening and closing the file	GROUP BY, ORDER BY	Deletion of data in MYSQL table with PHP
	SLO-2	Controlling the access to the files and directories	Continue , break statement in PHP	Directory operations in PHP	Joins	
S-14	SLO-1	chmod , chown,filter, grep commands	Including code from other module	Read operations in file.	Inner Join, Outer Join, Left Join, Right Join.	Updation of data in MYSQL table with PHP
	SLO-2	Introduction to VI editor	Embedding PHP in web pages	Write operations in file.	sub queries	
S-15	SLO-1	Working with VI editor	XML style, SGML style, ASP style and script style	Upload file	Nested sub queries and correlated sub queries	Displaying data from web page.
	SLO-2	Laboratory 3: Working with file commands, Creating and modifying files using Vi Editor	Laboratory 6: Embedding PHP script in HTML	Laboratory 9 : file and directory operations in PHP	Laboratory 12 : Working with queries, joins and sub queries in MYSQL	Laboratory 15 : creating PHP web applications to manipulating data [CRUD operations] from MYSQL table.

Learning Resources	1. Richard Petersen, (2006), "Linux : The Complete Reference" ,Sixth Edition 2. RasmusLerdorf, Kevin Tatroe, Bob Kaehms, RicMcGredy, (2002), "Programming PHP", O'REILLY	3. Lee Babin, Nathan A. Good, Frank M. Kromann, Jon Stephens (2005), "PHP 5 Recipes, A Problem Solution Approach", APRESS 4. VikramVaswani (2008), "PHP: A BEGINNER'S GUIDE", McGraw-Hill.
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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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelananarayanan., Professor, School of Computer Science and Engineering, VIT Chennai	Mrs. E Aarthi

Course Code	UCS23502J	Course Name	DESIGN AND ANALYSIS OF ALGORITHMS	Course Category	C	Discipline Specific Core Course	L	T	P	O	C
							3	0	3	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 :	Think and evolve logically
CLR-2 :	Write application code for specific purpose
CLR-3 :	Understand the effectiveness of programming
CLR-4 :	Customizing functions and procedures to encourage reusability
CLR-5 :	Establish interaction between stored files and the application code

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

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:
CLO-1 :	Understanding the Programming Life cycle
CLO-2 :	Writing the algorithm for various problems
CLO-3 :	Performing Time and Space Complexity for the algorithms written for a problem
CLO-4 :	How algorithms are written for Divide Conquer and Greedy method
CLO-5 :	Writing algorithms for Dynamic Programming and Back tracking

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
	H		H		H	-	M	M	L	-		-	M	H
	H		H		H	-	M	M	L	-	H	-	M	H
		H		H	L	-	M	M	L	-	H	-	M	H
	H		H		H	-	M	M	L	-		-	M	H
	H	H				-	M	M	L	-	H	-	M	H

Duration (hour)		18	18	18	18	18
S-1	SLO-1	Algorithm – Definition, Characteristics of an algorithm	Strassen's Matrix Multiplication definition	Dynamic Programming – definition, Multistage Graph – definition	Connected Components - definition	Usage of Graph coloring problem
	SLO-2	Steps to write the algorithm	Strassen's Matrix Multiplication Using Divide and Conquer method	Introduction to shortest path problem,	Bi Connected Components - definition	Application of Graph Coloring Algorithm
S-2	SLO-1	Writing algorithms for Sample problems	Convex Hull calculation	Introduction to Multistage Graph shortest path,	constructing Bi Connected Graphs with sample data	Applying backtracking algorithm for solving graph coloring problem
	SLO-2	Specification of algorithm, Recursive algorithms	Finding convex hull various methods including divide and Conquer method	Multistage Graph shortest path with sample data	Components of Bi connected graphs	Introduction to Hamiltonian cycle problem
S-3	SLO-1	Writing recursive algorithm for a sample problem	Introduction to Greedy Method and definition	Solving a Multistage Graph shortest path problem using dynamic programming algorithm	Dynamic programming	Introduction to Hamiltonian cycle problem - Continued
	SLO-2	Performance Analysis calculation	Example of Greedy Method, Control abstraction for greedy method	Introduction to All pairs shortest path problem	algorithm for constructing Bi Connected Graphs	Applications of Hamiltonian cycle problem
S4-6	SLO-1	Lab 1 - Time complexity for Merge Sort	Lab 4:- Executing the Greedy algorithm for tree vertex splitting problem	Lab 7;- Executing Multistage Graph shortest path problem using dynamic programming algorithm	Lab 10:- - Executing Dynamic programming algorithm for constructing Bi – connected Graphs problem	Lab 13;- Executing the Graph coloring with backtracking
	SLO-2					
S-7	SLO-1	Time Complexity	Knapsack Problem - Definition	All pairs shortest path problem with sample data	Backtracking - definition	Hamiltonian cycle problem with sample data
	SLO-2	Space Complexity				
S-8	SLO-1	Determining Times and Space Complexity problems	Algorithm for solving knapsack problem with greedy method	Solving an allpairs shortest path problem using dynamic programming algorithm	Solution space and Constraints in backtracking	Solve the Hamiltonian cycle problem
	SLO-2	Space Complexity for a recursive algorithm	Introduction to Tree Vertex Splitting problem	Single source shortest path problem – definition	Control Abstraction for Backtracking	Applying back tracking for Hamiltonian cycle problem
S-9	SLO-1	Determining space complexity for sum of n numbers using function	Tree vertex splitting algorithm with sample data	Dynamic programming method for Single source shortest path problem	Introduction to 8 Queens Problem – meaning, Solving the 8 Queens problem with sample data	Introduction to Brach and bound Problem, Branch and bound Problem with sample data
	SLO-2	Asymptotic notation	Solving Tree vertex splitting algorithm with Greedy method	String editing problem – definition , Dynamic programming method for String editing problem	Applying backtracking for solving 8 queens problem	Compare and contrast divide and conquer branch and Bound method
S10-12	SLO-1	Lab 2 - Time complexity for Quick Sort	Lab 5:- Executing the Tree vertex splitting algorithm with Greedy method	Lab 8;- Executing All pairs shortest path problem using dynamic programming algorithm	Lab 11: Executing Bi-Connected Components Graphs with backtracking	Lab 14: Executing Branch and bound Algorithm for solving Hamilton Problem
	SLO-2					
S-13	SLO-1	Divide and Conquer method	Job Sequencing Deadlines problem	Introduction to 0/1 Knapsack Problem	Introduction to Sum of subset problem	Introduction to Traveling salesman problem – meaning (TSP)
	SLO-2	Apply Divide and Conquer method in Merge Sort	Greedy algorithm for Job Sequencing Deadlines problem	Dynamic programming algorithm for solving 0/1 Knapsack Problem	solving sum of subsets problem – with sample data	Solving Traveling salesman problem – Sample data

S-14	SLO-1	Apply Divide and Conquer method in Quick Sort	Optimal storage on Tapes problem	Dynamic programming for solving 0/1 Knapsack Problem with sample data	Applying backtracking for solving sum of subsets problem	Applications of Traveling salesman problem
	SLO-2	Apply Divide and Conquer method in Selection Sort	Optimal storage on Tapes Problem with sample data	Introduction to Graphs - Traversals	Introduction to Graph Coloring	Solving TSP with graph coloring
S-15	SLO-1	Time complexity for Selection Sort	Solving Optimal storage problem using greedy algorithm	DFS and BFS with sample data	Graph Coloring with sample data	Branch and bound Algorithm for solving TSP
	SLO-2	Lab 3- -Executing Divide and conquer problem	Lab 6- Executing the Greedy algorithm for Optimal storage on Tapes problem	Lab 9;- Executing Dynamic programming algorithm for Single source shortest path problem	Lab 12- Executing 8 Queens problem with back tracking	Lab 15- – Executing the TSP with Branch and Bound method

Learning Resources	1. Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Galgotia Publication, 2008 2. Data structures, Algorithms and applications, Sahni, McGraw-Hill International Edition, 2005
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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	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mr Ramesh M

Course Code	USA23503T	Course Name	SOFTWARE ENGINEERING	Course Category	C	Discipline Specific Core Course	L	T	P	O	C										
							4	0	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	Familiarizethesoftwarelifecyclemodelsandsoftwaredevelopmentprocess			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2	Understandthevarioustechniquesforrequirements,planningandTesting			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	Examinethebasicmethodologiesforsoftwaredesign,development,testing																				
CLR-4	Manageuserexpectationsandsoftwaredevelopmentteam																				
CLR-5	Acquirethelatestindustryknowledgelikeagilefordevelopment																				
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																			
CLO-1	Identifytheprocessofprojectlifecycle modelandprocess			3	80	70	L	H	-	H	L	-	-	M	L	L	-	H	-	-	-
CLO-2	AnalyzeandspecifysoftwarerequirementsthroughaproductiveworkingRelationship Customers.			3	85	75	M	H	L	M	L	-	-	M	M	L	-	H	-	-	-
CLO-3	DesignthesystembasedonFunctionalOrientedandObjectOrientedApproachforSoftwareDesign.			3	85	80	M	H	M	H	L	-	-	M	M	L	-	H	-	-	-
CLO-4	Developthecorrectandrobustcodeforthesoftwareproducts			3	85	80	M	H	M	H	L	-	-	M	M	L	-	H	-	-	-
CLO-5	Performbyapplyingthetestplanandvarioustestingtechniques			3	85	75	H	H	M	H	L	-	-	M	M	L	-	H	-	-	-
Duration (Hour)	12		12	12			12			12			12								
S1	SLO-1	TheEvolvingRoleofSoftware	Computer-BasedSystems	PrinciplesofTesting			Integrationtesting			PerformanceTesting											
	SLO-2	SoftwareEngineeringDefinition	The System EngineeringHierarchy– SystemModeling	Introduction-TestingDefinition			TopdownIntegrationtesting			FactorsofGoverning											
S2	SLO-1	SoftwareCharacteristics	SystemSimulation	Phasesofsoftware			BottomupIntegrationtesting			Regressiontesting											
	SLO-2	Software Applications and ACrisis	ComparisonofvarioussoftwareDevelopment	Error, Fault, Bug-Failure of thesystem– Comparisonofthe terms			Bi-DirectionalIntegration			Typesofregressiontesting											
S3	SLO-	SoftwareMyths	BusinessProcessEngineering:AnOverview	Typesoftesting-			SystemIntegration			Softwaretestingstrategy											

	1					
	SLO-2	TypesOfMyths	RequirementsEngineering process	Qualityassurance	SystemAcceptanceTesting	Bestpracticein regression Testing
S4	SLO-1	Software Engineering : Layered Technology	Software requirements specification	Quality Control	Functional testing	Methodology for Performance Testing
	SLO-2					
S5	SLO-1	Software Process	Characteristics of GoodRequirements	Testing verification and validation	Non Functional testing	Tools for Performance Testing
	SLO-2	Software Process Models	Types of Requirements	White Box Testing	Functional Vs Non Functional Testing	Challenges for Performance Testing
S6	SLO-1	Linear Sequential Model	Requirements Elicitation	Techniques of White Box Testing	System Testing	Performing Initial Test, Understanding the Criteria
	SLO-2	Advantages And Disadvantages	Requirements Analysis and Negotiation	Black box testing	Design and Architectural Verification	Classifying Test Cases.
S7	SLO-1	Prototyping Model	Requirement Documentation	Techniques of Black box testing	Deployment Testing	Resetting the Test Cases
	SLO-2	Advantages And Disadvantages	Requirement Specification and Analysis	Static Testing	Beta Testing	Case study
S8	SLO-1	Rapid Application Development Model	Requirement Review, Validation	DYNAMIC Testing	Certification, Standards	Concluding the Results of Regression Testing
	SLO-2		Software Requirement Specification and System Requirement Specifications			
S9	SLO-1	EvolutionaryProcessModels	CharacteristicsofGoodSRS Document	Challengesinwhiteboxtesting	TestingforCompliance	Configurationtesting
	SLO-2	IncrementalModel	RequirementManagement	BlackBoxTesting	ScalabilityTesting	Compatibilitytesting
S10	SLO-1	AdvantagesandDisadvantages	SoftwarePrototyping	Techniquesof BlackBoxTesting	Reliabilitytesting	Testplanwithdebugging
	SLO-2	SpiralModel,WINWINModel	Selecting the prototypingapproach	Structuraltesting	Stresstesting	Levelsoftesting
S11	SLO-1	ConcurrentDevelopmentModel	SpecificationPrinciples, Representation	Statictesting	AcceptanceTesting	Testingtools
	SLO-2	ComponentBasedDevelopment	SpecificationReview	Verification&ValidationTechniques	AcceptanceCriteria	KeyIssuesinSoftwaremaintenance
S12	SLO-1	ComparisonofProcessmodels	CharacteristicsofGoodE-R Diagrams	Cyclomaticcomplexity	SelectingTestCases	Case study with an real time projects
	SLO-2	AdvantagesandDisadvantages	SRSDocument	Controllflowgraph	ExecutingTests	
Learning Resources		Software Engineering by Roger pressman 7 th edition Software engineering by Ian Sommerville 9 th edition Software testing,principles and practices by Srinivasan desikan,Gopalaswami ramesh -2015				
Learning Assessment						
Bloom's			Continuous Learning Assessment (50% weightage)			Final Examination (50% weightage)

Level of Thinking		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	
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai		Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	
		Internal Experts	
		Ms. Yogalakshmi P	

Course Code	UCS23D01J	Course Name	ARTIFICIAL INTELLIGENCE	Course Category	D	Discipline Specific Elective Course				
						L	T	P	O	C
						3	0	2	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 :	Provide a broad understanding of the basic techniques for building intelligent computer systems and an understanding of how AI is applied to problems.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Gain knowledge in problem formulation and building intelligent agents	Level of Thinking (Bloom) Expected Proficiency (%) Expected Attainment (%)			Fundamental 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 :	Understand the search technique procedures applied to real world problems																		
CLR-4 :	Understand the types of logic and knowledge representation schemes																		
CLR-5 :	Acquire knowledge in planning and learning algorithms																		

			Minimax approach			
	SLO-2	Constraint propagation	Minimax Algorithm	Conditions for Unification & Unification algorithm	Bayesian networks	Agent environment interface
S 14-15	SLO-1	Lab 3: Program for solving a water jug problem using Breadth first search	Lab 6: Program for Tic Tac Toe game played by two different human players.	Lab 9: Program for building a magic square of Even number of Rows and columns.	Lab 12: Program which demonstrates Best First Search.	Lab 15: program to implement five House logic puzzle problem
	SLO-2					

Learning Resources	1. Russel. SandNorvig.P, (2022), "Artificial Intelligence – A Modern Approach", Fourth Edition, Pearson Education. Unit (I – V) ISBN-13. 978-0134610993	2. Chandra S.S., Vinod, Hareendran S., Anand (2020), "ARTIFICIAL INTELLIGENCE PRINCIPLES AND APPLICATIONS", Second Edition, Pearson Education ISBN- 9789389347845
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Learning Assessment											
Level	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	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan., Professor, School of Computer Science and Engineering, VIT Chennai	Dr V Saravanan, FSH, SRMIST, RPM Dr(Mrs). R. Ramyadevi, FSH, SRMIST, RPM

Course Code	UCS23D02J	Course Name	CLOUD COMPUTING	Course Category	D	Disipline Specific elective course	L	T	P	O	C
							3	0	2	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 :	Understand the fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability; benefits, as well as current and future challenges	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15							
CLR-2 :	Learn cloud enabling technologies and get exposure to advanced clouds	Thinking	Proficient	Attainme	ental	Knowled	Problem	Analysis	Develop	Design,	Research	Tool	Survey	&	ment &	Sustaina	Ethics	Team	Commun	ication	Mgt. &	Life Long	Learning	PSO - 1	PSO - 2	PSO - 3
CLR-3 :	Explore cloud storage technologies and relevant distributed file systems, NoSQL databases and object storage;																									

CLR-4 :	Understand the cloud security threats and protective mechanism for cloud computing
CLR-5 :	Know the algorithms behind the protocols that helps data transfer

Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:		
CLO-1 :	Explain terms used in secured software development and life cycle process	2	85	80
CLO-2 :	Apply fundamental concepts in cloud infrastructures to understand the cloud system, network and virtualization and outline their role in enabling the cloud computing system model.	3	85	80
CLO-3 :	Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS	3	85	80
CLO-4 :	Evaluate the security issues related to cloud computing and handle the security threats and construct different cloud delivery design models	3	85	80
CLO-5 :	Describe the Cloud Security i.e., Risks, Privacy and Privacy impacts assessments	3	85	80

L	-		L		-	-	M	-	-	-	-	L	L	L			
-	M	H	--	H	-	-	-	-	M	-	-	M	-	L			
-	-	H	M	H	-	-	-	-	-	-	-	L	L	-			
-	-	-	M	-	-	-	H	-	-	-	-	M	-	M			
L	-	M	-	M	-	H	-	-	-	-	-	L	-	M			

Duration (hour)		15	15	15	15	15
S-1	SLO-1	The cloud ecosystem - Introduction to Cloud Computing	Parallel processing and distributed computing - Computer architecture concepts	Cloud data storage - Introduction to Cloud Data Storage	Cloud Security - Introduction	Cloud applications - development and architectural styles
	SLO-2	Evolution of cloud computing	Grand architectural complications	The evaluation of storage technology	Security—the top concern for cloud users	Coordination of multiple activities
S-2	SLO-1	Network-Centric Computing	ARM architecture	Storage Models	Cloud security risks	Coordination based on a state machine model—zookeeper
	SLO-2	Network-Centric Content	SIMD architectures	Solid-state disks	Cloud Security Mechanisms	MapReduce programming model
S-3	SLO-1	Origin of Cloud Computing	Graphics processing units	File Systems and databases		
	SLO-2	Basic Concepts and Terminology	Tensor processing units			
S-4-5	SLO-1	Lab 1: Create a virtual machine	Lab 4: Create a drop box using Google AP	Lab 7: Encryption and Decryption of Text	Lab 10: Develop a Hello World application using Google App Engine	Lab 13: Create a Warehouse Application in Sales force.Com
	SLO-2					
S-6	SLO-1	Cloud Service Models	Modularity. Soft modularity versus enforced modularity	General parallel file system	Digital Signature, Public Key Infrastructure	Current cloud applications and new applications opportunities
	SLO-2	Cloud Deployment Models	Layering and hierarchy			Clouds for science and engineering
S-7	SLO-1	Cloud Service Providers	Peer-to-peer systems	Google file system	Identity and Access Management	Social computing, digital content, and cloud computing
	SLO-2	the Cloud Ecosystem	Large-scale systems		Single Sign-On: Kerberos authentication	
S-8	SLO-1	Amazon Web Services(AWS), Google Clouds,	Composability bounds and scalability (R)	Locks	One-time password	Software fault isolation
	SLO-2	Microsoft Windows Azure and online services	Distributed computing fallacies and the CAP theorem	Chubby—a locking service	Basic cloud data security mechanisms	
S-9-10	SLO-1	Lab 2: Installation of Platforms	Lab 5: Transfer Data using Google APPs	Lab 8: Simple Experiments in Cloud Sim	Lab 11: Develop a Guestbook Application using Google App Engine	Lab 14: Create a Warehouse Application in Sales force.Com using Apex prog Lang
	SLO-2					
S-11	SLO-1	Service-level Agreements and Compliance-level Agreements	Cloud hardware and software - Cloud infrastructure challenges	NoSQL databases	Security risks posed by shared images	Dynamic data-driven applications
	SLO-2	Responsibility sharing between user and service provider	Cloud hardware; warehouse-scale computer (WSC)			Data streaming
S-12	SLO-1	User challenges and experience	WSC performance	Data storage for online transaction processing systems	Security risks posed by a management OS	Mobile computing and applications
	SLO-2	Software licensing	Hypervisors	BigTable	Xoar—breaking the monolithic design of the TCB	Energy efficiency of mobile computing
S-13	SLO-1	Challenges faced by cloud computing	Execution of coarse-grained data-parallel applications	Megastore	Mobile devices and cloud security	System availability at scale
	SLO-2		Fine-grained cluster resource sharing in Mesos	Storage reliability at scale	Mitigating cloud vulnerabilities in the age of ransomware	Scale and latency
S	SLO-1	Lab 3: Deploying existing Apps	Lab 6: upload and download using Google	Lab 9: Simple Experiments in CloudSim	Lab 12: Develop a Windows Azure Hello	Lab 15: Implementation of SOAP Web

14-15	SLO-2	APPs	World application	Services
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Learning Resources	1. Dan C. Marinescu, "Cloud Computing Theory and Practice", Third Edition Copyright © 2023 Elsevier Inc. ISBN: 978-0-323-85277-7 Unit (I – V)	6. Dan C. Marinescu, "Cloud Computing Theory and Practice", Third Edition Copyright © 2023 Elsevier Inc. ISBN: 978-0-323-85277-7 Unit (I – V)
	2. RajkumarBuyya, James Broberg, AndrzejGoscinski, Cloud Computing Principles and Paradigms, Wiley Publications, 2017.	7. RajkumarBuyya, James Broberg, AndrzejGoscinski, Cloud Computing Principles and Paradigms, Wiley Publications, 2017.
	3. Thomas Erl, ZaighamMahmood, and RichardoPuttini, "Cloud Computing: Concepts, Technology & Architecture", Prentice Hall/PearsonPTR, Fourth Printing, 2014, ISBN: 978013338752.	8. Thomas Erl, ZaighamMahmood, and RichardoPuttini, "Cloud Computing: Concepts, Technology & Architecture", Prentice Hall/PearsonPTR, Fourth Printing, 2014, ISBN: 978013338752.
	4. K. Chandrasekaran, "Essentials of Cloud Computing", Chapman and Hall/CRC Press, 2014, ISBN 9781482205435	9. K. Chandrasekaran, "Essentials of Cloud Computing", Chapman and Hall/CRC Press, 2014, ISBN 9781482205435
	5. ArshdeepBahga, Vijay Madiseti, "Cloud Computing: A Hands-On Approach", University Press, 2016, ISBN- 13: 978-0996025508.	10. ArshdeepBahga, Vijay Madiseti, "Cloud Computing: A Hands-On Approach", University Press, 2016, ISBN- 13: 978-0996025508.

Learning Assessment											
Level	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	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 Higher Technical Institutions		Internal Experts	
Experts from Industry					
1. Mr.Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai		1. Dr.Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai		1. Dr. P J Arul Leena Rose	

Course Code	UCS23G03J	Course Name	INTRODUCTION TO DATA SCIENCE	Course Category	G	Generic Elective Course					L	T	P	O	C
											3	0	2	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):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Understand the basics of Data Science
CLR-2 :	Learning and implementing the fundamentals of Python for data science
CLR-3 :	Exploring python libraries and data analysis methodologies like Exploratory Data Analysis
CLR-4 :	Acquiring the concepts of user defined modules and packages in python
CLR-5 :	Understanding Matplotlib and Data Visualization

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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fundamental 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	L	M	.	.	.	.	.	H	L	.	.	.	.	.
H	H	H	H	H	.	M	.	H	H	.	.	.	.	.
H	H	M	H	H	.	M	.	H	H	.	.	.	.	.
H	H	H	M	M	.	M	.	H	M	.	.	.	.	.

Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:	Level of Bloom	Expected (%)	Expected (%)
CLO-1 :	Learn the fundamentals of data science and its methodologies		2	85	80
CLO-2 :	Implement the data science concepts using python		3	85	80
CLO-3 :	Employ efficient storage and data operations using NumPy arrays		3	85	80
CLO-4 :	Apply powerful data manipulations using Pandas		3	85	80
CLO-5 :	Explore the data using various visualization and Matplotlib		3	85	80

Duration/Hour		15	15	15	15	15
S-1	SLO-1	Data science in a big data world	Python Language Basics	NumPy Basics	Getting Started with pandas	Data Cleaning and Preparation
	SLO-2	Benefits and uses of data science and big data,Facets of data, Structured data and Unstructured data	Scalar Types	The NumPyndarray: A Multidimensional Array Object	Series,DataFrame	Handling Missing Data,Filtering Out Missing Data
S-2	SLO-1	Natural language and Machine-generated data	Numeric types,Strings	Creating ndarrays,Data Types for ndarrays	Index Objects,Essential Functionality	Filling In Missing Data,Data Transformation
	SLO-2	Graph-based or network data And Audio, image, and video, Streaming data	List,Tuples	Arithmetic with NumPy Arrays,	Reindexing	Transforming Data Using a Function or Mapping
S-3	SLO-1	The data science process	Dictionary	Basic Indexing and Slicing	Dropping Entries from an Axis	Replacing Values
	SLO-2	The big data ecosystem and data science	Sets	Boolean Indexing,Fancy Indexing	Indexing, Selection, and Filtering	Renaming Axis Indexes
S4-5	SLO-1	Lab 1: Perform Analysis on Simple Dataset I for Data Science	Lab 4: Apply Python built-in data types: Strings, List, Tuples, Dictionary, Set and their methods to solve any given problem	Lab 7: Manipulation of NumPy arrays- Indexing, Slicing, Reshaping, Joining and Splitting	Lab 10:Perform operations on Data Frames using Python	Lab 13: Perform data transformations using python
	SLO-2					
S-6	SLO-1	Overview of the data science process	Type Conversion,Operators	Transposing Arrays and Swapping Axes	Selection with loc and iloc,Integer Indexes	String Manipulation
	SLO-2	Defining research goals and creating a project charter	Control Flow,Looping- Loop Control statement	Universal Functions: Fast Element-Wise Array Functions	Arithmetic and Data Alignment	Vectorized String Functions in pandas
S-7	SLO-1	Retrieving data,Cleansing, integrating, and transforming data	Built-in Sequence Functions,	Array-Oriented Programming with Arrays	Arithmetic methods with fill values	Plotting and Visualization,Brief matplotlib API Primer
	SLO-2	Combining data from different data sources,Transforming data	List, Set, and Dict Comprehensions	Expressing Conditional Logic as Array Operations	Operations between DataFrame and Series	Colors, Markers, and Line Styles,Ticks, Labels, and Legends
S-8	SLO-1	Exploratory data analysis	Functions	Mathematical and Statistical Methods,Methods for Boolean Arrays	Function Application and Mapping,Sorting and Ranking	Annotations and Drawing on a Subplot
	SLO-2	Build the models	Namespaces, Scope, and Local Functions	Sorting,Unique and Other Set Logic	Axis Indexes with Duplicate Labels	Saving Plots to File
S9-10	SLO-1	Lab 2: Create and upload dataset for data analytics	Lab 5: Solve problems using decision and looping statements	Lab 8: Perform array operations	Lab 11:Perform operations on Data Frames using Python	Lab 14: Install, Import Matplotlib. Explore all the Data Visualization Graphs
	SLO-2					
S-11	SLO-1	Presenting findings and building	Returning Multiple Values	File Input and Output with Arrays,	Summarizing and Computing Descriptive	Getting Started with SciPy

		applications on top of them			Statistics	
	SLO-2	What is Data Analysis?, Why Python for Data Analysis?	Errors and Exception Handling	Linear Algebra	Correlation and Covariance	SciPy Constants, SciPy Optimizers
S-12	SLO-1	Essential Python Libraries, Installation and Setup	Files and the Operating System	Pseudorandom Number Generation	Unique Values, Value Counts, and Membership	SciPy Sparse Data, SciPy Graphs
	SLO-2	Installing or Updating Python Packages	OOPs Concepts, Class and Objects	Example: Random Walks	Installing and Using Pandas, Exporting a data file Using Pandas	Getting started with Machine Learning with Scikit-Learn
S-13	SLO-1	Integrated Development Environments (IDEs) and Text Editor	Constructors, Data hiding and abstraction	Simulating Many Random Walks at Once	Reading Data from a Excel file, Reading Data from a .csv file	Getting started with Scikit-Learn
	SLO-2	The Python Interpreter	Inheritance	Example: Linear algebra	Reading Data from a .txt file	Exploring the Famous Iris Dataset
S14-15	SLO-1	Lab 3: Install Python IDE and perform basic python programs	Lab 6: Apply all basic python OOP Concepts	Lab 9: Implement Random Walks	Lab 12: : Install, Import Pandas Learn and Explore a Sample Dataset with it	Lab 15: Install, Import Scikit Learn and Explore Iris Dataset with Pandas for ML Modelling

Learning Resources	Cielen, D., & Meysman, A. (2016). <i>Introducing Data Science</i>, Manning Publications Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2018.
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Learning Assessment											
Level	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	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. S Kanchana

Course Code	UCS23S05J	Course Name	DATA VISUALIZATION TOOL	Course Category	S	Skill Enhancement Course	L	T	P	O	C
Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil		1	0	1	2	1
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 :	Analyze and visualize data	1	1
CLR-2 :	Navigate to data sources. Download data in proper format	2	2
CLR-3 :	Create visualizations that accurately represent the source data set	3	3
CLR-4 :	Use Table auto perform various types of analysis on data sets	4	4
CLR-5 :	Data visualizations that demonstrate an understanding of data	5	5
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	6	6
CLO-1 :	Design effective data visualizations in order to provide new in sights	7	7
CLO-2 :	Find and select appropriate data visualization in order to create a better understanding of the data	8	8
CLO-3 :	Create Heat map, wordcloud and different type of charts as visualization	9	9
CLO-4 :	Cite data from other sources in visualizations and documentation	10	10
CLO-5 :	Properly document and organize data and visualizations	11	11

Duration (hour)	06	06	06	06	06
S-1	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, Shelves & Cards	Adding multiple tables from the same database, Joining multiple tables from the same database	Line/Area chart – Tableau forecasting	Custom Geocoding, Background Maps and Layers: Map options	Floating Placement, Associated Dashboard elements, Advanced Dashboard elements – Layout Container, Blank
S-2	SLO-1 Lab 1: Shelves & Cards	Lab 4: Joining multiple tables from the same database	Lab 7: Pie chart, text table/ crosstab	Lab 10: Background Maps and Layers: Map options	Lab 13: Advanced Dashboard elements – Layout Container, Blank
	SLO-2 Basic Tableau Design Flow	Customizing your view of the data	Scatter plot, Bubble Chart	Webmap Services	Text, Image, Webpage
S-3	SLO-1 Basic Visualization Design using show me	Modifying Tableau default field	Bullet Group, Box Plot	Mapping and Mark types	Setting Dashboards and Element size
	SLO-2 Choosing Mark Types, Color, Size, Shapes and Label options – Choosing color options	Assignments, Hiding, Renaming and Combining fields	Treemap, Wordcloud	Custom Background Images	Dashboards Actions, Distributing and Sharing your Visualization – Exporting worksheets and Dashboards – Printing to PDF format
S-4	SLO-1 Lab 2: Color, Size, Shapes and Label options – Choosing color options	Lab 5: Hiding, Renaming and Combining fields	Lab 8: Wordcloud	Lab 11: Calculating fields, Table Calculations and Statistics – Creating Calculate fields	Lab 14: Distributing and Sharing your Visualization – Exporting worksheets and Dashboards – Printing to PDF format
	SLO-2 Setting Mark Size Text tables Mark Labels	Changing default field appearance	Interacting with the viewer – Filtering data, Basic filtering, Interactive filtering	Numeric calculations, String Manipulations, Date calculations	Exporting Worksheet Data
S-5	SLO-1 Choosing shapes, Formatting Options	Using Hierarchies, Groups and Sets	Quick filtering, Parameters – Creating parameters	Logic Constructs, Creating Binned fields	Exporting Worksheet Image
	SLO-2 Saving and Sharing Metadata, : Extracting data, Data Blending	Saving and Sharing Metadata, : Extracting data, Data Blending	Displaying parameters – Using a Parameter in a worksheet, Worksheet Actions – Filter Actions	Table Calculations, Reference Lines, Bands & Distributions	Exporting Dashboard Images, Using Tableau Reader

S-6	SLO-1	Lab 3:FormattingOptions	Lab 6:Extractingdata,DataBlending	Lab 9:WorksheetActions–Filter Actions	Lab 12:ReferenceLines,Bands& Distributions	Lab 15:UsingTableau Reader
	SLO-2		Movingfromtexttoproduction databases	HighlightActions,URLActions	TrendLines	PublishingtotheWeb

LearningResources	1. GeorgePeck,"Tableau8:TheOfficialGuide",Firstedition,McGrawHillProfessional,2013.,	1. Website:www.tableaureferenceguide.com
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Learning Assessment

Level	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	10%	10%	10%	10%	30%	30%	15%	15%
	Understand								
Level 2	Apply	50%	50%	50%	50%	40%	40%	50%	50%
	Analyze								
Level 3	Evaluate	40%	40%	40%	40%	30%	30%	35%	35%
	Create								
	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelananarayanan., Professor, School of Computer Science and Engineering, VIT Chennai	Ms. P Yogalakshmi

Course Code	UCS23P02L	Course Name	INTERNSHIP - II	Course Category	IAPC	Internship/Apprenticeship / Project/ Community Outreach	L	T	P	O	C
							0	0	0	0	1

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 :	Demonstrate skills learnt in the real time environment.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Explore the different industries that are using IT																		
CLR-3 :	Enhance the skills in the system aspects																		
CLR-4 :	Understanding the professional connections with the knowledge learnt																		
CLR-5 :	Applying the skills in problem solving																		
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 :	To get an insight of an industry and organization/company	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	H	H
CLO-2 :	To gain valuable skills and knowledge	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	H	H
CLO-3 :	To make professional connections and enhance networking	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	H	H
CLO-4 :	To get experience in a field to allow the student to make a career transition	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	H	H
CLO-5 :	To get an inside view of an industry and organization/company	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	H	H

Students can choose a company of their own interest for internship for a period of minimum four weeks to learn about the application of IT in real time environment. In the first week of July, all the students have to give a presentation about their observations made by them in internship. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

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

SEMESTER – VI

Course Code	UCS23601J	Course Name	PYTHON PROGRAMMING	Course Category	C	Discipline Specific Core Course					L	T	P	O	C
											3	0	3	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)														
		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 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 :	Discover the need for working with the strings and functions.				L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLR-3 :	Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.				M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLR-4 :	Indicate the use of regular expressions and built-in functions to navigate the file system.				M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLR-5 :	Infer the Object-oriented Programming concepts in Python.				M	H	M	H	L	-	-	-	M	L	-	H	-	-	-

Course Learning Outcomes (CLO):		Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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
S1	SLO-1	An introduction to python programming	The Structure of Strings	Introduction to Lists	Introduction to function
	SLO-2	Structure of a Python program	The Subscript Operator	List literals	Functions as Abstraction Mechanisms
S2	SLO-1	Understanding Python interpreter	Single-quote, double quote and multi-line strings	Basic list operators	Function Definition
	SLO-2	Understanding Python Shell	String literals	Replacing an Element in a List	Calling functions
S3	SLO-1	Datatypes in Python	String format	Example program to Replace an Element in a List	Defining a Recursive Function
	SLO-2	Escape Sequences	String concatenation, String slicing	List Methods for Inserting Elements	Tracing a Recursive Function
S4-s6	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	Laboratory 10: Program using recursive function
	SLO-2			Program to List Methods for Inserting Elements	Laboratory 13: Program using classes and methods
S7	SLO-1	Structuring with Indentation	String splitting and joining	List Methods for Removing Elements	Using Recursive Definitions to Construct Recursive Functions
	SLO-2	Naming convention of Variables	String Repetition and Indexing	Searching and sorting List	Infinite Recursion
S8	SLO-1	Variables and the assignment statement	String functions	Tuple Data types	The Costs and Benefits of Recursion
	SLO-2	Example program using variables	string Methods	Tuple assignment	Module Variables

S9	SLO-1	Program Comments and Doc Strings	String module	Tuples loop	Python function scope	Rational Number Arithmetic and Operator Overloading
	SLO-2	Character sets	String special operators	Creation of several tuples	Function Parameters and Temporary Variables	Comparison Methods
S10-S12	SLO-1	Laboratory 2: The Magic 8 Ball is a toy used for fortune-telling or seeking advice.	Laboratory 5: Find the Factorial of a Number Python Program to Convert Decimal to Binary, Octal and Hexadecimal	Laboratory 8: Using a List to Find the Median of a Set of Numbers Program using sorting and searching	Laboratory 11: Write the code for a mapping that generates a list of the absolute values of the numbers in a list named numbers.	Laboratory 14: Python Program for Operator overloading
	SLO-2					
S13	SLO-1	Arithmetic expressions	Program to convert binary to decimal	Python Sets	Default argument function	Equality and the eq Method
	SLO-2	Logical operators	Program to convert decimal to binary	Sets Methods	Variable argument function	Using pickle for Permanent Storage of Objects
S14	SLO-1	Formatting text for output	Octal and Hexadecimal Numbers	Loop Sets and Join Sets	Built-in functions in Python	Input of Objects and the try-except Statement Inheritance Hierarchies and Modeling
	SLO-2	Definite iteration : For loop	Text Files and Their Format	Python Dictionaries	Mapping	
S15	SLO-1	Selection : if and if else statement	Reading Text from a File	Dictionaries methods	Filtering & Reducing	Abstract Classes
	SLO-2	Conditional iteration :while loop	Writing text to a file	Adding Keys and Replacing Values oop and copy Dictionaries	Using lambda to Create Anonymous Functions	Polymorphic Methods
S16-S18	SLO-1	Laboratory 3: Check whether a number is prime or not, Python Program to Generate a Random Number	Laboratory 6: Program to read and write text and numbers	Laboratory 9: When the user enters a statement, the program responds in one of two ways: 1 With a randomly chosen hedge, such as "Please tell me more." 2 By changing some key words in the user's input string and appending this string to a randomly chosen qualifier. Thus, to "My teacher always plays favorites," the program might reply, "Why do you say that your teacher always plays favorites?"	Laboratory 12: Write the code for a filtering that generates a list of the positive numbers in a list named numbers. You should use a lambda to create the auxiliary function.	Laboratory 15: Program using polymorphism, abstract classes
	SLO-2					

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	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.,

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Course Code	USA23602J	Course Name	COMPUTER NETWORKS	Course Category	C	Discipline Specific Core Course	L	T	P	O	C
							3	0	3	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 :	Understand the evolution of computer networks using the layered network architecture	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Understand the addressing concepts and learn networks devices	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 :	Design computer networks using subnetting and routing concepts																		
CLR-4 :	Understand the error types, framing, flow control																		
CLR-5 :	Understand the various Medium Access Control techniques and also the characteristics of physical layer functionalities																		
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Understand the need for Network and various layers of OSI and TCP/IP reference model.	2	85	80	H	H	H	H	H	H	-	M	M	L	-	H	-	M	H
CLO-2 :	Explain various Data Communications media	3	85	80	L	H	H	H	H	H	-	M	M	L	-	H	-	M	H
CLO-3 :	Identify the different types of network topologies and Switching methods.	3	85	80	L	H	H	H	H	H	-	M	M	L	-	H	-	M	H
CLO-4 :	Identify the different types of network devices and their functions within a network.	3	85	80	L	H	H	H	H	H	-	M	M	L	-	H	-	M	H
CLO-5 :	Analyze and Interpret various Network and Transport Layer protocols.	3	85	80	L	H	H	H	H	H	-	M	M	L	-	H	-	M	H

Duration (hour)	18	18	18	18	18
S-1	SLO-1	Evolution of Computer Networks	Data Link Layer	Network Layer	Transport Layer
	SLO-2	The Internet	Functionalities	Functionalities	Functionalities
S2	SLO-1	The Internet today	MAC Addressing	Network Addressing	Port Numnber
					Frequency, Spectrum, And Bandwidth

	SLO-2	Computer Network Architecture	Framing	Classfull Addressing	TCP	Data And Signals
S3	SLO-1	Categories of Networks (LAM, WAN, MAN)	Data Link Control	Routers and Their Functions	TCP Functionalities	Analog And Digital Transmission
	SLO-2	A Data Communications Model- Networks	Line Discipline	Routing Metrics	UDP	Transmission Impairments
S4 – S6	SLO-1	Laboratory 1: Basic Network Commands and their functionalities	Laboratory 4: Construct N/W using bus topology, Star topology	Laboratory 7: Multi-routing connection with static router	Laboratory 10: Implementing a simple application using UCP	Laboratory 13: Analyse the Working of a DNS
	SLO-2	Protocols	Flow Control – Stop and Wait	Routing Table	UDP Functionalities	Analog to Digital Conversion
S7	SLO-2	Elements of Protocol	Flow Control – Sliding Window	Routing Algorithm Types	TCP Vs UDP	Digital to Analog Conversion
S8	SLO-1	Network Topologies	Error Control – Stop and Wait	Distance Vector Routing	Application Layer Functionalities	Noise in transmission Attenuation
	SLO-2	Transmission Modes in a Network	Error Control – Go back N	Distance Vector Routing with an Example	HTTP	Twisted Pair-Physical Description- Applications- Unshielded And Shielded Twisted Pair
S9	SLO-1	N/W Layerd Architecture	Error Control –Selective Reject	Link State Routing	HTTP Messages	Coaxial Cable- Physical Description-Applications- Transmission Characteristics
	SLO-2	OSI Model Reference Model		Link State Routing Example		Optical Fiber- Physical Description Applications- Transmission Characteristics
S10-12	SLO-1	Laboratory 2: Introduction to CISCO	Laboratory 5: Construct N/W using Ring topology, Mesh topology	Laboratory 8: Connecting 2 Lans Using Dynamic Routing	Laboratory 11: Analyling the Working of RIP	Laboratory 14:Implementing a simple web server
	SLO-2	Packet Tracer (CPT)				
S-13	SLO-1	Functions of the Various Layers of OSI reference model	Errors in Transmission - Types	Switching in N/W	DNS	Compare the various features of Guided Transmission media
	SLO-2	TCP/IP Reference Model		Circuit-Switching	Electronic mail	Radio Waves -Applications-Transmission Characteristics
S-14	SLO-1	Functionalities of the Various layers of the TCP/IP reference model	Error Detection – Parity, Checksum	Circuit-Switching Advantages	Basic Electronic Mail Operation	Micro Waves Applications-Transmission Characteristics
	SLO-2	Comparison of the OSI and TCP/IP Reference Models	Error Detection - CRC	Packet-Switching Principles	SMTP & MIME	Infrared WavesCahrecteristics-Applications
S-15	SLO-1	Comparison of Layers	Error Correction -Types	Advantage of Packet Switching	SMTP Overview-Connection Setup-	Satillite Communication
	SLO-2	Comparison of the services	Hamming Code	Comapare Circuit and Packet Switching	Mail Transfer	Compare Feature of Guided Vs UnGuided Transmission Media
S16-18	SLO-1	Laboratory 3: Build a Peer to Peer N/W using Hub and Switch. Analyse the difference between the working of a Hub and a Switch	Laboratory 6: Connecting two lans using router with static Router	Laboratory 9: Implementing a simple application using TCP	Laboratory 14 :ARP simulation in CPT	Laboratory 15: Emulate Working of a complete N/W using CPT

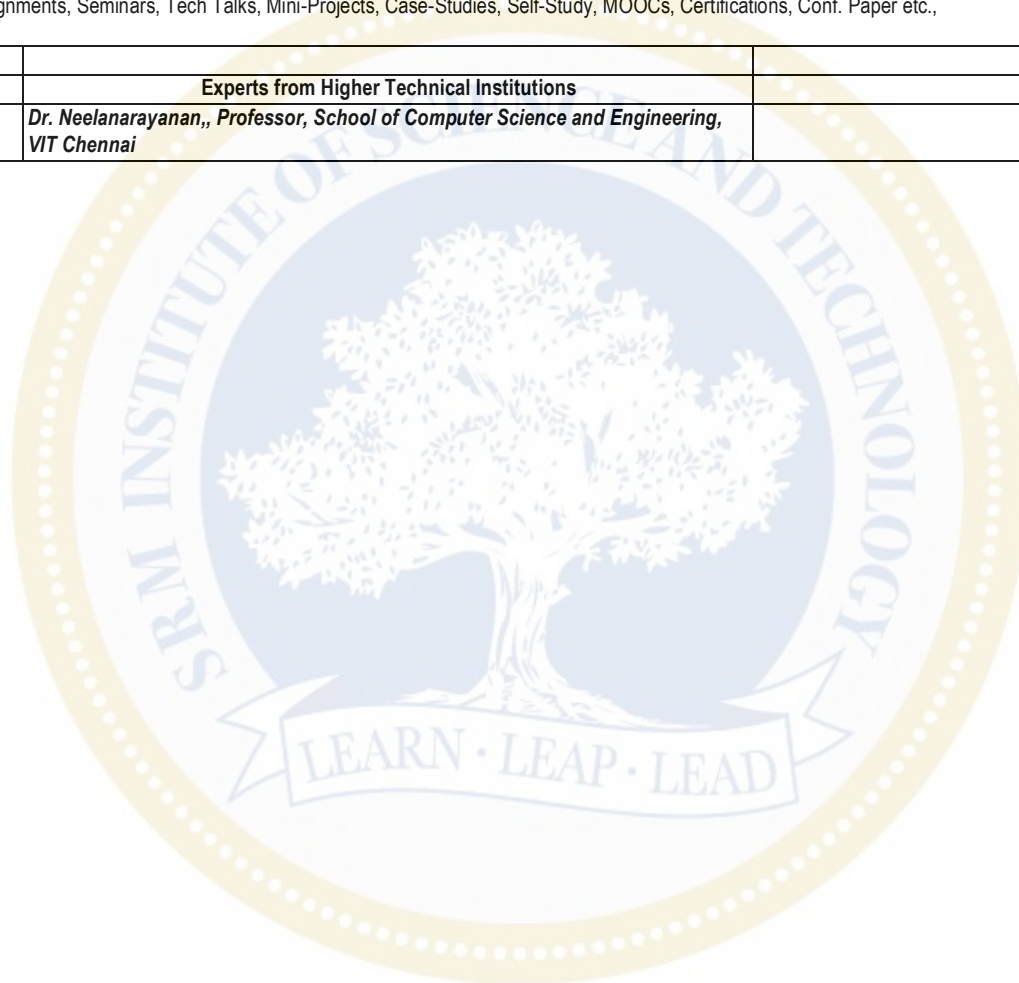
Learning Resources	1.BehrouzA.Forouzan,(2010), "Data Communications and Networking", 5th Edition 2. ToddLammle,(2011), "CCNA Study Guide", Seventh Edition	3.WilliamStallings,(2010), "Data and Computer Communications", Ninth Edition 4. https://www.netacad.com/courses/packet-tracer
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Learning 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	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 %	100 %	100 %	100 %	100 %	100 %

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Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelananarayan., Professor, School of Computer Science and Engineering, VIT Chennai	Dr. Muthulakshmi P



Course Code	USA23603T	Course Name	Research Methodology	Course Category	C	Discipline Specific Core Course	L	T	P	O	C
							4	0	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 Research principles while developing software.	1 2 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
CLR-2 :	Gain extensive knowledge about the Research concepts, methods and the process models.	Level of Thinking (Bloom)	Fundamental Knowledge
CLR-3 :	Obtain adequate knowledge about Research process models and software.	Expected Proficiency (%)	Application of Concepts
CLR-4 :	Identify the research methods involved in various area.	Expected Attainment (%)	Link with Related Disciplines
CLR-5 :	Define the hypothesis value, research reporting structure.		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
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:		
CLO-1 :	To understand the Research and Evaluation techniques.	2 85 80	H H H H H H - M M L - H - M H
CLO-2 :	To plan and manage hypothesis value at each stage of the Research.	3 85 80	L H H H H H - M M L - H - M H
CLO-3 :	To learn about the Research Type and find the correct methods to the	3 85 80	L H H H H H - M M L - H - M H
CLO-4 :	To develop Research skill.	3 85 80	L H H H H H - M M L - H - M H
CLO-5 :	To develop skills to manage the various phases involved in Research.	3 85 80	L H H H H H - M M L - H - M H

Note: All our curriculum, study materials, assignments, quizzes, lab works, and learning resources are personalized and dynamically generated using machine learning models based on the learner's learning ability. Users can review our learning curriculum only through our intelligent learning management platform (iLMSP), and our learning resources and lab infrastructures are available only in the digital form on our cloud infrastructures.

Duration (hour)	12	12	12	12	12
S-1	SLO-1 SLO-2	Introduction to Research Methods	Introduction to literature review	Introduction to Research Design	Introduction to Design of Sample Survey
S-2	SLO-1 SLO-2	Definition of research	Methods to collect the meaningful data	Identify the research problem	Introduction to Census
S-3	SLO-1 SLO-2	Role of Research	Data Cleaning	Select a Research problem	Introduction to Sample enumerations
S-4	SLO-1 SLO-2	objectives of research	Reviewing the data	Defining a Research problem	Difference between Census V/s Sample enumerations
S-5	SLO-1 SLO-2	Applications of research	Process the data	Introduction to need of research problem design	Introduction to objectives in Research sampling
S-6	SLO-1 SLO-2	Research in Computer Science & Applications	Analysis the Data	Apply the Research design with the simple data set	Introduction to principles of sampling
S-7	SLO-1 SLO-2	Steps involved in research	Conceptualization of a research problem	Introduction to Good Design	Introduction to Types of Sampling in Research methods
					Introduction to Data Collection & Analysis Primary & secondary data
					Validity and Reliability of data collection Procedures
					data preparation and exploratory data analysis
					Introduction to parametric and nonparametric tests
					Introduction to correlation and regression analysis
					Introduction to ANOVA Using MS Word - Test formatting, Math Type, MS Equation editor
					Introduction to INFLIBNET, e-journals, e-library and Scopus, Mathematical reviews

S-8	SLO-1 SLO-2	Aim and Scope of research in Computer filed	Formulation of a research problem	Feature of Good Research design	Sampling Errors	Introduction to Data Communication and networks
S-9	SLO-1 SLO-2	Types of Research	Identifying the variables	Introductions to different Research design	Non-sampling errors	Introduction to LAN, WAN,GAN, Internet
S-10	SLO-1 SLO-2	Research Process in the Computer Field	Assigning the initial value to the variables	different research designs -exploratory	Determination of the sample size	Website, Webpage, E-mail
S-11	SLO-1 SLO-2	Introduce the basic software to develop a Research	constructing hypothesis	different research designs - descriptive	Designing Questionnaires	Search Engines, Scientific search engines
S-12	SLO-1 SLO-2	Research Process	types of hypotheses.	different research designs - experimental	Design the interview	Prepare a PDF and Latex files

Learning Resources	Krishna Swamy K.N., Siva Kumar A.I., Mathirajan M., "Management Research Methodology (2006), Pearson Education, New Delhi.	Kothari C.R., "Research Methodology, Methods and Techniques, Second edition, (2008), New Age International Publication.
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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	30%	-	30%	-	30%	-	30%	-	30%	-
Level 2	Apply Analyze	50%	-	50%	-	50%	-	50%	-	50%	-
Level 3	Evaluate Create	20%	-	20%	-	20%	-	20%	-	20%	-
	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. Raja V

Course Code	UCS23D03J	Course Name	SERVICE ORIENTED ARCHITECTURE			Course Category	D	Discipline Specific Elective Course										L	T	P	O	C		
																		3	0	2	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 :	Learn service oriented analysis techniques			Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Learn technology underlying the service design						Fundamental 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 :	Learn advanced concepts in building SOA																							
CLR-4 :	Understand the Java Web services																							
CLR-5 :	To know about various Web services specification standards																							
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:			2	85	80	H	-	-	-	-	H	-	-	-	-	-	-	-	-	-	-	
CLO-1 :	Acquire the knowledge on service oriented design technology			3	85	80	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CLO-2 :	Acquire the ability to identify web services in SOA			3	85	80	H	-	-	-	-	-	-	-	M	-	-	-	-	-	-	-	-	
CLO-3 :	Understand the basic ideas about building SOA			3	85	80	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CLO-4 :	Appreciate the concepts of standards and security on SOA			3	85	80	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CLO-5 :	Apply the knowledge in Java based web service			3	85	80	H	-	-	-	H	-	-	-	-	-	L	-	-	-	-	-	-	
Duration (hour)		15		15		15		15		15		15												
S-1	SLO-1	Introduction to SOA , Defining SOA	Introduction to Web Services	Phases of the SOA delivery lifecycle	SOA support in J2EE	Introduction to WS-BPEL																		
	SLO-2	Necessity of SOA.	Primitive SOA	SOA Delivery Strategies Top- down strategy, Bottom-up strategy	SOA platform basics and building blocks	Basic terms used in the BPEL terminology																		
S-2	SLO-1	SOA timeline from XML to Web services to SOA	Web Service Framework with respect to SOA	Agile strategy with Pros and cons	Overview of Java API for XML-based web services(JAX- WS)	WS-Coordination overview																		
	SLO-2	History about XML	Logical components of the Web services framework	Objectives and service-oriented process steps	Java Architecture for XML binding (JAXB)	WS-Choreography																		
S-3	SLO-1	Web Services and SOA	Service descriptions with WSDL layout	Benefits of a business-centric SOA	Building web services and client with examples	WS-Policy with SOA																		
	SLO-2	Service Oriented Enterprise (SOE)	Meta data and service contracts	Service- oriented design	Introduction to Java API for XML Registries(JAXR)	WS Security																		
S-4- S-5	SLO-1	Lab 1: Create DTD file for student information and create a valid well-formed XML	Lab 4:Create web calculator service in NET Beans and consume it.	Lab 7: Create .NET client to consume web service created in JAVA	Lab 10: Using JAXP SAX echo given xml file on console.	Lab 13: Using AXIS 2 framework and TOMCAT create a java client to consume calculator web service.																		
	SLO-2	document to store student information against this DTD file																						
S- 6	SLO-1	Analyze the past architectures	Messaging with SOAP protocol and SOAP nodes	Introduction to WSDL language basics	Java API for XML based RPC (JAX-RPC)	Notification and Eventing																		
	SLO-2	Analyze the past architectures	SOAP message path	Define the structure of WSDL	Web Services Interoperability	Transaction Management																		
S-7	SLO-1	Scope Of SOA	Message exchange Patterns and Coordination	Implement sample WSDL file	SOA support in .NET	WS-MetadataExchange language basics																		
	SLO-2	SOA Reference Model	Web Services a Activity Management,	Introduction to SOAP basics	NET Platform overview																			
S-8	SLO-1	Key Service characteristics of SOA	Coordination types and protocols	SOAP language basics	ASP.NET Page Handling	WS-Security language basics																		

	SLO-2	Anatomy of SOA	ACID properties	Structure of SOAP	Post back vs Non post back events	The Security element (
S-9- S-10	SLO-1	Lab 2: Create XMS schema for student information and create a valid well-formed XML document to store student information against this XMS schema file.	Lab 5: Create web calculator service in .NET and create client to consume this service	Lab 8: Create java client to consume existing web service hosted in the internet	Lab 11: Using JAXP DOM echo given xml file on console	Lab 14: To create a web services in .NET
	SLO-2					
S-11	SLO-1	SOA component and specific behaviors	Orchestration	service layers and standards	ASP.NET Programming Basics	Case study-SOA in cloud
	SLO-2	Relationships among these components	Choreography	Entity-centric business service design: List the step-by-step process	Creating a Web Site Using Visual Studio IDE	research focus on SOA and issues
S-12	SLO-1	SOA architecture	Analyze atomic transaction with SOA	Implement SOAP style web services in Java	ASP.NET web services	Composing Security element contents
	SLO-2	Components in SOA interrelate	Business activities and protocols	SOA Composition	Creating a Web Site Using Visual Studio IDE	XML-Signature elements
S-13	SLO-1	Technical Benefits of SOA	Service layer configuration scenarios	Application service design: process steps	Case Studies: Implement the Small Business Customer Management application as a web applications using ASP.NET	Comparative Analysis of SOA and Cloud Computing
	SLO-2	Business Benefits of SOA	Application Service Layer	Task centric business service design process steps	Web Services Enhancements (WSE)	
S-14- S-15	SLO-1	Lab 3: Using XSL display student information in tabular format.	Lab 6: Create java client to consume web service created in .NET	Lab 9: Create a RESTFUL web-services in Net beans	Lab 12: Using AXIS 2 framework and TOMCAT create a simple calculator web service.	Lab 15: INVOKING EJB COMPONENTS AS WEB SERVICES

Learning Resources	1. Thomas Erl, – Service-Oriented Architecture: Concepts, Technology, and Design, Pearson Education, 2009.	
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Learning Assessment											
Level	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	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mr Parthasarathi J

Course Code	UCS23D04J	Course Name	MACHINE LEARNING				Course Category	D	Discipline Specific Elective Courses					L	T	P	O	C
													3	0	2	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 :	To provide basic concepts of machine learning					Level of Thinking (Bloom) Expected Proficiency (%) Expected Attainment (%)	1	2	3	Fundamental 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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-2 :	To provide deeper understanding of various tools and techniques for Machine learning Algorithms and outputs						L	M	-		-	-	-	-	-	-	-	-	M	-	-	-	-	-	-	-
CLR-3 :	Understand and Implement the major classification techniques						M	M	L		L	-	-	-	-	-	-	-	-	M	-	-	-	-	-	-
CLR-4 :	Understand and Implement the various Clustering Methods						H	M	M		H	H	-	-	-	-	-	-	-	M	-	-	-	-	-	-
CLR-5 :	Learn and Understand the Tree based machine Learning Algorithms						H	M	H		H	H	-	-	-	-	-	-	-	M	-	-	-	-	-	-

Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																							
CLO-1 :	Understand the concepts of machine learning					2	85	80																	
CLO-2 :	Learn and understand machine tools and libraries of machine learning					3	85	80																	
CLO-3 :	Learn and understand the linear learning models and classification in machine learning					3	85	80																	
CLO-4 :	Understand the clustering techniques and their utilization in machine learning					3	85	80																	
CLO-5 :	Study the tree based machine learning techniques and to appreciate their capability					3	85	80																	

Duration (hour)		15	15	15	15	15
S-1	SLO-1	Introduction to Machine Learning	Parametric Methods	Dimensionality Reduction	Expectation-Maximization Algorithm	Decision Trees
	SLO-2	What Is Machine Learning?	Introduction	Introduction	Introduction	Introduction
S-2	SLO-1	Examples of Machine Learning Applications	Maximum Likelihood Estimation	Subset Selection	Mixtures of Latent Variable Models	Univariate Trees
	SLO-2	Learning Associations	Bernoulli Density	Principal Components Analysis	Supervised Learning after Clustering	Classification Trees
S-3	SLO-1	Classification	Multinomial Density	Spectral decomposition	Hierarchical Clustering	Entropy
	SLO-2	Regression	Gaussian (Normal) Density	Scree graph	Agglomerative and Divisive Clustering	Gini index
S-4-S-5	SLO-1	Lab 1: Extract the data from database using python	Lab 4: Construct a Bayesian network considering medical data	Lab 7: Implement PCA Using Optdigits from the UCI repository	Lab 10: Implement k-means clustering	Lab 13: Implement a tree induction algorithm with backtracking.
	SLO-2					
S-6	SLO-1	Unsupervised Learning	Evaluating an Estimator: Bias and Variance	Common principal components	Dendrogram	Regression Trees

	SLO-2	Reinforcement Learning	The Bayes' Estimator	Factor Analysis	Choosing the Number of Clusters	Pruning
S-7	SLO-1	Supervised Learning	Parametric Classification	Multidimensional Scaling	Nonparametric Methods	Rule Extraction from Trees
	SLO-2	Learning a Class from Examples	Regression		Introduction	Learning Rules from Data
S-8	SLO-1	Vapnik-Chervonenkis Dimension	Model Selection Procedures	Linear Discriminant Analysis	Nonparametric Density Estimation	Multivariate Trees
	SLO-2	Probably Approximately Correct Learning			Histogram Estimator	Multilayer Perceptrons
S-9-S-10	SLO-1	<i>Lab 2: Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis</i>	<i>Lab 5: Implement the parametric classification</i>	<i>Lab 8: Draw two-class, two-dimensional data such that (a) PCA and LDA find the same direction</i>	<i>Lab 11: Implement Hierarchical Clustering</i>	<i>Lab 14: Implement a rule induction algorithm for regression</i>
	SLO-2					
S-11	SLO-1	Model Selection and Generalization	Parameter Estimation	Locally Linear Embedding	Generalization to Multivariate Data	Understanding the Brain
	SLO-2	Dimensions of a Supervised Machine Learning Algorithm	Estimation of Missing Values		Nonparametric Classification	Neural Networks as a Paradigm for Parallel Processing
S-12	SLO-1	Noise, Learning Multiple Classes	Multivariate Methods	Isomap	Kernel Estimator	Introduction
	SLO-2	Regression	Multivariate Data	geodesic distance.	k-Nearest Neighbor Estimator	artificial neural networks
S-13	SLO-1	Bayesian Decision Theory	Multivariate Normal Distribution	Clustering	Condensed Nearest Neighbor	The Perceptron
	SLO-2	Introduction		Introduction	Nonparametric Regression: Smoothing Models	Training a Perceptron
S-14-S-15	SLO-1	<i>Lab 3: Implement the naïve Bayesian classifier</i>	<i>Lab 6: Implement multivariate regression</i>	<i>Lab 9: Draw two-class, two-dimensional data such that (a) PCA and LDA find totally different directions</i>	<i>Lab 12: Generalize kernel smoother to multivariate data</i>	<i>Lab 15: Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets</i>

Learning Resources	<i>Introduction to Machine Learning, Second Edition, Ethem Alpaydm, the MIT Press, Cambridge, Massachusetts, London, England.</i> <i>Machine Learning , Tom M. Mitchell, McGraw-Hill Science, ISBN: 0070428077</i>	<i>Sebastian Raschka, Vahid Mirjalili, "Python Machine Learning and deep learning", 2nd edition, kindle book, 2018</i>
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Learning Assessment											
Level	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	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.

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Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. Jebamalar Tamilselvi

Course Code	UCS23G04J	Course Name	COMPUTER VISION FUNDAMENTALS	Course Category	G	Generic Elective Courses					L	T	P	O	C
											3	0	2	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 :	Inculcate the fundamentals of computer vision	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To teach the functions of a Computer vision techniques involved in training the Computer vision models on different problems	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 :	Build intelligent and automated real-world Computer vision applications				H	H	M	M	M	H	M	L	M	M	M	L	M	L	L
CLR-4 :	To teach the participants choosing the right set of frameworks involved in building critical Computer Vision.				H	H	M	M	M	M	L	L	M	M	M	M	M	L	L
CLR-5 :	Introduction to Text classification, Image classification, Image detection, Object recognition, and Object detection techniques.				H	H	M	M	M	M	M	L	M	M	H	L	M	L	L
					H	H	M	M	M	H	M	M	L	M	M	M	M	L	L
					H	H	M	M	M	H	M	M	L	M	M	M	M	L	L
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Understanding the fundamental concepts of Computer vision	2	85	80															
CLO-2 :	Gain hands-on solid skills, knowledge and expertise of real-world situations	3	85	80															
CLO-3 :	Expertise in Data gathering, Data collection, Model training, and model evaluation with domain-specific components.	3	85	80															
CLO-4 :	Applying all the computer vision techniques to real -world industry problems.	3	85	80															
CLO-5 :	Applying the right computer vision techniques for the problem statement at hand.	3	85	80															

Note: All our curriculum, study materials, assignments, quizzes, lab works, and learning resources are personalized and dynamically generated using machine learning models based on the learner's learning ability. Users can review our learning curriculum only through our intelligent learning management platform (iLMSP), and our learning resources and lab infrastructures are available only in the digital form on our cloud infrastructures.

Duration (hour)	15	15	15	15	15
S-1	SLO-1	Computer Vision - Introduction	Computer Vision Workflow Steps	Computer Vision Techniques an Overview	Image Classification Models
	SLO-2	Computer Vision Overview	Business Problem Identification	Image Processing	ImageNet
S-2	SLO-1	Computer Vision defined from academic perspective	Success Criteria Definition	Image Processing Techniques	CIFAR
	SLO-2	Computer Vision defined from Industry perspective	Right Computer Vision Techniques	Image Restoration, Linear Filtering , Independent Component Analysis , Pixelation	MNIST
S-3	SLO-1	Signal Processing for Computer Vision	Collect Training Data	Template Matching, Image Generation Technique, Filtering Techniques in Image Processing	Object Detection Models
	SLO-2	Pattern recognition of Computer Vision	Label Train and Test Datasets	Linear Filter, Non Linear Filter, Box Filter, Gaussian Filter	Fast R-CNN
S- 4-6	SLO-1	Lab 1-Install OpenCV Displaying images OpenCV	Lab 4: Text in Images	Lab 7: Image Edge Detection OpenCV	Lab 10: Image Filtering Blurring OpenCV Image Filtering Blurring Gaussian Blur OpenCV
S-7	SLO-1	Challenges of Computer Vision	Train the computer vision model	Median Filter	Faster R-CNN

	SLO-2	Computer Vision Data Requirements	Evaluate the computer vision model	Feature detection and matching	Computer Vision Hands On Lab Work - Build, Test and Deploy ML Models (Consumer 1)	Computer vision in security systems
S-8	SLO-1	How much data is needed	Test the model, Iterate the steps process	Harris Corner Detector, SIFT (scale invariant feature transform), SURF (speeded-up robust features), FAST (features from accelerated segment test)	Challenges, Choosing the hardware components (GPU, TPU)	Surveillance
	SLO-2	Is your data good enough? Data Structure, Data Format	Deploy the model, Computer vision architecture	BRIEF (Binary Robust Independent Elementary Features), Harris Corner Detector SIFT (scale invariant feature transform) SURF (speeded-up robust features) FAST (features from accelerated segment test), Problems that Computer Vision can Solve, Text Classification	High level decisions, Building a CV Software system	Fingerprint recognition and biometrics, Medical Imaging, Object Recognition
S-9-S-10	SLO-1	Lab2: Reading & Writing images OpenCV	Lab 5- Color Space OpenCV Thresholding OpenCV	Lab 8: Image Scaling & Rotation using OpenCV	Lab 11: Image Filtering Blurring Median Blur OpenCV Morphological Operations Erosion OpenCV	Lab 14: Morphological Operations Opening OpenCV
S-11	SLO-1	Data Type	Data Ingestion	Image Detection	Benefits	Medical Image Analysis
	SLO-2	Training Data	Data Pre-processing	Image Segmentation	Challenges	Content-Based Image Retrieval
S-12	SLO-1	Validation Data	Multiprocessing	Image Classification	High level decisions	Video Data Processing
	SLO-2	Test Data	Transfer Learning/Model Processing	Object Detection	Customer Image Segmentation	Virtual Reality and Augmented Reality
S-13	SLO-1	Image Processing Techniques,	Data Transformation	Object Recognition	Edge Detection Techniques	Computer vision applications in Construction
	SLO-2	Filtering Techniques in Image Processing Linear Filter, Non-Linear Filter	Popular Computer Vision frameworks: OpenCV, TensorFlow, Matlab	Object Classification	Canny Edge Detection	Computer Vision applications in Agriculture
S-14-15	SLO-1	Lab 3-Draw a Rectangle Draw a Circle	Lab 6: Finding Contours	Lab 9: Image Translation OpenCV Image Filtering OpenCV	Lab 12: Morphological Operations Dilation OpenCV	Lab 15: Morphological Operations Closing OpenCV
	SLO-2					

Learning Resources	1. R. Jain, R. Kasturi, and B. G. Schunck, Machine Vision, McGraw-Hill, Inc. 1995. 2. Digital Image Processing and Analysis: Application with MATLAB and CVIPtools, 3rd Edition, SE Umbaugh, Taylor&Francis/CRC Press, 2018 3. Computer Vision: Algorithms and Applications by Richard Szeliski. Available for free online. 4. Computer Vision: A Modern Approach (Second Edition) by David Forsyth and Jean Ponce. Available for free online. 5. Elements of Statistical Learning by Trevor Hastie, Robert Tibshirani, and Jerome Friedman. Available for free online (Warning: Direct PDF link). 6. Multiple View Geometry in Computer Vision (Second Edition) by Richard Hartley and Andrew Zisserman. Available for free online through the UM Library (Login required).					
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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	20%	15%	20%	15%	20%	15%	20%	15%	20%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	15%	10%	15%	10%	15%	10%	15%	10%	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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Dr.S.Meenakshi, SRM IST, RMP
		Dr.T.Papitha Christobel, SRM IST, RMP

Course Code	UCS23P04L	Course Name	MINI PROJECT	Course Category	IAPC	Internship/Apprenticeship / Project/ Community Outreach	L	T	P	O	C
							0	0	4	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)
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CLR-1 :	Demonstrate skills learnt in the real time environment.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Explore the different industries that are using IT	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 :	Enhance the skills in the system aspects				L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLR-4 :	Understanding the professional connections with the knowledge learnt				M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLR-5 :	Applying the skills in problem solving				M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
					H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	To get an inside view of an industry and organization/company	3	80	70															
CLO-2 :	To gain valuable skills and knowledge	3	85	75															
CLO-3 :	To make professional connections and enhance networking	3	75	70															
CLO-4 :	To get experience in a field to allow the student to make a career transition	3	85	80															
CLO-5 :	To get an inside view of an industry and organization/company	3	85	75															

Students can choose a company of their own interest for internship for a period of minimum four weeks to learn about the application of IT in real time environment. In the first week of July, all the students have to give a presentation about their observations made by them in internship. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

Learning Assessment			
Mini Project Work	Continuous Learning Assessment (50% weightage)		Final Evaluation (50% weightage)
	Review – 1	Review – 2	Project Report
	20%	30 %	Viva-Voce
			30 %
			20 %

SEMESTER VII

Course Code	USA23701J	Course Name	OBJECT ORIENTED ANALYSIS AND DESIGN	Course Category	C	Discipline Specific Core Course	L	T	P	O	C
							3	0	3	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 :	Build high quality reusable software	1 2 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
CLR-2 :	Apply UML for modeling problems	Level of Thinking (Bloom)	Fundamental Knowledge
CLR-3 :	Understand Software Design Patterns	Expected Proficiency (%)	Application of Concepts
CLR-4 :	Develop reliable software systems	Expected Attainment (%)	Link with Related Disciplines
CLR-5 :	Apply Standardized testing approaches		Procedural Knowledge
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:		Skills in Specialization
CLO-1 :	Master the vocabulary, use and idioms of the UML	2 85 80	Ability to Utilize Knowledge
CLO-2 :	Scope of Object Oriented Software Systems	3 85 80	Skills in Modeling
CLO-3 :	Understand and Apply UML	3 85 80	Analyze, Interpret Data
CLO-4 :	Design UML Architecture for a system	3 85 80	Investigative Skills
CLO-5 :	Develop Test Templates	3 85 80	Problem Solving Skills
			Communication Skills
			Analytical Skills
			ICT Skills
			Professional Behavior
			Life Long Learning

Duration (hour)	18	18	18	18	18
S-1	SLO-1 Introduction to OOAD	Basics of Structural Modeling	Behavioral Modeling	Architectural Modeling	Patterns & frameworks
	SLO-2 OO Basics	Classes, Class Diagram	Interactions, Sequencing	Component- Components and Interfaces	Patterns & Architecture
S-2	SLO-1 Importance of Modelling	Common Modeling Techniques for classes	Interactions-Links And Associations	Simple and Extended Components	Frameworks, Mechanisms
	SLO-2 Principles of Modelling	Relationships in classes	Objects Creation	Components And Classes	Modeling Design Patterns
S-3	SLO-1 Overview of UML	Modeling Dependencies, Inheritance	Modeling Flow Control by Time	Components And Interfaces	Modeling Architecture Patterns
	SLO-2 Where can UML be used?	Modeling Structural Relationship	Modeling Flow Control by Organization	Kinds Of Components	Black Board Architectural Patterns
S-4-6	SLO-1 Lab 1: Case Study: ATM System	Lab 4: Case Study-Quiz System	Lab 7: Case Study: Stock Maintenance System	Lab 10: Case Study: Exam Registration System	Lab 13: Case Study: Mark Analysis
	SLO-2				
S-7	SLO-1 Overview of Conceptual Model of UML	Extensibility Mechanisms in UML	Use case Diagrams	Organizing Components	Software Quality
	SLO-2 Building Blocks of UML-Things	Stereotypes, Tagged values, Constraints	Usecase, Actors	Component Diagrams	Software Testing
S-8	SLO-1 UML Relationships	Notes	Use Case Scenario	Modeling API using Components	Need for testing, Kinds of Error
	SLO-2 Introduction to OOAD	Standard Elements	Use Case and Collaborations	Modeling Tables, Files	Testing Standards
S-9	SLO-1 OO Basics	Other Adornments in UML	Organizing Usecases	Modeling Documents	Develop Test Cases
	SLO-2 Importance of Modelling	Modeling New Building Blocks	Modeling Context using usecases	Modeling Source Code using Component Diagram	Develop test plans

S-10-12	SLO-1	Lab:2	Lab 5: Case Study: Cellular Phone	Lab 8: Case Study:Passport Registration System	Lab 11: Case Study: Order Processing System	Lab 14: Case Study: Develop test template
	SLO-2	Case Study: Library Management System				
S-13	SLO-1	Principles of Modelling	Modeling Comments	Modeling Requirements using usecases	Deployment	Issues in OO Testing
	SLO-2	Architecture	Modeling new properties	Use case Diagram with relationships	Simple and Extended Nodes	Testing, Unit Testing, Integration Testing
S-14	SLO-1	Object Oriented Methodologies	Modelling Group of Elements using Packages	Activity Diagram	Nodes and components	Black Box Testing, White Box Testing
	SLO-2	SDLC, SDLC Phases	Interfaces, Object Diagrams	Modeling operation using Activity Diagram, State machine	Organizing Nodes , Connections in Nodes, Deployment Diagrams	Impact of Object Orientation on Testing, GUI Testing, System Testing
S-15	SLO-1	Object Oriented Analysis, Differentiate OOA & OOD	Objects & Links, Modelling Anonymous Objects,	Modeling the lifetime of an object	Modeling Processors, Devices, Embedded System	Object Oriented metrics
	SLO-2	Features of OOP,OOPL, Grady Booch, Rumbaugh, Methodology, Jacobson	Modeling object structures	State chart Diagram, Modeling Reactive objects using state chart	Modeling Embedded System using Deployment Diagram	Testing Standards
S-16-18	SLO-1	Lab 3:Case Study: Student Information System	Lab 6: Illustrate object diagram for Payroll Application	Lab:9: Case Study: Placement Registration System	Lab 12: Case Study: Air Line Reservation	Lab 15: Develop Test cases and Test plan for any system
	SLO-2					

Learning Resources	1.	Grady Booch, James Rumbaugh and Ivar Jacobson (2004). "The Unified Modeling Language User Guide". Addison Wesley Longman Pvt. Ltd., Singapore,
	2.	Craig Larman, —Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative DevelopmentII, Third Edition, Pearson Education, 2005
	3.	Ali Bahrami – Object Oriented Systems Development – McGraw Hill International Edition – 1999

Learning Assessment											
Level	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	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 Higher Technical Institutions		Internal Experts
Experts from Industry			
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelamarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai		Dr. Angelin Claret S P

Course Code	UCS23D05J	Course Name	WEB DEVLEOPMENT USING NODEJS AND MONGO				Course Category	D	Disipline Specific Elective Course										L	T	P	O	C								
																				3	0	3	2	4							
Pre-requisite Courses	HTML				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 the benefits of combining language and data formats while creating web applications				1			2			3																				
CLR-2 :	Encourage the reusability of programming resources				Level of Thinking (Bloom)			Expected Proficiency (%)			Expected Attainment (%)																				
CLR-3 :	Utilize the light weight applications across distributed devices																														
CLR-4 :	Understand multiuser conversations and data serialization																														
CLR-5 :	Understand the request and response model that works for client and server side applications																														
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																													
CLO-1 :	Write code for client and server				2			85			85																				
CLO-2 :	Create modules and use the same in applications				3			90			90																				
CLO-3 :	Code using callback functions for scaLaboratoryle functions				3			85			85																				
CLO-4 :	Distinguish RDBMS and schema design of MongoDB				4			90			90																				
CLO-5 :	Perform query operations using MongoDB				3			85			85																				
Duration (Hour)		9				18				18				18				18													
S-1	SLO-1	Need of Scripting Language		Array Methods :indexOf, join, lastIndexOf, toString		Add HTTP header		Streams – Reading a Stream				Document with different types of values i)Document with Scalar Values																			
	SLO-2	Difference between client and server side scripting		Array Methods : reduce, reverse, slice, some, sort		Example programs		Stream – Writing to a stream				ii)Document with Documents as values																			
S-2	SLO-1	Script tag in HTML		Function Definition		Read the Query String		Piping the Stream				iii)Document with Array as values																			
	SLO-2	Java Script declaration		Function Parameters		Split the Query String		Chaining the Streams				CRUD operation :Insert Operation i)insertOne() and ii)insertMany() with examples																			
S-3	SLO-1	Output printing – document. Write, innerHTML, window .alert, console.log		Calling a Function, Return Statements		Node.js URL Module, Node.js File Server		Node.js as a File Server Create Files, Reading Files				Perform Query Operation for the following situations i)Query on nested documents ii)Query an array																			
	SLO-2	Java script statements, Comments and Variables		Nested Functions		Node.js – NPM Package, Downloading and Using a Package		Delete Files, Update and rename files				ii)Query an array of nested documents iv)Geospatial Queries Query Operation Examples, Update Operation: updateOne(), updateMany(),replaceOne(), findAndModify() Update operation :Examples																			
S-4-6	SLO-1	Laboratory 1 – Java Script Input and Output		Laboratory 4 - Functions		Laboratory 7 –Query String		Laboratory 10 – Streams and Files				Laboratory 13 : Working with CRUD operations - Insert and Query																			
	SLO-2	Java script Operators -Logical, Bitwise		Web stacks introduction		Callback – Blocking code example		Creating a Upload Form				Delete Operation: deleteMany(), deleteOne()																			

	SLO-2	Arithmetic and Assignment operators	LAMP, LEMP, MEAN, MERN	Callback – Non- Blocking code example	Parse the uploaded files	iii)findOne() And Delete() Delete operation Examples
S-8	SLO-1	Java Script Datatypes - numeric	Difference between php and java script	Event Driven Programming	Save the files	Operation on Mongodb Data: projection
	SLO-2	Java Script Datatypes – non numeric	Node introduction and evolution	Working of node Application	Display the uploaded files	Limiting Records Sorting Records
S-9	SLO-1	Conditional statements, If else statements	Installing node.js and npm in windows, Installing node.js and npm in Linux	Node Even emitter class, add Listener(), on(), once()	Nodemailer Modules, Sending a email	Indexes in Mongodb, default _id index, Creating and Index createIndex method
	SLO-2	Switch statements, Iteration statements	Built in modules in node.js – http, https, Built in modules in node.js – querystring, readline	removeListener(), removeAllListeners(), setMaxListeners(), listeners()	Multiple Receivers, Sending HTML	IndexMethods : Single Field, Compound, Multikey, text Index, Hashed Index, Geospatial
S 10-12	SLO-1	Laboratory 2 – Java Script Operators and Conditions	Laboratory 5 – Installing Node.js	Laboratory 8 – Event Driver classes	Laboratory 11 – Sending Mail & Chat window	Laboratory 14 :Working with CRUD operations Update and Delete
	SLO-2					
S-13	SLO-1	Loop Controls – for loop	Include modules	Creating Buffers, writing to buffers	MongodbDatatypes: i)Integer ii)Boolean iii)Double iv)String v)Arrays vi)Object vii)NULL viii)Regular expression ix)Timestamp x)Date xi)Object ID	Properties of Index i)Unique Indexes ii)Partial Indexes
	SLO-2	While loop	Writing first sample application	Reading from Buffers	Installing Mongo DB in Windows, Linux and Mac Operating Systems	iii)Sparse Indexes iv)TTL Indexes
S-14	SLO-1	Do whileLoop	Creating own modules	Converting Buffer to JSON	Installing and Working with MongoDB interfaces: i)Mongo Shell, ii)Mongo Compass	Aggregation in MongoDB: i)aggregate() method Aggregate expressions: i) \$sum ii) \$avg iii) \$min iv) \$max
	SLO-2	For each loop	Including your own module	Concatenate Buffer	Introduction to entities of MongoDB: i)Databases ii)Collections and iii)Documents	v) \$push vi) \$addToSet vii) \$first viii) \$last
S-15	SLO-1	Arrays Introduction and declaring, Accessing arrays	Node.js – REPL Terminal – Read, Eval, Node.js – REPL Terminal – Print, Loop	Compare, Copy Buffer, Slice Buffer and Buffer Length	Database: i)createDatabase()method with example, ii)dropDatabase() method with example	MongoDB Backup: Export/Import data backup using shell i)mongodump ii)mongorestore, MongoDB Backup: Export/Import data backup using Mongo Compass
	SLO-2	Array Properties : index, input length, prototype, Array Methods :concat, every, forEach	Node.js as built in HTTP module, Node.js as a Web Server	isEncoding(), isBuffer(),byteLength	Collections: i)createCollection() method with example, ii)dropCollection() method with example	Monitoring Deployment using MongoDB: i)mongostat, mongotop iii)serverStatus, dbStats, collStats
S 16-18	SLO-1	Laboratory 3 - Looping Statements	Laboratory 6 - Running sample application using node.js	Laboratory 9 – Buffers & Web-socket	Laboratory 12 – creating dbs	Laboratory 15: i)Creating different types of indexes ii)Aggregate data using different Aggregate expressions iii) Perform Mongodb data Export and Import using shell iv)Working with mongo deployment commands
	SLO-2					
Learning Resources		1. Basarat Syed, (2014), “Practical Node.js: Building Real-World Scale Web Apps”, APress			1. URL: https://nodejs.org/dist/latest-v12.x/docs/api/ 2. URL: https://docs.mongodb.com/manual/tutorial/	

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 Higher Technical Institutions		Internal Experts
Experts from Industry			
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai		Ms. E Aarthi
			Dr. P Muthulakshmi

Course Code	UCS23D06J	Course Name	WEB DEVELOPMENT USING ANGULARJS AND MONGO			Course Category	D	Disipline Specific Elective Course					L	T	P	O	C							
Pre-requisite Courses		HTML		Co-requisite Courses		Nil		Progressive Courses		Nil							3	0	3	2	4			
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 :	Create single page applications and understand the functional behavior of dynamic web pages						Level of Thinking (Bloom)	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																							
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																							
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																						
CLO-1 :	Make use of expressions, do data binding with external components						3	90	90	H	L	H	M	H	-	-	-	M	-	-	-	M	M	H
CLO-2 :	Distinguish the role of MVC in creating dynamic web applications						3	90	90	H	M	H	M	H	-	-	-	H	-	-	-	M	M	H
CLO-3 :	Understand the role of reusability and data encapsulation in the form of objects						3	85	85	-	M	M	M	H	-	-	-	M	-	-	-	M	M	H
CLO-4 :	Distinguish RDBMS and schema design of MongoDB						4	90	90	H	M	H	M	H	-	-	-	M	-	-	-	M	M	H
CLO-5 :	Perform query operations using MongoDB						3	90	90	H	M	M	M	H	-	-	-	M	-	-	-	M	M	H
Duration (Hour)		18		18		18		18		18														
S-1	SLO-1	Introduction about HTML Need of Scripting Language		Function Definition, Function Parameters		Image Optimization		Lightweight injection token for libraries		ii)Query an array of nested documents iv)Geospatial Queries Query Operation Examples														
	SLO-2	Difference between client and server side scripting		Calling a Function Return Statements		Hydration		Angular Tools , Development workflow		Update Operation: updateOne(), updateMany()														
S-2	SLO-1	Script tag in HTML Java Script declaration		Nested Functions		Testing –Code Coverage, Testing Services, Basics Testing Components,		CLI Builders		replaceOne(), findAndModify() Update operation :Examples														
	SLO-2	Output printing – document. Write, innerHTML		Example program -Simple calculator		Test Pipes, Testing Utility		Language Service		Delete Operation: deleteMany(), deleteOne()														
S-3	SLO-1	window .alert, console.log Java script statements		Web stacks introduction, Difference between php and java script		Internationalization		Dev Tools		iii)findOneAndDelete() Delete operation Examples														
	SLO-2	Comments and Variables		LAMP and LEMP MEAN, MERN		Example Angular Applications		Schematics		Operation on Mongoddb Data: projection														
S-4-S6	SLO-1	Laboratory 1 – Java Script Input and Output		Laboratory 4 - Functions		Laboratory 7 – Create an interface		Laboratory 10 - creating database		Laboratory 13 – Working with Update and Delete operations														
	SLO-2	Java script Operators -Logical, Bitwise, Arithmetic and Assignment operators		Introduction About Angular		Animation – Transition and Triggers, Complex Sequence		Introduction about database, Schema		Limiting Records Sorting Records														
S-7	SLO-1	Java Script Datatypes – numeric, Java Script Datatypes – non numeric		Getting Started		Reusable Animations, Route Transition Animations		DBMS and RDBMS		Single Field, Compound, Multikey														

S-8	SLO-1	Conditional statements If else statements Switch statements	Understanding Angular, Overview, Component, Template,	Service workers & PWA	MongoDB Datatypes: i) Integer ii) Boolean iii) Double iv) String v) Arrays vi) Object vii) Null viii) Regular expression ix) Timestamp x) Date xi) Object ID	Geospatial, text Index, Hashed Index
	SLO-2	Iteration statements	Directives, Dependency Injection	Web Workers	Installing MongoDB in Windows, Linux and Mac Operating Systems	Properties of Index i) Unique Indexes ii) Partial Indexes
S-9	SLO-1	Loop Controls – for loop	Developer Guides, overview, standalone, change detection,	Server side rendering	Installing and Working with MongoDB interfaces: i) Mongo Shell, ii) Mongo Compass Introduction to entities of MongoDB: i) Databases ii) Collections and iii) Documents	iii) Sparse Indexes iv) TTL Indexes
	SLO-2	While loop, Do while Loop, For each loop	Routing and navigation	Pre rendering	Database: i) createDatabase() method with example ii) dropDatabase() method with example	Aggregation in MongoDB: i) aggregate() method Aggregate expressions: i) \$sum ii) \$avg iii) \$min iv) \$max v) \$push vi) \$addToSet vii) \$first viii) \$last
S 10-S-12	SLO-1	Laboratory 2 – Java Script Operators and Conditions	Laboratory 5 – Hello World, Create Home Component	Laboratory 8- Animation	Laboratory 11- Data base Collection	Laboratory 14- Perform Various Aggregation Method
	SLO-2					
S-13	SLO-1	Arrays Introduction and declaring	Forms, Reactive Forms	Angular Libraries	Collections: i) createCollection() method with example ii) dropCollection() method with example	MongoDB Backup: Export/Import data backup using shell i) mongodump ii) mongorestore
	SLO-2	Accessing arrays	Building dynamic forms	Feature Preview	Document with different types of values i) Document with Scalar Values	MongoDB Backup: Export/Import data backup using Mongo Compass
S-14	SLO-1	Array Properties : index	es-build based builds	Best Practices-Security, Accessibility	ii) Document with Documents as values	Monitoring Deployment using MongoDB: i) mongostat, mongotop
	SLO-2	Input length, prototype	ESM default imports vs. namespace imports	Keeping up to date	iii) Document with Array as values	iii) serverStatus, dbStats, collStats
S-15	SLO-1	Array Methods : concat, every, forEach, Array Methods : indexOf, join, lastIndexOf, toString	HTTP Client	property binding best practices	CRUD operation : Insert Operation i) insertOne() and ii) insertMany() with examples	expressions iii) Perform MongoDB data Export and Import using shell as well as mongo compass.
	SLO-2	Array Methods : reduce, reverse, slice, some, sort	Hydration, - Create Housing Location Component	Lazy loading features modules, Angular form, Integrate Angular forms , Build template driven forms	Perform Query Operation for the following situations i) Query on nested documents ii) Query an array – Perform CRUD operations	iv) Working with mongo deployment commands, Creating different types of indexes
S 16-S-18	SLO-1	Laboratory 3 - Looping Statements	Laboratory 6 - Create Housing Location Component	Laboratory 9 – Angular form, Integrate Angular forms , Build template driven forms	Laboratory 12 – Perform CRUD operations	Laboratory 15: i) Creating different types of indexes
	SLO-2					

Learning Resources	JavaScriptAngular: Up and Running: Learning Angular, Step by Step 1st Edition, Kindle Edition by <u>Shyam Seshadri</u> (Author) , O'Reilly	1. https://angular.io/docs 2. URL: https://docs.mongodb.com/manual/tutorial/ 3. https://www.javascript.com/
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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	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelananarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. Umarani

Course Code	UCS23G05J	Course Name	R Programming	Course Category	G	Generic Elective Course	L	T	P	O	C
							3	0	2	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 :	Analyze and visualize data		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Navigate to data sources. Download data in proper format		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 :	Create visualizations that accurately represent the source data set					H	H	H	H	H	M	H	H	H	H	M		L	H	H
CLR-4 :	Use Table auto perform various types of analysis on data sets							H			H	M			H	M		L	H	H
CLR-5 :	Data visualizations that demonstrate an understanding of data					H	H				M	H			M	H	L			
						H			H	H	M		H	H	M	H	L	H		
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		2	85	80															
CLO-2 :	Find and select appropriate data visualization in order to create a better understanding of the data		3	85	80															
CLO-3 :	Create Heat map, wordcloud and different type of charts as visualization		3	85	80															
CLO-4 :	Cite data from other sources in visualizations and documentation		3	85	80															
CLO-5 :	Properly document and organize data and visualizations		3	85	80															

Note: All our curriculum, study materials, assignments, quizzes, lab works, and learning resources are personalized and dynamically generated using machine learning models based on the learner's learning ability. Users can review our learning curriculum only through our intelligent learning management platform (ILMSP), and our learning resources and lab infrastructures are available only in the digital form on our cloud infrastructures.

Duration (hour)	15	15	15	15	15
S-1	SLO-1	Unit -1 Introducing to R	Unit 2: Matrices, Arrays And Lists	Unit 3: Data Frames	Unit 4 Control statements, Functions, R graphs
	SLO-2	R Data Structures	Matrices, Arrays And Lists Creating matrices	Creating Data Frames	Control statements
S-2	SLO-1	Help functions in R	Matrix operations	Matrix-like operations in frames	Arithmetic and Boolean operators and values
	SLO-2	Vectors	Applying Functions to Matrix Rows and Columns	Merging Data Frames	Default values for arguments
S-3	SLO-1	Scalars	Adding and deleting rows and columns	Applying functions to Data frames	Returning Boolean values
	SLO-2	Declarations, recycling, Common Vector operations	Vector/Matrix Distinction, Avoiding Dimension Reduction, lists	Factors and Tables, levels, Common functions used with factors	functions are objects, Environment and Scope issues, Writing Upstairs
S-4-S-5	SLO-1	Lab -1 How to create an empty vector in R	Lab4: Develop a data structures operations using R	Lab7: Create a Dataframe in R	Lab10: Perform a R program to run control statements
S-6	SLO-1	Using all and any	Creating lists	Working with tables	Recursion
	SLO-2	Vectorized operations			Replacement functions
S-7	SLO-1	NA and NULL values	General list operations	Other factors and table related functions	Tools for composing function code
	SLO-2	Filtering			Non-linear models

S-8	SLO-1	Vector Equality-1, Vector Equality- 2	recursive lists, Accessing list components and values-1	Other factors and table related functions 2,3	Math and Simulations in R Creating Graphs1,graph 2	Time Series in R-1,R-2
S-9-S 10	SLO-1	Lab2: <u>Create empty vector and append values</u> <u>Find Sum, Mean and Product of a Vector in R</u>	Lab5: Data structures program using R	Lab9: Control statement program using R	Lab11:Perform R program for Mathematical operations	Lab 14: perform R program on Linear Model Operations
S-11	SLO-1	Vectorised if-then else	Accessing list components and values-2	Working with tables-	Customizing Graphs- 1	Auto-correlation in R-1
	SLO-2					
S-12	SLO-1	Vector Element names-1	applying functions to lists-1	Working with tables-2	Customizing Graphs- 2	Auto-correlation in R-2
	SLO-2					
S-13	SLO-1	Vector Element names-2,3	applying functions to lists-2, recursive lists	Common functions used with factors, Other factors and table related functions	Saving graphs to files, Creating three-dimensional pl	Clustering in R,models
	SLO-2					
S-14-S-15	SLO-1	Lab3: Create a list with random values in R	Lab6: Perform List operation using R	Lab9: Control statement program using R	Lab12: Perform a Graph operation through R program	Lab15: Perform a Cluster operation in R.

LearningResources	Norman Mat off, "The Art of R Programming: A Tour of Statistical Software Design", No Starch Press, 2011..	1. Jared P. Lander, "R for Everyone: Advanced Analytics and Graphics", Addison-Wesley Data & Analytics Series, 2013
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LearningAssessment											
	Bloom'sLevelofThinking	ContinuousLearningAssessment(50%weightage)								FinalExamination(50%weightage)	
		CLA-1(10%)		CLA-2(10%)		CLA-3(20%)		CLA-4(10%) #			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level1	Remember	20%	15%	20%	15%	20%	15%	20%	15%	20%	15%
	Understand										
Level2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level3	Evaluate	10%	15%	10%	15%	10%	15%	10%	15%	10%	15%
	Create										
	Total	100%		100%		100%		100%		100%	

#CLA-4canbefrommanycombinationofthese:Assignments,Seminars,TechTalks,Mini-Projects,Case-Studies,Self-Study,MOOCs,Certifications,Conf.Paperetc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. Kalpana

Course Code	UCS23G06J	Course Name	Fundamentals of Computer Graphics	Course Category	G	Generic Elective Course				
						L	T	P	O	C
						3	0	2	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 :	Understand the concept of Computer Graphics	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Learn the basic Mathematics concepts used in Computer Graphics	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 :	Understand the effectiveness of Graphics																		
CLR-4 :	Identify the implementation framework of Computer Graphics																		
CLR-5 :	Apply CG concepts to solve problems																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Understand the Academic and Industry perspectives of CG	2	85	80															
CLO-2 :	Learn the concepts of Algorithm used in graphics	3	85	80															
CLO-3 :	Able to understand the basics of Graphics model	3	85	80															
CLO-4 :	Explore projections and visible surface detection techniques for display of 3D scene on 2D screen	3	85	80															
CLO-5 :	Defend the need for CG in providing solution to graphics algorithm problem	3	85	80															

Duration (hour)	15	15	15	15	15
S-1	SLO-1	Introduction to Computer Graphics (CG)	Graphics Input Devices	Two-Dimensional Transformations and Viewing	THREE-DIMENSIONAL concepts
	SLO-2	What is computer graphics	Keyboard, Mouse, Track-ball, spaceball, Joysticks	Basic Transformations	Three-Dimensional Display Methods
S-2	SLO-1	Computer Graphics Area	data Glove, Light Pen, Digitizer, Image scanners	Matrix Representations	Transformations Translation
	SLO-2	Design and Drawing	touchpanels, voice systems	Homogeneous Coordinates	Rotation
S-3	SLO-1	Animations	Graphics software	Composite Transformations	Scaling
	SLO-2	Multimedia applications	Introduction to C graphics	Other Transformations	Invers Transformation
S-4-5	SLO-1	Lab 1:	Lab 4:	Lab 7:	Lab 10:
	SLO-2	Graphics programs in C programming	Implement Bresenham Line algorithm	Implement Mid-point Ellipse algorithm	Implement algorithm of 2D Transformation, Cohen-Sutherland Algorithm
S-6	SLO-1	Simulations	Graphics functions	Viewing Pipeline	Shearing
	SLO-2	Storing picture & displaying picture	Graphics algorithms	Window-to-Viewport Coordinate Transformation	Reflection
S-7	SLO-1	CRT	Points and Lines	Mid-point subdivision algorithm	Parallel Projections
	SLO-2	CRT for Color display	Line drawing algorithms	2-D Clipping	Perspective Projections
S-8	SLO-1	Beam penetration	DDA Algorithm	Clipping Algorithms	Depth Cueing
					Back Face Detection algorithm

	SLO-2	The shadow Mask	Bresenham's Line drawing algorithms	Sutherland Line Clipping	Visible Line Identification	Depth-Buffer
S-9-10	SLO-1	Lab 2 : ImplementDDAlinealgorith	Lab 5: Implement BresenhamCircleAlgorithm	Lab 8: ImplementPolygonFilling , FloodFill algorithm	Lab 11: Implement PolygonClippingusingSutherland-HodgemanAlgorithm	Lab 14: ImplementIlluminationandshadingapplyonsp hereusingtwolightsourcesinOpenGL
	SLO-2					
S-11	SLO-1	DVST	Circle drawingalgorithm	Sutherland- Hodgeman Polygon Clipping	Surface Identification	A-Buffer Methods
	SLO-2	Graphics System	Ellipse drawingalgorithm	Basics Modeling concepts	Polygon Surfaces	Z-Buffer Methods
S-12	SLO-1	Video Display Devices	polygon	Interactive Input Methods	Polygon Tables	Wireframe Methods
	SLO-2	Types	Representationofpolygon	Logical Classification of Input Devices	Plane Equations	Light Sources
S-13	SLO-1	Raster Scan System	Conventionalmethodsfordrawingpolygons	Interactive Picture	Polygon Meshes	Color Models
	SLO-2	Random Scan system, Coordinaterepresentati on, PixelGraphics	Area Filling algorithms Boundary Fill Flood Fill, Line Attributes, Color levels Greyscale levels	Construction Techniques, Text Clipping, Types of text clippings	Projection. Perspective Projection, Parallel Projection	RGB,CMY and HLS, Computer Animation, Design of its Sequences and Languages
S-14-15	SLO-1	Lab 3 : Coordinaterepresentati on	Lab 6: Line Attributes	Lab 9: Text Clipping	Lab 12 : Perspective Projection	Lab 15: Computer Animation
	SLO-2	PixelGraphics	Color levels Greyscale levels	Types of text clippings	Parallel Projection	Design of its Sequences and Languages
Learning Resources		1. D. Hearn and M.P. Baker, 2005, Computer Graphics, 2nd Edition, Pearson Education, Prentice Hall, 19th Reprint. 2. S. Harrington, 1987, Computer Graphics, 2nd Edition, McGraw-Hill Book Co.		3. W.M. Newman and R.F. Sproull, 1997, Principles ofInteractive Computer Graphics, 2nd Edition,Tata McGraw-Hill Publishing Co. Ltd. 4. N. Krishnamurthy ,2002, Introduction to Computer Graphics, 1st Edition, Tata McGraw-Hill Publishing Co. Ltd.		

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LearningAssessment											
	Bloom'sLevelofThinking	ContinuousLearningAssessment(50%weightage)								FinalExamination(50%weightage)	
		CLA-1(10%)		CLA-2(10%)		CLA-3(20%)		CLA-4(10%) #			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level1	Remember	20%	15%	20%	15%	20%	15%	20%	15%	20%	15%
	Understand										
Level2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level3	Evaluate	10%	15%	10%	15%	10%	15%	10%	15%	10%	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mr. Murali Anand

Course Code	UCS23P03L	Course Name	INTERNSHIP - III	Course Category	IAPC	Internship/Apprenticeship / Project/ Community Outreach	L	T	P	O	C
							0	0	0	0	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)
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CLR-1 :	Demonstrate skills learnt in the real time environment.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Explore the different industries that are using IT																		
CLR-3 :	Enhance the skills in the system aspects																		
CLR-4 :	Understanding the professional connections with the knowledge learnt																		
CLR-5 :	Applying the skills in problem solving																		
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 :	To get an insight of an industry and organization/company	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	H	H
CLO-2 :	To gain valuable skills and knowledge	3	85	75	M	H	L	M	L	-	-	-	M	L	-	-	-	H	H
CLO-3 :	To make professional connections and enhance networking	3	75	70	M	H	M	H	L	-	-	-	M	L	-	-	-	H	H
CLO-4 :	To get experience in a field to allow the student to make a career transition	3	85	80	M	H	M	H	L	-	-	-	M	L	-	-	-	H	H
CLO-5 :	To get an inside view of an industry and organization/company	3	85	75	H	H	M	H	L	-	-	-	M	L	-	-	-	H	H

Students can choose a company of their own interest for internship for a period of minimum four weeks to learn about the application of IT in real time environment. In the first week of July, all the students have to give a presentation about their observations made by them in internship. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

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

Course Code	UCS23P05L	Course Name	Project Phase-I	Course Category	IAPC	Internship/Apprenticeship / Project/ Community Outreach	L	T	P	O	C
							0	0	8	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 :	Demonstrate skills learnt in the real time environment.	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-2 :	Explore the different industries that are using IT				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 :	Enhance the skills in the system aspects																			
CLR-4 :	Understanding the professional connections with the knowledge learnt																			
CLR-5 :	Applying the skills in problem solving																			
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																		
CLO-1 :	To get an inside view of an industry and organization/company	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-	
CLO-2 :	To gain valuable skills and knowledge	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-	
CLO-3 :	To make professional connections and enhance networking	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-	
CLO-4 :	To get experience in a field to allow the student to make a career transition	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-	
CLO-5 :	To get an inside view of an industry and organization/company	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-	

Students can choose a company of their own interest for internship for a period of minimum four weeks to learn about the application of IT in real time environment. In the first week of July, all the students have to give a presentation about their observations made by them in internship. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

Learning Assessment				
Project Phase-I	Continuous Learning Assessment (50% weightage)		Final Evaluation (50% weightage)	
	Review – 1	Review – 2	Project Report	Viva-Voce
	20%	30 %	30 %	20 %

SEMESTER VIII

Course Code	UCS23801T	Course Name	Distributed Systems	Course Category	C	Discipline Specific Core Course	L	T	P	O	C
							4	0	0	2	4

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Computer Science	DataBook/Codes/Standards	Graphsheetneeded		

Course Learning Rationale(CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Understand the need for distributed systems, the support of middleware technologies and its helpfulness in message passing across different systems	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Find the applications that need location transparency and global naming facility. understand the role of object sharing and facilitating the migration of objects	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Scientific Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Lifelong Learning	PSO-1	PSO-2	PSO-3
CLR-3 :	Figure out the situations and issues due to network delays and partial failures				M	M	M	M	M	-	-	-	M	M	H	M	-	-	-
CLR-4 :	Develop the strategies to provide access privileges and thereby ensuring confidentiality, authenticity and integrity				H	H	M	H	M	-	-	-	M	M	H	H	-	-	-
CLR-5 :	Focus on presentation and data management in Web based system architectures and coordination based system architectures.				M	H	M	H	M	-	-	-	M	M	H	H	-	-	-
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:				H	H	M	H	H	-	-	-	M	M	H	M	-	-	-
CLO-1 :	Defend the behavior of standalone and distributed systems	5	90	80	M	M	M	M	M	-	-	-	M	M	H	M	-	-	-
CLO-2 :	Distinguish the various communication models and the define the need for remote procedure calls, message passing in distributed systems	5	90	85	M	M	M	M	M	-	-	-	M	M	H	M	-	-	-
CLO-3 :	Figure out strategies to prevent the distributed system from issues that may eventually lead to failure	5	85	80	M	H	M	H	M	-	-	-	M	M	H	H	-	-	-
CLO-4 :	Reach out to ideas on access privileges and security management	3	85	80	H	H	M	H	H	-	-	-	M	M	H	M	-	-	-
CLO-5 :	Provide suggestions to choose the appropriate middleware as a part of Web based and coordination based systems and leverage the ideas on computation and coordination systems	3	90	85	M	M	M	M	M	-	-	-	M	M	H	M	-	-	-

Duration (hour)	LearningUnit/ Module1	LearningUnit/Module2	LearningUnit/Module3	LearningUnit/Module4	LearningUnit/Module5
12	12	12	12	12	12
S-1	SLO-1 SLO-2	Distributed Systems:Definition Goals	Communication: Fundamentals	Consistency and replication:Introduction	Security:Introduction
S-2	SLO-1 SLO-2	Types of distributed systems	Remote Procedure Call	Data-centric consistency models	Secure channels
S-3	SLO-1 SLO-2	Architectures: Architectural styles	Message-Oriented Communication	Client-centric consistency models	Access controls
S4	SLO-1 SLO-2	System architectures	Stream-Oriented Communication	Replica management	Security management
S-5	SLO1 SLO-2	Middleware	Multicast Communication	Consistency protocols	Distributed object-based systems: Architecture Process
					Fault Tolerance Security

S-6	SLO-1	Architecture versus middleware	Naming: Names, identifiers and addresses	Fault tolerance:Introduction	Communication	Distributed Coordination-based Systems: Introduction to coordination model
S-7	SLO-1	Self-management in distributed systems	Flat naming,Structures naming	Process resilience	Naming	Architectures
S-8	SLO-1	Process: Threads	Attribute based naming		Synchronization	
S-9	SLO-2	Virtualization	Synchronization:Clock Synchronization	Reliable client-server communication	Consistency and replication	
S-10	SLO-1	Clients	Local clocks	Reliable group communication	Fault tolerance	
S-11	SLO-2	Servers	Mutual exclusion	Distributed commit	Security	Processes
S-12	SLO-1	Code migration	Global positioning of nodes	Recovery		Communication
	SLO-2		Election algorithms			Naming
						Synchronization
						Consistency and Replication
						Consistency and Replication
						Fault Tolerance
						Security

LearningResources	1. Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Pearson Education, 2007. 2. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007. 3. Liu M.L., "Distributed Computing, Principles and Applications", Pearson Education, 2004.	4. Nancy A Lynch, "Distributed Algorithms", Morgan Kaufman Publishers, USA, 2003. 5. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012.
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LearningAssessment											
Level	Bloom's LevelofThinking	ContinuousLearningAssessment(50%weightage)								FinalExamination(50%weightage)	
		CLA-1(10%)		CLA-2(10%)		CLA-3(20%)		CLA-4(10%)#		Theory	Practice
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		
Level1	Remember	30%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level3	Evaluate	30%	-	30%	-	30%	-	30%	-	30%	-
	Create										
	Total	100%		100%		100%		100%		100%	

#CLA-4canbefromanycombinationofthese:Assignments,Seminars,TechTalks,Mini-Projects,Case-Studies,Self-Study,MOOCs,Certifications,Conf.Paperetc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. P Muthulakshmi

Course Code	UCS23D07J	Course Name	CRYPTOGRAPHY AND NETWORK SECURITY				Course Category	D	Discipline specific Elective Course										L	T	P	O	C		
																			3	0	2	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 the Cryptographic algorithms and protocols						1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-2 :	Understand the OSI Security Architecture																								
CLR-3 :	Analyze public-key cryptography, RSA and other public-key cryptosystems																								
CLR-4 :	Understand the AES structure and its implementation																								
CLR-5 :	Understand the E-mail architecture and E-mail security																								
Course Learning Outcomes (CLO):			At the end of this course, learners will be able to:					Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental 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	SO - 1	SO - 2	SO - 3
CLO-1 :	Acquire the basics of Cryptographic algorithms and protocols																								
CLO-2 :	Acquire the knowledge of OSI Security Architecture																								
CLO-3 :	Design the public-key cryptography, RSA and other public-key cryptosystems																								
CLO-4 :	Understand the structure and implementation of AES																								
CLO-5 :	Understand the security at Application layer and Security in E-mail																								
Duration (hour)		15		15		15		15		15															
S-1	SLO-1	Concepts of Computer Security	Modular Arithmetic	One-Time Pad	Implementation Aspects, Multiple Encryption			Transport Layer Security, Security at the Network Layer																	
	SLO-2	Challenges of Computer Security	Prime Numbers	Transposition Techniques	Triple DES with Two Keys, Triple DES with Three Keys			TWO MODES, Comparison, TWO SECURITY PROTOCOLS																	
S-2	SLO-1	Cryptographic algorithms and protocols	Fermat's Theorem	Traditional Block Cipher Structure	Electronic Codebook, Cipher Block Chaining Mode			Authentication Header (AH), Encapsulating Security Payload (ESP)																	
	SLO-2	Computer Security	Euler's Totient Function and Euler's Theorem	Stream Ciphers and Block Ciphers	Cipher Feedback Mode, Output Feedback Mode, Counter Mode			IPv4																	
S-3	SLO-1	OSI Security Architecture	Testing for Primality	Motivation for the Feistel Cipher Structure	Principles of Public Key Cryptography			IPv6																	
	SLO-2	Security Attacks	The Chinese Remainder Theorem	The Feistel Cipher	RSA Algorithm ,Applications of Cryptographic Hash Function			AH versus ESP																	
S-4-5	SLO-1	Lab 1: Implementation of Encryption Techniques	Lab 4: Implementation of encryption and decryption Techniques of the given message by using Caesar Cipher encryption algorithm.		Lab 7: Apply AES algorithm for practical applications.			Lab 10: Case study to check the security in Email Architecture and Email Security			Lab 13: Implementation of security protocols														
	SLO-2																								
S-6	SLO-1	Security Services and Mechanisms	Symmetric Cipher Model	The Data Encryption Standard	Applications of Cryptographic Hash Function, Message Authentication			Services Provided by IPSec																	
	SLO-2	Relationship Between Security Services and Mechanisms	Cryptography	DES Encryption and DES Decryption	Digital Signatures, Two Simple Hash Function			Security Association																	
S-7	SLO-1	Fundamental Security Design Principles	CrptAnalysis	A DES Example	Requirements and Security, Relationship Among Hash Function Properties			Idea of Security Association																	

	SLO-2	Advantages of Computer Security	Brute-Force Attack	The Avalanche Effect	<i>Birthday Paradox, Security at the Application Layer</i>	Security Policy Database
S-8	SLO-1	Attack Surfaces	<i>Types of Attack on Encrypted Messages.</i>	The Strength of DES	<i>E-mail Architecture, E-mail Security, PGP, Scenarios</i>	Internet Key Exchange (IKE)
	SLO-2	Attack Trees	<i>Substitution Techniques : Caesar Techniques</i>	Block Cipher Design Principles	<i>Key Rings, PGP Certificates, Key Revocation</i>	Improved Diffie-Hellman Key Exchange
S-9-10	SLO-1	<i>Lab 2: Implementation of Encryption and decryption Techniques</i>	<i>Lab 5: Implementation of Transposition techniques</i>	<i>Lab 8: Implementation of Public key in cryptography</i>	<i>Lab 11: Case study to implement Applications in PGP</i>	<i>Lab 14 Implement the. Diffie-Hellman Key Exchange algorithm for a given problem.</i>
	SLO-2					
S-11	SLO-1	A model for Network Security	<i>Monoalphabetic Ciphers</i>	AES Structure	<i>Extracting Information from Rings,</i>	IKE Phases
	SLO-2	Security Standards	Playfair Cipher	AES key Expansion	<i>PGP Packets, PGP Messages ,Applications of PGP</i>	Phases and Modes, Phase I: Main Mode
S-12	SLO-1	Divisibility	Hill Cipher	AES Example	<i>S/MIME, MIME, S/MIME, Applications of S/MIME</i>	Phase II: Aggressive Mode, Phase III: Quick Mode
	SLO-2	Division Algorithm	Polyalphabetic Cipher	The Avalanche Effect	<i>SSL ARCHITECTURE, Key Exchange Algorithms</i>	SA Algorithms
S-13	SLO-1	Euclidean Algorithm :Greatest Common Divisor	Vigenère Cipher	AES Implementation	<i>Encryption/Decryption Algorithms, Hash Algorithms</i>	ISAKMP
	SLO-2	Finding the Greatest Common Divisor	Vernam Cipher	<i>Equivalent Inverse Cipher</i>	<i>Cipher Suite, Four Protocols, SSL Message Formats</i>	General Header, Payloads
S-14 -15	SLO-1	<i>Lab 3: Implement Testing for Primality</i>	<i>Lab 6:DES algorithm for practical applications</i>	<i>Lab 9:Implementation of RSA Algorithm.</i>	<i>Lab 12: Case study to implement Transport Layer Security.</i>	<i>Lab 15:Implementation of SA algorithm.</i>

Learning Resources	1. William Stallings, "Cryptography and Network Security", 7 th edition, (2017) 2. Introduction to Cryptography and Network Security, Behrouz A. Forouzan, McGraw-Hill, First Edition 3. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.	4. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education
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Learning Assessment											
Level	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	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 Higher Technical Institutions	Internal Experts
Experts from Industry		
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. Sabeen

Course Code	UCS23D08J	Course Name	MULTIMEDIA SYSTEMS			Course Category	D	DisciplineSpecificElective Course											L	T	P	O	C	
								3	0	2	2	4												
Pre-requisite Courses		Nil		Co-requisite Courses		Nil		Progressive Courses			Nil													
Course OfferingDepartment			Computer Science			DataBook/Codes/Standards			Nil															
Course Learning Rationale(CLR):		The purpose of learning this course is to:					Learning			Program Learning Outcomes (PLO)														
CLR-1 : To get familiarity with gamut of multimedia and its significance							1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 : To acquire knowledge in multimedia components.							Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	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	Problem Analysis		
CLR-3 : To acquire knowledge about multimedia tools and authoring.																								
CLR-4 : To acquire knowledge in the development of multimedia applications.																								
CLR-5 : To explore the latest trends and technologies in multimedia																								
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																						
CLO-1 : Understand Multimedia works							2	85	80		H	-	H	-	M	-	M	H	-	L	L	-	M	
CLO-2 : Create a multimedia component using various tools and techniques							3	85	80		-	H	-	-H	-	H	-	M	-	L	-	L	M	-
CLO-3 : Import graphics and textures created on other applications into a multimedia software Program							3	85	80		H	H	-	L	-	-	M	M	H	-	-	M	L	-
CLO-4 : Create a website using simple animation							3	85	80		H	H	-	L	-	L	-	M	-	-		M	-	-
CLO-5 : Create an effective interactive site for web and mobile platforms.							3	85	80		H	H	-	M	-	-	-	M	H	L	L	-	-	M
Duration (hour)		15		15		15		15							15									
S-1	SLO-1	What is Multimedia		Automatic Authoring		Digitization of sounds, Nyquist theorem		Digital Video Editing and Post-Production							Computer-based Animation									
	SLO-2	Components of Multimedia		Adobe Premiere		SNR and SQNR, Overview of MIDI		Captured Animation and Image Sequences							Animation on the Web									
S-2	SLO-1	History of Multimedia		Macromedia Director		Structure of MIDI, MIDI to WAV conversion, Lossless Compression		'Digital Cel' and Sprite Animation							Rendering Algorithms									
	SLO-2	Multimedia and Hypermedia		Macromedia Flash		Basics of information theory Run Length coding		Key Frame Animation,Flash – Introduction,Animation							3D Animation									
S-3	SLO-1	Introduction to World Wide Web, History of WWW		Dreamweaver		Variable length coding		Interacting,Basic Concepts							Bouncing Ball with Star shape,ADDIE Model,Conceptualization									
	SLO-2	HyperText Transfer Protocol		VRML overview		Lossy Compression		Drawing Lines,Shapes							Content Collection,Storyboard,Script Authoring Metaphors,Testing									
S-4-S-5	SLO-1	Laboratory 1:UnderstandingPhotoshop Environment, Learningtheusageoftolsintoolbarwithsampleimages		Laboratory4:TestingLaboratoryMode, Multichannelcolormode, EdgeMask		Laboratory 7:Using RetouchingToolsina Image, AdjustingcolorandtoneforaImage		Laboratory 10: Drawing spokesonawheelandallowthewheeltorotate, MotionTwe ening, BouncingBall							Laboratory 13: Automatic Slideshow presentation andpresentationwithactionscript									
	SLO-2	HyperText Markup Language		Graphics/Image Data types		The rate distortion theory		Strokes,Fill							Report Writing,Documentation.									
S-6	SLO-1	Extensible Markup Language		1 Bit image, 8 bitgray level image		Quantization, DCT		Shapes and Brushes							Multimedia for the web and mobile platforms.									
	SLO-2	Overview of Multimedia software		Image datatype		Karhunen-Loeve transform		Selection							VirtualReality									

		Tools				Internet multimedia content distribution
	SLO-2	Music sequencing and notation	24 bitcolor image, 8 bit color image	Wavelet based coding	Transformation	
	SLO-1	Digital Audio	Color Lookup Tables	Layout,Text in Graphics, Markup	Reshaping	Multimedia Information sharing
S-8	SLO-2	Graphics and Image editing	File Formats, Graphics animation files, Ps and PDP	Text Layout Using HTML and CSS, Portable Documents	Importing Art Work	social mediasharing,cloud computing for multimedia services,interactive cloud gaming,Multimedia information retrieval.
S-9-S-10	SLO-1	Laboratory 2: Understanding the usage of selection Tools: Marquee Selections and Lasso Selections	Laboratory 5: Clone an Image, Captain Kirk's Myophia Effect	Laboratory 8: Apply ready made effects to image using Filter menu	Laboratory 11: Text and Shape Tweening, Moving a bus from one end to the other end of stage	Laboratory 14: Masking Effect and Water Masking.
	SLO-2					
S-11	SLO-1	Video Editing	Windows WMF, Windows BMP	A Short History of Hypertext and Hypermedia	Manipulating	What is a Multimedia Database
	SLO-2	Animations	Color and science, Color Models in images	The Nature of Hypertext	Images : Animation	Content-Based Storage and Retrieval (CBSR)
S-12	SLO-1	Multimedia Authoring Metaphores	Color Models in images, Color models in video	Links	Frame Animation	Designing a Basic Multimedia Database
	SLO-2	Multimedia Production	Types of Video signal, Analog video, Digital Video	Navigation and Structure in Hypertext	Principles of Animation	Image Color Features, Image Texture Features, Image-Shape Features
S-13	SLO-1	Multimedia Presentation	Digitization of sounds	Digitizing Video, Video Standards	Animation File Formats Animation Software	Audio and Video
	SLO-2	Automatic Authoring	Nyquist theorem	Introduction to Video Compression, QuickTime	Computer-based Animation	features, Classification of Data
S-14-S-15	SLO-1	Laboratory 3: Adjusting Brightness and Contrast, Isolating image from complex image in photoshop	Laboratory 6: Apply antique framing for photo, Apply various transformations for the selection in photoshop	Laboratory 9: Designing ID Card and Invitation Card using Layer and Layer effects, Gradients	Laboratory 12: Moving an object and text along a curved path	Laboratory 15: Creating buttons using an action script, States of button

Learning Resources	1. Fundamentals of Multimedia, Ze-Nian Li and Mark S. Drew, Pearson Education International 2. Ranjan Parekh, "Principles of Multimedia", 2 nd Edition, The Mc Graw Hill Companies	3. Nigel Chapman and Jenny Chapman, "Digital Multimedia", 2 nd Edition, John Wiley – 4. DreamTech Pvt. Ltd. Vishnu Priya Singh, (2006), "A Text Book of Multimedia", 1 st Edition, Computech Publication Ltd
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Learning Assessment		Continuous Learning Assessment (50% Weightage)								Final Examination (50% weightage)	
Bloom's Level of Thinking		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 Higher Technical Institutions	Internal Experts
Experts from Industry		
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. P J Arul Leena Rose

Course Code	UCS23D09J	Course Name	MULTICORE ARCHITECTURES				Course Category	D	Discipline Specific Elective Course										L	T	P	O	C					
Pre-requisite Courses		Nil		Co-requisite Courses		Nil		Progressive Courses		Nil										3	0	2	2	4				
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 :		Illustrate the need for multi-core processors and their architecture.						1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
CLR-2 :		Understand the challenges in parallel and multi-threaded programming.									Expected Proficiency (%)	Expected Proficiency (%)	Expected Proficiency (%)	Fundamental 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 :		Learn about the various parallel programming paradigms.									Expected Attainment (%)	Expected Attainment (%)	Expected Attainment (%)	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L
CLR-4 :		Acquire knowledge on shared memory programming with OpenMP												H	M	L	L	M	-	-	-	M	-	-	-	-	-	-
CLR-5 :		Develop and designDistributed memory programs using MPI												H	-	L	L	H	-	-	-	M	-	-	-	-	-	-
											L	-	H	H	H	-	-	-	M	-	-	-	-	-	-			
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:						3	85	80	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L		
CLO-1 :		Explain about multicore architectures and identify their characteristics and challenges.						2	85	80	H	M	L	L	M	-	-	-	M	-	-	-	-	-	-			
CLO-2 :		Identify the issues in parallel and multi-threaded programming						2	85	80	H	L	L	L	M	-	-	-	M	-	-	-	-	-	-			
CLO-3 :		Design and develop the various parallel programming paradigms.						2	85	80	H	M	L	L	M	-	-	-	M	-	-	-	-	-	-			
CLO-4 :		Execute programs using OpenMP and MPI						2	85	80	H	-	L	L	H	-	-	-	M	-	-	-	-	-	-			
CLO-5 :		Determining the parallel programming solutions to common problems						3	85	80	L	-	H	H	H	-	-	-	M	-	-	-	-	-	-			
Duration (hour)		15		15		15		15		15		15		15		15		15		15		15		15				
S-1	SLO-1	Why Parallel Computing?		Parallel Software		Distributed-Memory Programming with MPI		A parallel sorting algorithm		Shared-Memory Programming with OpenMP																		
	SLO-2	Why We Need Ever-Increasing Performance?		Caveats		Compilation and execution		serial sorting algorithms		Compiling and running OpenMP programs																		
S-2	SLO-1	Why We're Building Parallel Systems?		Coordinating the processes/threads		MPI programs		Parallel odd-even transposition sort		Scope Of Variables																		
	SLO-2	Why We Need to Write ParallelPrograms ?		Shared-memory		Communicators		Collective communications		Bubble sort																		
S-3	SLO-1	Concurrent, Parallel, Distributed		Dynamic and static threads		Message matching		Shared-Memory Programming with Pthreads		Odd-even transposition sort																		
	SLO-2	Processes, multitasking, and threads		Thread safety		The status p argument		Processes, Threads, and pThreads		Parallel Program Development																		
S-4-5	SLO-1	Lab 1: Introduction and Installation of Open MP		Lab 4: Program to Sort string of characters using OpenMP		Lab 7: Execute the code to compile and run serial programs, written in c, or java, on the login nodes.		Lab 10: Demonstrate threaded programs using pthreads		Lab 13: Program using MPI basic communication routines.																		
	SLO-2																											
S-6	SLO-1	The basics of caching		Communication: One-sided communication		Semantics of MPI _Send and MPI _Recv		ThreadExecution		TWO n-BODY SOLVERS																		
	SLO-2	Cache mappings		Partitioned global address space languages		Some potential pitfalls		Starting the threads		Two serial programs																		
S-7	SLO-1	Virtual memory		Input and Output		The trapezoidal rule in MPI		Running the threads		Parallelizing the n-body solvers																		
	SLO-2	Instruction-level parallelism		Performance		Parallelizing the trapezoidal rule		Stopping the threads		Parallelizing the basic solver using OpenMP																		
S-8	SLO-1	Hardware multithreading		Speedup and efficiency		Dealing with I/O		Error checking		Parallelizing the reduced solver using OpenMP																		
	SLO-2	Parallel Hardware & Parallel Software		Amdahl's law		Tree-structured communication		Other approaches to thread startup		Evaluating the OpenMP codes																		

S-9-10	SLO-1	Lab 2: Program to measure time in various ways using Chrono library.	Lab 5: Programs to illustrate basic MPI point-to-point library calls	Lab 8: Execute the code to run serial programs on the execution nodes.	Lab 11: Demonstrate threaded programs using OpenMP directives	Lab 14: Parallel Programming With MPI
	SLO-2	Comparison of Parallel Hardware and Software	Taking timings	Collective vs. point-to-point communications	Matrix-Vector Multiplication	Parallelizing the solvers using pthreads
S-11-12	SLO-1	SIMD systems	Parallel Program Design	Broadcast	Critical Sections	Parallelizing the basic solver using MPI
	SLO-2	MIMD systems	Serial program	Data distributions	Busy-Waiting	Parallelizing the reduced solver using MPI
S-13	SLO-1	Interconnection networks	Serial systems	MPI derived datatypes	Producer-Consumer Synchronization and Semaphores	Performance of the MPI solvers
	SLO-2	Lab 3: Program to reverse a string using OpenMP	Lab 6: Program to find the size of an array in function and calculate time and space complexity.	Lab 9: Demonstrate parallel message passing programs in c, using the MPI system.	Lab 12: Execute the program and notice the number of processors and the given rank to each one using MPI	Lab 15: Program to illustrate the MPI topology functions

Learning Resources	1. Peter S. Pacheco, — <i>An Introduction to Parallel Programming</i> , Morgan-Kaufman/Elsevier, 2011. 2. Darryl Gove, — <i>Multicore Application Programming for Windows, Linux, and Oracle Solaris</i> , Pearson, 2011..	1. Michael J Quinn, — <i>Parallel programming in C with MPI and OpenMP</i> , Tata McGraw Hill, 2003. 2. Victor Alessandrini, <i>Shared Memory Application Programming</i> , 1st Edition, Concepts and Strategies in Multicore Application Programming, Morgan Kaufmann, 2015. 3. Yan Solihin, <i>Fundamentals of Parallel Multicore Architecture</i> , CRC Press, 2015.
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LearningAssessment											
Bloom's LevelOfThinking		ContinousLearningAssessment(50%Weightage)								FinalExamination(50%weightage)	
		CLA–1(10%)		CLA–2(10%)		CLA–3(20%)		CLA–4#(10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level3	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 Higher Technical Institutions	Internal Experts
Experts from Industry		
Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelananarayanan., Professor, School of Computer Science and Engineering, VIT Chennai	Mrs. Kanimozhi
		Dr. Saravanan

Course Code	UCS23D10J	Course Name	SOFT COMPUTING				Course Category	D	Discipline Specific Elective Course					L	T	P	O	C						
										3	0	2	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 the basic concepts of Soft Computing						1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Learn various Artificial Neural network architectures						Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental 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 :	Learn fuzzy sets, fuzzy logic and fuzzy inference system																							
CLR-4 :	Understand genetic algorithm for global optimization																							
CLR-5 :	Learn hybrids of neuro, fuzzy and genetic algorithm, and their applications.																							
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																						
CLO-1 :	Understand various soft computing techniques						3	85	80	H	M	-	-	-	-	-	-	L	-	-	-	-	-	-
CLO-2 :	Design and develop different neural network algorithms						2	85	80	H	L	H	H	-	-	-	-	M	-	-	-	-	-	-
CLO-3 :	Analyse and apply fuzzy logic and fuzzy inference system						2	85	80	H	M	H	H	L	-	-	-	M	-	-	-	-	-	-
CLO-4 :	Solve problems using Genetic Algorithms						2	85	80	H	H	M	L	-	-	-	-	M	-	-	-	-	-	-
CLO-5 :	Apply various soft computing techniques for complex problems						3	85	80	L	H	H	H	M	-	-	-	M	-	-	-	-	-	-
Duration (hour)		15		15		15		15		15		15												
S-1	SLO-1	Neural Networks	Supervised Learning Network	Unsupervised Learning Networks	Genetic Algorithms	Hybrid Soft Computing Techniques																		
	SLO-2	Artificial Neural Network: Definition	Introduction	Fixed Weight Competitive Nets	Introduction	Introduction																		
S-2	SLO-1	Advantages of Neural Networks	Perceptron Networks	Hamming Network	Traditional Optimization and Search Techniques	Neuro-Fuzzy Hybrid Systems																		
	SLO-2	Application Scope of Neural Networks	Perceptron Learning Rule	Kohonen neural network	Genetic Algorithm and Search Space	Comparison of Fuzzy Systems with Neural Networks																		
S-3	SLO-1	Fuzzy Logic	Architecture	Learning Vector Quantization	Basic Terminologies in Genetic Algorithm	Characteristics of Neuro-Fuzzy Hybrids																		
	SLO-2	Soft Computing	Flowchart for Training Process	Adaptive Resonance Theory Network	General Genetic Algorithm .	Classifications of Neuro-Fuzzy Hybrid Systems																		
S- 4 - 5	SLO-1	Lab 1: Calculate the weights using sample network.	Lab 4:Write a MATLAB program to construct and test auto associative network for input vector using HEBB rule..	Lab 7: Implement Union, Intersection and Complement operations on fuzzy sets.	Lab 10: Write a MATLAB program for maximizing f(x) = x ² using GA, where xis ranges from 0 to 31	Lab 13: Create a perceptron network using the command "newp" and obtain its performance.																		
	SLO-2																							
S-6	SLO-1	Fundamental Concept -Artificial Neural Network	Perceptron Training Algorithm for Single Output Classes .	Fuzzy Systems	Operators in Generic Algorithm	Adaptive Neuro-Fuzzy Inference Sysrem																		
S-7		Basic Models of Artificial Neural Network	Architecture	Classical Sets	Selection	Genetic Algorithm Based Back-Propagation Network (BPN)																		
S-8	SLO-1	Connections, Supervised Learning	Flowchart for Training Process, Multiple Adaptive Linear Neurons	Operations on Classical Sets, Properties of Classical Sets	Crossover, Mutation	Advantages of Neuro-Genetic Hybrids, Genetic Fuzzy Rule Based Systems																		
	SLO-2	Unsupervised Learning, Reinforcement Learning	Flowchart ofTraining Process, Back-Propagation Network	Function Mapping of Classical Sets, Fuzzy Set Operations	Stopping Condition for Generic Algorithm, Constraints in Genetic Algorithm	GeneticTuningProcess, Genetic Learning of Rule Bases																		

S-9-10	SLO-1	Lab 2: Generate Program to implement AND gate	Lab 5: Write a program to implement artificial neural network with back propagation.	Lab 8: Implement adaptive theory network 2 for given inputs by a MATLAB program.	Lab 11: Implement the selection, crossover, and mutation operators used in a genetic algorithm.	Lab 14: Implement Travelling sales person using genetic Algorithm
	SLO-2					
S-11	SLO-1	Activation Functions	Learning Factors of Back-Propagation Network	Classical Relation	Classification of Generic Algorithm	Advantages of Generic Fuzzy Hybrids
	SLO-2	Important Terminologies of ANNs	Radial Basis Function Network	fuzzy Relations	Hybrid Genetic Algorithms	A Fusion Approach of Multispectral Images with SAR
S-12	SLO-1	McCulloch-Pitts Neuron	Associative Memory Networks	Membership Functions	Independent Sampling Generic Algorithm	Image Fusion
	SLO-2	Linear Separability	Introduction	Methods of Membership Value Assignments	Genetic Programming	Neural Network Classification
S-13	SLO-1	Hebb Network	Training Algorithms for Pattern Association	Defuzzification methods	Working of Genetic Programming	Methodology and Results
	SLO-2	Training Algorithm	Autoassociative Memory Network	Fuzzy Arithmetic and Fuzzy Measures	Characteristics of Generic Programming	Optimization of Travelling Salesman Problem using Genetic Algorithm Approach
S-14-15	SLO-1	Lab 3: Generate XOR function using McCulloch-Pitts neural net	Lab 6: Write a MATLAB program to implement Discrete Hopfield Network and rest the input pattern	Lab 9: Plot the correlation plot on dataset and visualize giving an overview of relationships among data. Analysis of covariance: variance (ANOVA), if data have categorical variables.	Lab 12: Implement the method one Generation that replaces the current population with a new population generated by applying the three operators: selection, crossover, and mutation	Lab 15: Write a program to implement AND function using ADALINE with bipolar inputs and outputs.
	SLO-2					
	SLO-2					

Learning Resources	1. S N Sivanandam, S N Deepa, "Principles of Soft Computing", Wiley India, 2nd Edition, 2011.	5. James A Freeman, David M Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Addison Wesley, 2003.
	2. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2002.	6. S Rajasekaran, G A Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm, Synthesis and Applications", PHI Learning, 2017.
	3. Kwang H Lee, "First course on Fuzzy Theory and Applications", Springer, 2005.	7. N P Padhy, S P Simon, "Soft Computing with MATLAB Programming", Oxford University Press, 2015.
	4. George J Klir, Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1996.	

Learning Assessment											
Level	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	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Dr. Saravanan
		Ms. Kanimozhi

Course Code	UCS23G07T	Course Name	Software Project Management	Course Category	G	Generic Elective Course	L	T	P	O	C
							4	0	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 :	Understand Project Management principles while developing software.	Level of Thinking (Bloom)	2	Expected Proficiency (%)	3	Expected Attainment (%)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-2 :	Gain extensive knowledge about the basic project management concepts, framework and the process models.						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 :	Obtain adequate knowledge about software process models and software effort estimation techniques.																					
CLR-4 :	Estimate the risks involved in various project activities.																					
CLR-5 :	Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.																					
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																				
CLO-1 :	To understand the Software Project Planning and Evaluation techniques.	2	85	80			H	H	H	H	H	-	M	M	L	-	H	-	M	H		
CLO-2 :	To plan and manage projects at each stage of the software development life cycle (SDLC).	3	85	80			L	H	H	H	H	-	M	M	L	-	H	-	M	H		
CLO-3 :	To learn about the activity planning and risk management principles.	3	85	80			L	H	H	H	H	-	M	M	L	-	H	-	M	H		
CLO-4 :	To manage software projects and control software deliverables.	3	85	80			L	H	H	H	H	-	M	M	L	-	H	-	M	H		
CLO-5 :	To develop skills to manage the various phases involved in project management and people management.	3	85	80			L	H	H	H	H	-	M	M	L	-	H	-	M	H		

Note: All our curriculum, study materials, assignments, quizzes, lab works, and learning resources are personalized and dynamically generated using machine learning models based on the learner's learning ability. Users can review our learning curriculum only through our intelligent learning management platform (iLMSP), and our learning resources and lab infrastructures are available only in the digital form on our cloud infrastructures.

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Introduction	Process Models	Objectives of Activity planning	Framework for Management and control	Managing people Motivation
	SLO-2	Importance of Software Project Management		Project schedules		
S-2	SLO-1	Activities	Choice of Process models	Activities	Collection of data	Organizational behavior
	SLO-2	Methodologies				
S-3	SLO-1	Categorization of Software Projects	Rapid Application development	Sequencing and scheduling	Visualizing progress	Best methods of staff selection
	SLO-2	Categorization of Software Projects				
S-4	SLO-1	Setting objectives	Agile methods	Network Planning models	Cost monitoring	The Oldham -Hackman job characteristic model
	SLO-2	Management Principles				
S-5	SLO-1	Management Principles	Dynamic System Development Method	Formulating Network Model	Earned Value Analysis	Stress
	SLO-2	Management Control	Extreme Programming			Health and Safety

S-6	SLO-1	Project portfolio Management	Managing interactive processes	Forward Pass & Backward Pass techniques	Prioritizing Monitoring	Ethical and Professional concerns
	SLO-2	Project portfolio Management				
S-7	SLO-1	Cost-benefit evaluation technology	Basics of Software estimation	Critical path (CRM) method	Project tracking	Working in teams
	SLO-2					
S-8	SLO-1	Risk evaluation	Effort and Cost estimation techniques	Risk identification	Change control	Decision making
	SLO-2					
S-9	SLO-1	Strategic program Management	COSMIC Full function points	Assessment	Software Configuration Management	Organizational structures
	SLO-2			Risk Planning		
S-10	SLO-1	Stepwise Project Planning-1	COCOMO II	Risk Management	Managing contracts	Dispersed and Virtual teams
	SLO-2			PERT technique		
S-11	SLO-1	Stepwise Project Planning-2	Types of COCOMO	Monte Carlo simulation	Contract Management-1	Communications genres
	SLO-2			Resource Allocation		
S-12	SLO-1	Software process	Illustration of cost estimation using COCOMO	Creation of critical paths	Contract Management-2	Communication plans
	SLO-2			Cost schedules.		Leadership.

Learning Resources	Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.	Walker Royce: –Software Project Management- Addison-Wesley, 1998. Gopalaswamy Ramesh, –Managing Global Software Projects – McGraw Hill Education (India), Fourteenth Reprint 2013.
	Robert K. Wysocki – Effective Software Project Management – Wiley Publication, 2011.	

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	30%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level 2	Apply	50%	-	50%	-	50%	-	50%	-	50%	-
	Analyze										
Level 3	Evaluate	20%	-	20%	-	20%	-	20%	-	20%	-
	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. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	Dr. Neelananarayan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mt. P Yogalakshmi

Course Code	UCS23P06L	Course Name	Project Phase-II	Course Category	IAPC	Internship/Apprenticeship / Project/ Community Outreach	L	T	P	O	C
							0	0	12	2	6

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 :	Demonstrate skills learnt in the real time environment.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Explore the different industries that are using IT																		
CLR-3 :	Enhance the skills in the system aspects																		
CLR-4 :	Understanding the professional connections with the knowledge learnt																		
CLR-5 :	Applying the skills in problem solving																		

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 :	To get an inside view of an industry and organization/company	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	To gain valuable skills and knowledge	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	To make professional connections and enhance networking	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	To get experience in a field to allow the student to make a career transition	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	To get an inside view of an industry and organization/company	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-

Students can choose a company of their own interest for internship for a period of minimum four weeks to learn about the application of IT in real time environment. In the first week of July, all the students have to give a presentation about their observations made by them in internship. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

Learning Assessment			
Project Phase-II	Continuous Learning Assessment (50% weightage)		Final Evaluation (50% weightage)
	Review – 1	Review – 2	Project Report
	20%	30 %	Viva-Voce
			20 %

SEMESTER – II

Course Code	UCD23P01 L	Course Name	Internship Report– I	Course Category	IAP C	Internship/Apprenticeship / Project/ Community Outreach	L 0	T 0	P 8	O 2	C 4
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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 :	Demonstrate skills learnt in the real time environment.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Explore the different industries that are using IT	Level of Thinking (1-3) 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 Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
CLR-3 :	Enhance the skills in the system aspects				L	H	M	H	L	M	L	L	L	L	L	H	M	L	L
CLR-4 :	Understanding the professional connections with the knowledge learnt				M	H	H	M	L	M	L	L	M	L	L	H	M	L	L
CLR-5 :	Applying the skills in problem solving				M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
					M	H	M	H	L	M	M	L	M	L	M	H	M	L	L

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (1-3) Expected Proficiency (%) Expected Attainment (%)	80	70	L	H	M	H	L	M	L	L	L	L	L	H	M	L	L
CLO-1 :	To get an inside view of an industry and organization/company	3	80	70	M	H	H	M	L	M	L	L	M	L	L	H	M	L	L
CLO-2 :	To gain valuable skills and knowledge	3	85	75	M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
CLO-3 :	To make professional connections and enhance networking	3	75	70	M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
CLO-4 :	To get experience in a field to allow the student to make a career transition	3	85	80	M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
CLO-5 :	To get an inside view of an industry and organization/company	3	85	75	H	H	M	H	L	M	M	M	M	L	M	M	M	L	L

Students can choose a company of their own interest for internship for a period of minimum TEN weeks (Part-time) to learn about the application of their related field in real time environment. All students have to give a presentation about their observations made by them in internship as per the schedule given. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

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

Course Code	UCD23P02 L	Course Name	Project Work – I	Course Category	IAP C	Internship/Apprenticeship / Project/ Community Outreach	L 0	T 0	P 8	O 2	C 4
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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 :	Demonstrate skills learnt in the real time environment.	1	2	3
CLR-2 :	Explore the different industries that are using IT	Level of Thinking (1=Low) Expected Proficiency (%) Expected Attainment (%)	80	70
CLR-3 :	Enhance the skills in the system aspects			
CLR-4 :	Understanding the professional connections with the knowledge learnt			
CLR-5 :	Applying the skills in problem solving			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (1=Low) Expected Proficiency (%) Expected Attainment (%)	80	70
CLO-1 :	To get an inside view of an industry and organization/company	3	80	70
CLO-2 :	To gain valuable skills and knowledge	3	85	75
CLO-3 :	To make professional connections and enhance networking	3	75	70
CLO-4 :	To get experience in a field to allow the student to make a career transition	3	85	80
CLO-5 :	To get an inside view of an industry and organization/company	3	85	75

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 Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
L	H	M	H	L	M	L	L	L	L	L	H	M	L	L
M	H	H	M	L	M	L	L	M	L	L	H	M	L	L
M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
H	H	M	H	L	M	M	M	M	L	M	M	M	L	L

Students can choose problems of their own interest to develop software package using the programming languages/tools available. There will be two reviews conducted during the project period for all the students. At the end of the project, every student shall submit a structured project report and will take a Viva Voce examination.

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

Course Code	UCD23P03 L	Course Name	Apprenticeship – I	Course Category	IAP C	Internship/Apprenticeship / Project/ Community Outreach	L 0	T 0	P 8	O 2	C 4
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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 :	Demonstrate skills learnt in the real time environment.	1	2	3
CLR-2 :	Explore the different industries that are using IT	Level of Thinking (1-3) Expected Proficiency (%) Expected Attainment (%)		
CLR-3 :	Enhance the skills in the system aspects			
CLR-4 :	Understanding the professional connections with the knowledge learnt			
CLR-5 :	Applying the skills in problem solving			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (1-3) Expected Proficiency (%) Expected Attainment (%)		
CLO-1 :	To get an inside view of an industry and organization/company			

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 Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
L	H	M	H	L	M	L	L	L	L	L	H	M	L	L

CLO-2 : To gain valuable skills and knowledge	3	85	75	M	H	H	M	L	M	L	L	M	L	L	H	M	L	L
CLO-3 : To make professional connections and enhance networking	3	75	70	M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
CLO-4 : To get experience in a field to allow the student to make a career transition	3	85	80	M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
CLO-5 : To get an inside view of an industry and organization/company	3	85	75	H	H	M	H	L	M	M	M	M	L	M	M	M	L	L

Students can choose a company of their own interest for Apprenticeship for a period of minimum TEN weeks (Part-time) to learn about the application of their related field in real time environment. All students have to give a presentation about their observations made by them in internship as per the schedule given. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

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

SEMESTER – IV

Course Code	UCD23P04 L	Course Name	Internship Report– II	Course Category	IAP C	Internship/Apprenticeship / Project/ Community Outreach	L	T	P	O	C
							0	0	8	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 :	Demonstrate skills learnt in the real time environment.
CLR-2 :	Explore the different industries that are using IT
CLR-3 :	Enhance the skills in the system aspects
CLR-4 :	Understanding the professional connections with the knowledge learnt
CLR-5 :	Applying the skills in problem solving

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom's)	Expected Proficiency (%)	Expected Attainment (%)
CLO-1 :	To get an inside view of an industry and organization/company	3	80	70
CLO-2 :	To gain valuable skills and knowledge	3	85	75
CLO-3 :	To make professional connections and enhance networking	3	75	70
CLO-4 :	To get experience in a field to allow the student to make a career transition	3	85	80
CLO-5 :	To get an inside view of an industry and organization/company	3	85	75

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 Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
L	H	M	H	L	M	L	L	L	L	L	H	M	L	L
M	H	H	M	L	M	L	L	M	L	L	H	M	L	L
M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
H	H	M	H	L	M	M	M	M	L	M	M	M	L	L

Students can choose a company of their own interest for internship for a period of minimum TEN weeks (Part-time) to learn about the application of their related field in real time environment. All students have to give a presentation about their observations made by them in internship as per the schedule given. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

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

Course Code	UCD23P05 L	Course Name	Project Work – II	Course Category	IAP C	Internship/Apprenticeship / Project/ Community Outreach	L 0	T 0	P 8	O 2	C 4
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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 :	Demonstrate skills learnt in the real time environment.	1	2	3
CLR-2 :	Explore the different industries that are using IT			
CLR-3 :	Enhance the skills in the system aspects			
CLR-4 :	Understanding the professional connections with the knowledge learnt			
CLR-5 :	Applying the skills in problem solving			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom's)	Expected Proficiency (%)	Expected Attainment (%)
CLO-1 :	To get an inside view of an industry and organization/company	3	80	70
CLO-2 :	To gain valuable skills and knowledge	3	85	75
CLO-3 :	To make professional connections and enhance networking	3	75	70
CLO-4 :	To get experience in a field to allow the student to make a career transition	3	85	80
CLO-5 :	To get an inside view of an industry and organization/company	3	85	75

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 Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
L	H	M	H	L	M	L	L	L	L	L	H	M	L	L
M	H	H	M	L	M	L	L	M	L	L	H	M	L	L
M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
H	H	M	H	L	M	M	M	M	L	M	M	M	L	L

Students can choose problems of their own interest to develop software package using the programming languages/tools available. There will be two reviews conducted during the project period for all the students .At the end of the project, every student shall submit a structured project report and will take a Viva Voce examination.

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

Course Code	UCD23P06 L	Course Name	Apprenticeship – II	Course Category	IAP C	Internship/Apprenticeship / Project/ Community Outreach	L 0	T 0	P 8	O 2	C 4
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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 :	Demonstrate skills learnt in the real time environment.	1	2	3
CLR-2 :	Explore the different industries that are using IT	Level of Thinking (Bloom's)	Expected Proficiency (%)	Expected Attainment (%)
CLR-3 :	Enhance the skills in the system aspects			
CLR-4 :	Understanding the professional connections with the knowledge learnt			
CLR-5 :	Applying the skills in problem solving			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom's)	Expected Proficiency (%)	Expected Attainment (%)
CLO-1 :	To get an inside view of an industry and organization/company	3	80	70
CLO-2 :	To gain valuable skills and knowledge	3	85	75
CLO-3 :	To make professional connections and enhance networking	3	75	70

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 Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
L	H	M	H	L	M	L	L	L	L	L	H	M	L	L
M	H	H	M	L	M	L	L	M	L	L	H	M	L	L
M	H	M	H	L	M	M	L	M	L	M	H	M	L	L

CLO-4 :	To get experience in a field to allow the student to make a career transition	3	85	80
CLO-5 :	To get an inside view of an industry and organization/company	3	85	75

M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
H	H	M	H	L	M	M	M	M	L	M	M	M	L	L

Students can choose a company of their own interest for Apprenticeship for a period of minimum TEN weeks (Part-time) to learn about the application of their related field in real time environment. All students have to give a presentation about their observations made by them in internship as per the schedule given. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

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