

ACADEMIC CURRICULA

UNDERGRADUATE DEGREE PROGRAMME

Bachelor of Computer Applications

(B.C.A)

Four Years

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

Choice Based Flexible Credit System

**Academic Year
2023-2024**



SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Kancheepuram District 603203, Tamil Nadu, India

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Department of Computer Applications

1. Department Vision Statement	
Stmnt - 1	<i>Creating the most conducive environment for imparting quality education in Computer Applications</i>
Stmnt - 2	<i>Contributing effectively to produce globally competent quality professionals in the field of IT</i>
Stmnt - 3	<i>Contributing towards preparing young minds to serve community</i>

2. Department Mission Statement	
Stmnt - 1	<i>Impart student's essential knowledge and skills required for a successful career in Information Technology</i>
Stmnt - 2	<i>Instill confidence in the students to take up new challenges by grooming them appropriately</i>
Stmnt - 3	<i>Inculcate in the students a sense of commitment to professional ethics, moral values with emphasis on team work and leadership qualities</i>
Stmnt - 4	<i>Instill the students with a clear awareness of environmental issues and their relevance to their profession</i>
Stmnt - 5	<i>Impress upon the students the impact of their work on the nation's economic and social progress</i>

3. Program Education Objectives (PEO)	
PEO - 1	<i>Offer the students those skill sets and domain knowledge based on needs of IT and dynamic business environment</i>
PEO - 2	<i>Provide the students with the capabilities in the areas of analysis, design, development and testing</i>
PEO - 3	<i>Kindle the minds of students to take up research and development in Computer Applications with missionary zeal</i>
PEO - 4	<i>Train the students to become effective communicators in professional as well as general aspects of life</i>
PEO - 5	<i>Prepare the students into balanced individuals who are keen to leave a mark by excelling in their profession</i>

4. Program Specific Outcomes (PSO)	
PSO - 1	<i>Graduates will acquire a comprehensive knowledge and sound understanding of fundamentals of IT.</i>
PSO - 2	<i>Graduates will develop practical, analytical and programming skills.</i>
PSO - 3	<i>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.</i>

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

7. Programme Structure- B.C. A Computer Applications

1. Discipline Specific Core Courses (C)							2. Discipline Specific Elective Courses (D)						
(20 Courses)							(10 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	UCA23D01J	Windows Programming using VB.NET					
USA23102J	Digital Logic Fundamentals	3	0	3	2	4	UCA23D02J	Data Analysis using R	3	0	2	2	4
UMS23101T	Discrete Mathematical Structures	4	0	0	2	4	UCA23D03J	Web development using Angular JS and Mongo					
USA23201J	Object Oriented Programming	3	0	3	2	4	UCA23D04J	Introduction to Animation					
USA23202J	Fundamentals of Data Structures and Algorithms	3	0	3	2	4	UCA23D05J	Introduction to Computer Vision	3	0	3	2	4
UMS23202T	Mathematical Foundation	4	0	0	2	4	UCA23D06J	Programming Using C#					
USA23301J	Programming in Java	3	0	3	2	4	UCA23D07J	Web development using Node JS and MongoDB	3	0	3	2	4
USA23302J	Database Management System	3	0	3	2	4	UCA23D08J	Cyber Security					
UMS23303T	Numerical Methods	4	0	0	2	4	UCA23D09J	Block chain Technology	3	0	2	2	4
UCA23401J	Open Source Technologies	3	0	3	2	4	UCA23D10J	Internet of Things					
USA23402J	Operating System	3	0	3	2	4	UCA23D11J	E-Commerce					
UMS23404T	Resource Management Techniques	4	0	0	2	4	UCA20D12J	IOS	4	0	0	2	4
UCA23501J	Python Programming	3	0	3	2	4	UCA20D13J	Artificial Intelligence					
UCA23502J	Computer Networks	3	0	3	2	4		Total Learning Credits					20
UCA23503J	Object Oriented Analysis and Design	3	0	3	2	4	4. Skill Enhancement Courses(S)						
UCA23601J	Software Engineering and Testing	3	0	3	2	4							
UCA23602J	Wireless Communication & Mobile Computing	4	0	0	2	4	(5 Courses)						
UCS23603T	Research Methodology	4	0	0	2	4	Course	Course Title	Hours/ Week				C
UCA23701J	Cloud Computing	3	0	3	2	4			L	T	P	O	
UCA23801J	Big data Analytics	3	0	2	2	4	UCD23S01L	Quantitative Aptitude and Logical Reasoning	0	0	2	2	1
	Total Learning Credits					80	UCD23S02L	Verbal Ability and Skill Development	2	0	0	2	2
							UCA23S03J	Web Programming	0	0	2	2	1
							UCA23S04J	Go Programming	1	0	2	2	2
							UCA23S05J	Lua Programming	1	0	1	2	1
								Total Learning Credits					7

3. Generic Elective Courses (G)							5. Ability Enhancement Courses (AE)						
(6 Courses)							(4 Courses)						
Course Code	Course Title	Hours/ Week				C	Course Code	Course Title	Hours/ Week				C
		L	T	P	O				L	T	P	O	
ULT23G01J	Tamil-I						ULE23AE1T	English	4	0	0	2	4
							ULT23AE01J	Applied Tamil - I					
							ULH23AE01J	Applied Hindi - I	1	0	2	2	2
							ULF23AE01J	French for specific purpose-I					
ULH23G01J	Hindi-I	2	0	2	2	3	ULT23AE02J	Applied Tamil – II					
							ULH23AE02J	Applied Hindi - II	1	0	2	2	2
ULF23G01J	French-I						ULF23AE02J	French for specific purpose-II					
ULT23G02J	Tamil-II						UES23AE1T	Environmental Studies	3	0	0	2	3
ULH23G02J	Hindi-II	2	0	2	2	3		Total Learning Credits					11
ULF23G02J	French-II												
UCA23G01J	Fundamentals of Data Science	3	0	2	2	4	6. Value Addition Course (V)						
UCA23G02J	Introduction to Machine Learning	3	0	2	2	4	(4 Courses)						
UCA23G03J	Serverless database Techniques	3	0	2	2	4	Course	Course	Hours/ Week				
UCA23G04J	Data Science Using Python	3	0	3	2	4	Code	Title	L	T	P	O	C
UCA23G05J	Data Visualization and exploring models	3	0	2	2	4	UCD23V01T	Universal Human Values – Understanding Harmony and Ethical Human Conduct	2	0	0	2	2
UCA23G06J	Basics of Android	3	0	2	2	4	UEN23VA1T	Communication Skills	0	0	4	2	2
UCA23G07T	Introduction to Server-side Web applications	4	0	0	2	4	UCD23V02L	Industry Oriented Employability Skills for Science	2	0	0	2	2
	Total Learning Credits					34	UCD23V05L	Career Readiness and Professional Skills	2	0	0	2	2
								Total Learning Credits					8

7. Internship/Apprenticeship / Project/ Community Outreach (IAPC)							8.Mandatory Courses(M)						
(6 Courses)							(2 Courses)						
Course Code	Course Title	Hours/ Week				C	Course Code	Course Title	Hours/ Week				C
		L	T	P	O				L	T	P	O	
UCA23I31L	Internship - 1					1	UNS23201L	NSS					
UCA23I51L	Internship - 2					1	UNC23201L	NCC					
UCA23I71L	Internship - 3					2	UNO23201L	NSO					
UCA23M61L	Mini Project			4	2	2	UYG23201L	YOGA					
UCA23P71L	Project Phase-I			8	2	4	UMI23S01L	My India Project					
UCA23P81L	Project Phase-II			12	2	6							
	Total Learning Credits					16		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

Semester	Discipline Specific Core Courses (C)	Discipline Specific Elective Courses (D)	Generic Elective Courses (G)	Skill Enhancement Courses(S)	Ability Enhancement Courses (AE)	Mandatory Courses(M)	Value Addition Course (V)	IAPC	Total Credits	No. of Periods
Sem I	C-1(4) C-2 (4) C-3(4)	-	G-1 (Tamil-I) G-1 (Hindi-I) G-1 (French-I) – (3)	S-1 (1)-(Soft skills)	AE-1(4) (English)	-	V-1(2)	-	22	28
Sem II	C-4(4) C-5 (4) C-6 (4)	-	G-2 (Tamil-II) G-2 (Hindi-II) G-2 (French-II) – (3)	S-2 (2)- (Quantitative Aptitude & Reasoning)	AE-2 (3) (EVS)	NSS/NCC/NSO /Yoga(0)	V-2(2)	-	22	29
Sem III	C-7(4) C-8 (4) C-9(4)	-	G-3(4)	S-3 (1)	AE – 3(2) (IL-1/ FL-1)	-	V-3(2)	IAPC-1 (1)	22	29
Sem IV	C-10(4) C-11 (4) C-12(4)	-	G-4(4)	S-4 (2)	AE – 4(2) (IL-1/ FL-1)	My India Project(0)	V-4(2)	-	22	30
Sem V	C-13(4) C-14(4) C-15(4)	D1/D2(4)	G-5(4)	S-5 (1)	-	-	-	IAPC -2 (1)	22	30
Sem VI	C-16(4) C-17(4) C-18(4)	D3/D4(4)	G-6(4)	-	-	-	-	IAPC -3 (2)	22	30
Sem VII	C-19(4)	D5/D6(4)	G-7(4) G-8(4)	-	-	-	-	IAPC -4 (2) IAPC -5 (4)	22	30
Sem VIII	C-20(4)	D7/D8(4) D9/D10(4)	G-9(4)	-	-	-	-	IAPC -6 (6)	22	30
Total Credits	80	20	34	7	11	0	8	16	176	236

Semester - I							Semester - II						
Course Code	Course Title	Hours/ Week				C	Course Code	Course Title	Hours/ Week				C
		L	T	P	O				L	T	P	O	
ULT23G01J	Tamil-I	2	0	2	2	3	ULT23G02J	Tamil-II	2	0	2	2	3

ULH23G01J	Hindi-I		0		2		ULH23G02J	Hindi-II		0		2	
ULF23G01J	French-I		0		2		ULF23G02J	French-II		0		2	
ULE23AE1T	English	4	0	0	2	4	UES23AE1T	Environmental Studies	3	0	0	2	3
USA23101J	Programming for Problem Solving	3	0	3	2	4	USA23201J	Object Oriented Programming	3	0	3	2	4
USA23102J	Digital Logic Fundamentals	3	0	3	2	4	USA23202J	Fundamentals of Data Structures and Algorithms	3	0	3	2	4
UMS23101T	Discrete Mathematical Structures	3	1	0	2	4	UMS23202T	Mathematical Foundation	4	0	0	2	4
UCD23S01L	Quantitative Aptitude and Logical Reasoning	0	0	2	2	1	UCD23S02T	Verbal Ability and Skill Development	2	0	0	2	2
UCD23V01T	Universal Human Values	2	0	0	2	2	UEN23VA1T	Communication Skills	0	0	4	2	2
							UNS23201L	NSS				2	
							UNC23201L	NCC					
							UNO23201L	NSO					
							UYG23201L	YOGA					
Total Learning Credits		16	0	14	18	22	Total Learning Credits		16	0	14	20	22
Total number of hours/Week		28					Total number of hours/Week		29				

Semester - III							Semester - IV						
Course Code	Course Title	Hours/ Week				C	Course Code	Course Title	Hours/ Week				C
		L	T	P	O				L	T	P	O	
USA23301J	Programming in Java	3	0	3	2	4	UCA23401J	Open Source Technologies	3	0	3	2	4
USA23302J	Database Management System	3	0	3	2	4	USA23402J	Operating System	3	0	3	2	4
UMS23303T	Numerical Methods	4	0	0	2	4	UMS23404T	Resource Management Techniques	4	0	0	2	4
ULT23AE01J	Applied Tamil - I	1	0	2	2	2	ULT23AE02J	Applied Tamil – II	1	0	2	2	2
ULH23AE01J	Applied Hindi - I						ULH23AE02J	Applied Hindi - II					
ULF23AE01J	French for specific purpose-I						ULF23AE02J	French for specific purpose-II					
UCA23G01J	Fundamentals of Data Science	3	0	2	2	4	UCA23G02J	Introduction to Machine Learning	3	0	2	2	4
UCA23S03J	Web Programming	0	0	2	2	1	UCA23S04J	Go Programming	1	0	2	2	2
UCA23I31L	Internship - 1					1	UCD23V05T	Career Readiness and Professional Skills	2	0	0	2	2
UCD23V02T	Industry Oriented Employability Skills for Science	2	0	0	2	2	UMI23S01L	My India Project				2	
Total Learning Credits		15	0	14	14	22	Total Learning Credits		16	0	14	14	22
Total number of hours/Week		29					Total number of hours/Week		30				

Semester - V						Semester - VI							
Course Code	Course Title	Hours/ Week				C	Course Code	Course Title	Hours/ Week				C
		L	T	P	O				L	T	P	O	

UCA23501J	Python Programming	3	0	3	2	4	UCA23601J	Software Engineering and Testing	3	0	3	2	4
UCA23502J	Computer Networks	3	0	3	2	4	UCA23602J	Wireless Communication & Mobile Computing	4	0	0	2	4
UCA23503J	Object Oriented Analysis and Design	3	0	3	2	4	USA23603T	Research Methodology	4	0	0	2	4
UCA23D01J	Windows Programming using VB.NET	3	0	2	2	4	UCA23D04J	Introduction to Animation	3	0	3	2	4
UCA23D02J	Data Analysis using R						UCA23D05J	Introduction to Computer Vision					
UCA23D03J	Web development using angular JS and MongoDB						UCA23D06J	Programming Using C#					
UCA23G03J	Serverless database Techniques	3	0	2	2	4	UCA23G04J	Data Science Using Python	3	0	3	2	4
UCA23S05J	Lua Programming	1	0	1	2	1	UCA23M61L	Mini Project	0	0	4	2	2
UCA23I52L	Internship - 2					1	Total Learning Credits		16	0	14	12	22
Total Learning Credits		16	0	14	12	22	Total number of hours/Week		30				
Total number of hours/Week		30											

Total Learning Credits

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Semester - VII

Semester – VIII

Course Code	Course Title	Hours/ Week				C	Course Code	Course Title	Hours/ Week				C
		L	T	P	O				L	T	P	O	
UCA23C71J	Cloud Computing	3	0	3	2	4	UCA23C81J	Big data Analytics	3	0	2	2	4
UCA23D07J	Web development using Node JS and Mongo	3	0	3	2	4	UCA23D09J	Block chain Technology	3	0	2	2	4
UCA23D08J	Cyber Security						UCA23D10J	IOT					
UCA23G05J	Data Visualization and exploring models	3	0	2	2	4	UCA23D11J	E-Commerce	4	0	0	2	4
UCA23G06J	Basics of Android						UCA20D12J	IOS					
UCA23I73L	Internship - 3					2	UCA20D13J	Artificial Intelligence					
UCA23P71L	Project Phase-I			8	2	4	UCA23G07T	Introduction to Server-side Web applications	4	0	0	2	4
							UCA23P82L	Project Phase-II			12	2	6
Total Learning Credits		12	0	18	10	22	Total Learning Credits		14	0	16	10	22
Total number of hours/Week		30					Total number of hours/Week		30				

Total Learning Credits

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1. Program Articulation Matrix		
Course Code	Course Name	Programme Learning Outcomes

		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
USA23101J	Programming for Problem Solving	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
USA23102J	Digital Logic Fundamentals	H	H	M	M	M	L	L	L	L	L	L	H	M	M	M
USA23201J	Object Oriented Programming	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
USA23202J	Fundamentals of Data Structures and Algorithms	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
USA23301J	Programming in Java	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
USA23302J	Database Management System	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23C41J	Open Source Technologies	H	H	H	H	M	L	L	L	M	M	M	M	L	L	L
USA23402J	Operating System	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23C51J	Python Programming	H	H	M	M	M	L	L	L	M	M	M	M	M	M	M
UCA23C52J	Computer Networks	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23C53J	Object Oriented Analysis and Design	H	H	M	H	M	L	L	L	M	M	M	H	M	M	H
UCA23C61J	Software Engineering and Testing	H	H	M	H	M	L	L	L	M	M	M	H	M	M	H
UCA23C62J	Wireless Communication & Mobile Computing	H	H	M	M	H	H	H	M	M	M	L	H	H	M	M
UCS23603T	Research Methodology	H	H	M	M	M	L	L	L	M	M	M	M	M	M	M
UCA23C71J	Cloud Computing	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23C81J	Big data Analytics	H	H	M	H	M	L	L	L	M	M	M	H	M	M	M
UCA23I31L	Internship - 1	H	H	M	H	M	L	L	L	M	M	M	H	M	M	M
UCA23I51L	Internship - 2	H	H	M	H	M	L	L	L	M	M	M	H	M	M	M
UCA23I71L	Internship - 3	H	H	M	M	H	H	H	M	M	M	L	H	H	M	M
UCA23M61L	Mini Project	H	H	M	H	M	L	L	L	M	M	M	H	M	M	M
UCA23P71L	Project Phase-I	H	H	M	H	M	L	L	L	M	M	M	H	M	M	M
UCA23P81L	Project Phase-II	H	H	M	M	H	H	H	M	M	M	L	H	H	M	M
ULT23G01J	Tamil-I	H	M	H	H	H	H	M	H	H	M	H	H	M	H	H
ULH23G01J	Hindi-I	H	H	H	H	H	H	M	H	H	H	H	H	M	H	H
ULF23G01J	French – I	H	H	H	M	H	H	M	H	H	H	H	H	M	H	H
ULT23G02J	Tamil-II	H	M	H	H	H	H	M	H	H	M	H	H	M	H	H
ULH23G02J	Hindi-II	H	H	H	H	H	H	M	H	H	H	H	H	M	H	H
ULF23G02J	French – II	H	H	M	H	H	H	H	H	M	H	H	H	M	H	H
ULT23AE01J	Applied Tamil-I	H	M	H	H	H	H	M	H	H	M	H	H	M	H	H
ULH23AE01J	Applied Hindi-I	H	H	H	H	H	H	M	H	H	H	H	H	M	H	H
ULF23AE01J	French for specific purpose-I	H	H	H	H	H	H	M	H	H	H	H	H	H	H	H
ULT23AE02J	Applied Tamil-II	H	M	H	H	H	H	M	H	H	M	H	H	M	H	H
ULH23AE02J	Applied Hindi-II	H	H	H	H	H	H	M	H	H	H	H	H	M	H	H
ULF23AE02J	French for specific purpose-II	H	H	M	H	H	H	H	H	M	H	H	H	M	H	H

UMS23C01T	Discrete Mathematical Structures	H	H	M	H	M	L	L	L	M	M	M	H	M	M	M
UMS23C02T	Mathematical Foundation	H	H	M	H	M	L	M	M	L	L	M	H	M	L	M
UMS23C03T	Numerical Methods	H	H	M	H	M	L	M	M	L	L	M	H	M	L	M
UMS23C04T	Resource Management Techniques	H	H	M	M	H	H	H	M	M	M	L	H	H	M	M
ULE23AE1T	English	H	H	M	M	L	L	L	L	L	L	L	H	M	M	M
UES23AE1T	Environmental Studies	H	H	M	M	M	L	M	M	L	M	L	H	M	M	L
UCD23S01L	Quantitative Aptitude and Logical Reasoning	H	M	M	M	M	L	M	L	M	M	L	H	H	H	H
UCD23S02L	Verbal Ability and Skill Development	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23S03J	Web Programming	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23S04J	Go Programming	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23S05J	Lua Programming	H	H	M	H	M	L	M	M	L	L	M	H	M	L	M
UCD23V01T	Universal Human Values – Understanding Harmony and Ethical Human Conduct	H	H	M	H	M	L	L	L	M	M	M	H	M	M	M
UEN23VA1T	Communication Skills	H	H	H	H	M	L	L	L	M	L	M	H	L	H	L
UCD23V02L	Industry Oriented Employability Skills for Science	H	H	M	H	M	L	M	M	L	L	M	H	M	L	M
UCD23V05L	Career Readiness and Professional Skills	H	H	M	M	H	H	H	M	M	M	L	H	H	M	M
UNS20201L	NSS	H	H	M	M	L	L	L	L	L	L	L	H	M	M	M
UNC20201L	NCC	H	H	M	M	L	L	L	L	L	L	L	H	M	M	M
UNO20201L	NSO	H	H	M	M	L	L	L	L	L	L	L	H	M	M	M
UYG20201L	YOGA	H	H	M	M	L	L	L	L	L	L	L	H	M	M	M
UMI23S01L	My India Project	H	H	M	M	M	L	L	L	M	M	M	M	M	M	M
UCA23D01J	Windows Programming using VB.NET	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23D02J	Data Analysis using R	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23D03J	Web development using Angular JS and Mongo	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23D04J	Introduction to Animation	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23D05J	Introduction to Computer Vision	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23D06J	Programming Using C#	H	H	M	H	M	L	L	L	M	M	M	H	M	M	M
UCA23D07J	Web development using Node JS and MongoDB	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23D08J	Cyber Security	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23D09J	Block chain Technology	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23D10J	Internet of Things	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA23D11J	E-Commerce	H	H	M	M	M	L	L	L	M	M	M	M	M	M	M
UCA20D12J	IOS	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
UCA20D13J	Artificial Intelligence	H	H	M	H	H	H	L	L	L	H	L	H	M	M	M
	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	<i>Nil</i>	Co-requisite Courses	<i>Nil</i>	Progressive Courses	<i>Nil</i>
Course Offering Department	<i>Tamil</i>	Data Book / Codes/Standards	<i>Nil</i>		

Course Learning Rationale (CLR):	<i>The purpose of learning this course is to:</i>	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	மரபிலிருந்து மாற்றம் பெற்ற புதுக்கவிதை மரபின் சிந்தனைகளை அறியச் செய்தல்	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	புதுக்கவிதையின் வழி மனித வாழ்வியல் விழுமியங்களைத் தெரியச் செய்தல்																		
CLR-3 :	சிற்றிலக்கியங்கள், காப்பியங்கள் கற்பிக்கும் தமிழ்ச் சமூகத்தின் வாழ்வியலை அறியச் செய்தல்																		
CLR-4 :	நவீன தமிழ் இலக்கிய வளர்ச்சி வரலாற்றைப் புரியச் செய்தல்																		
CLR-5 :	மொழிப் பயிற்சி வழி மொழியின் பல்வேறு நுட்பங்களைத் தெரியச் செய்தல்																		

Course Learning Outcomes (CLO):	<i>At the end of this course, learners will be able to:</i>	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 :	புதுக்கவிதை உருவாக்கித் தந்த புதிய சிந்தனைக் களங்களை அறிந்துகொள்ளுதல்	2	75	60	H	L	H	M	H	H	L	M	H	M	L	H	-	-	-
LLO-2 :	நவீன கவிதைகள் வழி மாற்றம் பெற்று வரும் மானுட விழுமியங்களைத் தெரிந்துகொள்ளுதல்	2	80	70	H	M	H	L	M	H	L	H	M	L	H	H	-	-	-
CLO-3 :	தமிழ்ச்சமூகத்தின் இடைக்கால வாழ்வியல் முறைகளை உணர்ந்துகொள்ளுதல்	2	70	65	H	L	H	M	H	H	M	H	L	H	M	H	-	-	-
CLO-4 :	நவீன இலக்கிய வரலாறு வழி தமிழ்க் கல்வி வரலாறு, சமூக வரலாறு பெற்ற வளர்ச்சி நிலைகளைத் தெரிந்துகொள்ளுதல்	2	70	70	H	M	H	L	H	M	M	H	H	L	H	H	-	-	-
CLO-5 :	மொழியின் நுட்பங்களை அறிந்து மொழி ஆளுமையோடு செயல்பட அறிந்துகொள்ளுதல்	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	தமிழ் இலக்கியத்தின் வளர்ச்சிப் போக்குகள்	நவீன கவிதை தோற்றம்	தமிழரின் வீரமரபு	சிற்றிலக்கியத் தோற்றம்	தமிழ் உரைநடை மரபில் உ.வே.சா.
	SLO-2	இலக்கிய உத்திகள்	நவீன கவிதை வரலாறு	போர் விழுமியங்கள்	சிற்றிலக்கிய வகைமை	ராஜ வைத்தியம்
S-2	SLO-1	தமிழ்க் கவிதை மரபு	நவீன கவிதை செல்நெறிகள்	பரணி அறிமுகம்	சிற்றிலக்கியங்கள்	வைத்தியர்களின் சிறப்பு
	SLO-2	காலந்தோறும் கவிதையின் கரு	செல்நெறிகளில் கோட்பாடுகள்	பரணி இலக்கியங்கள்	முதன்மைச் சிற்றிலக்கியங்கள் –	கழனியூரன் – அறிமுகம்
S-3	SLO-1	காலந்தோறும் கவிதையின் கட்டமைப்பு	கவிதை மொழி	கலிங்கத்துப்பரணி 477,490	பிள்ளைத்தமிழ் -உலா - தூது	சிறுதெய்வ வழிபாடு
	SLO-2	தற்கால இலக்கியம்	நவீன கவி ஆளுமைகள்	தலைவனின் வீரம்	புதுக்கவிதையில் சமூகம்	பொன் காத்த ஐயனார்
S-4	SLO-1	புதுக்கவிதை உருவாக்கம்	பெண் கவிஞர்கள்	தமிழ் இலக்கிய மரபில் தூது	புதுக்கவிதையும் இதழ்களும்	விருந்து – கள்ளர் செயல்கள்
	SLO-2	புதுக்கவிதை வளர்ச்சிநெறிகள்	கவிதையில் நாட்டுப்புற வடிவம்	தூது இலக்கியங்கள்	மணிக்கொடி இதழ்	பிழை நீக்கி எழுதுதல்
S-5	SLO-1	பாரதியார் – புதுக்கவிதையின் அடையாளம்	இளம்பிறை – அம்மா	தமிழ் விடு தூது (184 – 186)	எழுத்து இதழ்	எழுத்துப் பிழை
	SLO-2	பாரதியார் பன்முக ஆளுமைத்திறன்	பெண்களின் கல்வி நிலை	தமிழின் பெருமை	வானம்பாடி இதழ்	தொடர்பிழை
S-6	SLO-1	பாரத தேசம்	பெண் அடக்குமுறை	செய்யுள் மரபில் கலம்பகம்	சிறுகதை தோற்றம்	உயர்திணை, அஃறிணை
	SLO-2	பாரததேசத்தின் வளம்	ப. கல்பனா – கீறல் விழுந்த மாலைக் காலங்கள்	கலம்பக இலக்கியங்கள்	சிறுகதை வளர்ச்சி	பிறமொழிச் சொற்கள் வரலாறு
S-7	SLO-1	வெள்ளிப் பனிமலையின் மீதுலவுவோம்...	ஆண் பெண் சமத்துவம்	நந்திக் கலம்பகம்-வானூறு மதியை (110)	சிறுகதை – வரலாறு	பிறமொழிச் சொற்களை நீக்கி எழுதுதல்
	SLO-2	20 ஆம் நூற்றாண்டுக் கவிதை மரபில் பாரதிதாசன்	விளிம்புநிலை வாழ்வியல்	கையறுநிலை	சிறுகதை ஆசிரியர்கள்	ஷ, ஜ, ஸ, ஹ மாற்றொலிகள்
S-8	SLO-1	பாரதிதாசன் - அழகின் சிரிப்பு	திருநங்கை குணவதி - சமூகப்பார்வை	குறவஞ்சி அறிமுகம்	இதழ்களும் சிறுகதையும்	தமிழ் இலக்கண நுட்பங்கள்
	SLO-2	ஆல் - ஆயிரம் கிளைகள் கொண்ட அடிமரம்	திருநார்களும் சாதனைகளும்	குறவஞ்சி இலக்கியங்கள்	புதினம் தோற்றம்	இலக்கணமும் பயன்பாடும்
S-9	SLO-1	இயற்கையின் அழகியல்	புலம்பெயர் வாழ்வியல்	குற்றாலக் குறவஞ்சி – ஆடுமர வீனுமணி (3)	தொடக்கக்காலப் புதினங்கள்	தமிழில் சொல் வகைகள்
	SLO-2	வானம்பாடியில் மு.மேத்தா	ஸர்மிளா ஸெய்யித் – புராதன ஊர்	மலையும் வாழ்வும்	புதினம் வளர்ச்சி	சொல்லும் பயன்பாடும்

S-10	SLO-1	மு.மேத்தா - கவிதையின் தனித்தன்மைகள்	புலம் பெயர் வாழ்வின் வலியும் நம்பிக்கையும்	காப்பிய இலக்கணம்	புதினத்தின் வகைமை	பெயர்ச்சொற்கள்
	SLO-2	மனிதனைத்தேடி - கவிதை	காலந்தோறும் கவிதை வடிவில் மாற்றங்கள்	காப்பிய வகைமைகள்	புதின ஆசிரியர்கள்	பெயர்ச்சொற்கள் அறிதல்
S-11	SLO-1	மனிதநேயம்	ஹைக்கூ, லிமரைக்கூ, சென்ரியூ - தேர்ந்தெடுத்த கவிதைகள்	சிலப்பதிகாரம் - அறிமுகம்	தமிழ் இலக்கியத்தில் உரைநடைக்கூறுகள்	வினைச்சொற்கள்
	SLO-2	தமிழ்க் கவிதையில் சுற்றுச்சூழலியல்	ஹைக்கூ - மு.முருகேஷ்	கட்டுரைக்காதை	உரைநடையின் தோற்றம்	வினைச்சொற்கள் அறிதல்
S-12	SLO-1	பழனிபாரதியின் காடு	லிமரைக்கூ - ஈரோடு தமிழன்பன்	ஊழ்வினை	தமிழில் உரைநடை	தமிழில் பெயரடை, வினையடை
	SLO-2	இயற்கையும் சமூக சமத்துவ வாழ்வியலும்	சென்ரியூ - மாமதயானை	கோவலனின் முற்பிறப்பு வரலாறு	உரைநடை வளர்த்த அறிஞர்கள்	பெயரடை, வினையடை அறிதல்

Learning Resources	1.	முல்லைக்காடு, தொகுப்பும் பதிப்பும் - தமிழ்த்துறை ஆசிரியர்கள், எஸ்.ஆர்.எம். அறிவியல் மற்றும் தொழில்நுட்பக் கல்விநிறுவனம், காட்டாங்குளத்தூர், 603203, 2023
	2.	வல்லிக்கண்ணன், புதுக்கவிதை தோற்றமும் வளர்ச்சியும், ஆழி பதிப்பகம், சென்னை, 2018
	3.	கா. சிவத்தம்பி, தமிழில் சிறுகதை தோற்றமும் வளர்ச்சியும், என்.சி.பி.எச்., சென்னை, 2013
	4.	தமிழ் இணையக் கல்விக்கழகம் - http://www.tamilvu.org/
	5.	மதுரை தமிழ் இலக்கிய மின் தொகுப்புத் திட்டம் - 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	ULH23G01T	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	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	PSO -1	PSO -2	PSO-3
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:																		
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	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	TATWA	PRAKAR
	SLO-2	KAHANI KA MAHATVA	UDDESHYA	UDDESHYA	PRAKAR	MAHATVA
S-4	SLO-1	PAIKSHA- 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	VISHLESHAN	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	LEKHAK 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	LEKHAK PARICHAY	LEKHAK 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	LALCH 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	LEKHAK 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	2	3	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																						
CLR-3 :	Make them learn the basic rules of French Grammar.																						
CLR-4 :	Develop strategies of comprehension of texts of different origin																						
CLR-5 :	Strengthen the language of the students both in oral and written																						
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 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	85	75	H	H	L	M	H	M	L	H	M	M	H	H	-	-	-
CLO-4 :	To interpret the French language into other language					2	75	80	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		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	<i>Mots et Expressions</i>
	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)	<i>Grammaire.</i>
	SLO-2	Les exemples	Les exemples	Demander des informations personnelles	Les activités	Les exemples
S-11	SLO-1	Les activités	Communication	C'est qui ?	<i>Il y a</i>	Les activités
	SLO-2	Les nombres	Les activités	Qu'est-ce qu'ils font ?	Les activités	<i>Communication</i>
S-12	SLO-1	intonation et <i>est-ce que</i>	<i>Les verbes du ER –groupe</i>	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 (5%)#			
		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:	Learning	Program Learning Outcomes (PLO)
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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:	1	2	3
		Level of	Expected	Expected
CLO-1 :	Analyze different literary texts to identify the representation of issues related to gender, and class	2	75	60
CLO-2 :	Apply critical thinking skills to analyze and respond to academic texts.	2	80	70
CLO-3 :	Critically evaluate and discuss contemporary issues through online articles.	2	70	65
CLO-4 :	Refine their general writing skills	2	70	70
CLO-5 :	Improve their language application skills	2	80	70

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fundamental	Application of	Link with	Procedural	Skills in	Ability to Utilize	Skills in	Analyze,	Investigative	Problem Solving	Communication	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.	Reflecting the learning. -Review writing
	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	Choosing the subject for reviewing.
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.	Planning to choose.
	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	Understand the review process how effectively a review of any work can be done.
S-3 – S-4	SLO-1	Reading and recitation of the poem Phallus I cut.	Introduction to the writer Haruki Murakami.	Correction of errors- attempting to translate.	Introducing Content writing in Social Media- the importance of content writing.	Introducing the students to the review of 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- Fill 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.aptitudetests.org/verbal-reasoning-test 6. https://www.assessmentday.co.uk/aptitudetests_verbal.htm
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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 Understand	10%	10%	30%	15%
Level 2	Apply Analyze	50%	50%	40%	50%
Level 3	Evaluate Create	40%	40%	30%	35%
	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
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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	1. Dr. Dr. Shanthichitra, Associate Professor, & Head, Department of English, FSH,SRMIST 2. Dr Anchal Sharma, Prof & Hod EFL SRMIST NCR Campus 3. Dr T Sridevi, Assistant Professor English, FSH Ramapuram SRM 4. Dr Shanmuga Priya, Assistant Professor SRMIST Trichirapalli Campus

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		

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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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
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: sprint, 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					
S-13	SLO-1	Constants, Keywords	while loop	Accessing members of the structure	Function and call by reference	Processor Directives
	SLO-2	Literals, Bitwise and sizeof operator	do while	Structure and arrays	Functions and Returning array(use of pointers)	Predefined macros and macros
S-14	SLO-1	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
	SLO-2	Storage clauses, Increment and decrement operator	Understanding jump statements with branch and iterative statements	Nested structures	Incrementing Pointers, Constant Pointers	Processor Directives

S-15	SLO-1	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
	SLO-2	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
S 16-18	SLO-1	Lab 3: Data Types	Lab 6: Arrays – One Dimensional	Lab 9: Functions	Lab 12: Pointers	Lab 15: Creating Macros
	SLO-2					

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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, 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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
CLR-1 :	To learn the concepts of basics of Digital Logics	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To impart in-depth knowledge of Logic Gates	Level of Thinking	Expected	Expected	Engineering	Problem Analysis	Design & Analysis, Design, Modern Tool Usage	Society & Culture	Environment & Ethics	Individual & Team	Communication	Project Mgt. & Life Long Learning	PSO - 1	PSO - 2	PSO - 3	H	M	H	-
CLR-3 :	Understand the principles of Boolean Algebra																		
CLR-4 :	Basic knowledge of Combinational Circuits and it Applications																		
CLR-5 :	Basic knowledge of sequential Circuits and it Applications																		
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Have a thorough Understanding of the Fundamentals of Digital Logic and it Fundamentals	3	80	70	H	M	H	-	-	-	-	H	H	-	L	M	M	M	M
CLO-2 :	Understand the concepts of logic gates and its uses	3	85	75	H	M	H	M	H	-	-	-	M	M	-	L	M	M	M
CLO-3 :	Real time applications of Boolean Algebra	3	75	70	M	H	H	M	H	-	-	-	M	M	-	L	M	M	M
CLO-4 :	Design and implementation knowledge of Combinational Circuits	3	85	80	M	H	H	-	H	-	-	-	M	M	-	L	M	M	M
CLO-5 :	Design and implementation knowledge of Sequential Circuits	3	85	75	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
	SLO-2	Base conversions	Sum of Products	Designing of a Logic Circuit Diagram	Latches
S-2	SLO-1	Binary codes and its types	Product of Sums methods	Adders : Quarter, Half and Full Adders	Flip Flops - Introduction
	SLO-2	Code conversions	Conversions of SOP to POS	Subtractors: Half, Full Subtractors	RS Flip Flop
S-3	SLO-1	Basics of Logic Gates and Derived Gates	Simplifying Boolean Expressions using theorems	Design of Adder Circuits	JK Flip Flop
	SLO-2	Truth Tables	Derivation of a Boolean Functions	Design of Subtractor Circuits	D Flip Flop
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
	SLO-2				Lab 13: Ring Counters

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, Digital Logic Fundamentals, Margham Publications, 2005	3. Leach.D.P&Malvino.A.P, (2002), "Digital Principles and Applications", Fifth Edition, TM.
	2. Vijayendran. V, (2003), "Digital Fundamentals", S.V. Publishers	4. MorisMano.M,(2001), "Digital Logic and Computer Design", 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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	MR.M.RAMESH

Course Code	UMS23G101T	Course Name	DISCRETE MATHEMATICAL STRUCTURES				Course Category	G	Generic Elective										L	T	P	C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

CLO-2 :	Understand the concepts of Graphs terminology Sub graphs, Acyclic, Euler path, Hamiltonian Path	3	80	75
CLO-3 :	Logical knowledge through the Statements, connectives, arguments, validity of arguments and Normal forms using truth tables	3	85	80
CLO-4 :	Gain the knowledge about Trees , Labeled Trees, Binary trees ,Rooted Trees , Spanning Trees Minimal Spanning Trees	3	85	80
CLO-5 :	Apply the concepts of Boolean Algebra in real world problems related to Computer Science	3	85	80

H	H	M	M	H	M	M	M	L	L	L	-M	L	L	L
H	H	L	M	M	M	M	M	L	L	H	-M	L	L	L
M	H	H	M	L	M	M	M	L	L	H	-M	L	L	L
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	<i>Simple Problems</i>	Basic properties of Trees	Relation concepts
	SLO-2	Problems using Venn diagrams	<i>Symbolic representation</i>	Drawings of Graphs	properties of Trees	
S-3	SLO-1		Connectives explanation .	Special Families of Graphs	Labeled Trees	Simple problems
	SLO-2		conjunction, disjunction, negation	<i>Simple Problems</i>	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 using Truth Tables	<i>Simple Problems</i>	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	<i>Problems using</i>	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	<i>Simple Problems</i>	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	<i>Simple Problems</i>	Simple problems	Problems using the postulates of BooleanAlgebra
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	<i>Problems using Graphs</i>	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 functions Simple 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	<i>Problems using Hamiltonian Path</i>	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. <i>Discrete Mathematics with Graph Theory and Combinatorics</i> by T.Veerajan, McGraw Hill Education(India) Pvt Limited, 2007 2. <i>Dr. A. Singaravelu, Allied Mathematics, 7th edition, A. R. Publications, 2015.</i>					
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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

Course Code	UCD23S01L	Course Name	Quantitative Aptitude and Logical Reasoning	Course Category	S	Skill Enhancement Course				
						L	T	P	0	C
						0	0	2	2	1

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 :	Demonstrate various principles involved in solving mathematical concepts			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Critically evaluate basic mathematical concepts related to profit, loss, interest calculations, average and interpret data			Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-3 :	Enable students to understand reasoning skills																				
CLR-4 :	Use the basic mechanics of Grammar																				
CLR-5 :	Acquire time management skills and expose students to the requirements of the job market																				
CLR-6 :	Create awareness in students regarding the various concepts in quantitative aptitude and reasoning skills and also their importance in various competitive exams																				
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:		3	80	70	M	H	M	M	M	H	L	M	M	H	M	M	L	L	M
CLO-1 :	Understand the concepts of LCM, HCF, ratio and proportions, percentages and approach questions in a simpler and innovative method			3	80	75	M	H	M	M	M	H	L	M	M	H	M	M	L	L	M
CLO-2 :	Develop, solve, analyze, and use simple mathematical models that are relevant to daily life.			3	85	70	M	H	M	M	M	H	L	M	M	H	M	M	L	L	M
CLO-3 :	Solve problems on reasoning			3	85	80	M	M	M	M	M	M	L	M	M	M	H	M	L	H	H
CLO-4 :	Understand the different parts of speech and use them in sentences appropriately			3	85	75	M	M	M	M	M	M	L	M	M	M	H	M	L	H	H
CLO-5 :	Instill confidence in students and develop skills necessary to face the audience			3	85	75	M	M	M	M	M	M	L	M	M	M	H	M	L	H	H
CLO-6 :	Help students to take a variety of competitive exams			3	80	70	M	H	M	M	M	H	L	M	M	H	M	M	L	L	M

Duration (hour)		6	6	6	6	6
S-1	SLO-1	Speed Maths and Simplification	Profit and Loss-Introduction	Number Series	Most Logical Choice	Self-Introduction - Introduction
	SLO-2	Simplification Techniques and Tricks	Profit and Loss- Basic Problems	Number Series – Solving Problems	Most Logical Choice – solving problems	Self-Introduction - Session 1
S-2	SLO-1	Divisibility	Simple Interest-Introduction, Formulas &Problems	Word Series	Logical Order	Self-Introduction - Session 2
	SLO-2	Power cycle, Reminder cycle	Compound Interest-Introduction, Formulas &Problems	Word Series – Solving Problems	Logical Order – tips and tricks	Self-Introduction - Session 3
S-3	SLO-1	Problems On H.C.F and L.C.M	Averages-Introduction& Basics	Odd man out	Synonyms	Self-Introduction - Session 4
	SLO-2	Problems On H.C.F and L.C.M Solving problems	Averages-Tricky Problems	Missing number and wrong number	Antonyms	Self-Introduction - Session 5
S-4	SLO-1	Linear and Simultaneous Equation	Algebra –Introduction	Image Based Problems- Introduction	Essential Part	Self-Introduction - Session 6

	SLO-2	Linear and Simultaneous Equation – solving problems	Algebraic Expressions Concepts	Image Based Solving Problems	Parts of Speech - Worksheets	Self-Introduction - Session 7
S-5	SLO-1	Ratio and Proportions-Introduction	Data Interpretation – Bar chart, Pie Chart	Inequalities	Spotting Error	Basics of Written Communication
	SLO-2	Ratio and Proportions-Basics Problems	Data Interpretation – Table, Line Graph	Inequalities - methods	Spotting Error –Concord, Prepositional usage, Usage of Articles	Basics of Written Communication Methods
S-6	SLO-1	Percentage -Introduction	Quadratic Equations	Coding – Decoding-Introduction	Sentence Correction – Vocabulary based	Time Management Skills
	SLO-2	Percentage- Basic problems	Quadratic Equations – Formulas and Methods	Coding – Decoding-Different types	Sentence Correction – Grammar Based	Time Management Skills - Activity

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. Archana Ram, PlaceMentor: Tests of Aptitude for Placement Readiness, Oxford University Press, Oxford, 2018 4. Edgar Thrope, Test of Reasoning for Competitive Examinations, Tata McGraw Hill, 6th Edition 5. Singh O.P., Art of Effective Communication in Group Discussion and Interview, S Chand & Company, 2014 6. Bhatnagar R P, English for Competitive Examinations, 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, FSH, SRMIST
		Ms. Deepalakshmi S, Assistant Professor, Department of Career Guidance, FSH, SRMIST

Course Code	UCD23V01T	Course Name	Universal Human Values – Understanding Harmony and Ethical Human Conduct	Course Category	V	Value Addition Course	L	T	P	0	C
							2	0	0	2	2

Pre-requisite Courses	<i>Nil</i>	Co-requisite Courses	<i>Nil</i>	Progressive Courses	<i>Nil</i>
Course Offering Department	<i>Career Guidance Cell</i>	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	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 :	Help students initiate a process of dialog within themselves to know what they really want to be' in their life and profession.																						
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	M	M	H	M	M	M	M	L	L	M	L	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	M	M	H	M	M	M	M	L	L	M	L	M	H	H
CLO-3 :	Analyze the value of harmonious relationship based on trust and respect in their life and profession		3	85	70				M	M	M	H	M	M	M	M	L	L	M	L	M	H	H
CLO-4 :	Examine the role of a human being in ensuring harmony in society and nature.		3	85	80				M	M	M	H	M	M	M	M	L	L	M	L	M	H	H
CLO-5 :	Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.		3	85	75				M	M	M	H	M	M	M	M	L	L	M	L	M	H	H

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

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
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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. 2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.	3. A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak. 4. A N Tripathy, 2003, Human Values, New Age International Publishers.
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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%)#
		Practice	Practice	Practice	Practice
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, FSH, SRMIST
		Dr. Sweetly 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 :	சங்க இலக்கியங்கள் வழி தொன்மை அக, புற வாழ்வியலை அறியச் செய்தல்	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	தமிழ்ச்சமூகத்தின் அறவியல் குறித்து தெரியச் செய்தல்																		
CLR-3 :	பக்தி இலக்கியங்கள் போதித்த மனித மாண்புகளை உணரச் செய்தல்																		
CLR-4 :	பண்டைத் தமிழ்ச்சமூகத்தின் தொல் இலக்கியங்கள் வளர்ச்சி பெற்ற வரலாற்றைப் புரியச் செய்தல்																		
CLR-5 :	சிறுகதைகள் சொல்லும் வாழ்வியல் நெறி, மொழியின் நுட்பங்கள் ஆகியவற்றைத் தெரியச் செய்தல்																		

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 :	பண்டைத் தமிழ்ச் சமூகத்தின் அக, புற வாழ்வியல் இன்றைய சமூக மேம்பாட்டிற்கு வழிகாட்டி நிற்பதை அறிந்துகொள்ளுதல்	2	75	60	H	L	H	M	H	H	L	M	H	M	L	H	-	-	-
CLO-2 :	தமிழ்ச் சமூகம் அறத்தை வலியுறுத்திய சமூகம் என்பதன் வழி மானுட அறத்தைத் தெரிந்துகொள்ளுதல்	2	80	70	H	M	H	L	M	H	L	H	M	L	H	H	-	-	-
CLO-3 :	பக்தி இலக்கியம் மூலம் இறைத் தத்துவங்களை அறிந்து மானுட ஒற்றுமை மேம்பாட்டை அறிந்துகொள்ளுதல்	2	70	65	H	L	H	M	H	H	M	H	L	H	M	H	-	-	-
CLO-4 :	தொல் தமிழ்ச்சமூகம் இலக்கியம், அரசியல், அறம், பக்தி ஆகியவற்றில் தழைத்தோங்கியதைத் தெரிந்துகொள்ளுதல்	2	70	70	H	M	H	L	H	M	M	H	H	L	H	H	-	-	-
CLO-5 :	வாழ்வியலின் நெறிகளைச் சொல்லும் கதைகளைப் படைக்கும் திறனோடு மொழி ஆளுமையையும் அறிந்துகொள்ளுதல்	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	காலந்தோறும் தமிழ் அகத்திணை மரபு	சங்க மருவிய காலம்	பல்லவர் காலம்	பண்டைக்காலத் தமிழகம்	தமிழ்ச் சிறுகதைப் போக்குகள்
	SLO-2	அக இலக்கியத்தின் கட்டமைப்பு/ உள்ளடக்கம்	அறமும் வாழ்வியலும்	பல்லவர் கால இலக்கியங்கள்	சங்ககால மக்களின் வாழ்வியல்	தமிழ்ச் சிறுகதையும் தமிழ்ச் சமூக வாழ்வியலும்
S-2	SLO-1	எட்டுத்தொகை நூல்களும் பகுப்புமுறையும்	உலகப்பொதுமறை - திருக்குறள்	பக்தியும் தமிழும்	முச்சங்கம் – அறிமுகம்	புதுமைப்பித்தன் - சங்குத்தேவனின் தர்மம்
	SLO-2	ஐங்குறுநூறு (375)	திருக்குறளின் கட்டமைப்பு	பக்தி இலக்கியத் தோற்ற நிலை	முச்சங்க வரலாறு	கள்வனின் தர்மம்
S-3	SLO-1	உடன்போக்கும் நற்றாய் புலம்பலும்	திருக்குறள் வான்சிறப்பு (2)	சைவ சமய இலக்கியங்கள்	பத்துப்பாட்டும் எட்டுத் தொகையும்	ந.பிச்சமூர்த்தி – வேப்பமரம்
	SLO-2	ஐங்குறுநூறு (391)	மழையும் வாழ்வும்	சைவக்குரவர் நால்வர்	சங்க கால மக்களின் வாழ்வியல்	மரபும் நம்பிக்கைகளும்
S-4	SLO-1	உடன் போக்கும் தமிழர் பறவையியல் அறிவும்	திருக்குறள் – புலவி நுணுக்கம்	தேவாரம் – திருஞான சம்பந்தர் - பாடல் – 2834	எட்டுத்தொகை நூல்களின் வரலாறு	தமிழருவி மணியன் – ஒற்றைச் சிறகு
	SLO-2	குறுந்தொகை (02)	ஊடலின் அழகியல்	தேவாரம் – திருநாவுக்கரசர் – பாடல் - 4262	எட்டுத்தொகை நூல்களின் கட்டமைப்பு	உறவின் மேன்மை
S-5	SLO-1	இயற்கைப் புணர்ச்சியும் தலைவி நலம் பாராட்டலும்	நீதி இலக்கியங்கள்	திருவாசகம் அறிமுகம்	பத்துப்பாட்டு நூல்களின் வரலாறு	ஆர். சூடாமணி – மூடநம்பிக்கை
	SLO-2	குறுந்தொகை (03)	நாலடியார்	மாணிக்கவாசகர் பாடல் - ஆனந்த பரவசம் – பாடல் 10	பத்துப்பாட்டும் தமிழர் வாழ்வியலும்	சமூகத்தில் மூடநம்பிக்கைகள்
S-6	SLO-1	தலைவனின் மேன்மைத் தன்மையும் இயற்கையும்	வைகலும் - பாடல் (39)	வைணவ சமயம்	பதினெண் கீழ்க்கணக்கு நூல்கள்	மூடநம்பிக்கைகளின் சிக்கல்கள்
	SLO-2	அகநானூறு (238)	நிலையாமையும் அறமும்	வைணவ சமய வளர்ச்சிப்போக்கு	பதினெண் கீழ்க்கணக்கும் தமிழர் அற மரபும்	கிருஷ்ணா டாவின்ஸி – காலா அருகே வாடா

S-7	SLO-1	இயற்கையும் அகவாழ்வுச் சித்திரிப்பும்	தமிழர் மருத்துவம்	நாலாயிரத் திவ்யப் பிரபந்தம்	நீதி இலக்கியங்கள்	மனித வாழ்வில் மருத்துவம்
	SLO-2	நள்ளியின் கொடைத்திறம்	நீதி இலக்கியத்தில் மருந்து நூல்கள்	குலசேகராவார் பாடல் - 678	நீதி இலக்கியங்களின் பன்முகத் தன்மைகள்	பாரம்பரிய மருத்துவம்
S-8	SLO-1	கலித்தொகைப் பாடல் -(11)	சிறுபஞ்சமூலம் (64)	ஆண்டாள் பாடல் - 574.	காப்பிய இலக்கணம்	மொழிப்பயிற்சி
	SLO-2	அறம் பொருள் இன்பம் சிறப்பு	ஈகையின் சிறப்பு	திருமழிசை ஆழ்வார் பாடல் - கணிகண்ணன்	காப்பியத்தின் போக்குகள்	சொற்களை உருவாக்குதல்
S-9	SLO-1	சூழலியலும் மனித வாழ்வும்	பழமொழி நானூறு அறிமுகம்	தமிழில் இஸ்லாமிய இலக்கியங்கள்	காப்பியங்களின் வகைமை	எழுத்துகளில் இருந்து சொற்களைக் கண்டுபிடித்தல்
	SLO-2	தமிழர் புறமரபு	பழமொழி நானூறு - தனித்தன்மைகள்	இஸ்லாமிய இலக்கியங்களின் கொடை	ஐம்பெருங்காப்பியங் களின் தனித்தன்மைகள்	படம் பார்த்துக் கதை எழுதுதல்
S-10	SLO-1	புறநானூறு (107) பாரியும் மாரியும்	பழமொழி நானூறு (184)	சீறாப்புராணத்தின் அமைப்பு	தமிழ்ச் சமூகமும் சமயத் தத்துவங்களும்	படம் பார்த்துக் கவிதை எழுதுதல்
	SLO-2	புறநானூறு (110) பாரியின் வள்ளல் தன்மை	பழமொழியும் அறிவுரையும்	விடமீட்டப் படலம் (10 பாடல்கள்)	சமயத் தத்துவங்களும் வாழ்வியல் விழுமியங்களும்	கற்பனைத்திறன் - வளர்த்தல்
S-11	SLO-1	புறநானூறு (112) கையறுநிலை	பண்டைக்காலப் போரும் வாழ்வும்	கிறித்தவ சமய இலக்கியங்கள்	சைவத் திருமுறை - அறிமுகம்	கற்பனையும் படைப்பும்
	SLO-2	சிறுபாணாற்றுப்படை (84-115)	புற இலக்கியங்கள்	கிறித்தவ இலக்கியங்களின் தமிழ்க் கொடை	பன்னிரு திருமுறை - வரலாறு	தமிழில் வாசகம்
S-12	SLO-1	கடையெழு வள்ளல்களின் சிறப்புகள்	களவழி நாற்பது (40)	கிறித்துவின் அருள்வேட்டல் - திரு.வி.க	நாலாயிரத் திவ்வியப் பிரபந்தம் - அறிமுகம்	விளம்பரத்திற்கு வாசகம் எழுதுதல்
	SLO-2	பட்டினப்பாலை (40- 50) அட்டில் சாலைகளின் நிலை	போர்க்களமும் யானைப்படையும்	அலகிலொளி - 5 பாடல்கள்	வைணவ ஆழ்வார்கள் வரலாறு	வாசகம் எழுது முறைகள்

Learning Resources	1. கொன்றை, தொகுப்பும் பதிப்பும் - தமிழ்த்துறை ஆசிரியர்கள், தமிழ்த்துறை, எஸ்.ஆர்.எம். அறிவியல் மற்றும் தொழில்நுட்பக் கல்விநிறுவனம், காட்டாங்குளத்தூர், 603203, 2023
	2. தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை, 2017
	3. மு. அருணாசலம், தமிழ் இலக்கிய வரலாறு, நூற்றாண்டு முறை (9ஆம் நூ. முதல் 16 வரை), தி பார்க்கர், சென்னை, 2005
	4. தமிழ் இணையக் கல்விக்கழகம் - http://www.tamilvu.org/
	5. மதுரை தமிழ் இலக்கிய மின் தொகுப்புத் திட்டம் - https://www.projectmadurai.org/

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, Thiruvannmiyur, 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	ULH23G02T	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)																
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 knoeledge through poetry				H		H	H	H	H	M	L	H	H	M	L	L	H	M	-	-	-		
CLR-4 :	Media based understanding for employability				H		H	M	L	H	H	M	H	M	M	H	H	H	H	-	-	-		
CLR-5 :	Job Oriented writing skills				H		H	L	H	M	H	L	H	H	M	H	H	H	-	-	-			
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:				2		75	80	H	H	H	M	L	H	H	M	L	L	H	M	-	-	-
CLO-1 :	To provide a brief Introduction of Hindi poetry(Bhaktikal,Reetikal and Aadhunikkal)				2		80	90	H	H	M	L	H	H	M	L	L	H	M	-	-	-		
CLO-2 :	To Discuss the origin and development of various forms of poetry in Hindi				2		75	95	H	H	M	L	H	H	M	H	M	M	H	H	-	-	-	
CLO-3 :	Focus on Evaluating the social changes through poetry				2		80	90	H	H	L	H	M	H	L	H	H	M	H	H	-	-	-	
CLO-4 :	To Examine Transcreation in advertisement				2		85	90	M	H	M	H	L	H	H	L	H	M	H	H	-	-	-	
CLO-5 :	To guide the students in the learning of the technical aspect of the Hindi Languge,this would help them in the field administration				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	BHAKTI KALIN KAVITA	RITI KALIN KAVITA	ADHUNIK KAVITA	VIGYAPAN	PATRA LEKHAN & PARIBHASHIK SHABDAVALI
	SLO-2	BHAKTIU KALIN KAITA KI AVADHARNA	AVADHARNA	AVADHARNA	AWADHARNA	AVADHARNA
S-2	SLO-1	SWARUP	SWARUP	SWARUP	ARTH	ARTH
	SLO-2	MAHATVA	RITI KAL VIBHAJAN	MAHATVA	PARIBHASHA	SWARUP
S-3	SLO-1	UDDESHYA	MAHATVA	UDDESHYA	SWARUP	PARIBHASHA
	SLO-2	BHAKTIKAL KI PRASANGIKTA	UDDESHYA	MATHLI SHARAN GUPT- NAR HO NA NIRASH KARO MAN KO	VIGYAPAN KE PRAKAR	PRAYOJAN
S-4	SLO-1	DOHE- KABIRDAS	DOHE- BIHARI	KAVI PARICHAYA	VIGYAPAN KI VISHESHTAYEN	PRAYOG
	SLO-2	SANT PARICHAY	KAVI PARICHAYA	KAVITA KA VISLESHAN	VIGYAPAN MANG	MAHATVA
S-5	SLO-1	DOHE KA VISLESHAN	DOHE KA VISLESHAN	ASHAVADI DRISHTIKON	VIGYAPAN KA PRABHAV	PATRALEKHAN KALA
	SLO-2	GURU KA MAHATVA	KANAK KA MAHATVA	SANGHARSH KI AOR PRERNA	VIGYAPAN MAHATVA	PRAKAR
S-6	SLO-1	GURUTVA SE ISHVARATVA KI AOR	VIPRIT SWABHAV KI CHARCHA	SURYAKANT TRIPATHI NIRALA- VAR DE	VIGYAPAN KI BHASHA	VYAKTIGAT PATRA
	SLO-2	GURUTVA SE ISHVARATVA KI AOR	PRAKRITI KA ATAL RUP	KAVI PARICHAYA	VIGYAPAN AUR BAZAR	AUPCHARIK PATRA

S-7	SLO-1	BAHYA ADAMBAR KA VIRODH	YAMAK ALANKAR KA PRAYOG	KAVITA KA VISLESHAN	VIGYAPAN AUR ROZGAR	SARKARI PATRA
	SLO-2	MURTI POOJA KA VIRODH	SNEH KE MAHATVA KI CHARCHA	SARSHWATI KE PATRI SAMARPAN	PRINT VIGYAPAN	ARDHA SARKARI PATRA
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	KARYALYN 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				

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	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 :	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
	SLO-2	Les activités quotidiennes	Les activités	Les exemples	C'est / Il est
S-2	SLO-1	Les exemples	Les adjectifs interrogatifs	Acheter	Le verbe devoir
	SLO-2	Les activités	Les activités	Les exemples	Les activités
S-3	SLO-1	Les moments de la journée	Les prépositions avec les noms géographiques	Les aliments	Le verbe pouvoir
	SLO-2	Les exemples	Les activités	Les exemples	Le verbe savoir
S-4	SLO-1	Les matières scolaires	Les verbes prendre et sortir	Les emballages	Le verbe vouloir
	SLO-2	Les exemples	Les activités	Les exemples	Les sons
S-5	SLO-1	Les activités	Les sons	Les quantités	Demander et dire le prix
	SLO-2	Les loisirs	Les activités	Les exemples	Les activités
S-6	SLO-1	Les exemples	Parler de ses goûts	Les commerces	Faire des achats
	SLO-2	Les activités	Les activités	Les activités	Expliquer une recette de cuisine
S-7	SLO-1	La fréquence	Parler de ses préférences	les commerçants	Les activités
	SLO-2	Les exemples	Les activités	Les exemples	Les courses
S-8	SLO-1	Les activités	Parler de sa routine	L'impératif	Les activités
	SLO-2	Les verbes pronominaux	Les activités	Les activités	Vendre et acheter

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	<i>Très ou beaucoup (de)</i>	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 (5%)#				
		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	T	P	O	C								
											3	0	0	2	3							
Pre-requisite Courses		Nil	Co-requisite Courses		Nil		Progressive Courses		Nil													
Course Offering Department		Computer Applications			Data Book / Codes/Standards		Nil															
Course Learning Rationale (CLR):		The purpose of learning this course is to:			Learning			Program Learning Outcomes (PLO)														
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				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 :	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:																				
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																
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																		
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														Water Conservation				

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 among nations
	SLO-2	Mineral Resources	Aquatic ecosystems (rivers, estuaries, oceans)			
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 Code	USA23201J	Course Name	OBJECT ORIENTED PROGRAMMING	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 Applications	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.	1	2	3	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	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 :	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
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	<i>Lab 7: Inheritance</i>	Lab 10 : Simple file programs	Lab13 :Templates
	SLO -2					
S7	SLO-1	Control Structures	Overloading Concept in OOP	Inheritance : Hierarchical	<i>File Open Modes</i>	Exceptional Handling: Types of exceptional handling
	SLO-2	Examples of Control Structures	Overloading types	<i>Example program</i>	<i>Example program</i>	Exceptional Handling :Try and Catch, Example program
S-8	SLO-1	Functions and types	Function Overloading: Different parameter with same data type	Inheritance : Hybrid	<i>File Pointer Manipulations</i>	Exceptional Handling : Standard exceptions
	SLO-2	Function declaration and definition	Example Program	Example program	<i>Example Program</i>	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	<i>Sequential Input and Output Operations</i>	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	<i>Functions to handle file pointer, Example Program</i>	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	<i>Lab 11 : Working with files</i>	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, <i>Example Program</i>	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 functions Example 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	<i>Lab 9 : Abstract classes and Virtual Functions</i>	<i>Lab 12: command line arguments program</i>	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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Dr.R.Thilagavathy, SRMIST

Course Code	USA23202J	Course Name	<i>Fundamentals of Data Structures and Algorithms</i>	Course Category	C	Discipline Specific Core Courses	L 3	T 0	P 3	OC 2 4
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Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Computer Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
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		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Utilize the different data types; Utilize searching and sorting algorithms	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 :	Utilize linked list in developing applications																			
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 datastructures	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	Bubble sort	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	Quick sort Example	Graph Traversal – DFS, Topological Sorting
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	
S-8	SLO-1	Linear and Non Linear Data Structures	Operations on Queue	Expression trees	Merge sort	
	SLO-2	Operations on data structure	Circular Queue	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 – Kruskals
S-10-12	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 merge sort	Lab 14 : Implementation of shortestpath algorithm
	SLO-2					
S-13	SLO-1	Introduction to lists	Introduction to nonlinear 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
S-16-18	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 Indi, 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. ReemaThareja, (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										
	Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply										
	Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate										
	Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, 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. R. Aruna Rani

Course Code	UCD23S02L	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				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 :	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																					
CLR-6 :	Create awareness in students regarding the various concepts in verbal ability and skill development and also its importance in various competitive exams																					
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																				
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	75	M	H	M	M	M	M	L	M	M	H	M	H	M	M	M
CLO-2 :	Establish a student's interest and awareness in seating arrangements, mathematical operations, logical reasoning				3	85	70	M	M	M	M	M	H	L	M	M	M	H	M	M	M	H
CLO-3 :	Acquire soft skills that will help for applying jobs				3	85	80	M	M	M	M	M	M	L	H	M	H	M	H	M	M	M
CLO-4 :	Demonstrate various principles involved in aptitude problems				3	85	75	M	H	M	M	M	H	L	M	M	M	H	M	M	M	M
CLO-5 :	Ability to solve problems on reasoning and to interpret english language				3	80	70	M	M	M	M	M	H	L	M	M	H	M	H	M	M	M
CLO-6 :	Able to face different competitive exams				3	80	70	M	M	M	M	M	H	L	M	M	H	M	H	M	M	M

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
	SLO-2	Time and Distance – Problems	Seating Arrangements (Circular and table) – Problems	Resume Building	Chain Rule, Pipes and Cistern – Problems
S-2	SLO-1	Time & Work- Introduction	Mathematical Operations – Basic Problems	Group Discussions - Introduction	Data Sufficiency – Introduction
	SLO-2	Time & Work – Problems	Mathematical Operations – Tricky Problems	Group Discussions – Mock GD	Data Sufficiency – Problems
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				

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%	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, FSH, SRMIST
		Dr. Muthu Deepa M, Assistant Professor, Department of Career Guidance, FSH, SRMIST

Course Code	UMS23G201T	Course Name	Mathematical Foundation				Course Category	C	Discipline Specific Core Courses															L	T	P	C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

	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 $L[e^{at} f(t)]$
	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 $L[e^{at} f(t)]$
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 $L[e^{at} f(t)]$
	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 $L[e^{at} f(t)]$
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	<i>Problems on Euler's theorem</i>	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	<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
	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, 7th edition, A.R.S.Publications, 2015</i> 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%)				
		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 (AcademicExpert)	1.Dr.S.LakshmiPriya,SRMIST
2.Dr.M.Vasantha,ICMR,Chennai(IndustrialExpert)	2.Dr.L.Sivakami,SRMIST

Course Code	UEN23VA1L	Course Name	COMMUNICATION SKILLS	Course Category	AE	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.	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-2 :	Improve pronunciation and intonation to enhance clarity and effectiveness in oral communication.																		
CLR-3 :	Expand vocabulary and idiomatic expressions to communicate more accurately and expressively.																		
CLR-4 :	Enhance listening skills to understand and respond appropriately to spoken English in different situations.																		
CLR-5 :	Employ effective communication strategies, such as active listening, summarizing, paraphrasing, and asking clarifying questions, to enhance interpersonal and intercultural communication.																		
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																	
CLO-1 :	Demonstrate improved fluency in spoken English by expressing ideas and thoughts confidently and coherently.	2	75	60	H	M	M	L	-	M	-	M	H	L	H	L	-	-	-
CLO-2 :	Pronounce English words and phrases accurately, using appropriate intonation and stress patterns.	2	80	70	M	H	L	-	-	-	-	M	M	H	H	M	-	-	-
CLO-3 :	Expand and effectively use a range of vocabulary and idiomatic expressions to enhance communication.	2	70	65	M	M	M	-	L	L	-	H	M	H	H	L	-	-	-
CLO-4 :	Understand and comprehend spoken English in various contexts, including informal conversations, lectures, and presentations.	2	70	70	H	M	L	-	M	H	-	-	-	-	H	L	-	-	-
CLO-5 :	Deliver well-structured and engaging oral presentations, incorporating effective body language and visual aids.	2	80	70	H	H	-	M	-	M	-	L	L	M	H	M	-	-	-

Duration (hour)	12	12	12	12	12
S-1	SLO-1	Introduction to Listening Skills.	Introduction to Reading Skills. Discussion of techniques of Reading Skill	Introduction to Speaking Skills. Explaining the importance of phonetics and vocabulary	Introduction to Writing Skills Importance of writing skills
	SLO- 2	Exploring Effective Ways of Listening. Barriers of Listening. Active and Passive Listening.	Identifying common reading problems in students after making them read a few passages.	Explaining the usage of the Oxford Learner's Dictionary to learn phonetics of the words at the fundamental level.	Explaining various forms of writing with examples:. Encouraging the students to share a few of their favourite lines from any sources they have read or sharing a few lines from paditthadhil piditthadhu.
S-2	SLO-1	Introduction to Digital language lab/ usage of mobile applications	Learners are enabled to record their speech and listen to it in order to correct their problematic areas	The right enunciation of certain words to be taught through phonetic representation and decoding the phonetic symbols by learning to use the dictionary..	Introduction to letter writing. Types of letters- Formal and Informal letters with examples. Learning E-mail etiquette.
					Explaining why appreciating texts creates a good reader.

	SLO- 2	Equipping the listening skill of the learners	repetitive practices of reading select paragraphs from web resources, their standard will be measured.	Observe and repeat and learn the phonetic pronunciation of words by practicing continuously.	Class Assignment - write a formal letter and informal letter and check for e-mail etiquettes in writing.	Enabling the students to reflect in the classroom about any of their favourite books/ articles or magazines.
S-3 – S-4	SLO-1	Introducing google podcasts.	The speed, fluency, pronunciation, comprehension of the words in the paragraph	Teaching the usage of Thesaurus to understand and develop various words and improve vocabulary.	Enabling the students to unleash their potentials in creative writing through writing transcripts for advertisements of any product.	Introducing the text of Letters by Mathrubootham published in the Hindu.
	SLO- 2	Task to write down the words from the audio they have listened to. This activity should be done in two steps. 1. Jotting down the words simultaneously as they listen to the speaker. 2. Writing the transcript of the audio through repetitive play and pause.	hints and tricks to follow where the pauses are to be followed.	Identifying common errors in concord, preposition, direct speech and indirect speech.	write a review of any book or a movie or an interview or a debate.	Reading and recitation of the text of the first letter-Enjoy within limits, says Mr. Mathrubootham Understanding characters by analyzing the usage of their style of language
S-5	SLO-1	Imitating the speakers by listening to them and attempting to learn the pronunciation of the words uttered in the audio.	Students group 1- reads – group 2 identifies the flaws in reading.	Identifying common errors in tenses, punctuation, and syntactical errors..	Mechanics of writing like capitalization, punctuation, spelling, correct pronoun, preposition, concord usage can be taught.	Reading of the second letter- Nobel? What Nobel, asks Mr. Mathrubootham.
	SLO- 2	Repetitive listening to enhance pronunciation skills	The roles have to be exchanged between the two groups and the activity should be practiced.	Rectifying the common errors and instructing the learners about the right usage in order to avoid common errors.	mechanics of writing - assessed and evaluated.	Mathrubootham's humour and the language of code 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	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.
S 12	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 from 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, Intermediate English Grammar, Cambridge University Press, 2007			
	4.	R.P. Bhatnagar, English for Competitive Examinations, Trinity Press, 3 rd Edition,2016			
	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
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Course Code	UNS23201L/ UNC23201L UNO23201L/ UYG23201L	Course Name	NSS/NCC/NSO/YOGA	Course Category	EA	Extension Activity	L	T	P	C
							0	0	0	0

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
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	ULT23AE01J	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:*

CLR-1 :	தமிழின் எழுத்து, சொல் வளர்ச்சி வரலாற்றை அறியச் செய்தல்
CLR-2 :	மொழியைப் பிழையின்றி எழுதும் ஆற்றலை அடையச் செய்தல்
CLR-3 :	வாய்மொழி வழக்காறுகளின் நுட்பங்களைத் தெரியச் செய்தல்
CLR-4 :	கடிதம் எழுதும் முறை, கட்டுரை வரையும் முறை அறியச் செய்தல்
CLR-5 :	படைப்பாற்றல் திறனை வளரச் செய்தல்

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	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 :	சொற்களைச் சரியான பொருண்மையில் பயன்படுத்தும் திறன் பெறுதல்
CLO-2 :	மொழியைப் பிழையின்றி எழுதுவதன் வழி மொழி ஆளுமை பெறுதல்
CLO-3 :	வாய்மொழி மரபின் கூறுகள் வழி, மக்களின் வாழ்வியல் விழுமியங்களை அறிந்துகொள்ளுதல்
CLO-4 :	அலுவலகப் பயன்பாடு, திறன் மேம்பாடு ஆகியவற்றை நுட்பமாகத் தெரிந்துகொள்ளுதல்
CLO-5 :	கவிதை, கதை படைக்கும் ஆற்றலை அறிந்துகொள்ளுதல்

Duration (hour)	9	9	9	9	9
S-1	SLO-1	தமிழின் தொன்மை	மெய்யெழுத்துகளின் வகைகள்	வாய்மொழி மரபு, எழுத்து மரபு	தொடர் அமைப்பு
	SLO-2	தமிழின் சிறப்புகள்	மூவினம்	வாய்மொழி மரபில் அனுபவம்	எளிய தொடர்
S-2	SLO-1	கருத்து – பரிமாற்றம்	ஒற்று இடுதல்	வாழ்வியல் தத்துவம்	நெடுந்தொடர்
	SLO-2	பயன்பாட்டுத்தமிழ்	வல்லினம் மிகும் இடங்கள்	பழமொழிகள்	பத்தி எழுதுதல்
S-3	SLO-1	காலந்தோறும் தமிழ்	வல்லினம் மிகா இடங்கள்	பழமொழியும் மனித வாழ்வியலும்	ஒரு பொருளை மையமாகக் கொண்டு எழுதுதல்

	SLO-2	எழுத்துகள் - அறிமுகம்	எழுத்துப்பிழை நீக்கம்	பழமொழியின் வடிவம்	காலந்தோறும் கடிதங்கள்	கவிதைக் களங்கள்
S-4	SLO-1	தமிழ் எழுத்து வரலாறு	பிழை நீக்கி எழுதுதலின் அவசியம்	வட்டார மொழி	தமிழில் கடித இலக்கியம்	கவிதை உள்ளடக்கம்
	SLO-2	எழுத்துகளின் வரிவடிவம்	பிழைகளும் மொழிச் சிக்கல்களும்	வட்டார மொழியில் சொல்வடை	கடித வகைகள்	கவிதை எழுதும் முறை
S-5	SLO-1	எழுத்துகளின் பிறப்பு	எதிர்ச்சொல் வரலாறு	பழமொழியும் சொல்வடையும்	கடிதம் எழுதும்முறை	தன்னுணர்ச்சிக் கவிதை
	SLO-2	உயிர் எழுத்துப் பிறப்பு	எதிர்ச்சொல்லின் உருவாக்கம்	பேச்சுநடையும் சொல்வடையும்	அலுவல் கடிதம்	இயற்கை/ சமூகம் - கவிதை
S-6	SLO-1	மெய்யெழுத்துப் பிறப்பு	இணைச்சொல்லும் எதிர்ச்சொல்லும்	மரபுத்தொடர்	வாழ்த்து/ பாராட்டுக் / நட்புக் கடிதம்	காலந்தோறும் கதைகள்
	SLO-2	மொழி முதல் எழுத்துகள்	தமிழில் எதிர்ச்சொற்கள்	பழமொழி மரபுத் தொடர் வேறுபாடு	கட்டுரை வகைகள்	கதைகளில் கற்பனையும் உண்மையும்
S-7	SLO-1	மொழி இறுதி எழுத்துகள்	ஒரெழுத்து ஒருமொழி - அறிமுகம்	தமிழில் மரபுத்தொடர்	கட்டுரை எழுதும் முறை	வாய்மொழிக் கதை
	SLO-2	எழுத்து வேறுபாடும் பொருளும்	ஒரெழுத்து ஒருமொழியும் பொருளும்	விடுகதை	கட்டுரைக் களங்கள்	ஒரு பக்கக் கதை
S-8	SLO-1	ணகர - னகர - நகர வேறுபாடு	சொற்களின் தன்மைகள்	நுண்ணறிவு வெளிப்படுத்தல்	போட்டிக் கட்டுரை	சிறுகதை
	SLO-2	லகர - ளகர - முகர வேறுபாடு	ஒரு சொல் பல பொருள்	கதை மரபில் நாட்டுப்புறக் கதைகள்	அனுபவக் கட்டுரை	கதை எழுதும் முறை
S-9	SLO-1	சொல்லும் பொருளும்	ஒரு பொருள் பல சொல்	தமிழில் நாட்டுப்புறக் கதைகள்	பயணக் கட்டுரை	சமூக உணர்வின் வெளிப்பாடு
	SLO-2	காலந்தோறும் சொற்கள்	சொல் உருவாக்கத்தின் பயன்கள்	நாட்டுப்புறக் கதைகளும் சமூக வரலாறும்	இதழியல் கட்டுரைகள்	நிகழ்வைக் கதை வழியே வெளியிடல்

Learning Resources	1. நல்ல தமிழ் எழுத வேண்டுமா?, அ. கி. பரந்தாமனார், பாரி நிலையம், 2010. 2. நாட்டுப்புற இயல் ஆய்வு, சு. சக்திவேல், மணிவாசகர் பதிப்பகம், சென்னை, 2006. 3. படைப்புக்கலை, மு. சுதந்திரமுத்து, அறிவுப் பதிப்பகம், சென்னை, 2008. 4. கதையியல், க. பூரணச்சந்திரன், அடையாளம் பதிப்பகம், சென்னை, 2012. 5. இணைய வழித் தரவுகள் : https://tamilheritage.org/
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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	ULH23AE01J	Course Name	APPLIED HINDI-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		HINDI			Data Book / Codes/Standards																						
Course Learning Rationale (CLR):		The purpose of learning this course is to:			Learning			Program Learning Outcomes (PLO)																			
CLR-1 :	Explain and appreciate the Constant moral values of India			1			2			3			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Focus on Evaluating the social changes through prose			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 Display moral and social values in the field of religion and communal Unity												H	H	H	M	L	H	L	M	L	L	H	M	-	-	-
CLR-4 :	To make translation of good literature and any relevant document from the Hindi Language to English and vice –versa												H	H	M	L	H	H	M	H	M	M	H	H	-	-	-
CLR-5 :	To help the learners to tackle Administrative terminology												H	H	L	H	M	H	L	H	H	M	H	H	-	-	-
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:			2			75			80			H	H	M	L	H	L	M	L	L	H	M	-	-	-
CLO-1 :	Understand the various forms of Prose and different aspects of social issues			2			80			90			H	H	M	L	H	H	M	L	L	H	M	-	-	-	
CLO-2 :	To create an awerness on Ramayanan			2			75			95			H	H	M	L	H	H	M	H	M	M	H	H	-	-	-
CLO-3 :	To Examine the accuracy in Translation			2			80			90			H	H	L	H	M	H	L	H	H	M	H	H	-	-	-
CLO-4 :	To Provide technical writing skills			2			85			90			M	H	M	H	L	H	H	L	H	M	H	H	-	-	-
CLO-5 :	To evaluate the nuance in essays																										
Duration (hour)		9		9		9		9		9		9															
S-1	SLO-1	KAHANI		NIBANDH		BAL RAMAYAN		ANUVAD		PARIBHASHIK SHABDAVALI																	
	SLO-2	AVDHARNA		AVDHARNA		KHATHA VASHTU		AVDHARNA		ARTH																	
S-2	SLO-1	ARTH		ARTH		AVADHPURI MEN RAM		ARTH		PARIBHASHA																	
	SLO-2	SWARUP		SWARUP		RAM KE ADARSH KE PRATI PRERIT KARNA		SWARUP		SWARUP																	
S-3	SLO-1	PARIBHASHA		PARIBHASHA		RAMAYAN KE PRATI RUCHI JAGANA		PARIBHASHA		PRAKAR																	
	SLO-2	KAHANI KE TATVA		MAHABHARAT KE SAMAY KA BHARAT- BHALKRISHNA BHATT		RAMAYAN KA SAMAJ MEN MAHATVA		PRAKAR		AVADHARNA																	
S-4	SLO-1	UDDESHYA		LEKHAK PARICHAYA		LOKJEEVAN KE PRATI JAGRUP KARNA		MAHATVA		PRAYOJAN																	
	SLO-2			PATH KA VISLESHAN		JANGAL AUR JANKPUR		UDDESHYA		UDDESHYA																	
S-5	SLO-1	ANTASH MAN KI JAGRITI		UDDESHYA		GURU KE PRATI ADAR BHAV		ANUBAD PRAKRIYA		MAHATVA																	
	SLO-2	EIDGAH – KAHANI PREMCHAND		SAMAJIK SAMRASTA		VIRTA KE BHAV KO JAGANA		VIVIDH PRAYOG		PRAYOG																	

S-6	SLO-1	KAHANI KA PARICHAYA	PAURANIK KAHANIYO SE AVAGAT KARANA	VIDHARM KA PRATIFAL	HINDI SE ANGREZI ANUVAD	UDDESHYA
	SLO-2	KAHANI VISLESHAN	MAHABHARAT EVAM RAMAYAN KE SAMAJ KI TULNA	VAN JEVAN SE AVAGAT KARANA	ANGREZI SE HINDI ANUVAD	TAKANIKI SHABDAVALI KA MHATVA
S-7	SLO-1	BAL MANOVIGYAN	BABUL AUR KAKTASH-RAMDARASH MISHRA	SITA KE ADARSH CHARITRA SE AVAGAT KARANA	ANUVAD KA PRAYOGAN	HINDI SE ANGREZI SHABD
	SLO-2	ASMANTA KA CHITRAN	LEKHAK PARICHAY	RAM KE CHARITRA SE AVAGAT KARANA	ANUVAD KA PRAYOG	ANGREZI SE HINDI SHABD
S-8	SLO-1	DIP SE DIP JALE- USHA YADAV	PATH KA VISLESHAN	VIRTA KE BHAV JAGANA	SHROT 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: "PRAYOGAN MULOKE HINDI", SRIJONLOK PUBLICATION, 2023, New Delhi.					PUNRIKSHAN
	1.	Srijanlok Literary Magazine, Ara (Bihar – 802301)				
	2.	https://hindisamay.com/				
	3.	https://ncert.nic.in/textbook.php?fhbr1=0-12				
	4.	Prayogan mulak Hindi, Dr. Sontakke				
	5.	https://rajbhasha.gov.in/hi/ol_clause				

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	ULF23AE01J	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)															
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 (%)	Fundamental Knowledge	Application of Concepts	Link with Related Concepts	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 acquire knowledge about French language			2	75																			80
CLO-2 :	To strengthen the knowledge on concept, culture, civilization and translation of French			2	80																			90
CLO-3 :	To develop content using the features in French language			2	75																			80
CLO-4 :	To interpret & Translate the French language into other language			2	75																			90
CLO-5 :	To improve the communication, intercultural elements in French language			2	80																			75
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'infinif 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.gymqlish.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 (5%)#			
		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	USA23301J	Course Name	PROGRAMMING IN JAVA	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,	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	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 :	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:																	
CLO-1 :	Understand the difference between C++ and Java	2	85	80	H	M	H	M	M	M	M	M	L	L	M	L	M	L	M
CLO-2 :	Develop Java program using JVM	3	85	80	M	H	H	H	M	M	M	M	M	L	M	L	M	L	M
CLO-3 :	Use the various kinds of packages and interfaces	3	85	80	M	H	H	H	M	M	M	M	M	L	M	L	M	L	M
CLO-4 :	Apply the Exception handling methods in Java program.	3	85	80	M	H	H	H	M	M	M	M	M	L	M	L	M	L	M
CLO-5 :	Apply AWT controls I/O streams application programming	3	85	80	M	H	H	H	M	M	M	M	M	L	M	L	M	L	M

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, Literals Comments, Separators, Keywords	Returning Objects- Recursion Introducing Access Control	Using final with inheritance	Introduction to Legacy Calsses	Item Listener, Component Listener
S4 – S6	SLO-1 SLO-2	Lab1: Basic Java Programs	Lab 4: Classes and Objects	Lab7: Inheritance, Method Overriding, Abstract classes and methods	Lab10: Multithreading	Lab 13: Event Handling
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	Lab 2: Operators	Lab 5: Overloading Methods and Constructors	Lab 8: Packages and Interfaces	Lab11: Legacy Classes and Interfaces	Lab 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	Lab 3: Arrays, Control Statements	Lab 6: String Class, Command Line Arguments	Lab 9: Exception Handling	Lab 12: Utility Classes	Lab 15: Layout Managers, Byte and Character Streams
	SLO2					

Learning Resources	1. Herbert Schildt (2007), Java: The Complete Reference, Tata McGraw-Hill, Seventh Edition, New Delhi.	1. Horstmann S., Gray Cornell (2001), Core Java 2 Volume In, Fundamentals, Addition Wesley, New York. 2. Amold and Gosling, J. (2000), The Java Programming Language, Addition 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		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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Dr.S.P.Angelin Claret

Course Code	USA23302J	Course Name	DATABASE MANAGEMENT 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 Applications	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
The purpose of learning this course is 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	PSO - 1	PSO - 2	PSO - 3
CLR-1 : Understand the fundamentals of Database Management Systems, Architecture and Languages																			
CLR-2 : Conceive the database design process through ER Model and Relational Model																			
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	H	M	M	M	L	M	M	M	L	M	M	L	L	L
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	M	H	H	M	M	L	M	M	M	L	M	M	L	L	L
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	H	M	M	L	M	M	M	L	M	M	L	L	L
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	M	M	M	L	M	M	L	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	M	L	M	M	M	L	M	M	L	L	L

Duration (hour)		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
	SLO-2					Transaction Concept
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,	Transaction States
	SLO-2					

S-3	SLO-1	Introduction and applications of DBMS	Case study for ER Diagram	Aggregate Functions	BCNF, 4NF and 5NF	Concurrency Control: Lock based Protocols Two Phase Control Commit Protocol
	SLO-2			Built-in Functions-Numeric, Date, String Functions		
S-4	SLO-1	Views of data and <i>Data Independence</i>	Design Issues in ER Model	SQL: Joins Basics	PL/SQL Introduction	Concurrency Control: Time Stamp based
	SLO-2				PL/SQL: variable declaration and control structures	
S 5-6	SLO-1	SQL Data types and Schemas	Lab4 Inbuilt functions in SQL on sample Exercise.	Inner and Outer Joins with suitable examples	Lab 10: PL/SQL Conditional and Iterative Statements	Serializability
	SLO-2					
S-7	SLO-1	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				
S-8	SLO-1	<i>Roles of Database Administrator</i>	Mapping Cardinality		PL/SQL Cursor	Recovery mechanism- <i>Recovery Concepts, Deferred update technique,</i>
	SLO-2			Lab 7 : Join Queries on sample exercise.		
S-9	SLO-1	Overview of SQL	<i>Extended ER - Aggregation</i>	Demonstration for all Join Commands with SQL queries	PL/SQL: Functions and statements to handle Cursor	Recovery mechanism - <i>Immediate update technique, Shadow paging, check point</i>
	SLO-2		<i>Generalization and Specialization</i>			
S-10	SLO-1	<i>Comparison of Data Models</i>	ER Diagram Issues	Correlated sub queries	PL/SQL: Exceptional Handling	Database security and Authorization <i>Need for Database security</i>
	SLO-2	DDL (Data Definition Language) Command		Lab9: Correlated Subqueries		
S 11-12	SLO-1	Lab 1: Data Definition Language Commands on sample exercise	Conversion of ER to Relational Table	Introductions to Relational Algebra	Lab 14: PL/SQL Exceptional Handling	Mandatory Access control and Multilevel Security
	SLO-2					
S-13	SLO-1	SQL : Data Manipulation Commands	SQL Queries and SQL: Set Operations	Fundamental Operators used in relational algebra queries	PL/SQL: Trigger PL/SQL: Application Programs	Lab:15 Authenticating the user (Users Credential ability)
	SLO-2					
S-14	SLO-1	Lab 2: SQL Data Manipulation Language Commands	Lab:5 SQL Queries and Set operation SQL	Pitfalls in Relational database	Lab 14: PL/SQL Trigger	Lab 15 Project: Implementation by Using Tools Frontend (VB 10.0) and Backend (Oracle12g)
	SLO-2					
S-15	SLO-1	SQL: Data Control Commands	SQL: Nested Queries	Functional Dependency – definition,	File Organization	i)Employee payroll
	SLO-2					
S-16	SLO-1	SQL: Transaction Control	Lab 6: Nested Queries on sample	trivial and non-trivial FD	Indexing Methods –	

	SLO-2	Commands	exercise * Construction of Relational Table from the ER Diagram		Primary, Secondary, Multilevel Indices	processing system
S 17-18	SLO-1	Lab 3: SQL Data Control Language Commands and	SQL Views	Decomposition using FD-dependency	ISAM, B-trees Introduction	ii) Student Marksheet processing system
	SLO-2	Transaction control commands to the sample exercises		preservation,		iii) Banking system

Learning Resources	1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, Database System Concepts, Sixth Edition, Tata McGraw Hill, 2011. 2. Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, Sixth Edition, Pearson Education, 2011. 3. CJ Date, AKannan, SSwamynathan, An Introduction to Database Systems, Eight Edition, Pearson Education, 2006. 4. Rajesh Narang, Database Management Systems, 2nd ed., PHI Learning Private Limited, 2011.	5. Martin Gruber, Understanding SQL, Sybex, 1990 6. Sharad Maheshwari, Introduction to SQL and PL/SQL, 2nd ed., Laxmi Publications, 2016. 7. Raghurama Krishnan, Johannes Gehrke, Database Management Systems, 3rd Edition, McGraw Hill Education, 2003.

Learning Assessment												
Level	Bloom’s Level of Thinking	Continuous Learning Assessment (50% weightage)										
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (5%)#				
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	ATTEND ANCE (5%)	15%	15%
	Understand										15%	
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%		20%	20%
	Analyze										20%	
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%		15%	15%
	Create										15%	
	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. Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr. S. Gopinathan, Professor, University of Madras, Chennai	1. Mr. M. Ramesh (Assistant Professor, Department of Computer Science and Applications Vadapalani Campus)

Course Code	UMS23G301T	Course Name	Numerical Methods	Course Category	C	Discipline Specific Core Courses	L	T	P	C
							4	0	0	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)														
CLR-1 :	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems.				1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Apply numerical methods to obtain approximate solutions to mathematical 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 :	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				3	85	80	L	H	H	M	L	M	M	L	H	L	M	M	L	L	L
CLO-2 :	Appreciate the concepts of simultaneous equations				3	80	75	L	M	M	H	H	M	M	L	M	L	H	L	L	L	L
CLO-3 :	Understand the basic ideas about Interpolation and extrapolation				3	85	80	H	L	H	M	M	M	M	M	M	L	H	L	L	L	L
CLO-4 :	Acquire the knowledge on Numerical solutions of Ordinary differential equations of first and second order				3	85	80	M	H	L	H	M	M	M	M	L	L	H	L	L	L	L
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				3	85	80	H	H	H	M	L	M	L	M	M	L	M	M	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
		15	15	15	15	15
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

Duration (hour)	Learning Unit / Module 1		Learning Unit / Module 2		Learning Unit / Module 3		Learning Unit / Module 4		Learning Unit / Module 5	
	15		15		15		15		15	
	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 method. Introduction	Introduction and formula explanation		Problems solved based on the Lagrange's inverse interpolation		Truncation error in Simpson's 3/8 rule		Formula given for Runge-Kutta method of 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	

Duration (hour)	Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
	15	15	15	15	15
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											
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	15%	15%	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	15%	15%	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 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	UCA23G01J	Course Name	FUNDAMENTALS OF DATA SCIENCE	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 and Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Understand the basics of Data Science	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Learning and implementing the fundamentals of Python for data science	Level of Thinking	Expected Proficiency	Expected Attainment	Fundamental	Problem Analysis	Design & Analysis, Design, Modern Tool Usage	Society & Culture	Environment & Ethics	Individual & Team	Communication	Project Mgt. & Life Long Learning	PSO - 1	PSO - 2	PSO - 3				
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																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking	Expected Proficiency	Expected Attainment	Fundamental	Problem Analysis	Design & Analysis, Design, Modern Tool Usage	Society & Culture	Environment & Ethics	Individual & Team	Communication	Project Mgt. & Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CLO-1 :	Learn the fundamentals of data science and its methodologies	2	85	80	H	H	M	M	M	L	M	L	L	L	L
CLO-2 :	Implement the data science concepts using python	3	85	80	M	H	H	H	M	L	M	L	L	L	L
CLO-3 :	Employ efficient storage and data operations using NumPy arrays	3	85	80	M	H	M	H	H	L	M	M	L	L	L
CLO-4 :	Apply powerful data manipulations using Pandas	3	85	80	M	H	H	H	M	L	M	M	L	L	L
CLO-5 :	Explore the data using various visualization and Matplotlib	3	85	80	M	H	H	H	M	L	M	M	L	L	L

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	Scalar Types	The NumPy ndarray: A Multidimensional Array Object	Series	Handling Missing Data
S-2	SLO-1 Facets of data	Numeric types	Creating ndarrays	DataFrame	Filtering Out Missing Data
	SLO-2 Structured data and Unstructured data	Strings	Data Types for ndarrays	Index Objects	Filling In Missing Data

S-3	SLO-1	Natural language and Machine-generated data	List	Arithmetic with NumPy Arrays	Essential Functionality	Data Transformation
	SLO-2	Graph-based or network data And Audio, image, and video, Streaming data	Tuples	Basic Indexing and Slicing	Reindexing	Transforming Data Using a Function or Mapping
S-4-5	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	The data science process	Dictionary	Boolean Indexing	Dropping Entries from an Axis	Replacing Values
	SLO-2	The big data ecosystem and data science	Sets	Fancy Indexing	Indexing, Selection, and Filtering	Renaming Axis Indexes
S-7	SLO-1	Overview of the data science process	Type Conversion	Transposing Arrays and Swapping Axes	Selection with loc and iloc	String Manipulation
	SLO-2	Defining research goals and creating a project charter	Operators	Universal Functions: Fast Element-Wise Array Functions	Integer Indexes	Vectorized String Functions in pandas
S-8	SLO-1	Retrieving data	Control Flow	Array-Oriented Programming with Arrays	Arithmetic and Data Alignment	Plotting and Visualization
	SLO-2	Cleansing, integrating, and transforming data	Looping- Loop Control statement	Expressing Conditional Logic as Array Operations	Arithmetic methods with fill values	Brief matplotlib API Primer
S-9-10	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	Combining data from different data sources	Built-in Sequence Functions	Mathematical and Statistical Methods	Operations between DataFrame and Series	Colors, Markers, and Line Styles
	SLO-2	Transforming data	List, Set, and Dict Comprehensions	Methods for Boolean Arrays	Function Application and Mapping	Ticks, Labels, and Legends
S-12	SLO-1	Exploratory data analysis	Functions	Sorting	Sorting and Ranking	Annotations and Drawing on a Subplot
	SLO-2	Build the models	Namespaces, Scope, and Local Functions	Unique and Other Set Logic	Axis Indexes with Duplicate Labels	Saving Plots to File
S-13	SLO-1	Presenting findings and building applications on top of them	Returning Multiple Values, Errors and Exception Handling	File Input and Output with Arrays, Pseudorandom Number Generation Example: Random Walks	Summarizing and Computing Descriptive Statistics, Correlation and Covariance,	Getting Started with SciPy
	SLO-2	Python Data Analysis, Packages	Files and the Operating System, Constructors		Unique Values, Value Counts, and Membership	SciPy Constants, SciPy Optimizers SciPy Graphs, with Machine Learning with Scikit-Learn

S 14- 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
	SLO-2					

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 Understand	20%	20%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Total	100 %		100 %		100 %		100 %		100 %	

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

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Dr. J. Jebamalar Tamilselvi, FSH, SRMIST, RPM
		Dr V Saravanan, FSH, SRMIST, RPM

Course Code	UCA23S03J	Course Name	Web Programming	Course Category	S	Skill Enhancement Courses	L	T	P	O	C
							0	0	2	2	1

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	BCA – Data 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 learn the language of the web: HTML and CSS.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To use cascading style sheets to design web pages	Level of Thinking	Expected	Expected	Fundamental	Problem Analysis	Design & Analysis, Design, Modern Tool	Society & Culture	Environment & Sustainability	Ethics	Individual & Team	Communication	Project Mgt. & Life Long	PSO - 1	PSO - 2	PSO - 3			
CLR-3 :	To understand, analyze and build web applications using PHP																		
CLR-4 :	To personalize web site content using Session and Cookies																		
CLR-5 :	To develop an ability to design and implement static and dynamic website																		
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Design and implement dynamic websites with good aesthetic sense of designing	3	90	90	H	H	M	M	L	M	M	M	M	M	L	L	L		
CLO-2 :	Create web pages using HTML and Cascading Styles sheets	3	85	85	M	M	M	M	L	M	M	M	M	M	L	L	L		
CLO-3 :	Analyze a web page and identify its elements and attributes	3	85	85	H	M	M	H	L	M	M	M	M	M	L	L	L		
CLO-4 :	Manage web site content using Session and Cookies	3	85	85	H	M	H	H	L	M	M	M	M	M	L	L	L		
CLO-5 :	Build web applications using PHP	3	90	90	H	H	H	M	L	M	M	M	M	M	L	L	L		

Duration (hour)		6	6	6	6	6
S-1	SLO-1	Introduction to HTML	Types of style sheet	Working with Forms and Form Data	MySQL Basics	Retrieving data from MySQL
	SLO-2	Structure of HTML	About CSS Selectors	Building forms	MySQL introduction	Working with retrieved data
S-2	SLO-1	Attributes & Values	About CSS Properties	Single-page form processing	Creating a database	Creating records with PHP
	SLO-2	Comments, Header Tags	Background Properties	Validating form values	Creating a database table	
S-3	SLO-1	Image Tag & Link Tags (Text & Image)	Box Properties	Custom validation functions	CRUD in MySQL	Updating and deleting records with PHP

	SLO-2	Marquee Tag	Border Properties	Single-page form with validations	Populating a MySQL database	
S-4	SLO-1	List Tag (Ordered & Unordered)	Positioning Properties	Working with Cookies and Sessions	Relational database tables	SQL injection
	SLO-2	Table Tag		Working with Cookies	Populating the relational table	
S-5	SLO-1	Form Tags	CSS Menu Design	Setting cookie values	Using PHP to Access MySQL	Escaping strings for MySQL
	SLO-2	Audio, Video Tags		Reading cookie values	Database APIs in PHP	
S-6	SLO-1	Embedding PHP code on a page	Creating a Web Layout using Divs, CSS	Unsetting cookie values	Connecting to MySQL with PHP	Introducing prepared statements
	SLO-2	Building Web Pages with PHP		Working with sessions		

Learning Resources	<i>Learning PHP, MySQL & JavaScript, 6th Edition by Robin Nixon, O'Reilly Media, Inc., 2021, ISBN: 9781492093824</i>	<i>Microsoft® HTML5 Step by Step, by Faithe Wempen, Microsoft Press ISBN: 9780735656543, 2011</i>
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Learning Assessment						
Level	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)				Final Examination (50% weightage)
		CLA – 1 (20%)	CLA – 2 (20%)	CLA – 3 (30%)	CLA – 4 (30%)#	
		Practice	Practice	Practice	Practice	
Level 1	Remember	10%	30%	30%	25%	
	Understand					
Level 2	Apply	40%	30%	40%	40%	
	Analyze					
Level 3	Evaluate	40%	40%	30%	35%	
	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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Dr.J.Jebamalar Tamilselvi, SMIST, RPM
		Dr V Saravanan, SRMIST, RPM

Course Code	UCA23I31L	Course Name	INTERNSHIP - 1	Course Category	IAPC	Internship/Apprenticeship / Project/ Community Outreach	L	T	P	C
							-	-	-	1

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

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Demonstrate skills learnt in the real time environment.	1	2	3	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 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	8 5	7 5
CLO-3 :	To make professional connections and enhance networking	3	7 5	7 0
CLO-4 :	To get experience in a field to allow the student to make a career transition	3	8 5	8 0
CLO-5 :	To get an inside view of an industry and organization/company	3	8 5	7 5

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

Course Code	UCD23V02L	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):		<i>The purpose of learning this course is to:</i>			Learning			Program Learning Outcomes (PLO)															
CLR-1 :	<i>Demonstrate various principles involved in solving mathematical concepts related to permutation and combination and probability and interpret data</i>				1	2	3	Fundamental Knowledge	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	<i>Learn the basic mechanics of grammar and develop resume-building practice and presentation skills in students</i>				Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		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 :	<i>Understand the object oriented features</i>																						
CLR-4 :	<i>Prepare students for job interviews</i>																						
CLR-5 :	<i>Instill confidence in students and develop the necessary skills to face interview</i>																						
CLR-6 :	<i>Build student's self-confidence and equip them with interview skills</i>																						
Course Learning Outcomes (CLO):		<i>At the end of this course, learners will be able to:</i>																					
CLO-1 :	<i>Understand the concepts of permutation and combinations, probability and approach questions in a simpler and innovative method</i>				3	80	70	M	M	M	M	M	H	L	M	H	M	M	H	M	M	M	
CLO-2 :	<i>Understand the different parts of speech and use them in sentences appropriately and also the importance of resume preparation</i>				3	85	75	M	M	M	M	M	H	L	M	M	M	H	L	M	M	H	
CLO-3 :	<i>Understand the importance of object oriented features</i>				3	85	80	H	M	M	M	M	H	L	M	M	M	M	M	M	M	H	
CLO-4 :	<i>Face interviews confidently</i>				3	85	80	M	M	H	M	M	H	L	M	M	M	M	M	M	M	H	
CLO-5 :	<i>Develop their domain skills</i>				3	85	80	M	M	H	M	M	H	L	M	M	M	M	M	M	M	H	
CLO-6 :	<i>Succeed in their placement interviews</i>				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	4. Greg Perry, Dean Miller, C Programming Absolute Beginner, Que Publishing, 3 rd Edition
	2. Scott Bennett, The Elements of Resume Style: Essential Rules for Writing Resumes and Cover Letters That Work, AMACOM, 2014	5. Cay S. Horstmann, Core Java Fundamentals, Volume 1, 11th Edition, Prentice Hall, 2018
	3. Raymond Murphy, Intermediate English Grammar, Cambridge University Press, 2007	6. Langsam, Augenstein, Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.

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	10%	10%	30%	30%
	Understand				
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	ULT23AE02J	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)																
CLR-1 :	அகராதி, கலைச்சொல் குறித்த நுட்பங்களை அறியச் செய்தல்				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 :	நேர்காணல் செய்யும் திறனும் செய்தி வாசிப்பு முறைகளையும் தெரியச் செய்தல்																							
CLR-3 :	விமர்சனத்தின் தன்மைகளும் செய்தியறிக்கை தயாரிக்கும் முறையையும் அறியச் செய்தல்																							
CLR-4 :	பேச்சுக்கலையின் தனித்துவங்களைப் புரியச் செய்தல்																							
CLR-5 :	கணினித்தமிழின் பல்வேறு நுட்பங்களைத் தெரியச் செய்தல்																							
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:			Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	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 :	அகராதித்துறை, கலைச்சொல்லாக்கத் துறையைத் தெரிந்துகொள்ளுதல்				2	75	60	H	L	H	M	H	H	L	M	H	M	L	H	-	-	-		
CLO-2 :	ஊடகங்களில் மொழி ஆளுமையோடு செயல்படும் திறன் பெறுதல்				2	80	70	H	M	H	L	M	H	L	H	M	L	H	H	-	-	-		
CLO-3 :	கலை, இலக்கிய விமர்சன முறைகளையும், செய்தியறிக்கை தயாரிக்கும் நுட்பங்களையும் தெரிந்துகொள்ளுதல்				2	70	65	H	L	H	M	H	H	M	H	L	H	M	H	-	-	-		
CLO-4 :	பல்வேறு வடிவங்களைக் கொண்ட பேச்சுக்கலையை அறிவதன்வழி, சிறந்த மேடைப் பேச்சாளராக உருவாகும் தகுதியைப் பெறுதல்				2	70	70	H	M	H	L	H	M	M	H	H	L	H	H	-	-	-		
CLO-5 :	தமிழைக் கணினி வழி, இணையம் வழி கொண்டுசேர்க்கும் உலகளாவிய செயல்பாடுகளை அறிந்துகொள்ளுதல்				2	80	70	H	M	H	H	M	H	L	M	H	L	H	H	-	-	-		

Duration (hour)		9	9	9	9	9
S-1	SLO-1	தமிழில் அகராதிகள்	நேர்காணல் அறிமுகம்	விமர்சனம் – அறிமுகம்	பேச்சுக்கலை	கணினித்தமிழ்
	SLO-2	ஒரு மொழி/ இருமொழி அகராதி	ஆளுமைத்திறன்	விமர்சனத்தின் நோக்கம்	பேச்சின் அடிப்படைகள்	கணினி வழித் தட்டச்சு
S-2	SLO-1	பன்மொழி அகராதி	நோக்கம் – கண்டறிதல்	விமர்சன வகைகள்	தன்னம்பிக்கையும் பேச்சும்	தட்டச்சு செய்யும் மென்பொருட்கள்
	SLO-2	உயிர்/ மெய் எழுத்துகள்	நேர்காணல் முறைகள்	இலக்கிய விமர்சனம்	பேச்சின் வகைகள்	எழுத்துருக்கள்
S-3	SLO-1	உயிர்மெய் எழுத்துகள்	இனிய சொற்கள் பயன்பாடு	திரை விமர்சனம்	மேடைப் பேச்சு	யூனிகோடு எழுத்துருக்கள்/ பிற எழுத்துருக்கள்
	SLO-2	அகராதிக்கான அடிப்படைகள்	நேர்காணல் வகைகள்	கலை விமர்சனம்	பட்டிமன்றப் பேச்சு	குரல் வழி தட்டச்சு
S-4	SLO-1	அகராதி உருவாக்கப் பயிற்சி	நேரடியாக வினா விடை	விமர்சகர் தகுதிகள்	சொற்பொழிவு முறை	எழுத்து வழி தட்டச்சு
	SLO-2	அகராதி உருவாக்கப் பயிற்சி	அச்ச ஊடக நேர்காணல்	தேர்ந்த புலமை	பேச்சின் நுட்பங்கள்	தட்டச்சு செய்யும் பயிற்சி
S-5	SLO-1	கலைச்சொல் அறிமுகம்	காட்சி ஊடக நேர்காணல்	எழுத்துவடிவ விமர்சனம்	பேச்சாளர்களும் பேசும் முறைகளும்	தட்டச்சு செய்யும் பயிற்சி
	SLO-2	பிறமொழிச் சொற்களும் தமிழில் கலைச் சொற்களும்	கேட்பு ஊடக நேர்காணல்	காட்சி வடிவ விமர்சனம்	பேச்சு - எடுத்துரைப்பும் உடல்மொழியும்	பிழை திருத்திகள்
S-6	SLO-1	கலைச்சொல்லாக்க நெறிமுறைகள்	கள ஆய்வில் நேர்காணல்	விமர்சனம் செய்யும் பயிற்சி	நவீன தொழில்நுட்பங்களில் பேச்சு முறைகள்	தமிழில் பிழை திருத்தம் செய்யும் மென்பொருட்கள்
	SLO-2	கலைச்சொல் உருவாக்க உத்திகள்	நேர்காணல் செய்யும் பயிற்சி	விமர்சனம் செய்யும் பயிற்சி	பேச்சாளர்க்குரிய தகுதிகள்	வலைப்பூ உருவாக்கம்
S-7	SLO-1	துறைசார் சொற்கள்	நேர்காணல் செய்யும் பயிற்சி	செய்தியறிக்கை	பேச்சுப் பயிற்சி	வலைப்பூவில் எழுதும் முறைகள்
	SLO-2	புதிய கண்டுபிடிப்புகளும் கலைச்சொற்களும்	செய்தி வாசிப்பு முறைகள்	சமூக நிகழ்வை எழுதுதல்	பேச்சுப் பயிற்சி	வலைப்பூவின் பயன்கள்
S-8	SLO-1	பயன்பாட்டுச் சொற்கள்	செய்தி வாசிப்பு நுட்பங்கள்	செய்தியாளர்க்குரிய தகுதிகள்	கலந்துரையாடலின் நோக்கம்	தமிழ் இணைய நூலகங்கள்
	SLO-2	கலைச்சொல்லாக்கப் பயன்பாடுகள்	உச்சரித்தல்	உற்றுநோக்குதல்	கலந்துரையாடலின் தனித்தன்மைகள்	இணைய நூலகப் பயன்பாடுகள்
S-9	SLO-1	கலைச்சொல் உருவாக்கப் பயிற்சி	பிழையின்றி வாசித்தல்	சமநிலையில் எழுதுதல்	தம் கருத்தைத் தெளிவாக உரைத்தல்	தமிழ்த் தொடரடைவுகள்
	SLO-2	கலைச்சொல் உருவாக்கப் பயிற்சி	வாசித்தலும் உணர்வும்	செய்தியறிக்கை தயாரித்தல்	கலந்துரையாடல் பயிற்சி	தொடரடைவின் பயன்பாடுகள்

Learning Resources	1. அகராதியியல், பெ. மாதையன், தமிழ்ப் பல்கலைக்கழகம், தஞ்சாவூர், 1997. 2. பேச்சுக்கலை, ம. திருமலை, மீனாட்சி புத்தக நிலையம், மயூராவளாகம், மதுரை, 2009. 3. பேச்சாளராக, அ.கி.பரந்தாமனார், பாரி நிலையம், சென்னை, 1961 4. இணையத் தமிழ், சந்திரிகா சுப்பிரமணியன், சந்திரோதயம் பதிப்பகம், மதுரை, 2020. 5. நேர்காணல், மின்னூலகம், தமிழ் இணையக் கல்விக் கழகம், 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.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	ULH23AE02J	Course Name	APPLIED HINDI-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	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 (1-3)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	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	H	M	L	H	H	M	L	L	H	M	-	-	-
CLR-5 :	To Acquire technical words for various job Prospects				H	H	M	L	H	H	M	H	M	M	H	H	-	-	-
					H	H	L	H	M	H	L	H	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	H	H	H	M	L	H	L	M	L	L	H	M	-	-	-
CLO-2 :	To Comprehend Media Studies	2	80	90	H	H	H	M	L	H	H	M	L	L	H	M	-	-	-
CLO-3 :	To Evaluate report Writing	2	75	95	H	H	M	L	H	H	M	H	M	M	H	H	-	-	-
CLO-4 :	Enhance their Writing Skills in Media Studies	2	80	90	H	H	L	H	M	H	L	H	H	M	H	H	-	-	-
CLO-5 :	To Understand and usage of technical words in Hindi	2	85	90	M	H	M	H	L	H	H	L	H	M	H	H	-	-	-

Duration (hour)	9	9	9	9	9
S-1	SLO-1	HINDI CINEMA	MEDIA AUR HINDI BHASHA	REPORTARJ LEKHAN	FILM REVIEW& VIGYAPAN
	SLO-2	CINEMA KI AVDHARNA	AVDHARNA	AVDHARNA	ARTH
S-2	SLO-1	UDBHAV	SWARUP	SWARUP	PARIBHASHA
	SLO-2	VIKASH	MAHATVA	UDDESHYA	SWARUP
S-3	SLO-1	DOCUMENTRI MOVE KI AVDHARNA	MEDIA MEN BHASHA KA PRAYOG	MAHATVA	AWADHARNA
	SLO-2	COMERCIAL MOVE KI AVDHARNA	UTTARDAYITVA	REPORTARJ LEKHAN KE PRATI RUCHI JAGANA	PRAKAR
S-4	SLO-1	PRAYOJAN	PRINT MEDIA	REPORTAJ KI BHUMIKA	FILM REVIEW KA MAHATTVA
	SLO-2	UDDESHYA	ELECTRONIC MEDIA	PRAYOJAN	AVADHARNA
S-5	SLO-1	MAHATVA	MEDIA KI JIMMEDARI	PRAYOG	PRAYOJAN
	SLO-2	PRAKAR	SMACHAR LEKHAN	UTTARDAYITVA	UDDESHYA
S-6	SLO-1	PRISHTBHUMI	REPORTER KE GUN	RIPOTARJ LEKHAN	MAHATVA
	SLO-2	KARYASHALA	SAHAJTA	PUNRIKSHAN	PRAYOG
S-7	SLO-1	DOCUMENTRY KI VIDHI	NISPAKSHTA	LEKHAN VIDHI	AWADHARNA
	SLO-2	DOCUMENTRY AUR COMERCIAL MOVE MEN ANTAR	PEET PATRAKARITA	SAMAJIK DAYRA	ARTH
S-8	SLO-1	COMERCIAL KI VIDHI	UTTARDAYITVA	SAHITYA ME RIPOTARJ LEKHAN	PARIBHASHA
	SLO-2	MOVE VISLESHAN	BHASHA GYAN	PARIYOJNA KARYA	SWARUP
S-9	SLO-1	PARICHARCHA	PARICHARCHA	PARICHARCHA	VIGYAPAN KE PRAKAR
	SLO-2	PRASHNABHYASH	PRASHNABHYASH	PRASHNABHYASH	VIGYAPAN KI VISHESHTAYEN

Learning Resources	Edited Book: "PRAYOJAN MULOK HINDI", SRIJONLOK PUBLICATION, 2023, New Delhi.
	1. Film Banti Hai aur Banati Bhi hai, Lekhika – Sonal, Neolit Publication
	2. https://navbharattimes.indiatimes.com/entertainment/movie-review/articlelist/2325387.cms?curpg=3
	3. https://epustakalay.com/book/4858-hindi-patrakarita-by-dr-krishnabihari-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	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	ULF23AE02J	Course Name	French for Specific purpose-II			Course Category	AE	Ability Enhancement Courses (AE)															
								L	T	P	O	C											
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 :		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 (%)															
CLO-1 :		o enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French				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	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)		9		9		9		9		9		9											
S-1	SLO-1	TOEIC		Les quantificateurs		Les prépositions de lieu		Les verbes irréguliers		La négation													
	SLO-2	Qu'est-ce que c'est/		le génitif		Les activités		le futur et		l'interrogation													
S-2	SLO-1	À qui est-il destiné ?		Les adjectifs		Les prépositions de temps -		le conditionnel		Les activités													
	SLO-2	Les compétences évaluées		et pronoms possessifs		Les activités		les modaux		l'exclamation													
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 indénombrables		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 adverbes		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	<i>Les exemples</i>	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 adverbes	Les exemples	les verbes à particule	Les subordonnées circonstancielles
	SLO-2	Les exemples	Les activités	- Le présent perfect be+ing	les verbes suivis de V-ing	Les activités
S-9	SLO-1	pronoms possessifs (this et that)	les prépositions-	Le past perfect 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, Studyrama.
	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.gymqlish.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 (5%)#			
		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%	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	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	UCA23C41J	Course Name	Open Source Technologies	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 Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	To gain knowledge about Open Source Software	1	2	3															
CLR-2 :	To Learn basic file and directory commands in Linux																		
CLR-3 :	To develop simple PHP programs																		
CLR-4 :	To understand working with arrays and functions																		
CLR-5 :	To learn various MySQL queries																		
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 :	Create files using Vi editor	2	85	80															
CLO-2 :	Write PHP scripts to handle HTML forms.	3	85	80															
CLO-3 :	Write regular expressions including modifiers, operators, and metacharacters.	3	85	80															
CLO-4 :	Create PHP programs that use various PHP library functions, and that manipulate files and directories	3	85	80															
CLO-5 :	Analyze and solve various database tasks using the PHP language	3	85	80															

Duration (hour)	18	18	18	18	18
S-1	SLO-1	Introduction to Linux	What Does PHP Do?	Introduction to Function	Introduction to Arrays
					Introduction to MySQL Database

	SLO-2	Features of Linux	A Brief History of PHP	Calling a Function	Indexed Versus Associative Arrays	Connecting to and disconnecting from the server
S-2	SLO-1	Introduction to Linux Distributions	Language Basics	Defining a Function	Identifying Elements of an Array	Creating and using a database
	SLO-2	Widely used Linux distros	Lexical Structure	Variable scope	Storing Data in Arrays	Selecting a database
S-3	SLO-1	Open Source software	Introduction to Data Types	Passing parameters by value	Multidimensional Arrays	Creating a table
	SLO-2	Benefits of Open Source software, Linux Files	Scalar Types, Compound Types, Special Types	Passing parameters by reference, Default Parameters, Variable Parameters	Extracting Multiple Values, Converting Between Arrays and Variables, Traversing Arrays	Loading data into a table, Retrieving information from a table
S 4-6	SLO-1	Lab 1 : Basic Linux Commands	Lab 4: Writing Simple PHP Programs	Lab 7: Passing parameters to a function	Lab 10: Arrays	Lab 13: Creating Database, tables
	SLO-2					
S-7	SLO-1	Listing files	Defining Variables	Missing Parameters	Sorting	Selecting particular rows
	SLO-2	Working with ls command	Variable Scope	Return Values	Reversing an array	Selecting particular columns
S-8	SLO-1	Displaying Files	Introduction to Expressions and Operators	Variable Functions	Introduction to Object	Sorting rows
	SLO-2	Working with cat, more, less command	Arithmetic operators, Comparison operators, Bitwise operators	Anonymous Functions	Creating an Object	Date Calculation
S-9	SLO-1	Printing Files, Working with lpr	Logical operators, Casting operators & Miscellaneous Operators	Introduction to Strings	Accessing Properties and Methods	Working with Null values
	SLO-2	Managing Directories, Working with mkdir, rmdir, cd and pwd commands	Operator precedence, Introduction to Flow-Control Statements	Quoting String Constants, Variable Interpolation	Declaring a Class, Declaring methods and properties	Pattern Matching, Counting Rows, Using more than one table
S 10-12	SLO-1	Lab 2: Creating Directory and file in Linux	Lab 5: Operators & Control Statements	Lab 8: Functions & Strings	Lab 11: Arrays & Objects	Lab 14: Working with various MySQL Queries
	SLO-2					
S-13	SLO-1	Listing directories	Working with While, for, foreach,	Accessing Individual Characters	Inheritance	Introduction to Working with MySQL Database using PHP
	SLO-2	ls command	Using exit, return, goto statements	Cleaning Strings	Interfaces	Connecting to MySQL database
S-14	SLO-1	File and directory operations	Including Code form another module	Encoding and Escaping	Traits	Querying database
	SLO-2	find, cp, mv, rm and ln commands	Working with include and require construct	Comparing Strings	Abstract Methods	Retrieving and displaying the results

	SLO-1	Controlling Access to directories and files	Embedding PHP in Web Pages	Manipulating and Searching Strings	Constructors	Modifying data
S-15	SLO-2	Working with chmod command, working with Vi editor	Standard (XML) Style, SGML Style, ASP Style, Script Style	Introduction to Regular expression, Pattern matching and substituting new text for matching text	Destructors, Introduction to Introspection, Examining an Object	Deleting data, Designing simple database application
S-16-18	SLO-1 SLO-2	Lab 3: Working with file commands, Creating and modifying files using Vi Editor	Lab 6: Embedding PHP script in HTML	Lab 9: String Manipulation	Lab 12:: Introspection and Serialization	Lab 15: Developing Simple Database Applications

Learning Resources	1. Richard Petersen - <i>Linux : The Complete Reference ,Sixth edition (2006)</i> 2. Rasmus Lerdorf, Kevin Tatroe, Bob Kaehms, Ric McGredy (2002), <i>Programming PHP</i> , O'REILLY(SPD)	3. Lee Babin, Nathan A. Good, Frank M. Kromann, Jon Stephens (2005), "PHP 5 Recipes, A problem solution approach", après 4. Vikram Vaswani (2008), <i>PHP: A BEGINNER'S GUIDE</i> , McGraw-Hill.
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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 (5%)#				
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	ATTENDANCE (5%)	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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai			Dr.S.Gopinathan, Professor, University of Madras, Chennai		Dr.V.Raja

Course Code	USA23402J	Course Name	OPERATING SYSTEM		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 Applications			Data Book / Codes/Standards		Nil					

Course Learning Rationale (CLR):		The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)																
CLR-1 :	Utilize operating systems based on its features and utility		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 the Process Management functions of an Operating system							Application of Concepts														
CLR-3 :	Utilize the features of Memory Management concepts of an Operating system							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														
			Expected Proficiency (%)				Ability to Utilize Knowledge															
			Expected Attainment (%)				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:	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 :	Identify functions of an operating system, analyze the process management functions		2	85	80	H	H	M	M	M	M	L	M	M	H	L	M	M	L	L
CLO-2 :	Analyze CPU scheduling and synchronization process of an operating system		3	85	80	H	H	M	M	M	M	L	M	M	H	L	M	M	L	L
CLO-3 :	Analyze the need of Memory management functions of an operating system		3	85	80	H	H	M	M	M	M	L	M	M	H	L	M	M	L	L
CLO-4 :	Identify the significance of device management and file management's role of an operating system		3	85	80	H	H	M	M	M	M	L	M	M	H	L	M	M	L	L
CLO-5 :	Identify the essentials of inter process communication in an operating system, evaluate hypervisors		3	85	80	H	H	M	M	M	M	L	M	M	H	L	M	M	L	L

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	Synchronization	Resource Allocation Graph	Swapping

	SLO-2	Multiprocessor, Time Sharing, parallel systems	multiprocessing	hardware 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	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
	SLO-2					
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	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
	SLO-2					
Learning Resources	1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating systems, 9 th ed., John Wiley & Sons, 2013 2. William Stallings, Operating Systems-Internals and Design Principles, 7 th ed., Prentice Hall, 2012 3. Andrew S. Tanenbaum, Herbert Bos, Modern Operating systems, 4 th ed., Pearson, 2015 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 %	

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.M. R..Sudha

Course Code	UMS23401T	Course Name	Resource Management Techniques	Course Category	C	Professional core			
						L	T	P	C
						4	0	0	4

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	Level of Thinking (Bloom)	2	3	Scientific Knowledge	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To apply basic concepts of Linear programming problems																		
CLR-3 :	To learn and understand Operations research approach to various applications																		
CLR-4 :	To provide a set of algorithms for solving sequencing problems																		
CLR-5 :	To employ appropriate methods of Game theory																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	L	H	M	M	H	M	M	M	M	L	H	M	L	L	L
CLO-1 :	To recognize the scope and models of Operations research methods for decision making process.																		
CLO-2 :	To apply Operations research techniques for solving real life problems																		
CLO-3 :	To know optimization through various transportation and assignment problems																		
CLO-4 :	To schedule jobs through machines using the prescribed algorithm																		
CLO-5 :	To calculate saddle point, strategy and value of the game by various methods	3	85	80	3	80	75	3	85	80	3	85	80	3	85	80	3	85	80

		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 problem	Characteristics of Game theory
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 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	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

Course Code	UCA23G02J	Course Name	INTRODUCTION TO MACHINE LEARNING	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 Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):		The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
CLR-1 :	Gain knowledge on the Machine learning concepts		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Gain theoretical Knowledge on setting hypothesis for pattern recognition.																			
CLR-3 :	Applying suitable machine learning techniques for data handling and to gain knowledge from it.																			
CLR-4 :	Evaluate the performance of algorithms and to provide solution for various real world applications																			
CLR-5 :	To Solve Real World Problems																			
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	PSO - 1	PSO - 2	PSO - 3
CLO-1 :	Understand the basic concepts in Machine learning		2	80	70	H	H	H	M	M	L	M	L	M	M	M	M	L	L	L
CLO-2 :	Characteristics of Machine Learning techniques that enable to solve real world problems		2	75	75	H	H	H	M	M	L	M	L	M	M	M	M	L	L	L
CLO-3 :	Characteristics of machine learning strategies		2	85	70	H	H	H	M	M	L	M	L	M	M	M	M	L	L	L
CLO-4 :	Implement various supervised learning methods to appropriate problems		2	80	80	M	M	H	H	H	L	M	L	M	M	M	M	L	L	L
CLO-5 :	Integrate and Identify more than one techniques to enhance the performance of learning		2	75	75	M	M	H	H	H	L	M	L	M	M	M	M	L	L	L

Duration (hour)		15	15	15	15	15
S-1	SLO-1	Introduction to Machine Learning	Introduction to Machine Learning Techniques	Clustering and regression	Introduction Classification and Regression	Introduction to Unsupervised learning
	SLO-2					
S-2	SLO-1	Define Learning	Supervised Learning	linear regression	K-Nearest Neighbor algorithm	Introduction to clustering
	SLO-2					
S-3	SLO-1	Applications of Machine Learning	Unsupervised Learning	logistic regression	Linear Regression	Types of Clustering
	SLO-2					
S 4-5	SLO-1	LAB : Install Python and import the necessary files	LAB : Sample Programs for Supervised Learning & Unsupervised Learning	LAB : Sample programs for Clustering and Regression	LAB : Sample Program for KNN & Linear Regression	Sample Program for Clustering
	SLO-2					
S6	SLO-1	processes involved in Machine Learning	Reinforcement Learning	Bayesian decision theory	Logistic Regression	Hierarchical Clustering
	SLO-2					

S-7	SLO-1	Introduction to datasets	Real life examples of Machine Learning	classifiers	Introduction to Support Vector Machine (SVM)	Agglomerative Clustering
	SLO-2					
S-8	SLO-1	How to import the dataset	Difference between the Learning Types	discriminant functions	Properties of SVM	Divisive clustering
	SLO-2					
S 9-10	SLO-1 SLO-2	LAB : Sample program to import the dataset	LAB : Sample Programs for Reinforcement Learning	LAB: Sample programs using Classifiers	LAB : Sample Program using Logistic Regression and SVM	Sample Programs for different types of Clustering
S-11	SLO-1 SLO-2	Feature sets	Machine perception	univariate networks.	Introduction to Evaluation Measures in ML	Partial Clustering
S-12	SLO-1 SLO-2	Introduction to Dataset division	feature extraction	multivariate Network	SSE, MME, R2, confusion matrix, precision	K-means clustering
S13	SLO-1 SLO-2	test, train and validation sets, cross validation	classification	Bayesian belief networks.	Recall, F-Score, ROC-Curve	Difference between Partial and K-means Clustering
S 14-15	SLO-1 SLO-2	LAB : Sample program to train and Validation of dataset	LAB : Sample Programs for Feature Extraction	LAB : Sample Programs for Bayesian Networks	LAB : Sample Program using the Evaluation Measures	Sample Programs for Partial Clustering and K-means Clustering

Learning Resources	1. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, Prentice Hall of India, 3rd Edition 2014.	5. Charu C. Aggarwal, "Data Classification Algorithms and Applications", CRC Press, 2014.
	2. Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar "Foundations of Machine Learning", MIT Press, 2012.	6. Charu C. Aggarwal, "DATA CLUSTERING Algorithms and Applications", CRC Press, 2014.
	3. Tom Mitchell, "Machine Learning", McGraw Hill, 3rd Edition, 1997.	7. Kevin P. Murphy "Machine Learning: A Probabilistic Perspective", The MIT Press, 2012
	4. MACHINE LEARNING - An Algorithmic Perspective, Second Edition, Stephen Marsland, 2015.	8. Jiawei Han and Micheline Kamber and Jian Pei, "Data Mining Concepts and Techniques", 3rd edition, Morgan Kaufman Publications, 2012.

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 (5%)#				
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	Attendance (5%)	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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai		Dr.S.Gopinathan, Professor, University of Madras, Chennai	Dr.V.Raja , SRM IST

Course Code	UCA23S 04J	Course Name	GO PROGRAMMING			Course Category	S	Skill Enhancement Courses										L	T	P	O	C
	Pre-requisite Courses		Nil	Co-requisite Courses	Nil			Progressive Courses		Nil								1	0	2	2	2
Course Offering Department		Computer Applications			Data Book / Codes/Standards		Nil															
Course Learning Rationale (CLR):		The purpose of learning this course is to:				Learning			Program Learning Outcomes (PLO)													
CLR -1 :	Learn Go fundamentals and apply them in real world scenarios				1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR -2 :	Understand and develop your knowledge of programming fundamentals				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 :	Learn to handle the data with various data types.																					
CLR -4 :	Learn the importance of interfaces																					
CLR -5 :	Learn the Concept of Server Programming																					
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																				
CLO -1 :	Understand the Programming concepts in free form environment				3	80	70	H	M	M	H	L	M	M	M	M	L	H	M	L	L	
CLO -2 :	Know how to use the slices and maps				3	85	75	H	M	M	M	L	M	M	H	M	M	L	H	M	L	L
CLO -3 :	Understand to handle the data using pointers				3	75	70	H	M	M	M	L	M	M	H	M	M	L	H	M	L	L
CLO -4 :	Usage of Structs and Interfaces etc.,				3	85	80	H	M	M	M	L	M	M	H	M	M	L	H	M	L	L
CLO -5 :	Write basic applications in Go				3	85	75	M	M	M	M	L	M	M	H	M	H	L	H	M	L	L

Duration (hour)		09	09	09	09	09
S-1	SLO-1	GO Languages - Advantages	Control statements – if	What is a function? Declaration of Function	What are Structs in GO programming? Syntax for declaring structs	What are Files? How do we do File operations?
	SLO-2	Syntax of a GO Program	switch case	Types of Functions		Writing Data into a File and Reading Data from a File
S-2, 3	SLO1	Program to display Sample Text	Write a program to find the biggest of three numbers	Program to find minimum and maximum using function	Program for employee pay roll with structs	Program to demonstrate for Writing Data into a File and Reading Data from a File
S-4	SLO-1	What are variables? Rules for naming a variable.	Repetitive Statements – for loop	Recursive Functions	What are the Maps in GO? Syntax for creating a map	What are interfaces in GO?
	SLO-2	Constants , Data Types	Go Slices	Function to return multiple values		
S-5, 6	SLO-1	Write a Simple Program in GO	Program to display all Prime numbers between 1 to 100 Program to display a Pattern	Program to find nCr using recursive function Program to swap two numbers with a function returning two values	Program to demonstrate map	Program to demonstrate interfaces
	SLO-2					
S-7	SLO-1	Different Types of Operators	Array	Go Srtructure	What are pointers and how Pointers are declared and used	What is OOPS? How a class is created and used in GO?
	SLO-2	Expressions and their types	Array Types	Go Type Casting		
S-8, 9	SLO-1	Write a program to find area of the rectangle Write a program to find Simple and Compound Interest	Program for Two Dimensional Array- Matrix Multiplication Write a program to implement Jump Statements	Program to demonstrate Slices Program for string operations. Program to demonstrate string operations	Program to demonstrate the usage of pointers	Program to demonstrate classes
	SLO-2					

Learnin g Resourc es	1. An Introduction to Programming in Go, Caleb Doxsey 2. <i>Programming in Go: Creating Applications for the 21st Century</i> by Mark Summerfield (Addison-Wesley Professional) 3. <i>The Go Programming Language</i> by Alan A. Donovan and Brian W. Kernighan (Addison-Wesley Professional Computing Series)
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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.D.Helen

Course Code	UCD23V05L	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			Level of Thinking (Bloom)	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-2 :	Prepare students for job interviews						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 :	Learn structured query language (SQL) to an intermediate/advanced level						M	M	M	M	M	M	L	M	M	H	M	H	M	M	H	H
CLR-4 :	Learn the benefits of Python as a scripting language						M	M	H	M	M	M	L	L	M	M	M	M	M	M	H	H
CLR-5 :	Develop life-long skills students can use to seek jobs, internships and make career changes						M	M	H	H	M	M	L	M	M	M	M	M	M	M	M	H
CLR-6 :	Assist students in seeking out opportunities to gain experience within their chosen career fields						M	H	M	H	M	M	L	M	M	M	M	M	M	M	M	H
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:		3	80	75	3	80	75	3	75	70	3	75	70	3	75	70	3	75	70	
CLO-1 :	Solve the problems on reasoning			3	80	75	M	M	M	M	M	L	M	M	H	M	H	M	M	H		
CLO-2 :	Face interviews confidently			3	80	75	M	M	H	M	M	M	L	L	M	M	M	M	H	H		
CLO-3 :	Understand the importance and major issues of database security and the maintenance of data integrity.			3	75	70	M	M	H	H	M	M	L	M	M	M	M	M	M	H		
CLO-4 :	Utilise essential programming components including variables, conditional logic, loops, and functions to create simple programmes.			3	75	70	M	M	H	H	M	M	L	M	M	M	M	M	M	H		
CLO-5 :	Assist students in choosing a career path during their course			3	75	70	M	M	H	H	M	M	L	M	M	M	M	M	M	H		
CLO-6 :	Show a better awareness of the process of career exploration and how their own interests and skills connect with a chosen professional path.			3	75	70	M	H	M	H	M	M	L	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	Class coding basics
	SLO-2	Partnership related solving problems	Etiquettes	SQL Statement Classes	SQL – inner joins –Join Syntax	Class coding basics – quiz session
S-2	SLO-1	Cryptarithmic	Interview Skills - Introduction	Introduction to Databases	Introducing Python	Understanding Data Structures
	SLO-2	Cryptarithmic – solving problems	Do's and Don'ts during Interview	SQL - Databases & RDBMS	Introducing Python Object Types	Python for Data
S-3	SLO-1	Ordering, Ranking	Mock Interview – Session 1	SQL data types - Introduction	Python - Data Types & Operators	Python Data Types
	SLO-2	Grouping	Mock Interview – Session 2	SQL data types	Python's Core Data Types	Overview of Python Data Types
S-4	SLO-1	Venn Diagrams concepts	Mock Interview – Session 3	SQL - Syntax	Introduction to Functions	Python Structures
	SLO-2	Venn Diagrams solved questions	Mock Interview – Session 4	SQL – Data Type Syntax	Why use Functions	Overview of Python Data Structures

S-5	SLO-1	Types of Paragraph	HR Round – Practice Session	SQL – Commands Introduction	Python – Functions basic	Python - Collections
	SLO-2	Paragraph Forming Questions	HR personal Interview –Mock-Session	SQL - DDL, DML Commands	Coding functions	Improving Code readability
S-6	SLO-1	Types of Sentences	Email Etiquettes	SQL - Subqueries	Introduction to Classes	Collection Module
	SLO-2	Ordering of Sentences	Email Drafting – Do's and Don'ts	Non-correlated Subqueries	Why Use Classes?	Collection Module in Python

Learning Resources	1. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata McGraw Hill, 5th Edition	4. Bhatnagar R P, English for Competitive Examinations, Trinity Press, 2016
	2. Dr. Agarwal.R.S, Quantitative Aptitude for Competitive Examinations, S. Chand and Company Limited, 2018 Edition	5. C. J. Date, A. Kannan, S. Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
	3. Edgar Thrope, Test of Reasoning for Competitive Examinations, Tata McGraw Hill, 6th Edition	6. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.

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	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 Vidyapeedam, Coimbatore	Dr. Sathish K, HOD, Department of Career Guidance, FSH, SRMIST
		Ms. Deepalakshmi S, Assistant Professor, Department of Career Guidance, FSH, SRMIST

Course Code	UMI23S01L	Course Name	My India Project	Course Category	S	Skill Enhancement course	L	T	P	C
							0	0	0	1

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

(Assessment Method – Fully Internal)

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

SEMESTER – V

Course Code	UCA23C51J	Course Name	Python Programming	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 APPLICATIONS		Data Book / Codes/Standards	NIL	

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)														
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CLR-1 :	Describe the core syntax and semantics of Python programming language.
CLR-2 :	Discover the need for working with the strings and functions.
CLR-3 :	Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
CLR-4 :	Indicate the use of regular expressions and built-in functions to navigate the file system.
CLR-5 :	Infer the Object-oriented Programming concepts in Python.

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

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

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:
CLO-1 :	Develop, document, and debug modular python programs to solve computational problems
CLO-2 :	Select a suitable programming construct and data structure for a situation.
CLO-3 :	Use built-in strings, lists, sets, tuples and dictionary in applications.
CLO-4 :	Define classes and use them in applications
CLO-5 :	Use files for I/O operations.

Duration (hour)		18	18	18	18	18
S-1	SLO-1	An introduction to python programming	The Structure of Strings	Introduction to Lists, List literals	Introduction to function, Functions as Abstraction Mechanisms	Introduction to classes
	SLO-2	Structure of a Python program	The Subscript Operator	Basic list operators, Replacing an Element in a List	Functions Eliminate Redundancy, Functions Hide Complexity	Design with Classes
S-2	SLO-1	understanding Python interpreter	Program using subscript operator	Replacing an Element in a List	Functions Support General Methods with Systematic Variations	Objects and Classes, An example for class
	SLO-2	understanding Python Shell	Slicing for Substrings, Program for slicing substrings	Example program to Replace an Element in a List	Functions Support the Division of Labor	Docstrings
S-3	SLO-1	Datatypes, Example program using all data types	Testing for a Substring with the in Operator, Program using substring	List Methods for Inserting Elements	Defining a Recursive Function	Method Definitions, The init Method
	SLO-2	String literals, Escape Sequences	The Positional System for Representing Numbers	Program to List Methods for Inserting Elements	Tracing a Recursive Function	Instance Variables
S-4-6	SLO-1	Lab 1: Write a Python code to display system information using pywhois	Lab 4: Make a simple calculator	Lab 7: Program to Transpose a Matrix Program to List Methods for Inserting Elements	Lab 10: Program using recursive function	Lab 13: Program using classes and methods
	SLO-2					
S-7	SLO-1	String Concatenation	Converting binary to decimal, Program to convert binary to decimal	List Methods for Removing Elements	Using Recursive Definitions to Construct Recursive Functions	The str Method
	SLO-2	Variables and the assignment statement	Converting decimal to binary, Program to convert decimal to binary	Searching a List, Sorting a List	Recursion in Sentence Structure	Accessors, Mutators
S-8	SLO-1	Example program using variables	Converting binary to decimal, Program to convert binary to decimal	Mutator Methods, Aliasing	Infinite Recursion, The Costs and Benefits of Recursion	The Lifetime of Objects
	SLO-2	Program Comments and Doc Strings	Converting decimal to binary, Program to convert decimal to binary	Aliasing side effects	Managing a Program's Namespace	Rules for Defining a Simple Class
S-9	SLO-1	Numerical Datatypes, Character sets	String Methods, Program using string method	Equality: Object Identity	Module Variables, Parameters, and Temporary Variables	Rational Number Arithmetic and Operator Overloading
	SLO-2	Arithmetic expressions, Understanding error messages	Octal and Hexadecimal Numbers, Text Files and Their Format	Structural Equivalence	Scope, Lifetime	Comparison Methods, Equality and the eq Method
S	SLO-1					

10-12	SLO-2	Lab 2: The Magic 8 Ball is a toy used for fortune-telling or seeking advice.	Lab 5: Find the Factorial of a Number Python Program to Convert Decimal to Binary, Octal and Hexadecimal	Lab 8: Using a List to Find the Median of a Set of Numbers Program using sorting and searching	Lab 11: Write the code for a mapping that generates a list of the absolute values of the numbers in a list named numbers.	Lab 14: Python Program for Operator overloading
S-13	SLO-1	Logical operators	Writing Text to a File, Writing Numbers to a File	Tuples, Creation of several tuples	Default (Keyword) Arguments	Using pickle for Permanent Storage of Objects
	SLO-2	Definite iteration : For loop, Example program using for loop	Reading Text from a File, Reading Numbers from a File	Dictionaries, Dictionary Literals	Functions as First-Class Data Objects	Input of Objects and the try-except Statement
S-14	SLO-1	Formatting text for output,	Example program to read and write text and numbers	Adding Keys and Replacing Values	Mapping, Filtering, Reducing	Inheritance Hierarchies and Modeling
	SLO-2	Selection : if and if else statement, Example program using if and if else	Accessing Files and Directories on Disk	Accessing Values	Using lambda to Create Anonymous Functions	Polymorphic Methods, Abstract Classes
S-15	SLO-1	Conditional iteration :while loop	Manipulating Files and Directories on Disk	Removing Keys	Example program using functions	The Costs and Benefits of Object-Oriented Programming
	SLO-2	Example program using while loop	Example program to access and manipulate files	Traversing a Dictionary	Creating Jump Tables	Event-Driven Programming, Example for Event-Driven Programming
S 16-18	SLO-1 SLO-2	Lab 3: Check whether a number is prime or not, Python Program to Generate a Random Number	Lab 6: Program to read and write text and numbers	Lab 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?”	Lab 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.	Lab 15: Program using polymorphism, abstract classes

Learning Resources	Kenneth A. Lambert, <i>The Fundamentals of Python: First Programs</i> , 2011, Cengage Learning, ISBN: 978-1111822705
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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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai			Dr.S.Gopinathan, Professor, University of Madras, Chennai			Ms.N.Revathi
						Dr. Agusthiyar. R

Course Code	UCA23C52J	Course Name	COMPUTER NETWORKS	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,	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																		
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:	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 need for Network and various layers of OSI and TCP/IP reference model.		2	85	80	H	H	M	M	M	H	M	M	M	M	M	M	L	L	L
CLO-2 : Explain various Data Communications media		3	85	80	H	H	M	M	M	H	M	M	M	M	L	M	L	L	L
CLO-3 : Identify the different types of network topologies and Switching methods.		3	85	80	H	H	M	M	M	H	M	M	M	M	L	M	L	L	L
CLO-4 : Identify the different types of network devices and their functions within a network.		3	85	80	H	H	M	M	M	H	M	M	M	M	L	M	L	L	L
CLO-5 : Analyze and Interpret various Network and Transport Layer protocols.		3	85	80	H	H	M	M	M	H	M	M	M	M	L	M	L	L	L

Duration (hour)		18	18	18	18	18
S-1	SLO-1	Evolution of Computer Networks	Data Link Layer	Network Layer	Transport Layer	Physical Layer - Functionalities
	SLO-2	The Internet	Functionalities	Functionalities	Functionalities	Transmission Terminology
S2	SLO-1	The Internet today	MAC Addressing	Network Addressing	Port Number	Frequency, Spectrum, And Bandwidth
	SLO-2	Computer Network Architecture	Framing	Class full 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: Analyze the Working of a DNS
	SLO-2					
S7	SLO-1	Protocols	Flow Control – Stop and Wait	Routing Table	UDP Functionalities	Analog to Digital Conversion
	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 Layard 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 Packet Tracer (CPT)	Laboratory 5: Construct N/W using Ring topology, Mesh topology	Laboratory 8: Connecting 2 LANs Using Dynamic Routing	Laboratory 11: Analyzing the Working of RIP	Laboratory 14: Implementing a simple web server
	SLO-2					
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 Waves Characteristics-Applications
S-15	SLO-1	Comparison of Layers	Error Correction -Types	Advantage of Packet Switching	SMTP Overview-Connection Setup-	Satellite Communication
	SLO-2	Comparison of the services	Hamming Code	Compare Circuit and Packet Switching	Mail Transfer	Compare Feature of Guided Vs Un Guided Transmission Media
S16-18	SLO-1	Laboratory 3: Build a Peer to Peer N/W using Hub and Switch. Analyze 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	3.WilliamStallings,(2010), "Data and Computer Communications", Ninth Edition 4. https://www.netacad.com/courses/packet-tracer
	2. ToddLammle,(2011), "CCNA Study Guide", Seventh Edition	

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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	SWEETY BAKYARANI E

Course Code	UCA23C53J	Course Name	OBJECT ORIENTED ANALYSIS & DESIGN	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 Applications	Data Book / Codes/Standards	NIL		

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	<i>Build high quality reusable software</i>	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 :	<i>Apply UML for modeling problems</i>																		
CLR-3 :	<i>Understand Software Design Patterns</i>																		
CLR-4 :	<i>Develop reliable software systems</i>																		
CLR-5 :	<i>Apply Standardized testing approaches</i>																		
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																	
CLO-1 :	<i>Master the vocabulary, use and idioms of the UML</i>	2	85	80	H	H	M	M	H	M	M	M	M	L	L	M	L	L	M
CLO-2 :	<i>Scope of Object Oriented Software Systems</i>	3	85	80	H	H	M	M	H	M	M	M	M	L	L	M	L	L	M
CLO-3 :	<i>Understand and Apply UML</i>	3	85	80	M	M	M	M	H	H	H	M	M	L	L	M	L	L	M
CLO-4 :	<i>Design UML Architecture for a system</i>	3	85	80	M	M	M	M	H	H	H	M	M	L	L	M	L	L	M
CLO-5 :	<i>Develop Test Templates</i>	3	85	80	M	M	M	M	H	H	H	M	M	L	L	M	L	L	M

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 Case Study: Library Management System	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					
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 Development, Third Edition, Pearson Education, 2005 3. Ali Bahrami – Object Oriented Systems Development – McGraw Hill International Edition – 1999
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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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Mr.D.B.Shanmugam, SRMIST

Course Code	UCA23D01J	Course Name	WINDOWS PROGRAMMING USING VB.NET	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 Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Understand the basic structure of VB.Net and features of IDE
CLR-2 :	Understand .NET framework and can realize some of the major enhancements in the new version of VB
CLR-3 :	Develop programs using primitives and constructs in VB .NET
CLR-4 :	Handle controls in Forms(message Box, InputBox), Windows MDI forms and Controls (Textbox, Creating MultiLine, Word Wrap textboxes)
CLR-5 :	Understand various controls in VB.NET and able to develop programs using controls

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

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

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:
CLO-1 :	Design/develop programs with GUI interfaces
CLO-2 :	Assemble multiple forms, modules, and menus into working VB.NET solutions
CLO-3 :	Develop menu based program for text manipulation
CLO-4 :	Implement lists and loops with VB.NET controls and iteration
CLO-5 :	Understand ADO .NET and develop database applications

Duration (hour)		15	15	15	15	15
S-1	SLO-1	Evolution of the .NET Framework	Control Statements	Inheritance	Exception Handling	Single Document Interface(SDI)
	SLO-2	Overview of the .Net Framework	If Statement	Polymorphism& Virtual Methods	Default Exception Handling Mechanism	Multiple Document Interface (MDI)
S-2	SLO-1	Components of .NET Framework	Radio Button Control	Abstract classes & Abstract Methods	User Defined Exception Handling Mechanism	Implementation for SDI and MDI
	SLO-2	Common Language Runtime (CLR)	Check Box Control	Sealed Classes	Implementation for Default and User Defined Exception Handling	Dialog Boxes
S-3	SLO-1	Common Type System(CTS)	List Box Control, Group Box Control	Interfaces - Definition of an Interface	The Throw Statement	Implementation for Modal and Modeless Dialog Boxes
	SLO-2	Common Language Specification (CLS)	Checked List Box Control & Combo Box Control	Declaration of an Interface	Custom Exception	Built-in Dialog Boxes
S-4 to S-5	SLO-1	Lab1: Understanding the IDE of Visual Studio, Changing background and foreground color using toolbox controls	Lab 4: String Handling Functions, Applications using group box, list box, checked list box, combo box	Lab 7: Connecting to URL using Link Label, Paint Brush Application, Application for Implementing the concept Abstract class and abstract methods	Lab 10: Application using default and User Defined Exception Handling Mechanism	Lab 13: Develop applications using SDI and MDI
	SLO-2					
S-6	SLO-1	Framework Class Library (FCL)	Select ... Case Statement	Usage of Interface	Multithreading	Implementation for Dialog Boxes
	SLO-2	Base Class Library	While and Do Statement	Implementation of an Interface	Usage of Threads, Thread Class	ToolBar&StatusBarControl
S-7	SLO-1	AJAX	For Statement and Methods	Multiple Implementation of an Interface and Interface with Inheritance	Start(), Abort() and Join() Methods	Database Connectivity – Introduction
	SLO-2	Windows Forms	Types of methods	Implementation of an Namespace	Sleep(), Suspend(), Resume() Method	Advantages of ADO.NET
S-8	SLO-1	ASP.Net&ADO.Net	Arrays, One-dimensional Array	Components	Implementation for Thread Class	Managed Data Providers
	SLO-2	Benefits of .Net, VB.NET Language	Multidimensional Array	Access Modifiers	Thread Priority	Developing a Simple ADO.NET Based Application
S-9 to S-10	SLO-1	Lab2: Computing area of rectangle, circle, square , Designing Math Calculator	Lab 5: Digital clock using Timer control, Design of Animation application	Lab 8: Application using ImageList, Loading pictures into picture box, Application using Interface, Components	Lab 11: Application using Thread class, Multithreading	Lab 14: Textpad Application using Dialog control, Toolbar Application, Notepad Editor
	SLO-2					

S-11	SLO-1	Development of Simple VB.Net Program	Definition of Class&Usage of Class	Implementation for Public Access Modifier	Synchronization	Creating of a Data Table
	SLO-2	Variable declaration and Initialization	Jagged Array	Implementation for Private Access Modifier	I/O Streams	Retrieving Data from Tables
S-12	SLO-1	Value Data Types & Reference Data Types	Constructor Overloading	Implementation for Protected Access Modifier	Binary Data Files	Table Updating
	SLO-2	Boxing& Unboxing	Instance Class Members	Implementation for Friend Access Modifier and Protected Friend Access Modifier	Text Files, Data Files	Disconnected Data Access Through Dataset Object
S-13	SLO-1	Arithmetic Operator, Label Control& & Button Control	Shared Class Members	Implementation for Polymorphism	FileInfo classes	Object Model Data set Class
	SLO-2	Text Box Control	Shared Constructors	Implementation for Abstract Class and Abstract Methods	DirectoryInfo Classes	SQL& OLEDB Provider
S-14 to S-15	SLO-1	Lab 3: Shopping Cart Application, Student Marksheet, Application using text box control, Label and Button control	Lab 6: Sorting array in ascending and descending order, Implementing Constructor, Copy Constructor and Shared Constructor	Lab 9: Application using Sealed Class, Polymorphism, Access Modifiers	Lab 12: Application for implementing Thread priority, Synchronization, and files	Lab 15: Employee Database design with coding, Retrieving data using Grid control, Marksheet preparation using ADO.Net

Learning Resources	1. Muthu.C (2008), “Visual Basic.Net”, 2 nd Ed, Vijay Nicole Imprints Pvt., Ltd,	3. Michael Halvorson (2010), “Visual Basic 2010 Step by Step”, Microsoft Press.
	2. Jeffrey R.Shaprio (2002), “Visual Basic .NET The Complete Reference”, Mac Graw Hill	4. Harold Davis (2002), “Visual Basic.NET Programming”, Sybex.

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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	<i>Dr. E. Srimathi, Assistant Professor, Department of BCA, SRM IST, Ramapuram Campus.</i>

Course Code	UCA23D02J	Course Name	DATA ANALYSIS USING R	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 Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	<i>Learn in-depth concepts, methods and applications of R programming</i>	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	<i>Learn how to start looking at data from the perspective of the data scientist</i>																		
CLR-3 :	<i>Experimenting with different data pre-processing techniques for knowledge discovery</i>																		
CLR-4 :	Learn about data pre-processing and Exploratory Data Analysis																		
CLR-5 :	<i>Use R software for data import and export, data exploration and visualization, and for data analysis tasks</i>																		

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 fundamental concepts and applications of R Language	2	85	80	H	M	M	M	M	H	M	M	M	M	L	H	L	M	L
CLO-2 :	Analyze the basic principles of Controls statements , functions and arrays	3	85	80	H	M	M	M	M	H	M	H	M	M	L	M	L	M	L
CLO-3 :	Learn various data structures and their functions	3	85	80	M	M	M	M	M	H	M	H	M	M	L	H	L	M	L
CLO-4 :	Understand about data pre-processing and Exploratory Data Analysis	3	85	80	M	M	M	M	M	H	M	H	M	M	L	H	L	M	L
CLO-5 :	Apply data visualization techniques for various dataset	3	85	80	M	M	M	M	M	H	H	H	M	M	L	M	L	M	L

Duration (hour)	15	15	15	15	15
S-1	SLO-1 Introduction to R Programming	Control statements IF, IF...ELSE	R-Function	Importing Files: CSV,xls,text files	Overview of Data Visualization in R
	SLO-2 Essentials of the R Language	SWITCH	Creating Function, Calling function, passing Arguments	Loading and handling Dataset in R	Data Visualization Packages

S-2	SLO-1	Getting Started with R: Installation of R & R Studio	Looping statements: FOR	Built in functions: mean(), paste(),	Getting and Setting the Working Directory – getwd(),setwd()	Interactive Graphics
	SLO-2	R Packages	WHILE, REPEAT	sum(), min(), max(), seq()	tandard Deviation, Skewness ,Kurtosis, Bivariate Quantitative Analysis – Crosstabs , Covariance , Correlation, Data Manipulation in R	Working with Graphs: Creating and saving graphs, Customizing symbols, lines, colors, and axes Annotating with text and titles Controlling a graph's dimensions, Combining multiple graphs into one
S-3	SLO-1	Installing Packages	Control Statement: break statement, next statement	user-defined function	List Management Data Transformation	Plotting, Scatter plot,Line Plot
	SLO-2	Loading Libraries	Working with String and Date	Working with R Date & Math Functions	Merging Data Frames Outlier Detection Combining multiple vector	R – Bar Charts & Box Plot: Bar Chart Labels, Title and Colors.
S-4-5	SLO-1 SLO-2	Lab 1: Implementation to install R & R Studio and install & load packages	Lab 5: Implementation of Control Statements & Looping Statements in R	Lab 7: Implementation of R Function	Lab :9 Implemataion of Data Manipulation in R	Lab 13: Implementation of data visualization in R
S-6	SLO-1	Working with R Environement Setup	R Data Structure	Working with string functions	Introduction to Data Preprocessing in R	- R –Pie Charts: Pie Chart title and Colors – Slice Percentages and Chart Legend, 3D Pie Chart
	SLO-2	R Script	R Vectors – Sequence vector, rep function, vector access,	Manipulating Text in Data: substr(), strsplit(), paste(), grep(), toupper(), tolower()	Steps for Data Pre- processing in R	R Histograms – Density Plot,
S-7	SLO-1	Basic Syntax	R List - Creating a List, List, Add/Delete Element List, Size of List, Merging Lists, Accessing element in the List	Data Aggergation	Handling Missing Values: Is.na(),is.nan	Kernel density plots, Violin plots, Heat maps

	SLO-2	Variables in R	R Matrices: Creating Matrixes, Accessing Elements of a Matrix,	Data Summarization	na.omit, na.exclude, na.pass, na.fail	Regression Analysis - Simple Linear Regression
S-8	SLO-1	Variable Assignment	Matrix Computations: Addition, subtraction, Multiplication and Division	Apply Family: apply(), lapply(), sapply()	Exploratory Data Analysis ,Types of EDA	Multiple Regression
	SLO-2	Data types and R Objects	R Arrays: Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculation Across Array Elements	tapply(), mapply()	Descriptive Statistics : min(), max(), range(), mean(),	Logistic Regression
S-9,10	SLO-1 SLO-2	Lab:2 Implementation of data types in R	Lab 6: Implementation of Vector & List	Lab 7: Implementation of R Function	Lab :10 Implementation of R Program to handle missing values for real-time dataset	Lab 14: Implementation of various charts for catogorical data
S-11	SLO-1	Working with files: Read and writing into different types of files	Data Frames –Create Data Frame, Data Frame Access	split() Function, by()	median(), quartile ()	Poisson Regression
	SLO-2	Comments in R	Understanding Data in Data Frames: dim(), nrow(), ncol(), str(), Summary(), names(), head(), tail(), edit() functions - Extract Data from Data Frame	Working with Tables	Measures of Central Tendency:Mean,Median,Mode	Visualizing bivariate and multivariate relationships
S-12	SLO-1	Saving in R data ,Loading R data objects ,Writing to files	Expand Data Frame: Add Column, Add Row - Joining columns and rows	Matrix/Array-Like Operations on Tables	Measures of Dispersion	Understanding correlograms
	SLO-2	Data sorting , Data aggregation	Data frame rbind() and cbind()	Extracting a Sub table, Table-Related Function	Standard Deviation, ,Bivariate Quantitative Analysis	Using mosaic and association plots
S-13	SLO-1	R Operators: Arithmetic operators, Assignment operators	Merging Data frames merge() – Melting and Casting data melt(), cast().	Data Murging in R	Skewness ,Kurtosis	Identification of missing data

	SLO-2	Comparison operators, Logical operators, Miscellaneous operators	R Factors –creating factors, generating factor levels	Working with dplyr packages	Crosstabs, Covariance , Correlation,	Visualization of missing data patterns
S-14,15	SLO-1 SLO-2	Lab: 3 Implementation of operators in R	Lab 6: Working with Data frames & Factor	Lab 8: Implementation of Data murgung operationg for real-time data set.	Lab :12 Implementation of Descriptive Statistics	Lab:15: Implementation of Data Visualization for missing data petterns

Learning Resources	1. Roger D. Peng,” R Programming for Data Science “, 2012 2. Norman Matloff,”The Art of R Programming- A Tour of Statistical Software Design”, 2011	1. Robert I. Kabacoff, “R in Action Data Analysis and Graphics with R”, Manning Publications, 2011. 2. Tony Fischetti Data Analysis with R, Packt Publishing; 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, 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.D.Helen

Course Code	<i>UCA23D07J</i>	Course Name	WEB DEVELOPMENT USING ANGULAR JS AND MONGODB	Course Category		Discipline Specific Elective Courses	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 and Applications		Data Book / Codes/Standards	Nil	

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

	ecture 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	H	M	H	M	M	M	M	M	L	M	M	L	L	L
CLO-2 :	Distinguish the role of MVC in creating dynamic web applications	3	90	90			H	H	H	M	M	M	M	M	M	L	M	M	L	L	L

CLO-3 :	Understand the role of reusability and data encapsulation in the form of objects	3	85	85		M	M	H	H	H	M	M	M	M	L	L	M	L	L	L
CLO-4 :	Distinguish RDBMS and schema design of MongoDB	4	90	90		M	M	H	H	H	M	M	M	M	L	L	M	L	L	L
CLO-5 :	Perform query operations using MongoDB	3	90	90		M	M	H	H	H	M	M	M	M	L	L	M	L	L	L

Duration (Hour)		15	15	15	15	15
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 MongoDB Data: projection
S	SLO-1					

4-6	SLO-2	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
S-7	SLO-1	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
	SLO-2	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 i)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 Mongoddb: i)aggregate() method Aggregate expressions: i) \$sum ii) \$avg iii) \$min iv) \$max v) \$push vi) \$addToSet vii) \$first viii) \$last
S	SLO-1	Laboratory 2 – Java Script		Laboratory 8- Animation		

10-12	SLO-2	Operators and Conditions	Laboratory 5 – Hello World, Create Home Component		Laboratory 11- Data base Collection	Laboratory 14- Perform Various Aggregation Method
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 Mongoddb: 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	Lazy loading features modules	Perform Query Operation for the following situations i)Query on nested documents ii)Query an array	iv)Working with mongo deployment commands
S 15-18	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	1. JavaScript 2. Angular: Up and Running: Learning Angular, Step by Step 1st Edition, Kindle Edition by Shyam Seshadri (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		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										
	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%

Level 2	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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Dr S.Umarani , SRMIST,RPM

Course Code	UCA23G03J	Course Name	<i>Serverless Database Techniques</i>	Course Category	G	<i>Generic Elective Courses</i>	L	T	P	O	C
							3	0	2	2	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	<i>Understand Serverless Computing</i>	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	<i>Design Efficient and Scalable Applications</i>	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 :	<i>Improve Development Agility</i>																		
CLR-4 :	<i>Enhance Data Manipulation and Querying Skills</i>																		
CLR-5 :	<i>Ensure Data Security and Access Control</i>																		

Course Learning Outcomes (CLO):	At the end o 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 :	<i>Understand the concepts and benefits of serverless computing and its application in database systems.</i>	3	80	70	H	H	M	H	M	M	M	M	L	M	L	M	L	L	L
CLO-2 :	<i>Design and implement serverless database applications based on given requirements.</i>	3	85	75	H	H	M	M	H	M	M	M	M	M	L	M	M	L	L
CLO-3 :	<i>Apply appropriate data modeling techniques for serverless databases.</i>	3	75	70	M	M	M	H	M	H	H	M	M	M	L	M	M	L	L
CLO-4 :	<i>Perform querying and data manipulation operations in a serverless environment.</i>	3	85	80	M	M	H	H	M	M	M	H	M	M	L	M	M	L	L
CLO-5 :	<i>Implement security measures and access control mechanisms for serverless databases.</i>	3	85	75	M	M	M	M	H	H	H	M	M	M	L	M	L	L	L

Duration (hour)	15	15	15	15	15
S-1	SLO-1	Introduction to Serverless Computing and Databases	Designing Serverless Database Applications	Querying and Data Manipulation in Serverless Databases	Security and Access Control in Serverless Databases
					Monitoring, Troubleshooting, and Performance Optimization

	SLO-2	Understanding the concept of serverless computing and its benefits	Analyzing the requirements and considerations for serverless database application design	Querying and retrieving data from serverless databases using SQL and NoSQL techniques	Security considerations for serverless database applications	Monitoring serverless database performance and usage metrics
S-2	SLO-1	Overview of different types of serverless databases	Designing data models and schemas for serverless databases	Implementing data manipulation operations such as insert, update, and delete in a serverless environment	Implementing authentication and authorization mechanisms for serverless databases	Types of Troubleshooting databases
	SLO-2	Exploring the architectural components of serverless databases	Exploring the integration of serverless databases with other cloud services	Understanding the limitations and trade-offs of serverless querying and data manipulation	Applying encryption techniques to protect data in transit and at rest	Optimization of Serverless Database applications
S-3	SLO-1	Introduction to popular serverless database providers and their offerings	Best practices for performance optimization and scalability in serverless database applications	Exploring serverless database-specific querying languages and frameworks	Managing access control policies and roles in a serverless database environment	Implementing logging Strategies
	SLO-2	Types of Serverless Database Techniques	CRUD Operation in SQLite	SQLite Joins	Introduction to Azure Serverless Computing	error handling strategies in serverless database applications
S-4,5	SLO-1	Lab 1 : SQLite Installation, working with SQLite	Lab 4: Program to implement CRUD operations	Lab 7: Program to implement SQLite Join operations	Lab 10: A quick tour to Azure Serverless Computing	Lab 13: Run interactive queries using serverless SQL
	SLO-2					
S-6	SLO-1	Introduction of SQLite	SQLite Insert Query	SQLite Inner Join, Outer Join, Cross Join	Overview of Serverless Computing	Scaling strategies for serverless databases based on usage patterns
	SLO-2	History	SQLite Select Query	SQLite Date and Time,	Evolution of Serverless Computing	Auto-scaling strategies
S-7	SLO-1	SQLite Features	SQLite Update Query	Connectivity	Characteristics of Serverless Computing	Information Protection & Encryption
	SLO-2	SQLite Advantages	SQLite Delete Query	Database Connectivity	Benefits of Serverless Computing	
S-8	SLO-1	SQLite Syntax	SQLite Conditions	Python and SQLite Development	Supported Programming languages for Azure functions	Working with Azure Serverless SQL Database
	SLO-2	SQLite Data Type	List of conditions	SQLite Driver for Python	Azure Serverless SQL Database	Implementing Azure Serverless Solutions
S-9,10	SLO-1	Lab 2 : Program to execute SQLite commands	Lab 5: Program to implement SQLite Conditions	Lab 8: To create and execute a simple python program	Lab 11: Program to create serverless database using Azure.	Lab 14: Program to perform Customer Tweet Analysis
	SLO-2					

S-11	SLO-1	SQLite Operators	SQLite Where ,AND , OR	SQLite Indexes	Structure, Objective	Problem Statement for Customer Tweet Analysis application
	SLO-2	SQLite Expressions	SQLite LIKE	Python SQLite Cursor object	Overview of Azure Serverles SQL Database	Design the Customer Tweet Analysis application
S-12	SLO-1	SQLite Create DB, SQLite Detach DB	SQLite Glob , Limit	SQLite Transactions	Difference between Azure Serverless SQLDatabase and Azure Provisioned SQL Database	Implement the Customer Tweet Analysis application
	SLO-2	SQLite Attach DB	SQLite Order By ,Group By, SQLite Having	SQLite Constraints	Benefits of Azure Serverless SQL Database	Test the Customer Tweet Analysis application
S-13	SLO-1	SQLite Create Table	SQLite Distinct, SQLite Union, Union All	SQLite Views, Creating and dropping views	SQL Azure Database Architecture	Problem Statement & Design for Human Resource Management
	SLO-2	SQLite Alter Table	SQLite Triggers ,After Insert , After Update, SQLite Drop Trigger	Getting Started with Python and SQLite, Connecting to SQLite	Azure SQL Services, Scaling Using Azure SQL Database, Azure Blob Storage	Implement and Test the Human Resource Management
S-14, 15	SLO-1	Lab 3 : Program to create , attach and detach database	Lab 6: Program to implement Triggers	Lab 9: Program to perform SQLite Database connectivity from a python program	Lab 12: Program to perform basic database operations using Azure	Lab 15: Program to develop human resource management
	SLO-2					

Learning Resources	1.	Serverless Architectures on AWS: With examples using AWS Lambda" by Peter Sbarski
	2.	"Serverless Design Patterns and Best Practices: Build, secure, and deploy enterprise ready serverless applications with AWS" by Brian Zambrano and Ajay Nair
	3.	Python and SQLite Development by Agus Kurniawan
	4.	Mastering Azure Serverless Computing by Abhishek Mishra · 2020
	5.	"Hands-On Serverless Applications with Kotlin: Build scalable, reliable, and cost-effective applications with AWS and Kotlin" by Hardik Trivedi
	6.	"Serverless Applications with Node.js: Using AWS Lambda and Claudia.js" by Slobodan Stojanovic, Aleksandar Simovic, and Philipp Müns
	7.	"Mastering Azure Serverless Computing: Design and manage powerful serverless applications using Azure Functions" by Ovais Mehboob

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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Dr. P. Roshni Mol, SRMIST

Course Code	UCA23S05J	Course Name	Lua Programming	Course Category	S	Skill Enhancement Course				
						L	T	P	O	C
						1	0	1	2	1

Pre-requisite Courses	NIL	Co-requisite Courses	NIL	Progressive Courses	NIL
Course Offering Department	Computer Applications		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 :	Learn the basics of working with Lua	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Learn String Manipulation using Lua	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 :	Learn to work with decision control and looping statements																		
CLR-4 :	Learn object-oriented programming concept in Lua																		
CLR-5 :	Learn and use the concept of arrays																		

Course Learning Outcomes (CLO):		<i>At the end of this course, learners will be able to:</i>		
CLO-1 :	Understand the basics of programming the Lua language	3	80	70
CLO-2 :	Understand how to use tables, the data structure that makes Lua so powerful	3	85	75
CLO-3 :	Apply Inheritance	3	75	70
CLO-4 :	<i>Perform String Manipulation</i>	3	85	80
CLO-5 :	<i>Use Lua Libraries</i>	3	85	75

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

Duration (hour)		06	06	06	06	06
S-1	SLO-1	Introduction To Lua Programming	Functions	While Loops, Infinite Loops	Arrays	Inheritance
	SLO-2	Writing First Lua Program	Defining a Function, Calling a Function, Function Arguments, Any No of Arguments, Returning a value, Returning Multiple values	Breaking a Loop	Array constructors, Array are one based, Sparse array, The size of an array, Multidimensional array	Single and Multiple Inheritance
S-2	SLO-1	Basic Syntax	Define a function using variable no of arguments to sum all the argument passed.	Write a program to reverse a number	Write a program to add two matrix	Write a program to implement single and multiple inheritance
	SLO-2	Token, Comments, Identifiers, Keywords, Whitespaces				
S-3	SLO-1	Variables	Operators	Repeat until loop, for loop	Iterating	math
	SLO-2	Basic Data Types	Arithmetic operators, Relational Operators, Logical Operators, Misc Operators, Operator Precedence	Nested Loop	Understanding pairs, Understanding ipairs, Closures, Iterative functions	Trigonometry, Changing Numbers, Comparing Numbers, Randomness
S-4	SLO-1	Developing Simple Programs	Write a program to perform simple arithmetic operations	Write a program to generate multiplication table	Write a program to illustrate the concept Iterators	Write a program to work with math library
	SLO-2					
S-5	SLO-1	String Types - String Literals/, String Length, Concatenate Strings, String Coercion, Escape Characters, Console input	Control Structures	Creating Tables, Storing Values	Objects	File IO

	SLO-2	Scope – Scope access, Global Access, Shadowing	If, elseif, else, Nesting if statements	Table Constructors, Tables are references	Classes, The : operator, Tables inside of objects	Opening a File, Reading Data, Writing Data, Closing a File
S-6	SLO-1	Write a program to perform various string manipulations	Write a Program that takes user input. If typed 'Hi' display "Welcome", If typed "Bye", Display "Good Bye"	Write a program to work with tables	Write a program using class and objects	Write a program to create a file
	SLO-2					

Learning Resources	1.	<i>"Lua Programming, A Beginners Guide, 2019 Edition, The Definitive Lua Programming Guide, Lua Publishing</i>
	2.	<i>Lua Quick Start Guide by Gabor Szauer, 2018, Packt Publishing</i>

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	Theory	Practice			
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%	15%				
	Understand															
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%				
	Analyze															
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%	15%				
	Create															
	Total	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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Mr.D.B.SHANMUGAM, Assistant Professor, SRM IST, Ramapuram Campus,

Course Code	UCA23I51L	Course Name	INTERNSHIP - 2	Course Category	IAPC	Internship/Apprenticeship / Project/ Community Outreach	L	T	P	C
							-	-	-	1

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

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	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	M	M	M	M	M	M	M	M	M	M	L	H	M	H	H
CLO-2 :	To gain valuable skills and knowledge	3	85	75	M	M	M	M	L	M	L	M	M	M	L	H	L	H	H
CLO-3 :	To make professional connections and enhance networking	3	75	70	M	M	M	M	L	M	L	M	M	M	L	H	L	H	H

CLO-4 :	To get experience in a field to allow the student to make a career transition	3	8 5	8 0
CLO-5 :	To get an inside view of an industry and organization/company	3	8 5	7 5

M	M	M	M	L	M	L	M	M	M	L	H	L	H	H
M	M	M	M	L	M	L	M	M	M	L	H	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				
Project Work / Internship	Continuous Learning Assessment (50% weightage)		Final Evaluation (50% weightage)	
	Review – 1	Review – 2	Internship Report	Viva-Voce
	20%	30 %	30 %	20 %

SEMESTER-VI

Course Code	UCA23C61 J	Course Name	SOFTWARE ENGINEERING AND TESTING	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 Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Familiarize the software life cycle models and software development process	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Understand the various techniques for requirements, planning and Testing																		
CLR-3 :	Examine the basic methodologies for software design, development, testing																		
CLR-4 :	Manage user expectations and software development team																		
CLR-5 :	Acquire the latest industry knowledge like agile for development																		
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 :	Identify the process of project life cycle model and process	2	85	80	H	H	M	M	H	M	M	M	M	L	L	M	L	M	M
CLO-2 :	Analyze and specify software requirements through a productive working Relationship Customers.	3	85	80	H	H	M	M	H	M	M	M	M	L	L	M	L	M	M
CLO-3 :	Design the system based on Functional Oriented and Object Oriented Approach for Software Design.	3	85	80	M	M	M	M	H	H	H	M	M	L	L	M	L	M	M
CLO-4 :	Develop the correct and robust code for the software products	3	85	80	M	M	M	M	M	H	H	M	M	L	L	H	L	M	M
CLO-5 :	Perform by applying the test plan and various testing techniques	3	85	80	M	M	M	M	M	H	H	M	M	L	L	H	L	M	M

Duration (hour)		18	18	18	18	18
S-1	SLO-1	The Evolving Role of Software	Computer-Based Systems	Principles of Testing	Integration testing	Performance Testing
	SLO-2	Software Engineering Definition	The System Engineering Hierarchy – System Modeling	Introduction-Testing Definition	Top down Integration testing	Factors of Governing
S-2	SLO-1	Software Characteristics	System Simulation	Phases of software	Bottom up Integration testing	Regression testing
	SLO-2	Software Applications and A Crisis	Comparison of various software Development	Error, Fault, Bug-Failure of the system –Comparison of the terms	Bi-Directional Integration	Types of regression testing
S-3	SLO-1	Software Myths	Business Process Engineering: An Overview	Types of testing-	System Integration	Software testing strategy
	SLO-2	Types Of Myths, <i>Software Engineering : Layered Technology</i>	Requirements Engineering process, <i>Software requirements specification</i>	Quality assurance, <i>Quality Control</i>	System Acceptance Testing, <i>Functional testing</i>	Best practice in regression testing, <i>Methodology for Performance Testing</i>
S 4-6	SLO-1	Lab :Problem Statement Preparation	Lab : Software Requirement Specification Document Preparation	Lab : Preparation of DFD of any Project	Lab : Test Case Design	Lab : Manual Testing – Usage of Text
	SLO-2					
S-7	SLO-1	<i>Software Process</i>	<i>Characteristics of Good Requirements</i>	<i>Testing verification and validation</i>	<i>Non Functional testing</i>	<i>Tools for Performance Testing</i>
	SLO-2	<i>Software Process Models</i>	<i>Types of Requirements</i>	<i>White Box Testing</i>	<i>Functional Vs Non Functional Testing</i>	<i>Challenges for Performance Testing</i>
S-8	SLO-1	<i>Linear Sequential Model</i>	<i>Requirements Elicitation</i>	<i>Techniques of White Box Testing</i>	<i>System Testing</i>	<i>Performing Initial Test, Understanding the Criteria</i>
	SLO-2	<i>Advantages And Disadvantages</i>	<i>Requirements Analysis and Negotiation</i>	<i>Black box testing</i>	<i>Design and Architectural Verification</i>	<i>Classifying Test Cases.</i>
S-9	SLO-1	<i>Prototyping Model</i>	<i>Requirement Documentation</i>	<i>Techniques of Black box testing</i>	<i>Deployment Testing</i>	<i>Resetting the Test Cases, Concluding the Results of Regression Testing</i>
	SLO-2	<i>Advantages And Disadvantages, Rapid Application Development Model</i>	<i>Requirement Specification and Analysis, Software Requirement Specification and System Requirement Specifications</i>	<i>Static Testing, DYNAMIC Testing</i>	<i>Beta Testing, Certification, Standards</i>	
S 10-12	SLO-1	Lab :Problem Statement Preparation	Lab: Drawing E-R Diagram for any project	Lab : Preparation of DFD of any Project	Lab : Manual Testing – Calculator	Lab : Manual Testing – Sorting
	SLO-2					
S-13	SLO-1	Evolutionary Process Models	Characteristics of Good SRS Document	Challenges in white box testing	Testing for Compliance	Configuration testing

	SLO-2	Incremental Model	Requirement Management	Black Box Testing	Scalability Testing	compatibility testing
S-14	SLO-1	Advantages and Disadvantages	Software Prototyping	Techniques of Black Box Testing	Reliability testing	Test plan with debugging
	SLO-2	Spiral Model, WIN WIN Model	Selecting the prototyping approach	Structural testing	Stress testing	Levels of testing
S-15	SLO-1	Concurrent Development Model	Specification Principles, Representation	Static testing	Acceptance Testing	Testing tools
	SLO-2	Component Based Development, Comparison of Process models	Specification Review, Characteristics of Good E-R Diagrams, SRS Document	Verification & Validation Techniques, Cyclomatic complexity, Control flow graph	Acceptance Criteria, Selecting Test Cases, Executing Tests	Key Issues in Software maintenance
S-16-18	SLO-1	Lab : Software Requirement Specification Document Preparation	Lab: Drawing E-R Diagram for any project	Lab : Test Case Design	Lab : Manual Testing – Mark sheet	Lab : Manual Testing – Login Form
	SLO-2					

Learning Resources	1. Roger S. Pressman, (2001), “Software Engineering “, Fifth edition, McGraw-Hill Higher Education - A Division of The McGraw-Hill Companies. 2. Srinivasan Desikan and Gopalasamy Ramesh, "Software Testing for Principles and Practices", Pearson Education.	3. William E. Perry (2006), “Effective Methods of Software Testing”, 3rd Ed, Wiley India. 4. Renu Rajani, Pradeep Oak (2007), “Software Testing”, TMH
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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 %	

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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	Mr .J. Venkata Subramanian, SRMIST
		Mrs. M. R. Sudha, SRMIST

Course Code	UCA23C62J	Course Name	WIRELESS COMMUNICATION & MOBILE COMPUTING	Course Category	C	Discipline Specific Core Courses	L	T	P	O	C
							4	0	0	2	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Understand the concept of Wireless and Mobile Communication
CLR-2 :	Learn the protocols followed in Wireless Communication
CLR-3 :	Understand the effectiveness of Mobile Nodes and IP
CLR-4 :	Identify the various types of Ad-hoc Networks
CLR-5 :	Study about latest protocols and applications of wireless and mobile standards

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:
CLO-1 :	Understand the concept of Wireless Communication, Spread Spectrum
CLO-2 :	Learn the concepts of Multiplexing, Medium Access Control
CLO-3 :	Able to understand the Mobile Communications and Standards
CLO-4 :	Grasp the Social Awareness of Telecommunication Systems
CLO-5 :	Defend the need for Wireless Communication in providing solution to technical problems

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

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 to Networks	Wireless LAN	Wireless ATM	Mobile Computing Introduction	Mobile Telecommunication System
	SLO-2	Wireless Networks	IEEE 802.11 Architecture	Mobile Network Layer		
S-2	SLO-1	Transmissions	Protocol Architecture	Handover Location Management	Wireless Networking and Mobile Computing	Global System for Mobile Communication
	SLO-2	Wireless Transmission	MAC Management			
S-3	SLO-1	Applications of Wireless Transmission	Hyper LAN	Access Point Control Protocol	Mobile Computing Applications	General Packet Radio Service
	SLO-2		Protocol Architecture	Mobile IP		
S-4	SLO-1	Frequency	Channel Access Control Sub layer	DHCP	Characteristics of Mobile Computing	Universal Mobile Telecommunication System
	SLO-2	Radio Transmission	Medium Access Control Sub layer		Advancements	
S-5	SLO-1	Signal Propagation	Bluetooth	Types of Handover	Structure of Mobile Computing	Commercial Mobile Operating Systems
	SLO-2	Multiplexing		Handover scenarios		
S-6	SLO-1	Space Division Multiplexing	Bluetooth Physical layer	Forward and Backward Handover	Mobile Ad-hoc Networks	Software Development Kit
	SLO-2	Frequency Division Multiplexing	MAC layer	Computer Tomography		IOS
S-7	SLO-1	Time Division Multiplexing	Networking Security	Mobile Quality Service	Needs and Importance of Mobile Ad-hoc Networks	Android Operating System
	SLO-2	Classical Aloha, Slotted Aloha	Link Management	APCP Objective type Test		
S-8	SLO-1	CSMA, Demand Assigned Multiple Access	WATM Services	IP Packet Delivery	Ad-hoc Concepts	Blackberry, Windows OS
	SLO-2	Code Division Multiplexing	Reference Model	Agent advertisement		
S-9	SLO-1	Modulations	Telecommunication System	Discovery	Ad-hoc Characteristics	M-Commerce
	SLO-2				Applications	
S-10	SLO-1	Spread Spectrum	Satellite System	Tunneling & Encapsulation,	Design Issues	Structure Pros & Cons
					Routing	
S-11	SLO-1	PRMA	Broadcasting System	Reverse Tunneling,	Traditional Routing Protocols	Mobile Payment System
	SLO-2	Medium Access Control			Popular Routing Protocols	
S-12	SLO-1	Multiple Access with Collision Avoidance	Handover Reference Model	Optimization,	Vehicular Ad-hoc Networks	Security Issues
			Handover Requirements	DSDV, DSR	Mobile Ad-hoc Networks	

Learning Resources	1. William Stallings, "Wireless communication and networks", Pearson education 2. Jochen H. Schiller, "Mobile Communications", Pearson Education, New Delhi, 2007, 2nd Edition. 3. Dharma Prakash Agarwal, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd. 2005 4. UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, "Principles of MobileComputing", Springer 2003	5. NPTEL & MOOC courses titled Mobile Computing 6. https://www.smartworld.com/notes/mobile-computing-pdf-notes-mc-notes-pdf/ 7. https://www.vidyarthiplus.com/vp/Thread-IT6601-Mobile-Computing-Lecture-Notes-All-Uni 8. https://nptel.ac.in/courses/106106147/
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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.,

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Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
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Course Code	USA23603T	Course Name	Research Methodology	Course Category	C	Discipline Specific Core Courses				L	T	P	C
										4	0	0	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 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)	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 :	Obtain adequate knowledge about Research process models and software.																		
CLR-4 :	Identify the research methods involved in various area.																		
CLR-5 :	Define the hypothesis value, research reporting structure.																		
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	M	H	M	M	L	M	M	L	L	H	L	M	M
CLO-2 :	To plan and manage hypothesis value at each stage of the Research.	3	85	80	H	H	M	H	M	M	L	M	M	L	L	H	L	M	M
CLO-3 :	To learn about the Research Type and find the correct methods to the	3	85	80	H	H	M	H	M	M	L	M	M	L	L	H	L	M	M
CLO-4 :	To develop Research skill.	3	85	80	H	H	M	H	M	M	L	M	M	L	L	H	L	M	M
CLO-5 :	To develop skills to manage the various phases involved in Research.	3	85	80	H	H	M	H	M	M	L	M	M	L	L	H	L	M	M

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 to Research Methods	Introduction to literature review	Introduction to Research Design	Introduction to Design of Sample Survey	Introduction to Data Collection & Analysis Primary & secondary data
	SLO-2					
S-2	SLO-1	Definition of research	Methods to collect the meaningful data	Identify the research problem	Introduction to Census	Validity and Reliability of data collection Procedures
	SLO-2					
S-3	SLO-1	Role of Research	Data Cleaning	Select a Research problem	Introduction to Sample enumerations	data preparation and exploratory data analysis
	SLO-2					
S-4	SLO-1	objectives of research	Reviewing the data	Defining a Research problem	Difference between Census V/s Sample enumerations	Introduction to parametric and nonparametric tests
	SLO-2					
S-5	SLO-1	Applications of research	Process the data	Introduction to need of research problem design	Introduction to objectives in Research sampling	Introduction to correlation and regression analysis
	SLO-2					
S-6	SLO-1	Research in Computer Science & Applications	Analysis the Data	Apply the Research design with the simple data set	Introduction to principles of sampling	Introduction to ANOVA Using MS Word - Test formatting, Math Type, MS Equation editor
	SLO-2					
S-7	SLO-1	Steps involved in research	Conceptualization of a research problem	Introduction to Good Design	Introduction to Types of Sampling in Research methods	Introduction to INFLIBNET, e-journals, e-library and Scopus, Mathematical reviews
	SLO-2					
S-8	SLO-1	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
	SLO-2					
S-9	SLO-1	Types of Research	Identifying the variables	Introductions to different Research design	Non-sampling errors	Introduction to LAN, WAN, GAN, Internet
	SLO-2					
S-10	SLO-1	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
	SLO-2					
S-11	SLO-1	Introduce the basic software to develop a Research	constructing hypothesis	different research designs - descriptive	Designing Questionnaires	Search Engines, Scientific search engines
	SLO-2					
S-12	SLO-1	Research Process	Types of hypotheses.	different research designs - experimental	Design the interview	Prepare a PDF and Latex files
	SLO-2					

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	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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Dr. V.Raja SRM IST, Vadapalani

Course Code	UCA23D04J	Course Name	Introduction to Animation	Course Category	D	Discipline Specific Elective 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 Applications	Data Book / Codes/Standards	NIL		

Course Learning Rationale (CLR):		Learning	Program Learning Outcomes (PLO)
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CLR-1 :	To acquire the knowledge on basic principles of animation
CLR-2 :	To learn the art of story telling
CLR-3 :	To up skill digital character based animation and titles for short films, videos
CLR-4 :	To learn 2D animation, motion graphics and GIF stickers
CLR-5 :	Understand key principles and process to translate sequential images into animation
CLR-6 :	To understand basic knowledge on Rendering

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

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

Course Learning Outcomes (CLO):		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
CLO-1 :	Understand the design principles to animation production	2	75	70
CLO-2 :	Identify the 12 principles of animation and apply them	2	80	70
CLO-3 :	Assess and commend the trends in current animation	2	70	60
CLO-4 :	Demonstrate progress in basic drawing and animation	2	70	65
CLO-5 :	Create traditional and computer generated 2D animation, motion graphics and GIF stickers	2	75	70
CLO-6 :	Create digital animation ad knowledge of rendering	2	80	65

Duration (hour)		18	18	18	18	18
S-1	SLO-1	Animation - Introduction	Applications	Modifier	Ball animation - gradients	Animal Walk Cycle
	SLO-2	Concept	Outcomes	Bend	Using key frames	Drawing Cycle sheet
S-2	SLO-1	Research	Cell Animation	Smooth	Stretch and squash	Drawing animal
	SLO-2	Preparation	Introduction	Special features	Timing and motion	Dividing body parts - symbols
S-3	SLO-1	Narrative Drawing	Walk Cycles	Bend Tool	tween	Creating key frames
	SLO-2	Techniques and approach	Drawing		Shadow layer	Different types of walk cycle
S-4-6	SLO-1	Lab: Types of animation	Lab: 3D software interface	Lab: Frame by frame animation of 10-20 sec	Lab: Ball animation	Lab: Animal walk cycle
	SLO-2					
S-7	SLO-1	Story	3D animation	UV Map	Creating symbols	Lip synchronization
	SLO-2	Design		Effects	Drawing simple character	Knowing alphabets
S-8	SLO-1	Design as concept	Standard and Extended primitives	Effects tool	Using pen tool or shape tool	Knowing movements
	SLO-2	Art of Story telling	Standard Tool	Modelling	Divide body parts to symbols	Creating mouth shapes
S-9	SLO-1	Storyboard as narratives	Adjusting Segment, Logo	Logo	Creating symbols	Movement of the lips
	SLO-2	Storyboard as composition	Architecture, tilting	Modeling tool	Type of symbols	Creating expression, emotion
S-10-12	SLO-1	Lab: Principles of Animation	Lab: Drawing tools, pen tools create drawing in the frames.	Lab: Frame by frame animation in color (20 sec)	Lab: Character drawing & creating symbols	Lab: Lip Synchronizing character mouth shape & dialogue
	SLO-2					
S-13	SLO-1	Character and movement	Creating object	Special Effects	Human walk cycle	Short animation film
	SLO-2	Character Development	Creating tool	Bomb and Particles	Drawing cycle sheet for walk	Storyboard creation
S-14	SLO-1	Sound	Material Editor	Special tool	Creating key frames and tween	Background in layers
	SLO-2	Technique	Applying on objects	Video tool	Normal walk cycle	Creating characters
S-15	SLO-1	The Animator	Giving effects	Lighting tool	jump, run	Creating props, scenes
	SLO-2	Roles	Editing tool	Camera tool	Tiptoe, crawl	Background music & dialogue
S-16-18	SLO-1	Lab: Principles of Animation	Lab: draw flipbook with animation principles	Lab: Creating simple animation with shape, classic & motion tweening.	Lab: Human walk cycle	Lab: Create a short animation film
	SLO-2					

Learning Resources	1. Frank Thomas and Odie Johnson, <i>The Illusion of Life: Disney Animation</i>, Disney Editions; Rev Sub edition, 2014 2. <i>The Animator's Survival Kit</i> by Richard Williams, Revised Edition, Faber & Faber, 2011 3. Wells, P. (2006) <i>The Fundamentals of Animation</i>. Switzerland: AVA Publishing 4. Autodesk 3ds Max 2013 Essentials, Dariush Derakhshani, 2013, First Edition, John Wiley and Sons, USA 5. Adobe Creative Team, 2012 <i>Adobe After Effects CS6 Classroom in a Book</i> Adobe.
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	6. <i>Cartoon Animation with Preston Blair, Revised Edition!:</i> Learn techniques for drawing and animating cartoon characters, Preston Blair, Walter Foster Publishing, 03-Nov-2020
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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%	20%	20%
	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%	10%	10%
	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	Mrs J Shyamala Devi, Assistant Professor, SRMIST, Ramapuram

Course Code	UCA23D05J	Course Name	INTRODUCTION TO COMPUTER VISION	Course Category	D	Discipline Specific Elective 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 Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
CLR-1 :	Inculcate the fundamentals of computer vision	1	1
CLR-2 :	To teach the functions of a Computer vision techniques involved in training the Computer vision models on different problems	2	2
CLR-3 :	Build intelligent and automated real-world Computer vision applications	3	3
CLR-4 :	To teach the participants choosing the right set of frameworks involved in building critical Computer Vision.		4
CLR-5 :	Introduction to Text classification, Image classification, Image detection, Object recognition, and Object detection techniques.		5
CLR-6 :	Apply real-world business problems		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)	Fundamental Knowledge
CLO-1 :	Understanding the fundamental concepts of Computer vision	2	H
CLO-2 :	Gain hands-on solid skills, knowledge and expertise of real-world situations	3	H
CLO-3 :	Expertise in Data gathering, Data collection, Model training, and model evaluation with domain-specific components.	3	H
CLO-4 :	Applying all the computer vision techniques to real -world industry problems.	3	H
CLO-5 :	Applying the right computer vision techniques for the problem statement at hand.	3	H
CLO-6 :	Design and develop the "end-to-end" computer vision solution for a given problem statement either in a group or individually.	3	H
		Expected Proficiency (%)	Application of Concepts
		Expected Attainment (%)	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

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)	18	18	18	18	18
S-1	SLO-1	Computer Vision - Introduction	Computer Vision Workflow Steps	Computer Vision Techniques an Overview	Image Classification Models
					Computer Vision in Real World Applications

	SLO-2	Computer Vision Overview	Business Problem Identification	Image Processing	ImageNet	Computer Vision in Healthcare
S-2	SLO-1	Computer Vision defined from academic perspective	Success Criteria Definition	Image Processing Techniques	CIFAR	Computer Vision in Retail
	SLO-2	Computer Vision defined from Industry perspective	Right Computer Vision Techniques	Image Restoration, Linear Filtering , Independent Component Analysis , Pixelation	MNIST	Computer Vision in Energy
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	Computer Vision in Oil & Gas
	SLO-2	Pattern recognition of Computer Vision	Label Train and Test Datasets	Linear Filter, Non Linear Filter, Box Filter, Gaussian Filter	Fast R-CNN	Computer Vision in Automobile
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	Lab 13: Image Filtering bilateral OpenCV
S-7	SLO-1	Challenges of Computer Vision	Train the computer vision model	Median Filter	Faster R-CNN	Computer Vision in day to day life
	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	Harris Corner Detector, SIFT (scale invariant feature transform), SURF (speeded-up robust features), FAST (features from accelerated segment test	Challenges	Surveillance

	SLO-2	Is your data good enough?	Deploy the model	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)	High level decisions	Fingerprint recognition and biometrics
S-9	SLO-1	Data Structure	Iterate the steps process	Problems that Computer Vision can Solve	Choosing the hardware components (GPU, TPU)	Medical Imaging
	SLO-2	Data Format	Computer vision architecture	Text Classification	Building a CV Software system	Object Recognition
S-10-12	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-13	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-14	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-15	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-16-18	SLO-1	Lab 3-Draw a Rectangle	Lab 6: Finding Contours	Lab 9: Image Translation OpenCV	Lab 12: Morphological Operations Dilation OpenCV	Lab 15: Morphological Operations Closing OpenCV
	SLO-2	Draw a Circle		Image Filtering OpenCV		

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.,

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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	UCA23D06J	Course Name	PROGRAMMING USING C#	Course Category	D	Discipline Elective Course	L	T	P	C
							3	0	3	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 cover the fundamental concepts of the C# language
CLR-2 :	To learn various C# libraries
CLR-3 :	To understand the basis of web programming
CLR-4 :	To understand the basis of Windows Programming
CLR-5 :	To understand .NET Controls and ActiveX Data Objects
CLR-6 :	To enable the learner to become an application developer using this language

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

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	L	H	M	M	M	L	M	L	L	H	M	L	L	L
H	H	M	M	M	M	L	M	L	L	H	M	M	L	L
H	H	M	M	M	M	L	M	L	M	H	M	M	L	L
H	H	H	M	M	M	M	M	L	L	M	M	M	L	L
H	H	H	M	M	M	M	M	L	M	M	L	M	L	L
H	H	H	M	M	M	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 :	Understand the basics of C# and .NET framework
CLO-2 :	Develop applications using object-oriented aspects of C#
CLO-3 :	Design Windows applications
CLO-4 :	Create Database applications using ActiveX Data Objects
CLO-5 :	Develop Web based applications
CLO-6 :	Develop Web based applications with Database Interaction

Duration (hour)	18	18	18	18	18
S-1	SLO-1	Introducing C# - Understanding .NET Framework	Class Fundamentals	Delegates – Declaration, Methods	Programming with Basic Windows Form Controls: Button Control, Label and Link Label Control ADO.Net framework

	SLO-2	Origin and Benefits	Principles, Defining Class	Delegate Instantiation, Invocation	Textbox Control, Radiobutton and Checkbox Controls	Architecture of .Net Framework
S-2	SLO-1	Overview of C#	Creating Objects	Multicast Delegates	Rich textbox Contro, Listbox and CheckedListbox Controls	ADO.NET managed providers
	SLO-2	Simple C# Program	Accessing Objects	Implementing Multicast delegates	Simple windows	Types of Providers
S-3	SLO-1	Literals, Variables and Data Types	Constructors	Console I/O Operations – Console Input, Output	ListView Controls, Advanced Windows Form Features	Data set – Object Model
	SLO-2	Declaration and Initialization of variables	Example using Constructors	Formatted Output, Numeric Formatting, Standard Numeric Format, Custom Numeric Format	Menus and Toolbars	DataTable Collection
S-4-S 6	SLO - 1	Lab 1: Initialization and Declaration, Data types	Lab 4: Classes, Constructors	Lab 7: Delegates	Lab 10: Create Windows Applications	Lab 13: Develop Web Applications Using Object Model
S-7	SLO-1	Operators and Expressions	Indexers and Properties	Event Handling	SDI and MDI Applications	Data source controls
	SLO-2	Evaluation of Expressions	Implementation of an indexer and property	Application of event with Delegates	Building MDI Applications	SQL DataSource, AccessDataSource
S-8	SLO-1	Program Control Statements: Branching	Inheritance	Errors and Exception Handling	Validation Controls	Working with Grid view
	SLO-2	If, If else, Elseif	Implementation of inheritance	Using try, Catch	Types of Validation Controls	Bind Data Using SqlConnection and SQL Adapter
S -9	SLO-1	Program Control Statements: Looping	Abstract Class, Sealed Class	Exception Hierarchy	Navigation Controls	DataList
	SLO-2	While, Do While, For	Case Study	Implementing Exception Hierarchy	Types of Navigation Controls	Templates and Events in Datalist

S-10 - S-12	SLO-1	Lab 2:Control Statements	Lab 5: Inheritance	Lab 8: Exception Handling	Lab 11: Develop Web Applications using Validation and Navigation Controls	Lab 14: Develop Web Application Using DataSource Control
	SLO-1	Methods in C#	Interface	Custom Exception	Data Controls	Formview
S-13	SLO-2	Case Study Using Methods	Sample Programs	Throwing our own Exceptions	Program using Data Controls	Displaying Data with Formview Control
	SLO-1	Arrays : Array Class, Array List	Operator Overloading	Multithreading in C#	Creating Web Applications	Repeater Control
S-14	SLO-2	One Dimensional array, Two Dimensional array, Jagged Arrays	Overloadable Operators, Defining	Creating and Starting Thread	Case Study	Templates and Events in Repeater
	SLO-1	Arrays : Array Class, Array List	Operator Overloading – Unary Operators, Binary Operators	Scheduling a Thread	Deployment	Designing Web Application
S-15	SLO-2	One Dimensional array, Two Dimensional array, Jagged Arrays	Operator Overloading – Binary Operators	Synchronizing Threads	Steps to Deployment	Steps to Design Web Applications
S-16-S-18	SLO-1	Lab 3:Arrays	Lab 6: Interface, Operator Overloading	Lab 9: Custom Exception, Thread	Lab 12: Develop Web Applications using Data Controls	Lab 15: Develop Web Application Using Form View and Repeater Control

Learning Resources	1. E. Balagurusamy, "Programming in C#-A Primer" – Fourth Edition, Mc Graw Hill Education. Kogent(2010), "ASP.NET 4.0 Black Book – Platinum Edition", Dreamtech Press, New Delhi 2.	1. Paul Deitel, Harvey Deitel – C# 2010 For Programmers, Deitel Developer Series – Pearson Education – 2011 2. Andrew Troelsen – C# and the .NET Platform – A1 Press – 2003
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		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

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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.L.Selvam

Course Code	UCA23G04J	Course Name	DATA SCIENCE USING PYTHON	Course Category	G	Generic Elective 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 Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1:	Understand the basics of Data Science	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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:	The overview of the python with emphasis on various python data structures and various libraries																		
CLR-5:	Develop algorithmic solutions to data science related problems																		
CLR-6:	Appreciate the applications and implications of Data Science using Python																		

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:	Learn the fundamentals of Data Science and its methodologies	3	80	70	M	H	M	H	L	M	L	L	L	L	M	H	M	L	L
CLO-2:	Implementation of data science concepts using python	3	85	75	M	H	L	M	L	H	L	L	M	L	M	H	M	L	L
CLO-3:	Execution of various libraries in python	3	75	70	M	H	M	H	L	M	L	L	M	L	M	H	M	L	L
CLO-4:	Knowledge of Machine Learning and Deep Learning using python libraries	3	85	80	M	H	M	H	L	M	L	L	M	L	M	H	M	L	L
CLO-5:	Exploring the data using various OpenCV and Matplotlib	3	85	75	H	H	M	H	L	M	L	L	M	L	M	H	M	L	L
CLO-6:	Apply data science concepts using python	3	80	70	L	H	M	H	L	M	L	L	L	L	M	H	M	L	L

Duration (hour)	18	18	18	18	18
S-1	SLO-1	Data Science Overview	Modelling Data	Creating Numpy Array Slicing	Data Cleaning and Preparation:
	SLO-2	Data Science Pipeline	Modelling Evaluation	Numpy Data Types	Handling Missing Data
					NumPy and Image Basics
S-2	SLO-1	Data Engineering	Introduction to Data Science Essential Skill Matrix	Numpy Array Shape and Reshape	Data Transformation
	SLO-2	Data Preparation, Exploration	Essential Programming Skills	Numpy Data Joins, Split, Search	Removing Duplicates
					Video Processing with OpenCV

S-3	SLO-1	Data Science Methodologies Overview	Data Engineering Skills	Scientific Computing with Python (Scipy)	Replacing Values	Object Detection with OpenCV
	SLO-2	Data aggregation, <i>Data munging techniques</i> , Data Science vs. Business Intelligence	Data Visualization Skills, Communication Skills	Getting Started with SciPy, Constants, Optimizers	Detecting and Filtering Outliers, <i>Vectorized String Functions in pandas</i> , Plotting with pandas: Line Plots, Bar Plots,	Object Tracking with OpenCV, Object Detection with OpenCV
S-4-S-6	SLO-1	Lab 1: Perform Analysis on Simple Dataset I for Data Science and Business Intelligence Applications	Lab 4: Perform Analysis on Simple Data for Mathematical, Numerical, Data Engineering Processing	Lab 7: Apply Scientific functions on a given dataset with SciPy	Lab 10: Import any CSV file to Pandas Data Frame and perform the following: (a) Handle missing data by detecting and dropping/filling missing values. (b) Transform data using apply () and map () method. (c) Detect and filter outliers. (d) Perform Vectorized String operations on Pandas Series.	Lab 13: Install, Import OpenCV and Explore a Simple Image for Image Processing
S-7	SLO-1	Getting started with R	Business Skills	SciPy Sparse Data	Getting Exploratory with Data Analysis	Natural Language Processing with NLTK
	SLO-2	Environment setup	Ethical Skills	SciPy Graphs	Initial Data Exploration with Simple Pandas Functions	Getting started with Natural Language Processing
S-8	SLO-1	Data types	Introduction to Python	SciPy Spatial Data Overview	Univariate Analysis	Getting started with NLP library NLK
S-9	SLO-1	Arrays	Expression and Variables	SciPy Spatial Matlab Arrays	Machine Learning basic Terminology	Text Processing In NLTK
	SLO-2	Matrices Lists, Data Frames	Python String Operations, Python Data Structures: List, Tuple, Dictionary, Sets. Python Conditional Statements	SciPy Interpolation, Data Manipulation with Pandas, Getting Started with Data Manipulation with Pandas	Getting started with Machine Learning with Scikit-Learn, Cost Functions, Optimization Algorithms	Text Processing – Tokenizing, Stop Words
S-10 – S-12	SLO-1	Lab 2: Perform Analysis on Simple Dataset II for Data Science and Business Intelligence Applications	Lab 5: Install Python and apply all basic python functions	Lab 8: Install, Import Pandas Learn and Explore a Sample Dataset with it	Lab 10: Install, Import Scikit Learn and Explore Iris Dataset with Pandas for ML Modelling	Lab 12: Install and perform a simple text processing using NLTK

S-13	SLO-1	Introduction to Data Science Methodologies	Python Branching Statements	Installing and Using Pandas	Machine Learning Workflow	Text Processing – Stemming
	SLO-2	Business Understanding	Python Exception Handling	Exporting a data file Using Pandas	Simple Machine Learning Implementation with the Iris Dataset	Text Processing – Part of Speech
S-14	SLO-1	Problem Statement Formulation	Python Case Statements	Reading Data from a Excel file	Deep Learning with Tensor Flow and Keras	Text Processing – Lemmatizing
	SLO-2	Analytic Understanding	Loops, Functions	Reading Data from a .csv file	Getting started with Deep Learning with Tensor Flow and Keras	Exploring Data Analysis
S-15	SLO-1	Understanding Data Requirements	Objects and Classes	Reading Data from a .txt file	Deep Learning Workflow	The EDA Approach
	SLO-2	Data Collection, Data formation, Data Understanding	Getting Started with Numpy, Creating Numpy Array Indexing	Exploratory Data Analysis, Function Application and Mapping, Understanding Python's Role in Data Science	Deep Learning Model Features, Deep Learning Model Performance	Measuring central tendency, Working with percentiles
S-16 – S-18	SLO-1	Lab 3: Collect and Understand a simple data for a Data Science Application	Lab 6: Install and perform a Numerical Array Processing using NumPy	Lab 9: Install and perform a simple Exploratory Data Analysis using Pandas	Lab 11: Install, Import Tensorflow and Keras. Create a Basic Neural Network with few layers	<i>Lab 15: Case study</i>

Learning Resources	1. Kenneth A. Lambert, (2011), “The Fundamentals of Python: First Programs”, Cengage Learning. 2. Jojo Moolayil, “Smarter Decisions: The Intersection of IoT and Data Science”, PACKT, 2016.	3. Cathy O’Neil and Rachel Schutt, “Doing Data Science”, O’Reilly, 2015. 4. David Dietrich, Barry Heller, Beibei Yang, “Data Science and Big data Analytics”, EMC 2013
	5. Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools, Davy Cielen, Arno D.B. Meysman, et al., Minning 6. Data Science From Scratch: First Principles with Python, Joel Grus , SPD	7. https://bedford-computing.co.uk/learning/wp-content/uploads/2015/10/Python-for-Data-Analysis.pdf

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 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %
	Understand										

Level 2	Apply	20 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %
	Analyze										
Level 3	Evaluate	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %
	Create										
	Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %

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	Mrs. K. Kanmani, SRMIST

Course Code	UCA23M61L	Course Name	MINI PROJECT	Course Category	IAPC	Internship/Apprenticeship / Project/ Community Outreach	L	T	P	OC
							0	0	4	2

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

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	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)	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

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	M	M	L	L	M	H	M	M	L
M	H	L	M	L	M	M	M	M	L	M	H	M	M	L
M	H	M	H	L	M	L	M	M	L	M	H	L	M	M
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
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H	H	M	H	L	M	L	L	M	L	M	M	M	L	L
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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	Viva-Voce
	20%	30 %	30 %	20 %

SEMESTER – VII

Course Code	UCA23C71J	Course Name	CLOUD COMPUTING	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 Applications		Data Book / Codes/Standards	Nil	

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Understand the evolution of parallel and distributed computing	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Understand the architecture of cloud	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related 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 need for virtualization				L	H	L	H	L	M	L	M	L	L	M	H	L	L	L
CLR-4 :	The concepts behind scheduling and load balancing that is happening across Heterogeneous resources in the environment				H	H	L	M	L	M	L	M	M	L	M	H	M	L	L
CLR-5 :	Justify the need for improved hardware and software infrastructures (servers, protocols, security algorithms)				M	H	M	H	L	M	M	M	M	L	L	H	M	L	L
CLR-6 :	Know the commercial functioning of cloud computing				M	H	M	H	L	M	L	L	M	L	L	H	L	L	L
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Defend the need for cloud computing to run an online business	3	85	75															
CLO-2 :	Understand and figure out the necessities of middleware technologies	3	75	70															
CLO-3 :	Practically create a virtual environment (lab purpose using vmware)	3	75	70															
CLO-4 :	Implement crypto algorithms that may be used in the computing environment	3	85	80															
CLO-5 :	Use few libraries from the cloud sim to create Cloudlets, cloudletlist, scheduling modules	3	85	75															

Duration(Hour)		18	18	18	18	18
S-1	SLO-1	Evolution and History of cloud computing	Cloud Infrastructure	Platform as a Service	Data in Cloud	Cloud Computing–Simulation
	SLO-2	Introduction to Cloud Computing	Architectural Design of Computer and storage Clouds	Evolution of PaaS	Data as a Service	Cloud Computing :Simulation Tools
S-2	SLO-1	Cloud Types	Layered Cloud Architectural Development	Introduction to Paas	DaaS: Architecture	Simulation Tools :CloudSim, Cloud Analyst
	SLO-2	Basics types of Models	Cloud enabling technologies	Paas Service Provider	DaaS: Advantages	Simulation Tools: Green Cloud, EMUSIM
S-3	SLO-1	Layers and types of Cloud	Data center technologies	Platform as a Service :Acquia Cloud	DaaS: Disadvantage	Simulation Tools: Ground Sim, MR-CloudSim
	SLO-2	Features of Cloud Computing	Web technologies	Platform as a Service :Amazon AWS	Database as a service	Cloud based Web Applications &Service Testing Tools
S-4-6	SLO-1	Laboratory1:Createavirtual machine	Laboratory 4:Create a drop box using Google AP	Laboratory 7:Encryption and Decryption ofT ext	Laboratory 10:Laboratory8:SimpleExperimentsinCloudSim	Laboratory 13: Create a Warehouse Applicationin Sales force.Com
	SLO-2					
S-7	SLO-1	Cloud Computing Stack	Multitenant technologies	Platform as a Service: APP42PaaS	Cloud Based data storage	Cloud based Web Applications & Service Testing Tools
	SLO-2	Advantages of Cloud computing	Service technologies	Platform as a Service: Google AppEngine	Advantage and limitations	Cloud Based Mobile &Multimedia Application Testing Tools
S-8	SLO-1	Components of Cloud computing	Hardware and Infrastructure	PaaS Application Framework	Cloud Storage Interoperability	Cloud Applications and New Opportunity
	SLO-2	Limitations of Cloud computing	Client net work	PaaS Operator Verbs	Cloud Security	Design approach with case studies
S-9	SLO-1	Cloud Computing service providers	Security Networks	Paas Developer Verbs	Introduction	Design methodology for IaaS Service model
	SLO-2	Types of service provider	Services	Advantages and challenges of PaaS	Security Risks and Best Practice	Google API

S-10-12	SLO-1	Laboratory 2: Installation of Platforms	Laboratory 5: Transfer Data using Google Apps	Laboratory 8: Simple Experiments in Cloud Sim	Laboratory 11: Simple Experiments in Cloud Sim	Laboratory 14: Create a Warehouse Application in Salesforce Communitix Apexprog Lang
	SLO-2					
S-13	SLO-1	Virtualization	Accessing the Cloud	Software as a Service	Security Cloud	AWS EC2 instance
	SLO-2	History of virtualization	Platforms	Evolution of SaaS	Security risk and Best Practices	Migration
S-14	SLO-1	Introduction to virtualization	Web Applications	Basis of SaaS	Security Cloud: CIA Concept	Specific Cloud Services Models
	SLO-2	Types of Virtual Machines	Web APIs	Advantages of SaaS	Types of Security Attacks	Introduction
S-15	SLO-1	Advantages of virtualization	Web browsers	Brief Introductory part of software as a service	Security Policy Implementation	Resource allocation in cloud computing
	SLO-2	Components of virtualization	Cloud storage	SaaS: Unification Technologies	Security Policy Implementation: Policy Types	Introduction
S-16-18	SLO-1	Laboratory 3: Deploying existing Apps	Laboratory 6: upload and download using Google Apps	Laboratory 9: Simple Experiments in Cloud Sim	Laboratory 12: Simple Experiments in Cloud Sim	Laboratory 15: Implementation of SOAP Web Services
	SLO-2					

Learning Resources	1. Dr. Anand Nayyar, (2019), "Handbook of Cloud Computing", BPB 2. Buyya R., Broberg J., Goscinski A., "Cloud Computing: Principles and Paradigm", John Wiley & Sons, 2011. 3. Arshdeep Bahga and Vijay Madisetti, "Cloud Computing – A Hands on Approach", Universities Press (India) Pvt Ltd. 2014. 4. A. Srinivasan and J. Suresh, "Cloud Computing – A Practical Approach for Learning and Implementation", Pearson India Publications 2014.
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LearningAssessment											
Bloom’s LevelofThinking		ContinousLearningAssessment(50%Weightage)								FinalExamination(50%wei ghtage)	
		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%	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	1.Dr.S.Jayachandran 2.Dr. AGUSTHIYAR R

Course Code	UCA23D07J	Course Name	Web development using Node JS and Mongo	Course Category	E	Discipline Specific Elective 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 Applications	Data Book / Codes/Standards			NIL

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Full Stack Development using Node.js	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Design social media websites,music players and mini games via scripting																		
CLR-3 :	Building own modules																		
CLR-4 :	Understanding Node Package Manager																		
CLR-5 :	Interface with Mongo DB																		
CLR-6 :	Master NoSQL database																		
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 :	Install Node.js	2	80	70
CLO-2 :	Create basic web applications using Node.js	3	85	75
CLO-3 :	Build HTTP server using core modules	3	75	70
CLO-4 :	Use stream IO to efficiently serve the web page	3	85	80
CLO-5 :	Create Modules to organize server	3	85	75
CLO-6 :	Quering and performing CRUD on Mongo DB	3	80	70

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

Duration (hour)		18	18	18	18	18
S-1	SLO-1	Need of Scripting Language	Array Methods :indexOf, join, lasIndexOf, toString	Add HTTP header	Streams – Reading a Stream	Document with different types of values i) <i>Document with Scalar Values</i>
	SLO-2	Difference between client and server side scripting	Array Methods : reduce, reverse, slice, some, sort	Example programs	Stream – Writing to a stream	ii) <i>Document with Documents as values</i>
S-2	SLO-1	Script tag in HTML	Function Definition	Read the Query String	Piping the Stream	iii) <i>Document with Array as values</i>
	SLO-2	Java Script declaration	Function Parameters	Split the Query String	Chaining the Streams	CRUD operation :Insert Operation i) <i>insertOne()</i> and ii) <i>insertMany()</i> 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 – NPM Package	Node.js as a File Server, Create Files, Reading Files	Perform Query Operation for the following situations i) <i>Query on nested documents</i> ii) <i>Query an array</i>
	SLO-2	Java script statements, Comments and Variables	Nested Functions, Example Programs	Node.js File Server, Downloading and Using a Package	Delete Files, Update and rename files	ii) <i>Query an array of nested documents</i> iv) <i>Geospatial Queries</i> Query Operation Examples, Update Operation: <i>updateOne(), updateMany()</i>
S-4-6	SLO-1	Lab 1 – Java Script Input and Output	Lab 4 – Functions	Lab 7 –Query String	Lab 10 – Streams and Files	Lab : <i>Working with CURD operations</i>
	SLO-2					Insert and Query

S-7	SLO-1	Java script Operators - Logical, Bitwise, Arithmetic and Assignment operators	Web stacks introduction LAMP, LEMP, MEAN, MERN	Callback – Blocking code example Callback – Non- Blocking code example	Creating a Upload Form Parse the uploaded files	Delete Operation: deleteMany(), deleteOne() iii)findOneAndDelete() Delete operation Examples
	SLO-2	Java Script Datatypes - numeric	Difference between php and java script	Event Driven Programming	Save the files	Operation on Mongodb Data: projection
S-8	SLO-1	Java Script Datatypes – non numeric	Node introduction and evolution	Working of node Application	Display the uploaded files	Limiting Records Sorting Records
	SLO-2	Conditional statements	Installing node.js and npm in windows	Node Even emitter class	Nodemailer Modules	Indexes in Mongodb, default _id index
S-9	SLO-1	If else statements	Installing node.js and npm in Linux	add Listener(), on(), once()	Sending a email	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	Single Field, Compound, Multikey, Geospatial, text Index, Hashed Index
S-10-12	SLO-1	Lab 2 – Java Script Operators and Conditions	Lab 5 – Installing Node.js	Lab 8 – Event Driver classes	Lab 11 – Sending Mail	Lab :Working with CRUD operations Update and Delete
	SLO-2					
S-13	SLO-1	Loop Controls – for loop	Include modules	Creating Buffers, writing to buffers	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	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 while Loop	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 i)Collections and iii)Documents	v) \$push vi) \$addToSet vii) \$first viii) \$last
S-15	SLO-1	Arrays Introduction and declaring	Node.js – REPL Terminal – Read, Eval	Compare, Copy Buffer	Database: i)createDatabase()method with example	<i>Mongodb Backup:</i> <i>Export/Import data backup using shell</i> i)mongodump ii)mongorestore
	SLO-2	Accessing arrays	Node.js – REPL Terminal – Print, Loop	Slice Buffer and Buffer Length	ii)dropDatabase() method with example	<i>Mongodb Backup:</i> <i>Export/Import data backup using Mongo Compass</i>
S-16-18	SLO-1	Lab 3: Looping Statements	Lab 6 - Running sample application using node.js	Lab 9 - Buffers	Lab 12 – Working with MongoDB – create,drop,working with Collections	Lab: i)Creating different types of indexes ii)Aggregate data using different Aggregate expressions iii)Perform Mongodb data Export and Import using shell as well as mongo compass. iv)Working with mongo deployment commands
	SLO-2					

Learning Resources	- Dayley, C., Dayley, B., Dayley, B. (2017). Node.js, MongoDB and Angular Web Development: The Definitive Guide to Using the MEAN Stack to Build Web Applications. United Kingdom: Pearson Education. - MongoDB Complete Guide: Develop Strong Understanding of Administering MongoDB, CRUD Operations, MongoDB Commands, MongoDB Compass, MongoDB Server, MongoDB Replication and MongoDB Sharding (English Edition). (2021). India: BPB Publications. Online Official Documentation - NodeJS v13.10.1 Docs: https://nodejs.org/latest-v13.x/api/documentation.html - MongoDB: https://docs.mongodb.com/manual/tutorial/getting-started/
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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		
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		Dr N Vijayalakshmi, SRM IST
		Mrs. S Suriya, SRM IST

Course Code	UCA23D08 J	Course Name	Cyber Security	Course Category	D	Discipline Specific Elective Courses	L	T	P	O	C
							3	0	3	2	4

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

Course Learning Rationale (CLR):	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Learn overview of cyber crimes and cyber security	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Understand different methods of cyber attacks	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 :	Learn using tools used in cyber crime.				L	H	H	M	M	M	L	H	M	M	L	M	L	L	L
CLR-4 :	Understand cyber laws for organizations				M	M	H	H	H	L	L	M	M	M	L	M	M	L	L
CLR-5 :	Know use of forensics in cyber crime investigations				M	M	H	H	H	L	L	M	M	L	L	M	M	L	L
CLR-6 :	Know cyber safety and avoid victimization.				L	L	H	H	H	M	L	M	L	M	L	M	M	L	L
CLR-5 :	Know use of forensics in cyber crime investigations	3	80	70	H	H	H	M	M	L	L	M	M	L	L	M	M	L	L
CLR-6 :	Know cyber safety and avoid victimization.	3	85	70	L	H	H	H	M	M	L	M	M	L	M	M	M	L	L
CLO-1 :	Understand the fundamentals of keeping information safe online, recognizing illegal online activities, and the laws that govern them.	3	80	70	L	H	H	H	M	M	L	M	M	L	M	M	M	L	L
CLO-2 :	Identify different kinds of cyber attacks and learn about the tools used to carry out these attacks.	3	85	75	M	M	H	H	H	L	L	M	M	M	L	M	M	L	L
CLO-3 :	Use different tools to gather information from various sources for cybersecurity purposes.	3	75	70	M	M	H	H	H	L	L	M	M	L	L	M	M	L	L
CLO-4 :	Utilize techniques to identify and detect unauthorized access or intrusion attempts in a system.	3	85	80	L	L	H	H	H	M	L	M	L	M	L	M	M	L	L
CLO-5 :	Implement measures and techniques to prevent unauthorized access or intrusion into a system.	3	75	70	H	H	H	M	M	L	L	M	M	L	L	M	M	L	L
CLO-6 :	Apply cyber safety for organizations.	3	85	80	L	H	H	H	M	M	L	M	M	L	M	M	M	L	L

Duration (hour)		18	18	18	18	18
S-1	SLO-1	Cyber Security - Introduction	Reconnaissance	Scanning Methodology	Intrusion Detection	Cyber Attacks
	SLO-2	History of Internet	Harvester	Techniques	Introduction	Types and effects
S-2	SLO-1	Impact of Internet	Whois	Ping Swear	Host Based Intrusion	Online auctions
	SLO-2	CIA Triad	Netcraft	Techniques	Detection	Online shopping
S-3	SLO-1	Cybercrime - History	Host	Nmap Commands	Network Based Intrusion	Online games
	SLO-2	Reasons for Cybercrime	Extracting Information - DNS	Switches	detection	online gambling
S-4,5,6	SLO-1	Lab: Substitution & transposition techniques Ceaser Cipher	Lab: Diffie-Hellman Key Exchange algorithm	Lab: chkrootkit security audit tool	Lab: Installing SNORT either Lnx/windows	Lab: Content Matching
	SLO-2					
S-7	SLO-1	Classification of cyber crimes	Extracting Information from EMail Servers	SYN Scan	Distributed or Hybrid Intrusion Detection	Spyware
	SLO-2	Cybercriminals		Types - TCP, UDP Scan		Scrumware
S-8	SLO-1	Need for Cyber Security	Social Reconnaissance	Connect Scan	Exchange format	Internet addiction
	SLO-2	Cyber laws	Scanning	Half-open Scan	Honeypots	Theft of identity
S-9	SLO-1	The Indian IT Act	Port Scanning	Stealth	SNORT Types	Stolen software
	SLO-2	Punishment for cyber crimes	Pros and Cons	XMAS Scan	Modes in SNORT	Scams
S-10,11,12	SLO-1	Lab: Rail fence row and column transformation	Lab: ImplementBrute force Attack	Lab: Implement SCAN methods	Lab: Intrusion Detection System to detect attacks	Lab: Real time network traffic analysis
	SLO-2					
S-13	SLO-1	Attacks and Countermeasures	Network Scanning	NULL SCAN	Firewalls	Criminal Hackers
	SLO-2	Malicious attacks	Types of network scanning	IDLE SCAN	Intrusion Prevention systems	Plagiarism
S-14	SLO-1	Types of malicious attacks	Vulnerability Scanning	FIN SCAN	Firewall characteristics	Phishing
	SLO-2	Common attack vectors	Pros and Cons	Comparision of scans	Types of firewalls	Cyber bullying
S-15	SLO-1	Web application attack	Types - Vulnerability Scanning	Banner Grabbing	Firewall Location	Cyber Safety
	SLO-2	Countermeasures	OWASP Top 10 vulnerabilities	OS finger printing	Configurations	Tips to stay protected
S-16,17,18	SLO-1	ImplementDictionary Attack	Lab: program to hide text data in image file (Steganography)	Lab: Sniff ARP traffic	Lab: OS finger printing	Lab: Data packet logging
	SLO-2					
Learning Resources		1. Cyber Security- Understanding CyberCrimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, Publication Wiley 2. Cyber Security - A practitioner's guideBy David Sutton , BCS, The Chartered Institute for IT Publication Date: 10 Jul 2017 ISBN-13: 9781780173405 3. Computer Security Principles and Practice,William Stallings, Lawrie Brown, Third Edition, Pearson Education, 2015				

	4. Penetration Testing: A Hands-On Introduction to Hacking, Georgia Weidman, No Starch Press, 2014 5. Patrick Engebretson, “The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made easy”, Elsevier, 2011 6. Kimberly Graves, “CEH Official Certified Ethical hacker Review Guide”, Wiley Publishers, 2007
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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%	20%	20%
	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%	10%	10%
	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	Mrs. J. Shyamala Devi, MCA,ME, Asst. Prof. – BCA

Course Code	UCA23G05J	Course Name	Data Visualization and Exploring Models	Course Category	G	Generic Elective Courses					L	T	P	O	C
											3	0	2	2	3

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

Course Learning Rationale (CLR):		Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Understanding the concept of statistical analysis and R
CLR-2 :	Gaining knowledge about various libraries in Python for visualization
CLR-3 :	The detailed concept of Dataset
CLR-4 :	Understand the Exploratory Data analysis
CLR-5 :	Various Processes for Analyzing Data
CLR-6 :	Implementation of Theoretical knowledge by using algorithms

1	2	3
Level of Thinking	Expected Proficiency	Expected Attainment

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

Course Learning Outcomes (CLO):		Level of Thinking	Expected Proficiency	Expected Attainment
CLO-1 :	Identify the key components of statistical analysis and R	3	80	70
CLO-2 :	List out the process of visualization in python	3	85	75
CLO-3 :	Understanding the in depth concept of Dataset	3	75	70
CLO-4 :	Understand Exploratory Data analysis	3	85	80
CLO-5 :	List out the phases involved in data analysis	3	85	75
CLO-6 :	Apply algorithms for dataset	3	80	70

Duration (hour)		15	15	15	15	15
S-1	SLO-1	Introduction to Statistics	Introduction to Data Visualization in Python	Introduction to Dataset	Interpreting a heatmap	Statistical data elaboration
	SLO-2	Difference between inferential statistics and descriptive statistics	Matplotlin and Seaborn	Initial exploration of the dataset	Visualizing a variable relationship	

S-2	SLO-1	Drawing Inferences from Data	Lie Chart	Functions for initial Exploration	ExploratoryDataAnalysis (EDA)	1-D,2-D,N-D Statistical analysis
	SLO-2	Random Variables	Bar Chart	Counting Categorical value		
S-3	SLO-1	Normal Probability Distribution	Histograms	Data validation	Definition, Motivation, Stepsindataexploration	Extreme Value Analysis Clustering based Data
	SLO-2	Sampling	Scatter plots	Detecting data types		
S-4-5	SLO-1	Lab 1:Exporting dataset into R	Lab 4: Creating a dashboard with Plotly	Lab 7: Import the dataset, categorize, and implement agg() with visualization	Lab 10: Find the shape of your dataset using EDA	Lab 13: Implementing genetic algorithm
	SLO-2					
S-6	SLO-1	Sample Statistics	Heat Maps	Validating continents and range	The basic data types Data Type Portability	Distance Based and Density Based outlier analysis Outlier Detection in Categorical
	SLO-2	Sampling Distributions.	Adding error bars to a chart	Data Summarization		
S-7	SLO-1	Introduction to R	Adding error bars to a plot	.groupby() and .agg()	Introduction to Missing Data	Feature selection algorithms: filter methods
	SLO-2	Overview and About R	Creating box plots	Named aggregation	Traditional methods for dealing with missing data	wrapper methods and embedded methods
S-8	SLO-1	R and R studio Installation	Quantitative scatter plot	Visualising Categorical summaries	Maximum Likelihood Estimation	Principal Component Analysis(PCA)
	SLO-2	Introduction to data frames in R	Encoding time by color	Addressing Missing Data	Introduction to Bayesian Estimation	Kernel PCA
S-9-10	SLO-1	Lab 2: Visualizing Carbon dioxide levels	Lab 5: Implementation of multiple graphs	Lab 8: Variation of the gold price with time data	Lab 11: Bayesian Estimation	Lab 14: Locating outliers in Dataset
	SLO-2					
S-11	SLO-1	Modifying and Manipulating Data frames in R	Waffle chart	Converting and analyzing missing data	Multiple Imputation-Imputation Phase,	Canonical Correlation Analysis
	SLO-2	Introduction to visualization with R	Word cloud	Importing Date time data	Analysis and Pooling Phase	
S-12	SLO-1	Introduction to ggplot 2	Seaborn and Regression plot	Visualizing relationships over time	Practical Issues in Multiple Imputation	Factor Analysis
	SLO-2	Aggregates in R	Data visualization interfaces with Dash	Correlation		
S-13	SLO-1	Joining tables in R	Styling the header	Interpreting a heatmap Visualizing a variable relationship	Models for Missing Notation Random Data	Multi-dimensional scaling
	SLO-2	Mean and mode in R	Styling the Charts			
S-14-15	SLO-1					

	SLO-2	Lab 3: Implementation of Mean, Mode average for the dataset uploaded.	Lab 6: Interactive Charts for Stock Market	Lab 9: Implement Missing data functions	Lab 12: Replace the missing data with mean	Lab 15: Implementation of PCA
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Learning Resources	1. Core Python Programming - Second Edition, R. Nageswara Rao, Dreamtech Press. 2. R Graphics Essentials for Great Data Visualization by Alboukadel Kassambara 3. Charu C. Aggarwal, “Data Mining The Textbook, Springer, 2015. 4. Craig K. Enders, “Applied Missing Data Analysis”, The Guilford Press, 2010.
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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%	20%	20%
	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%	10%	10%
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

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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	Mrs. S. Suriya Dr. Agusthiyar R

Course Code	UCA23G06J	Course Name	Basics of Android	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 Applications	Data Book / Codes/Standards		NIL	

Course Learning Rationale (CLR):	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Develop Mobile applications	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Design UI for activities of mobile applications	Level of Thinking	Expected Proficiency	Expected Attainment	Fundamental	Application of	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-3 :	Get familiarized with broadcast receivers and Internet services																		
CLR-4 :	Work with SQLite Database and content providers																		
CLR-5 :	Work on interactive activities that comprises an application																		
CLR-6 :	Test application (using emulator) and export the application to a mobile phone																		

Course Learning Outcomes (CLO):	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLO-1 :	Develop android app that include date, time, toast,	3	80	70	L	H	M	H	L	M	L	M	M	M	H	L	L	L
CLO-2 :	Develop mobile app involving interactive components (UI)	3	85	75	H	H	L	M	L	M	L	M	L	M	H	L	L	L
CLO-3 :	Create activity that makes use of images, sound files	3	75	70	M	H	M	H	L	M	L	M	L	M	H	L	L	L
CLO-4 :	Able to create a contact list that simulates mobile phones (SQLite)	3	85	80	M	H	M	H	L	M	L	M	L	M	H	L	L	L
CLO-5 :	Use of spinners, progress bar to simulate loading files with respect to size of file, time and speed of network.	3	85	75	H	H	M	M	L	M	L	M	L	M	H	L	L	L
CLO-6 :	Export the activities to the mobile phone and cheer up the work of his own	3	80	70	L	H	M	H	L	M	L	M	L	M	H	L	L	L

Duration (hour)	15	15	15	15	15
S-1	SLO-1 Introduction to Android	Layouts and its Types	Gallery and ImageView	Location-Based Services	Eclipse for Android Development
	SLO-2 Android versions	Linear, Scrollview	ImageSwitcher, Grid View	Displaying Maps	Workspaces
S-2	SLO-1 Android open stack	Absolute,Table	Using Menus with View	Creating the Project	Package Explore

	SLO-2	Features	Relative,Frame	Displaying Menus – Options menu	Obtaining Maps API Key	Using Projects from Other Workspaces
S-3	SLO-1	Mobile Application development	Resize and reposition	Context menu	Displaying the Map	Editors
	SLO-2	Mobile Application trends	Screen orientation	Helper methods for menus	Displaying the Zoom Control	Perspectives
S-4,5	SLO-1	Lab1: Simple Mobile App development	Lab4: Demonstrate different layout and views	Lab7: Displaying Pictures an Menus with View	Lab10: Program to display map and location.	Lab13: Demonstration of Eclipse Platform.
	SLO-2					
S-6	SLO-1	Eclipse, SDK, AVD	Checkbox	Develop a digital clock	Getting the Location That Was Touched	Code Completion
	SLO-2	Demonstrations Android application	ToggleButton, RadioButton	SMS Messaging	Developing Android Services	Refactoring
S-7	SLO-1	Anatomy of Android applications	RadioGroup	Sending SMS Messages Programmatically	Creating Your Own Service	Debugging
	SLO-2	Life cycle of Android	ProgressBar	Getting Feedback After Sending the Message	Performing Long-Running Tasks in a Service	Setting Breakpoint and exceptions
S-8	SLO-1	Implicit Intent	AutocompleteText	Receiving SMS	Performing Repeated Tasks in a Service	User defined content providers
	SLO-2	Explicit Intents	Picker View	Broadcasting and service	Executing Asynchronous Tasks on Separate Threads Using Intent Service	Managing data using SQLite
S-9,10	SLO-1	Lab2: Applying Styles and Themes to Activity	Lab5: Displaying the Time and Date Picker in a Dialog Window	Lab8: Demonstrating Message services.	Lab11: Program for Creating Your Own Service.	Lab14: Program to demonstrate SQLite application.
	SLO-2					
S-11	SLO-1	Understanding Activities	Time and Date Picker View	Caveats and Warnings	Binding Activities to Services	Connecting SQLite
	SLO-2	Understanding the Components of a Screen	Listviews – list view	Networking	Publishing Android Applications	Data persistence
S-12	SLO-1	Understanding the Components of a Screen	Spinner view	Downloading Binary Data	Preparing for Publishing	Types of Data persistence
	SLO-2	Understanding the Components of a Screen	Web view	Downloading Text File	Versioning	Shared User preferences
S-13	SLO-1	Creating the User Interface Programmatically	Web view	Downloading Text File	Versioning	Shared User preferences

	SLO-2	Basic Views	Customizing the ListView	Accessing Web Services	Digitally Signing Your Android Applications	Need of Persistence
S-14,15	SLO-1	Lab3: Designing Your User Interface Using View	Lab6: Demonstrate the List view and Spinner View	Lab9: Mobile app for Sending an EMAIL	Lab12: Publish Android applications.	Lab15: Mobile App development using Persistence
	SLO-2					

Learning Resources	1. Wei-Meng Lee (2012), “Beginning Android Application Development”, Wrox Publications (Programmer to Programmer) 2. EdBurnette (2010), “Hello Android: Introducing Google's Mobile Development Platform”, The Pragmatic Publishers, Third Edition 3. Jerome DiMarzio, “Beginning Android Programming with Android Studio”, 4 th Edition
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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 %	

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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. Agusthiyar R

Course Code	UCA23I71L		Course Name	INTERNSHIP - 3	Course Category	IAPC	Internship/Apprenticeship / Project/ Community Outreach	L	T	P	C
								-	-	-	1

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

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :		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																		
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 insight of an industry and organization/company		3	80	70	L	H	L	H	L	L	L	L	L	M	M	M	H	M	
CLO-2 :	To gain valuable skills and knowledge		3	85	75	M	H	L	M	L	M	L	L	M	L	M	M	H	M	
CLO-3 :	To make professional connections and enhance networking		3	75	70	M	H	M	H	L	M	L	L	M	L	M	M	H	M	

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

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

Course Code	UCA23P71L	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 Applications	Data Book / Codes/Standards			Nil

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	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	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 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				
<i>Project Phase-I</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	UCA23C81J	Course Name	Big data Analytics	Course Category	C	Discipline Specific Core Courses	L	T	P	O	C
							3	0	2	2	4

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

Course Learning Rationale (CLR):		Learning	Program Learning Outcomes (PLO)
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CLR-1 : Understand the Big Data Platform and its Use cases	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 : Provide an overview of Apache Hadoop	Level of Thinking	Expected Proficiency	Expected Attainment	Fundamental	Application of	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-3 : Provide HDFS Concepts and Interfacing with HDFS																		
CLR-4 : Understand Map Reduce Jobs																		
CLR-5 : Provide hands on Hadoop Eco System																		
CLR-6 : Apply analytics on Structured, Unstructured Data																		
Course Learning Outcomes (CLO):																		
CLO-1 : Identify Big Data and its Business Implications.	3	80	70	H	H	M	M	M	L	L	L	M	M	M	L	M	L	L
CLO-2 : List the components of Hadoop and Hadoop Eco-System	3	85	75	H	H	H	M	M	L	M	L	M	M	M	L	M	L	L
CLO-3 : Access and Process Data on Distributed File System	3	75	70	H	H	M	H	M	L	M	L	M	M	M	L	M	L	L
CLO-4 : Understand the YARN Infrastructure	3	85	80	H	H	H	M	M	L	M	L	M	M	M	L	M	L	L
CLO-5 : Manage Job Execution in Hadoop Environment	3	85	75	H	H	M	M	M	L	M	L	M	H	M	M	M	L	L
CLO-6 : Develop Big Data Solutions using Hadoop Eco System	3	80	70	H	H	M	M	M	L	L	L	M	H	M	M	M	L	L

Duration (hour)	15	15	15	15	15
S-1	SLO-1	Introduction of Big Data	Big Data Hadoop	Big Data HDFS	How does MapReduce Work?
	SLO-2	Big Data Tools Overview	Overview of Hadoop	Overview of Eco System	Business benefits of MapReduce
					Introduction to PIG
					Execution Modes of Pig,

S-2	SLO-1	Hadoop	Apache Hadoop overview	HDFS	Business Challenges of MapReduce	Comparison of Pig with Databases
	SLO-2	Apache Storm	Business Benefits of Apache Hadoop	YARN	MapReduce Architecture	Grunt
S-3	SLO-1	Hadoop	Need of Apache Hadoop	Map Reduce	MapReduce Example	Pig Latin
	SLO-2	Apache Storm	Components of Hadoop	Spark	Implementation of MapReduce	User Defined Function
S-4& S-5	SLO-1	Lab 1: Normalizing data	Lab 4: Creating Modules	Lab 7: Set up Hadoop cluster configuration	Lab 10: Import data from MS Excel into HDFS	Lab 13: Implement partitioner in Hadoop
	SLO-2					
S-6	SLO-1	Big Data Technologies Overview	Processing Layer (MapReduce)	Pig	Job Scheduling Optimizations, MR Task Distribution Optimization	Data Processing Operators
	SLO-2	Data Management	Storage Layer (HDFS)	Hive	Networking & I/O Optimizations	Hive Shell
S-7	SLO-1	Data Mining	Hadoop YARN	HBase	Iterative Processing	Hive Services
	SLO-2	In-Memory Analytics	Apache Spark overview	Mahout	Join Operations	Hive Meta store
S-8	SLO-1	Predictive Analytics	Benefits of Apache Spark	Zookeeper	Data Access	Comparison with Traditional Database
	SLO-2	Text Mining	Need of Apache Spark	Oozie	Load Balancing	HiveQL
S-9& S-10	SLO-1	Lab 2: Formatting data	Lab 5: Install and configure Hadoop, set working directory and various processes	Lab 8: Implement HDFS and explore its characteristics	Lab 11: Import data from MySQL into HDFS	Lab 14: Implement nested MapReduce
	SLO-2					
S-11	SLO-1	Big Data Analytics	Components of Apache Spark	Basic File System	Data Flow Optimization	Tables
	SLO-2	Text Analytics	Spark Core Engine	Operations in File system	Short Job Optimization	Querying Data
S-12	SLO-1	Information extraction	Spark SQL	Data Flow	Controlling Map Reduce Execution	User Defined Function
	SLO-2	Text Summarization	Spark Streaming	Data Ingest	Input Format	HBase
S-13	SLO-1	Question Answering, Role of Bigdata	MLib , GraphX, Hadoop 2.X versus Hadoop 3.X	Flume and Scoop, Hadoop archives, Hadoop I/O: Compression	Reader , Writer, Combiner, Partitioners	Concepts in HBase, Hbase Versus RDBMS
	SLO-2	Working with Semi-structured Data, UnStructured Data	Processing data with Hadoop and Interacting with Hadoop Eco System	Serialization, Avro and File-Based Data structures	Developing simple MapReduce Application.	Hive Services, Data types in Hive, Built in function in Hive, Big SQL
	SLO-1	Lab 3: Importing Modules				

S-14 &S-15	SLO-2		Lab 6: Implement basic commands in Hadoop to manipulate big data.	Lab 9: Explore the properties of YARN	Lab 12: Implement reducer in Hadoop	Lab 15: Create a scenario based on real time domain
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Learning Resources	1. Tom White “Hadoop: The Definitive Guide” Third Edit on, O’reily Media, 2012. 2. SeemaAcharya, SubhashiniChellappan, Big Data and Analytics, Wiley Publications, 2nd Edition, 2014, DT Editorial Services, Big Data, Dream Tech Press, 2nd Edition, 2015. 3. Black Book Big Data, Dream tech publications, 1st Edition, 2017.
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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%	20%	20%
	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%	10%	10%
	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	<i>Dr.N.Vijayalakshmi, SRMIST</i>

Course Code	UCA23D09J	Course Name	Blockchain Technology	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	
Course Offering Department	Computer Applications			Data Book / Codes/Standards	

Course Learning Rationale (CLR):	This course offers learners to	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	State core blockchain concepts, the benefits, and the limitations of blockchain technologies.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Acquire knowledge about cryptography and cryptocurrency fundamentals																		
CLR-3 :	Obtain knowledge on Consensus mechanism algorithm.																		
CLR-4 :	Acquire knowledge about open-source blockchain platform																		
CLR-5 :	Determine real world challenges that blockchain technologies may assist in solving																		
CLR-6 :	Make decisions about the use (or not) of blockchain technology in systems, and support decisions with relevant arguments.																		

Course Learning Outcomes (CLO):	The 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 :	Contentedly discuss and describe the history, types and applications of Blockchain	3	80	70	H	M	M	L	H	H	L	L	L	L	L	L	H	M	M
CLO-2 :	Gains familiarity with cryptography and Consensus algorithms.	3	85	75	M	H	H	M	H	H	M	L	L	L	L	M	H	L	M
CLO-3 :	Apply the tools for understanding the background of crypto currencies	3	75	70	M	H	H	H	H	H	M	M	L	L	L	L	H	L	M
CLO-4 :	Identify in different open-source blockchain platform	3	85	80	M	H	H	M	H	H	H	H	M	M	L	M	H	L	M
CLO-5 :	Identify major research challenges and technical gaps existing between theory and practice in cryptocurrency domain	3	85	75	M	H	H	H	H	H	M	M	M	M	L	M	H	L	M
CLO-6 :	Understanding of latest advances and its applications in Block Chain Technology.	3	80	70	M	H	H	H	H	H	M	M	M	M	L	M	H	H	H

Duration Hours	15	15	15	15	15
S1	SLO1	Distributed DBMS	Cryptocurrency Fundamentals	Operation of Bitcoin Blockchain	Ethereum
					Blockchain Implementation Challenges

	SLO2	Limitations of Distributed DBMS	Bitcoin	Blockchain Architecture	Ethereum Network	Zero Knowledge proofs
S2	SLO1	Introduction to Block chain	Digital Keys and Addresses	Block, Hash, Distributer P2P	Ethereum Virtual Machine (EVM)	protocols in Block chain
	SLO2	History, Definition	Transactions, Mining	Structure of Blockchain	Components of Ethereum	Succinct non interactive argument for Knowledge (SNARK)
S3	SLO1	Physical Ledger vs Digital Ledger	Bitcoin Networks and Payments Wallets	Database vs. Blockchain Architecture	Wallets for Ethereum	pairing on Elliptic curves
	SLO2	Distributed Ledger	Alternative Coins,	How does Blockchain Architecture works	Solidity	Zcash
S4, 5	SLO1	Lab1: Create a Public Ledger vs. Private Ledger with the various attributes like Access, Network Actors, Native token, Security, Speed and examples.	Lab 4: - Bitcoin Wallet Creation and Transactions	Lab7: - Building a Distributed Peer-to-Peer Network	Lab 10: - Ethereum Network Setup	Lab13: Understanding Zcash , a privacy-focused cryptocurrency
S6	SLO1	Digital Money to Distributed Ledgers	Name coin, Zcash	Consensus mechanism	Smart Contracts	Attacks on Blockchains
	SLO2	Design Primitives: Protocols, Security, Consensus	Bitcoin limitations	Proof of Work (PoW)	some attacks on smart contracts	Sybil attacks
S7	SLO1	Blockchain Categories: Public	Cryptography Fundamentals	Proof of Stake (PoS)	Ethereum and Smart Contracts	selfish mining

	SLO2	Private	overview of Hashing	Byzantine Fault Tolerance(BFT)	The Turing Completeness of Smart Contract Languages	51% attacks
S8	SLO1	Consortium	cryptographic algorithm	Proof of Authority (PoA)	verification challenges	
	SLO2	Blockchain Categories Use Cases	SHA 256,signature schemes	Proof of Elapsed Time (PoET)	comparing Bitcoin scripting vs. Ethereum Smart	Sharding based consensus algorithms
S9, 10	SLO1	Lab2: - Peer-to-Peer Network Simulation	Lab 5: - Bitcoin Mining Simulation	Lab 8: Consensus Mechanism Simulation	Lab 11: Solidity Smart Contract Development	Lab 14: Case Study about the different attacks
S11	SLO1	Blockchain Network and Nodes	encryption schemes and elliptic curve cryptography	consensus protocols	Contracts	Introduction to Web3
	SLO2	Peer-to-Peer Network	Introduction to Hyperledger	Permissioned Block chains	Decentralized Applications (DApps)	Contract Deployment
S12	SLO1	Decentralized networks and technology (serverless)	Hyperledger framework	Design goals	Any two example Decentralized Applications (DApps)	POST Requests
	SLO2	Features of Blockchain	Hyperledger as a Protocol	Consensus protocols for Permissioned Block chains.		
S13	SLO1	Applications of Blockchain technology	Hyperledger Fabric	Block chain network creation	Blockchain oracles	Development Frameworks
	SLO2		Digital Security Technology			
S14 ,15	SLO1	Lab3: Explore available tools for blockchain technology	Lab6: implementation of Cryptographic hash functions used in password verification.	Lab9: Building Blockchain	lab 12: Explore any one Decentralized Applications (DApps)	Lab 15: Simple application using web3

Learning Resources	1. Melanie Swan, “Block Chain: Blueprint for a New Economy”, O’Reilly, first edition – 2015. 2. Daniel Drescher, “Block Chain Basics”, Apress; 1st edition, 2017 3. Imran Bashir, “Mastering Blockchain: Distributed Ledger Technology, decentralization, and smart contracts explained”, 2nd Edition, Packt Publishing Ltd, March 2018. 4. Mark Gates, “Block chain: Ultimate guide to understanding block chain, bit coin, crypto currencies, smart contracts and the future of money”, Wise Fox Publishing and Mark Gates 2017. Reference Books: 1. Ritesh Modi, “Solidity Programming Essentials: A Beginner’s Guide to Build Smart Contracts for Ethereum and Block Chain”, Packt Publishing. Websites: 1. https://developer.ibm.com/patterns/create-and-deploy-block-chain-network-usingfabric-sdk-java/ 2. https://docs.docker.com/get-started/https://console.ng.bluemix.net/docs/services/block%2520chain/index.html
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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	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 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.P.Chanthini, SRMIST, KTR Campus

Course Code	UCA23D10J	Course Name	Internet of Things	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 Applications	Data Book / Codes/Standards			

Course Learning Rationale (CLR):		Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Demonstrate the design, communication model and enabling technologies for IoT.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Explore the system management and domain for various applications of IoT																		
CLR-3 :	Categorize the various protocols that are used for developing IoT applications.																		
CLR-4 :	Deploy an IoT application and connect to the cloud.																		
CLR-5 :	Develop IoT application for real time scenario																		
CLR-6 :	Create innovate device for organizations and society																		
Course Learning Outcomes (CLO):		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 :	Apply the knowledge/understanding of mathematics, science, to the solution of complex problems applicable to the discipline	3	80	70	L	H	L	H	L	M	M	L	L	L	M	H	M	L	L
CLO-2 :	Design, implement, and evaluate a computer-based system, process, component, or program to meet desired solutions that meet the specified needs with suitable concern for the public health and safety, and the cultural, societal, and environmental considerations.	3	85	75	H	H	L	M	L	M	M	L	M	L	M	H	M	L	L
CLO-3 :	Create, select, and apply applicable techniques, resources, and modern engineering and IT tools to complex engineering activities with an understanding of the limitations.	3	75	70	M	H	M	H	L	M	M	L	M	L	M	H	M	L	L
CLO-4 :	Function successfully as an individual, and as a member or leader in assorted teams, and in multidisciplinary settings.	3	85	80	M	H	M	H	L	M	M	L	M	L	M	H	M	L	L

CLO-5 :	Prove knowledge and understanding of the engineering and management principles and apply the same to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	3	85	75
CLO-6 :	<i>Design and develop creative devices for the society.</i>	3	80	70

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

Duration (hour)		15	15	15	15	15
S-1	SLO-1	Introduction, Types, Applications, Merits	Communication Models in IoT	IoT Platforms Design Methodology	IoT Platforms	Introduction about RESTful API
	SLO-2	Definition& Characteristics of IoT	Device to Device Model	Purpose & Requirements, process model specification, domain model specification	IoT Logical Design with Python	Designing a RESTful Web API
S-2	SLO-1	Physical design of IoT , Things in IoT	Device to Cloud Model	Information model specifications, service specifications, Iot level specifications	Python Data types and Data Structures	Amazon Web Services
	SLO-2	IoT protocols	Device to Gateway Model	Functional view specifications, operational view specifications.	Control Flow statements	Amazon Web Services for IoT
S-3	SLO-1	logical Design of IoT	M2M	Device & component Integration, Application development	Classes and Python Packages for IoT	Creating a ID in Amazon
	SLO-2	IoT Functional Blocks	Differences between IoT and M2M	IoT System for Weather Monitoring	JSON, XML	Implementation of EC2
S 4-5	SLO-1	Lab 1: Explain working of Raspberry Pi.	Lab 4: Demonstrate a smart object API gateway service reference implementation in IoT toolkit	Lab 7: Explain application framework and embedded software agents for IoT toolkit.	Lab 10: Reading Data from Internet using sensor	Lab 13: Smart Irrigation System
	SLO-2					

S-6	SLO-1	IoT Levels and Deployment Templates	M2M in IoT	Purpose & Requirements, process model specification, domain model specification	HTTP Lib, URL Lib	Implementation of Autoscaling
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	SLO-2	Levels 0, Levels 1	Architecture of M2M	Information model specifications, service specifications, Iot level specifications	SMTP Lib	Implementation of S3
S-7	SLO-1	Levels 2, Levels 3	Software-Defined Networking (SDN) SDN	Functional view specifications, operational view specifications.	Introduction to IoT Physical Devices	Implementation of RDS
	SLO-2	Level 4, Level 5	Architecture of SDN	Device & component Integration, Application development	Basic Building Blocks of IoT device	DynamoDB
S-8	SLO-1	IoT Deployment Challenges	Network Function Virtualization(NFV)	IoT System for Agriculture	Example Device: Raspberry Pi	Implementation of DynamoDB
	SLO-2	Domain Specific IoT	Architecture of NFV	Functional view specifications, operational view specifications.	About the board	Kinesis
S 9-10	SLO-1	Lab 2: Controlling LED with Raspberry Pi	Lab 5: Write and explain working of an HTTP- to-CoAP semantic mapping proxy in IoT toolkit.	Lab 8 : Arduino with ESP8266 explanation	Lab 11: Home Automation	Lab 14: Health care system
	SLO-2					
S-11	SLO-1	Home, Cities	NFV for IOT	Introduction to Cloud Storage Models	Raspberry Pi Interfaces & SPI Serial	Implementation of Kinesis
	SLO-2	Environment, Energy systems	IoT System Management	Stages of IoT Architecture	Introduction to Arduino	Case studies – Environment
S - 12	SLO-1	Industry	Advantages and Disadvantages of IoT system management	Sensors/Actuators	IoT hardware	IoT systems for weather Reporting Bot
	SLO-2	Agriculture	Need for IoT Systems Management	Devices , Gateway and Cloud	Microprocessors & Microcontrollers	Renewable Energy Systems
S-13	SLO-1	Health and Lifestyle	NETCONF , YANG and NETOPEER	IoT Security and Interoperability	Resistive Sensors, Capacitive Sensors	Forest Fire Detection&Smart grid
	SLO-2	IoT components	IoT Systems and Device Management with NETCONF-YANG	Risks and Attacks&Tools for Security	Inductive Sensors, Electromagnetic Sensors	Case studies - IoT system for Energy

S 14- 15	SLO-1	Lab 3: Interfacing Light Sensor with Raspberry pi	Lab 6: Describe gateway as a service deployment in Iot toolkit	Lab 9: Weather Monitoring System	Lab 12: Remote Surveillance system	Lab 15: Air Pollution Monitoring System
	SLO-2					
	SLO-2					

Learning Resources	1. Arshdeep Bahga and Vijay Madisetti, "Internet of Things - A Hands-on Approach", Universities Press, 2015. 2. Dieter Uckelmann et.al, "Architecting the Internet of Things", Springer, 2011. 3. Cuno Pfister, "Getting Started with the Internet of Things", O'Reilly, 2011. 4. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", Wiley, 2014. 5. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press, 2012.
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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%	20%	20%
	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%	10%	10%
	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	Mrs M.Divya , SRMIST

Course Code	UCA23D11J	Course Name	E-Commerce	Course Category	D	Discipline Specific Elective 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	Computer Applications		Data Book / Codes/Standards	Nil	

Course Learning Rationale (CLR):	<i>The purpose of learning this course is to:</i>
CLR-1:	To acquire the basic concept of E-Commerce
CLR-2:	Understand business of internet
CLR-3:	To impart knowledge on electronic payment systems
CLR-4:	To build various security and challenges in ECommerce
CLR-5:	To gain knowledge on consumer aspects in E-Commerce

Course Learning Outcomes (CLO):	<i>At the end of this course, learners will be able to:</i>
CLO-1:	Understand the basic concept of E- Commerce and its applications
CLO-2:	To gain the knowledge on EDI
CLO-3:	Analyze security and the web
CLO-4:	To gain knowledge on consumer aspects in E-Commerce
CLO-5:	To gain knowledge on consumer aspects in E-Commerce

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	ICT Skills	Professional Behavior	Life Long Learning
L	H	M	H	L	L	L	M	L	L	M	H	M	L	L
H	H	L	M	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
M	H	M	H	L	M	M	M	M	L	M	H	M	L	L
H	H	M	H	L	M	M	M	M	L	M	M	M	L	L

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Introduction to E- Commerce	Consumer oriented E-Commerce	EDI Implementation, MIME, and Value-Added Networks	Security: Internet security standards	Management Policies
	SLO-2	Definition& Classification of E-Commerce	Consumer oriented E-Commerce applications	Standardization and EDI	Network security and firewalls	Business Procedure
S-2	SLO-1	Framework of electronic commerce	Mercantile Process Models	EDI Software Implementation	client server network security	Public Laws
	SLO-2	Anatomy of E-Commerce Applications	Mercantile Models from the consumer's Perspective	EDI Envelope for Message Transport	secure electronic payment protocols	Payment Systems
S-3	SLO-1	E- Business models	Mercantile Models from the Merchant's Perspective	Value-Added Networks	cryptography and authentication	Business concept in E-Commerce: Digital Commerce Marketing
	SLO-2	E-Commerce based activities	Electronic business models	Internet-Based EDI	emerging client server security threats	Advertising strategies and tools
S-4	SLO-1	Goals of E-Commerce	B2B, B2C, C2C, C2B	Customization and Internal Commerce	security issues	Internet Marketing Technologies
	SLO-2	Technical Components of E-Commerce	B2B, B2C, C2C, C2B	Supply Chain Management	Firewalls and network security	Social Marketing
S-5	SLO-1	Functions	Electronic Payment Systems	Technology for Online-Business	encryption techniques	Mobile Marketing

	SLO-2	Advantages, and disadvantages of E-Commerce	Types of Electronic Payment Systems	Middleware	Encryption Tools and Techniques	Location based Marketing
S-6	SLO-1	Scope of E-Commerce	Digital Token -Based Electronic Payment Systems	Domain names	data and message security	Ethical, Social, in E-Commerce
	SLO-2	Electronic Commerce Applications	Smart cards and Electronic Payment Systems	8. Choose the Perfect Domain Name for Ecommerce	Threats to message security	Political Issues in E-Commerce
S-7	SLO-1	Network infrastructure	Credit card Based Electronic Payment System	work flow atomization and coordination	encrypted documents and electronic mail	The Means of Distribution

	SLO-2	Market forces Influencing the I-way	Risk and Electronic Payment System	customization		A model for Message Handling
S-8	SLO-1	Role of Internet	Designing Electronic Payment System	internal commerce	hypertext publishing	security and the web
	SLO-2	The Internet Terminology	Web-site Design	Contents: Text	MIME	B2C Models of E-commerce Business model of any e-commerce website
S9	SLO-1	E- commerce and World Wide Web	Web sites as market place	Contents: Integrating	S/MIME	Web security
	SLO-2	Globalization of the Academic Internet	E –commerce, pure online vs. brick and click business	E-business applications	MOSS	website security
S10	SLO-1	Components of the I way	click business	Component of Internet	MIME	The new age of Information based marketing
	SLO-2	Network Access Equipment	Electronic data interchange	Information technology structure	elated Facilities for EDI over the Internet.	Advertising on the internet
S11	SLO-1	Network Access Equipment-	EDI Applications in business EDI: Legal, Security, and Privacy Issues	Development of Intranet	Securing Channels of Communication	Case Study: Identify Key components
	SLO-2	Public Polic Issues shaping the I-way	EDI and Electronic Commerce	Extranet and their Difference	Protecting Networks	strategy
S12	SLO-1	Internet Terminology	Internal Information System	Assessing requirement for an online business designing	Protecting Servers	B2B
	SLO-2	An overview of Internet Applications	Work-Flow Automation and Coordination	Developing and deploying the system	ProtectingClients	B2C Models of E-commerce Business model of any e-commerce website

Learning Resources	1. Ravi Kalakota and Andrew B Whinston, (1999), "Frontiers of Electronic Commerce", Pearson Education Asia, (Unit I, II& III) 2. Marilyn Greenstein and Todd M Feinman, (2000), "Electronic commerce: Security, Risk Management and Control" Tata McGraw-Hill. (Unit IV & V)	3. 3. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", Wiley, 2014. 4. K.Bajaj& D Nag , "E-Commerce", Tata McGraw Hill – 1999.
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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 (5%)#					
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice

Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	ATTEND ANCE (5%)		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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	<i>Dr.T.S.Suganya BCA Dept. SRM ISTRamapuram.</i>

Course Code	UCA20D12J	Course Name	IOS	Course Category	D	Discipline Specific Elective 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	Computer Applications			Data Book / Codes/Standards	Nil

Course Learning Rationale (CLR):		<i>The purpose of learning this course is to:</i>			Learning			Program Learning Outcomes (PLO)																
CLR-1 :	To acquire the basic concept of IOS				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 :	Understand the IOS design patterns																							
CLR-3 :	To gain knowledge in IOS frameworks																							
CLR-4 :	To build applications using SWIFT																							
CLR-5 :	To impart knowledge of IOS app publishing process																							
Course Learning Outcomes (CLO):		<i>At the end of this course, learners will be able to:</i>			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 :	To gain knowledge to develop IOS apps																							
CLO-2 :	Understand the basic concept of Swift programming language and also gain knowledge in Xcode																							
CLO-3 :	To understand the IOS Framework																							
CLO-4 :	To gain knowledge on MapKit framework and IOS design patterns																							
CLO-5 :	Ability to work with IOS development tools																							

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Introduction to IOS Development	Swift Programming Language	Introduction to Xcode	Table views and collection views	Push notifications and in-app messaging
	SLO-2		Introduction to Swift		Table view cells	User notification framework
S-2	SLO-1	Overview of IOS development	Main Advantages and Disadvantages of Swift	Creating the initial user interface	table view data sources	Push notification services
	SLO-2				collection views	
S-3	SLO-1	Understanding IOS architecture	Syntax and basic concepts	interface Builder	collection view cells –collection view data sources	In-app messaging
	SLO-2		The println() function Variables, Constants, Data types		Layouts and scrolling	

S-4	SLO-1	IOS Framework	Conditional Statements & Operators	X code editor	Networking and web services	Personalization and targeting
	SLO-2				Introduction to networking	Debugging and testing techniques
S-5	SLO-1	IOS software stack	Comparison operators Arithmetic operators Logical operators	Debugging and testing	URLSession framework	
S-6	SLO-1	core OS layer	Functions and closures	Debugging tools	RESTful web services RESTful Architecture JSON Authentication	Xcode debugger:
	SLO-2		Functions with parameters			
S-7	SLO-1	Core Service layer	Functions with returned values	Simulator		Logging and console output Unit testing: Integration testing
	SLO-2		Optional Unwrapping Forced optional unwrapping			
S-8	SLO-1	IOS development tools SWIFT XCODE	Loops, For loops, While loops For in loops	Source control	Core data and persistence	App distribution and monetization
	SLO-2					
S9	SLO-1	Cocoa Touch Firebase	Objects & classes Methods, Properties	Deployment	SON and XML parsing	App review guidelines
	SLO-2		Methods with parameters Methods with return values			
S10	SLO-1	Setting up development environment	Structs Creating a struct, Accessing a struct	Version control	Authentication and security	In-app purchases:
	SLO-2		Inheritance, Creating a subclass, Method overriding			
S11	SLO-1	Creating a new IOS project	Memory management	Navigation and tab bar controllers	Location and maps integration	Advertising and sponsorships Advertising Networks In-App Advertising Native advertising Sponsorship UserData
	SLO-2		Automatic Reference counting Strong and Weak References Retain Cycles	Navigation controllers UIWindow - UILabel - UIButton - UISegmentedController - UITextField - UISlider - UISwitch - UIActivityIndicatorView - UIProgressView - UIPageControl - UIStepper	MapKit framework Map Display Location Services	
S12	SLO-1	Running the IOS app	Error handling- Error handling patterns, Error codes, Error Logging	tab bar controllers	Geo coding and reverse geocoding	Subscription models
	SLO-2					

Learning Resources	1. Learning IOS Development: A Hands-on Guide to the Fundamentals of IOS Programming" by Maurice Sharp and Jordan Morgan: 2. "IOS Programming: The Big Nerd Ranch Guide" by Joe Conway and Aaron Hillegass	3. IOS Development with Swift" by Craig Grummitt
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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 (5%)#				
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	ATTENDANCE (5%)	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.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Dr. S. Lakshmi

Course Code	UCA20D13J	Course Name	Artificial Intelligence	Course Category	D	Discipline Specific 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 Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):		The purpose of learning this course is to,			Learn ing	Program Learning Outcomes (PLO)																			
CLR-1 :	Discover problems that are agreeable to solution by AI methods.				1	2	3	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-2 :	Study the basics of designing intelligent agents that can solve general purpose problems																								
CLR-3 :	Discover appropriate AI methods to solve a given problem																								
CLR-4 :	Perform intellectual task as decision making, problem solving, perception, understanding																								
CLR-5 :	Formalize a given problem using different AI methods																								
CLR-6 :	Provides adaptive learning																								
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																							
CLO-1 :	Demonstrate fundamental understanding of the history of artificial intelligence and its foundations				2	8	8				H	L	M	L	M	L	L	M	M	M	H	L	H	M	M
CLO-2 :	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning				3	8	8				L	H	M	L	M	L	L	M	M	H	H	L	M	M	M
CLO-3 :	Identify systems with Artificial Intelligence.				3	8	8				L	L	H	L	M	L	L	M	M	M	H	L	H	M	M
CLO-4 :	Ability to understand Artificial Intelligence techniques, such as search algorithms,				3	8	8				L	H	M	L	M	L	L	H	M	M	H	L	M	M	L
CLO-5 :	Ability to learn Artificial Intelligence techniques for problem solving.				3	8	8				L	L	M	L	H	L	L	M	H	M	H	L	M	M	L

CLO-6 :	<i>Ability to learn the current Artificial Intelligence techniques.</i>	3	8	8	L	L	H	L	M	L	L	M	H	M	H	L	M	L	L
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Duration (hour)		12	12	12	12	12
S-1	SLO-1	Introduction to Artificial Intelligence	Logical Reasoning- Introduction	Planning: designing programs to search for data or solutions to problems	Uncertain Knowledge and reasoning	Learning
	SLO-2	History of AI- Overview of AI	Knowledge Representation	Forward search and backward search	Quantifying uncertainty	Learning agents
S-2	SLO-1	Applications of AI- Ai Techniques	Logical Agents: Knowledge based Agents	state-space search	Probability Theory: Uncertain Knowledge	Classification of learning
	SLO-2	Types of AI: General vs Narrow	The Wumpus World & Logic	Represent the current state and goal state	Axioms of probability	Learning elements
S-3	SLO-1	Problem Solving with AI- AI models	Propositional logic	Problems to solve: Water Jug Problem	Bayes Theorem	Inductive Learning methods
	SLO-2	Data Acquisition and Learning Aspects in AI	Propositional logic: Syntax & Syntax grammar	State representation: Initial, operator, goal state	Bayes' Rules& uses	Learning decision tree
S-4	SLO-1	Problem-Solving Process	Inference	Train travel problem	probabilistic Reasoning	Attribute based representation
	SLO-2	Formulating Problems	Implication by inference Types of reasoning	State representation: Initial, operator, goal state	Uncertainty: Causes of uncertainty:	Choosing an attribute
S-5	SLO-1	Problem Types and Characteristics	First-Order logic	partial-order planning	Probability	Decision tree learning
	SLO-2	Problem Analysis and Representation	Syntax of First-Order logic	Basic representation Operator representation	Probability of occurrence\	Ensemble learning
S-6	SLO-1	Agents- Examples of Agents	Basic elements of First order logic Reducing first-order inference	planning graphs	Conditional probability	Explanation based learning
	SLO-2	Types of agents	Quantifiers in First-order logic	Planning graph of feeding	Probability occurrence for the problem	Information gain
S-7	SLO-1	General Search algorithm Uniformed Search Methods	Inference in first order logic and Generalized rules for FOL	Uses of planning graph	Bayesian networks	Explanation based learning

	SLO-2	Heuristic Search Techniques	FOL inference rules for quantifier	Planning graph example	Types of Bayesian Network	Statistical Learning methods
S-8	SLO-1	BFS, Uniform Cost Search	Forward chaining	Graph plan algorithm	Building model op Bayesian Network	Learning with hidden variable
	SLO-2	Depth First search, Depth Limited search (DLS)	Properties of forward chaining	Using planning graphs for heuristics	Directed Acyclic Graph	Naïve Bayes
S-9	SLO-1	Iterative Deepening search algorithm	Fast conversion of forward chaining	planning and acting in the real world	Conditional probability	Instance base learning
	SLO-2	Iterative Deepening search for DFS	Properties of forward chaining Examples for forward chaining	Basic Planning	Bayesian Network Graph	Neural Networks
S-10	SLO-1	Informed Search-Introduction	Backward Chaining	Real world: JOB shop scheduling	Inferences in Bayesian networks	Reinforcement Learning
	SLO-2	General tree search: Evaluation function	Properties of Backward chaining Examples for Backward chaining	Critical path method	Components of Bayesian Network	Elements of reinforce learning
S-11	SLO-1	General graph search: Evaluation function	Unification	Forward march	Temporal models	Reinforcement learning problem
	SLO-2	Generate and Test BFS	Conditions for Unification & Unification algorithm	Backward march	Inference in temporal models	Agent environment interface
S-12	SLO-1	Generate and Test A* & AO* algorithm	Resolution for inference rule	Limited resources	Hidden Markov models	Steps for Reinforcement learning
	SLO-2	CSP	Steps for Resolution	Hierarchical Planning	HMM components	Problem solving methods for RL

Learning Resources	3. Russel.SandNorvig.P, (2003), “Artificial Intelligence – A Modern Approach”, Second 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	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 Industry	Experts from Higher Technical Institutions	Internal Experts
Mr.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Mrs. PM Kavitha Dr. Agusthiyar R Dr.S Jayachandran

Cours e Code	UCA23G0 7T	Cours e Name	<i>Introduction to Server-side Web applications</i>	Course Catego ry	G	Generic Elective Courses	L	T	P	O	C
							4	0	0	2	4

Pre- requisite Courses	<i>NIL</i>	Co-requisite Courses	<i>NIL</i>	Progressiv e Courses	<i>NIL</i>
Course Offering Department	<i>Computer Applications</i>		Data Book / Codes/Standards	<i>NIL</i>	

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learni ng	Program Learning Outcomes (PLO)
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CLR-1 :	<i>To gain knowledge about server side programming</i>	Level of Thinking	Expected Proficiency	Expected Attainment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	<i>To Learn basic protocols</i>																		
CLR-3 :	<i>To develop simple PHP programs</i>																		
CLR-4 :	<i>To understand working with arrays and functions</i>																		
CLR-5 :	<i>To learn various session and cookies</i>																		
CLR-6 :	<i>To create database-driven applications</i>																		
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																	
CLO-1 :	write client side scripting	2	80	70	M	H	M	M	H	M	L	M	H	M	M	M	M	L	M
CLO-2 :	Implement the server side of the web application	3	85	75	L	M	M	H	M	M	L	M	H	M	L	H	M	M	M
CLO-3 :	Implement Web Application using PHP	3	75	70	H	M	M	M	M	M	L	M	H	M	M	M	H	M	M
CLO-4 :	implement a full-stack Single Page Application using PHP	3	85	80	M	M	M	M	H	M	L	M	H	M	L	M	M	H	M
CLO-5 :	Design and develop fully functional dynamic web applications using the concepts of PHP, MySQL	3	85	75	M	M	H	M	H	M	L	M	H	M	L	M	M	M	M
CLO-6 :	Learn and apply advanced asynchronous web communication mechanisms like REST API, AJAX and JQuery for building highly interactive webpages	3	80	70	M	H	H	M	M	M	L	M	M	M	L	H	M	M	M

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Introduction to the server side	HTML page structure	What Does PHP Do?	Introduction to Function	<i>Need of session management</i>
	SLO-2	What is server-side website programming?	Benefits of html tags	A Brief History of PHP	Calling a Function, Defining a Function	<i>Various techniques for state and session management</i>
S-2	SLO-1	Static Website	formatting tags in HTML	Language Basics	Variable scope	Hidden Fields
	SLO-2	Dynamic Website	Tables rows and column	Lexical Structure	Passing parameters by value and references	Query String
S-3	SLO-1	Are server-side and client-side programming the same?	Hyperlinks	Introduction to Data Types	Default Parameters and Variable Parameters	Cookie and Session
	SLO-2	Architecture of server side programming	Image and image list	Scalar Types	Missing Parameters	Paasing variable through cookies
S-4	SLO-1	Benefits of server side programming	meta tags	Compound Types	Return Values and Variable Functions	Setting up cookies data in php
	SLO-2	Server - Client - Communication Protocol (HTTP)	Use of frames	Special Types	Anonymous Functions	Basic settingsfor session tracking
S-5	SLO-1	Basics of WWW	Implementation of frameset	Defining Variables	Variable Interpolation	Basic commands for database connection
	SLO-2	HTTP protocol methods and headers	html form tags	Variable Scope	Printing Strings	query execution with CURD
S-6	SLO-1	HTTP Request and Response	Role of form action tag	Introduction to Expressions and Operators	Introduction to Arrays	Storing and retrieving data using PHP
	SLO-2	Architecture of web browser	Audio.video tags	Arithmetic operators, Comparison operators, Bitwise operators	Indexed Versus Associative Arrays	Object oriented database access using PHP
S-7	SLO-1	Web server installation	APIs	Logical operators, Casting operators & Miscellaneous Operators	Identifying Elements of an Array	Introduction to MySQL Database

	SLO-2	Web server configuration	HTML5 tags in relation to validations	Operator precedence	Storing Data in Arrays	Connecting to and disconnecting from the server
S-8	SLO-1	Web security	CSS: Need for CSS, Basic syntax and structure	Introduction to Flow-Control Statements	Multidimensional Arrays	Creating and using a database
	SLO-2	CORS	Backgrounds, Colors and properties, Manipulating texts	Working with If & Switch	Extracting Multiple Values	Selecting a database
S-9	SLO-1	Understanding SEO	Fonts, borders and boxes, Margins, Padding Lists,	Working with While, for, foreach,	Converting Between Arrays and Variables	Creating a table
	SLO-2	Web Containers	Difference between CSS2 and CSS3	Using exit, return, goto statements	Traversing Arrays	Introduction to Working with MySQL Database using PHP
S-10	SLO-1	Web Components	Flex Box, Media Queries	Including Code form another module	Sorting	Connecting to MySQL database
	SLO-2	Use of Servlet	Working with Gradients	Working with include and require construct	Reversing an array	Querying database
S-11	SLO-1	Lifecycle - Request - Servlet	basic of frameworks like Bootstrap	Embedding PHP in Web Pages	Introduction to Object	Retrieving and displaying the results
	SLO-2	Benefits of Servlet response	Responsive web design and Media Query	Standard (XML) Style, SGML Style	Creating an Object	Modifying data
S-12	SLO-1	Servlet - Dispatching Requests	CSS variables	ASP Style	Accessing Properties and Methods	Deleting data
	SLO-2	Use of WebSocket	Working with CSS variables	Script Style	Declaring a Class, Declaring methods and properties	Designing simple database application

Learning Resources	Learning materials:
	1. HTML 5 Black Book 2Ed, by Kogent Learning Solutions Inc. 2. Learning PHP, MySQL, JavaScript, CSS & HTML5, 3rd Edition 3. PHP: The Complete Reference By Steven Holzner, McGrawhill Online Official Documentation: 1 .HTML & CSS: https://developer.mozilla.org/en-US/docs/Web/HTML 2.PHP: https://www.tutorialspoint.com/php/index.htm

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.,

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		Dr N Vijayalakshmi, SRM IST
		Mrs. S Suriya, SRM IST

Course Code	UCA23P81L	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 Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning	Program Learning Outcomes (PLO)
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CLR-1 :	Demonstrate skills learnt in the real time environment.	Level of Thinking (Bloom)	1	2	3	Disciplinary Knowledge	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:																			
CLO-1 :	To get an inside view of an industry and organization/company	3	80	70	L	H	M	H	L	M	L	L	L	L	L	H	M	L	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	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	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	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	M	L	M	M	M	L	L	

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	Viva-Voce
	20%	30 %	30 %	20 %