SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Chengalpattu District 603203,

Tamil Nadu, India

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

ACADEMIC CURRICULA

UNDERGRADUATE DEGREE PROGRAMMES

Bachelor of Science (Honors)
in
Computer Science
(III to VIII Semester)

(National Education Policy/National Credit Framework)

Learning Outcome-Based Curriculum Framework

Regulations 2024

Faculty of Science and Humanities

Office of the Registrar, SRM IST

Control Copy

Approved in:

69th Executive Council Meeting 28.12.2024

57th Academic Council Meeting 30.11.2024

SURUTTAIA UDAIYAR PONNUSAMY

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REGISTRAR

FACULTY OF SCIENCE AND HUMANITIES

ACADEMIC CURRICULA

UNDERGRADUATE DEGREE PROGRAMME

Bachelor of Science (Honors)
in
Computer Science

Four Years

National **E**ducation **P**olicy

Learning **O**utcome-based **C**urricula **F**ramework

National **C**redit **F**ramework

Academic Year

2024 - 2025



SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Chengalpattu District 603203, Tamil Nadu, India

1.	Vision Statement
Stmt - 1	To reach the goals of expansion and improvement of the department and rank among the top computer science departments in the world for teaching, learning, research, and community involvement
Stmt - 2	Ensure that students have high-quality learning experiences by implementing efficient classroom procedures, using active learning techniques, and creating chances for students and faculty to engage in meaningful interactions

2.	Mission Statement
Stmt - 1	To create, disseminate, and apply knowledge in all areas of computer science, including interdisciplinary fields that broaden the field's application and advance humankind
Stmt - 2	To equip to work both independently and in teams to solve challenging problems across domains and foster the development of communication skills as an integral part of the profession
Stmt - 3	To be successful, moral, ethically strong in the diverse society and encourage consistent and constant active learning throughout the life that will positively impact growth of the individual and the country
Stmt - 4	To spearhead the progress of computer science by globally acknowledged research and technology transfer
Stmt - 5	To be an aspirational, idealized future state for a company, act as inspiration and a roadmap for organizing and making decisions.

"Stmt" stands for Statement

3.	Program Education Objectives (PEO)
PEO - 1	The graduates will use their expertise to further their careers and/or pursue advanced degrees.
PEO - 2	The graduates will be able to solve issues creatively, communicate clearly, and work well in inclusive, varied multidisciplinary teams.
PEO - 3	The graduates will effectively execute hardware and/or software-related engineering projects to achieve customer business objectives and/or engage in fruitful research, our graduates will employ computing principles and techniques that are rooted in mathematics and science.
PEO - 4	The graduates may become entrepreneurs who can innovate and develop software/hardware solutions through the utilization of design thinking and create value for their products
PEO - 5	The graduates shall exploit the best practices of cognitive ability and demonstrate the psychological fitness to work across the globe

4.	Consistency of Program Education Objectives with Mission				
	Mission Stmt. – 1	Mission Stmt. – 2	Mission Stmt. - 3	Mission Stmt. - 4	Mission Stmt. – 5
PEO - 1	High	High	Medium	Low	Medium
PEO - 2	Medium	High	Medium	Low	Medium
PEO - 3	High	High	Medium	High	Medium
PEO - 4	High	Medium	Medium	High	High
PEO - 5	High	High	High	High	High

** H – High Correlation, M – Medium Correlation, L – Low Correlation
** H, M, and L have numerical equivalents of 3, 2, 1 correspondingly

5.	Programme Learning Outcomes (PLO)
	Graduate Learning Attributes
PLO - 1	The capacity to apply mathematical and computer knowledge
PLO - 2	The capacity to interact and converse
PLO - 3	An understanding towards the tradeoffs involved in design decisions computational systems.
PLO - 4	Accept responsibility for personal behavior and actions

PLO - 5	A proficiency with the techniques, skill sets, and software/hardware tools
PLO – 6	A comprehension of the duties and obligations related to the computer profession in terms of professionalism, ethics, la
PLO – 7	The capacity to evaluate the impact of computers and software/hardware products among common people, groups, and society
PLO – 8	Development of science and society through entrepreneurship and innovative technologies for various needs and demands
PSO – 1	Make an effort to use and create simulation tools that can aid in the solution of simple to complicated problems requiring computation-based and computation-oriented solutions that are low-complexity, optimized, energy-efficient, and indigenous.
PSO – 2	A zeal to engage with cutting-edge technologies in order to quickly find solutions for an ecosystem of intelligent applications.

PSO – Programme Specific Outcome

6. Mapping of PLOs with PEOs

	PLO – 1	**PLO – 2**	**PLO – 3**	**PLO - 4**	**PLO - 5**	**PLO – 6**	**PLO – 7**	**PLO – 8**	**PSO - 1**	**PSO – 2**
PEO – 1	2	2	3	2	2	1	1	3	2	2
PEO – 2	3	3	2	1	2	1	1	3	2	2
PEO – 3	3	3	2	3	3	2	3	2	1	2
PEO – 4	1	1	3	3	2	1	3	3	1	3
PEO - 5	3	3	3	3	2	3	3	3	1	3

7. Programme Structure

Discipline Core Courses (C)

Course Code	Course Title	Hours/ Week L	T	P	C
UCS24101J	Digital Electronics	3	0	3	4
USA24102J	Programming for Problem Solving	3	0	3	4
UMS24101T	Discrete Mathematical Structures	4	0	0	4
USA24201J	Data Structures and Algorithms	3	0	3	4
UCS24202J	Object Oriented Programming using Java	3	0	3	4
UMS24202T	Mathematical Foundation	4	0	0	4
UCS24301J	Operating System	3	0	3	4
USA24302J	Database Management System	3	0	3	4
UMS24303T	Statistical Methods	4	0	0	4
USA24401J	Python Programming	3	0	3	4
Total Learning Credits					**40**

Discipline Core/ Elective Courses (D)

Course Code	Course Title	Hours/ Week L	T	P	C
UMS24D01T	Resource Management Techniques	4	0	0	4
UMS24D02T	Numerical Methods				
UCS24D01J	Software Engineering	3	0	3	4
UCS24D02J	Computer Networks and Data Communication				
UCS24D03J	Object Oriented Analysis and Design	3	0	3	4
UCS24D04J	Machine Learning				
UCS24D05J	Fundamentals of Business Application Development	3	0	3	4
UCS24D06J	NLP and Language Models				
USA24D07J	Cloud Computing	3	0	3	4
UCS24D08J	Microprocessors and Embedded Systems				
UCS24D09J	Mobile Application Development	3	0	3	4
USA24D10T	Wireless Communication and Mobile Computing	4	0	0	
UCS24D11J	Web Application Framework	3	0	2	4
UCS24D12J	Computer Vision				
UCS24D13J	Big Data Analytics	3	0	2	4
UCS24D14J	Cryptography and Network Security				
UCS24D15J	AI and Business Analytics	3	0	2	4
USA24D18J	Cyber Security				
USA24D20J	Blockchain Technology	3	0	2	4
UCS24D18T	Introduction to Cyber Physical Systems	4	0	0	4
Total Learning Credits					**40**

Elective Courses (Minor) (E)

Course Code	Course Title	Hours/ Week L	T	P	C
UDS24E01J	Data Science and Analytics	3	0	3	4
UDS24E02J	Data Analytics using Spreadsheet	3	0	3	4
UDS24E03J	Essentials of Machine Learning	3	0	3	4
UDS24E04J	Programming using R	3	0	3	4
UDS24E05J	Programming using Python	3	0	3	4
UDS24E06J	Introduction to Deep Learning	3	0	3	4
UDS24E07J	Applications of Computer Vision	3	0	3	4
UDS24E08J	Data Visualization Tools	3	0	3	4
Total Learning Credits					**32**

Multidisciplinary Courses (M)

Course Code	Course Title	Hours/ Week L	T	P	C
UCS24M01J	Introduction to ICT Tools	2	0	2	3
UCS24M02J	Fundamentals of Digital Marketing	3	0	1	3
UCS24M03J	Basics of Web Application Development	2	0	2	3
Total Learning Credits					**9**

Value Added Courses (V)

Course Code	Course Title	Hours/ Week L	T	P	C
UCD24V01T	Essentials of Artificial Intelligence	1	0	0	1
UES24V01T	Environmental Studies	2	0	0	2
UCD24V02T	Universal Human Values	2	0	0	2
Total Learning Credits					**5**

Ability Enhancement Courses (A)

Course Code	Course Title	Hours/ Week L	T	P	C
ULT24AE1J	Tamil - I	2	0	2	3
ULH24AE1J	Hindi - I				
ULF24AE1J	French - I				
ULE24AE1J	English	2	0	2	3
ULT24AE2J	Tamil - II	2	0	2	3
ULH24AE2J	Hindi - II				
ULF24AE2J	French - II				
Total Learning Credits					**9**

Skill Enhancement Courses (S)

Course Code	Course Title	Hours/ Week L	T	P	C
UCD24S01J	Verbal Ability and Skill Development	1	0	2	2
UCD24S02L	Quantitative Aptitude and Logical Reasoning	0	0	2	1
UCD24S03J	Industry Oriented Employability and Leadership Skills	1	0	2	2
UEN24S01L	Communication Skills	0	0	4	2
UCD24S04J	Career Readiness and Professional Skills	1	0	2	2
Total Learning Credits					**9**

Project Work / Internship (P)					
Course Code	Course Title	Hours/ Week L	T	P	C
UCS24P01L	Internship - I	-	-	-	1
UCS24P02L	Internship – II	-	-	-	1
UCS24P03L	Project Work	0	0	4	2
UCS24P04L	Research Project and Dissertation	0	0	24	12
UCS24P05L	Professional Internship				
Total Learning Credits					**16**

Mandatory Courses (Y)					
Course Code	Course Title	Hours/ Week L	T	P	C
UNS24Y01L	NSS	0	0	0	0
UNC24Y01L	NCC				
UNO24Y01L	NSO				
UYG24Y01L	YOGA				
UMI24Y01L	My India Project	0	0	0	0
Total Learning Credits					**0**

Internship – I to be completed during Summer Vacation of the First year
Internship – II to be completed during Summer Vacation of the Second year

Students from other departments can enroll in Elective Courses (Minor) (E)
Students from all departments will be able to enroll in Multidisciplinary Courses (M).

8. Course Allocation across Semesters

Semester – I					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
ULT24AE1J	Tamil – I	2	0	2	3
ULH24AE1J	Hindi – I				
ULF24AE1J	French – I				
ULE24AE1J	English	2	0	2	3
UCS24101J	Digital Electronics	3	0	3	4
USA24102J	Programming for Problem Solving	3	0	3	4
UMS24101T	Discrete Mathematical Structures	4	0	0	4
UCD24S01J	Verbal Ability and Skill Development	1	0	2	2
	Learning Credits				**20**

Semester – II					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
ULT24AE2J	Tamil – II	2	0	2	3
ULH24AE2J	Hindi – II				
ULF24AE2J	French – II				
USA24201J	Data Structures and Algorithms	3	0	3	4
UCS24202J	Object Oriented Programming using Java	3	0	3	4
UMS24202T	Mathematical Foundation	4	0	0	4
UCD24V01T	Essentials of Artificial Intelligence	1	0	0	1
	Multidisciplinary Course – I				3
UCD24S02L	Quantitative Aptitude and Logical Reasoning	0	0	2	1
UNS24Y01L	NSS	0	0	0	0
UNC24Y01L	NCC				
UNO24Y01L	NSO				
UYG24Y01L	YOGA				
	Learning Credits				**20**

Total Learning Credits of Courses of FIRST Year = 40

Semester – III					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	T	P	
UCS24301J	Operating System	3	0	3	4
USA24302J	Database Management System	3	0	3	4
UMS24303T	Statistical Methods	4	0	0	4
	Minor Elective – I				4
UCS24P01L	Internship – I	0	0	0	1
	Multidisciplinary Course – II				3
Total Learning Credits					**20**

Semester – IV					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
USA24401J	Python Programming	3	0	3	4
UMS24D01T	Resource Management Techniques	4	0	0	4
UMS24D02T	Numerical Methods				
	Minor Elective – II				4
	Minor Elective – III				4
UEN24S01L	Communication Skills	0	0	4	2
UCD24S03J	Industry Oriented Employability and Leadership Skills	1	0	2	2
UMI24Y01L	My India Project	0	0	0	0
Total Learning Credits					**20**

Total Learning Credits of Courses of SECOND Year = 40

Semester – V					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
UCS24D01J	Software Engineering	3	0	3	4
UCS24D02J	Computer Networks and Data Communication				
UCS24D03J	Object Oriented Analysis and Design	3	0	3	4
UCS24D04J	Machine Learning				
	Minor Elective – IV				4
	Multidisciplinary Course – III				3
UES24V01T	Environmental Studies	2	0	0	2
UCD24S04J	Career Readiness and Professional Skills	1	0	2	2
UCS24P02L	Internship – II	0	0	0	1
Total Learning Credits					**20**

Semester – VI					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
UCS24D05J	Fundamentals of Business Application Development	3	0	3	4
UCS24D06J	NLP and Language Models				
USA24D07J	Cloud Computing	3	0	3	4
UCS24D08J	Microprocessors and Embedded Systems				
	Minor Elective – V				4
	Minor Elective – VI				4
UCS24P03L	Project Work	0	0	4	2
UCD24V02T	Universal Human Values	2	0	0	2
Total Learning Credits					**20**

Total Learning Credits of Courses of THIRD Year = 40

Semester – VII					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
UCS24D09J	Mobile Application Development	3	0	3	4
USA24D10T	Wireless Communication and Mobile Computing	4	0	0	
UCS24D11J	Web Application Framework	3	0	2	4
UCS24D12J	Computer Vision				
UCS24D13J	Big Data Analytics	3	0	2	4
UCS24D14J	Cryptography and Network Security				
	Minor Elective – VII				4
	Minor Elective – VIII				4
Learning Credits					**20**

Semester – VIII					
Course Code	**Course Title**	**Hours/ Week**			**C**
		L	**T**	**P**	
UCS24D15J	AI and Business Analytics	3	0	2	4
USA24D18J	Cyber Security				
USA24D20J	Blockchain Technology	3	0	2	4
UCS24D18T	Introduction to Cyber Physical Systems	4	0	0	
UCS24P04L	Research Project and Dissertation	0	0	24	12
UCS24P05L	Professional Internship				
Learning Credits					**20**

Total Learning Credits of Courses of FOURTH Year = 40

8.1 Elective Courses (MINOR) offered by the Department of Computer Science to other Departments (Excluding Department of Computer Science)

Elective Courses (Minor) (E)						
Semester	Course Code	Course Title	Sessions Per Week			C
			L	T	P	
III	UDS24E01J	Data Science and Analytics	3	0	3	4
IV	UDS24E02J	Data Analytics using Spreadsheet	3	0	3	4
IV	UDS24E03J	Essentials of Machine Learning	3	0	3	4
V	UDS24E04J	Programming using R	3	0	3	4
VI	UDS24E05J	Programming using Python	3	0	3	4
VI	UDS24E06J	Introduction to Deep Learning	3	0	3	4
VII	UDS24E07J	Applications of Computer Vision	3	0	3	4
VII	UDS24E08J	Data Visualization Tools	3	0	3	4
	Total Learning Credits					**32**

8.2 Multidisciplinary Courses offered by the Department of Computer Science to all departments (Including Department of Computer Science)

Multidisciplinary Courses (M)						
Semester	Course Code	Course Title	Sessions Per Week			C
			L	T	P	
II	UCS24M01J	Introduction to ICT Tools	2	0	2	3
III	UCS24M02J	Fundamentals of Digital Marketing	3	0	1	3
V	UCS24M03J	Basics of Web Application Development	2	0	2	3
	Total Learning Credits					**9**

9. Programme Articulation Matrix

Course Code	Course Title	Program Learning Outcomes									
		1	2	3	4	5	6	7	8	PSO 1	PSO 2
ULT24AE1J	Tamil – I	3	2	2	2	2	2	-	2	2	2
ULH24AE1J	Hindi – I	3	2	2	2	2	2	-	2	2	2
ULF24AE1J	French – I	3	2	2	2	2	3	-	2	2	2
ULE24AE1J	English	3	2	2	2	2	3	-	2	2	2
UCS24101J	Digital Electronics	3	2	2	2	2	3	-	2	-	-
USA24102J	Programming for Problem Solving	3	2	2	2	2	3	-	2	2	2
UMS24101T	Discrete Mathematical Structures	3	1	2	2	3	3	-	2	2	2
UCD24S01J	Verbal Ability and Skill Development	3	1	3	-	2	2	-	-	-	-
ULT24AE2J	Tamil – II	3	2	2	2	2	2	-	2	2	2
ULH24AE2J	Hindi – II	3	2	2	2	2	2	-	2	2	2
ULF24AE2J	French – II	3	2	2	2	2	3	-	2	2	2
USA24201J	Data Structures and Algorithms	3	2	2	2	3	3	-	2	2	2
UCS24202J	Object Oriented Programming using Java	3	2	2	2	3	3	-	2	2	2
UMS24202T	Mathematical Foundation	3	2	2	2	3	3	-	2	2	2
UCD24V01T	Essentials of Artificial Intelligence	3	3	2	2	3	3	-	2	2	2
	Multidisciplinary Course – I										
UCD24S02L	Quantitative Aptitude and Logical Reasoning	3	2	2	2	3	3	-	2	2	2
UNS24Y01L	NSS	--	3	-	3	-	-	3	-	-	-
UNC24Y01L	NCC	--	3	-	3	-	-	3	-	-	-
UNO24Y01L	NSO	--	3	-	3	-	-	3	-	-	-
UYG24Y01L	YOGA	--	3	-	3	-	-	3	-	-	-
UCS24301J	Operating System	3	2	2	2	3	3	-	2	2	2
USA24302J	Database Management System	3	2	2	2	3	3	-	2	2	2
UMS24303T	Statistical Methods	3	2	2	2	3	3	-	2	2	2
	Minor Elective – I										
UCS24P01L	Internship – I	3	3	3	2	3	2	2	3	2	2
	Multidisciplinary Course – II										
USA24401J	Python Programming	3	2	2	2	3	3	-	2	2	2
UMS24D01T	Resource Management Techniques	3	2	3	2	2	3	-	2	2	-
UMS24D02T	Numerical Methods	3	2	3	2	2	3	-	2	2	-
	Minor Elective – II										
	Minor Elective – III										
UEN24S01L	Communication Skills	3	3	3	2	3	2	2	3	2	2
UCD24S03J	Industry Oriented Employability and Leadership Skills	3	3	3	2	3	2	2	3	2	2
UMI24Y01L	My India Project	3	3	3	2	3	2	2	3	2	2
UCS24D01J	Software Engineering	3	2	2	2	3	3	-	2	2	2
UCS24D02J	Computer Networks and Data Communication	3	2	2	2	3	3	-	2	2	2
UCS24D03J	Object Oriented Analysis and Design	3	2	2	2	3	3	-	2	2	2
UCS24D04J	Machine Learning	3	2	2	2	3	3	-	2	2	2
UCS24E04J	Minor Elective – IV										
	Multidisciplinary Course – III										
UES24V01T	Environmental Studies	--	3	-	3	-	-	3	-	-	-
UCD24S04J	Career Readiness and Professional Skills	3	2	2	2	3	3	-	2	2	2
UCS24P02L	Internship – II	3	3	3	2	3	2	2	3	2	2
UCS24D05J	Fundamentals of Business Application Development	3	2	2	2	3	3	-	2	2	2
UCS24D06J	NLP and Language Models	3	2	2	2	3	3	-	2	2	2
USA24D07J	Cloud Computing	3	2	2	2	3	3	-	2	2	2
UCS24D08J	Microprocessors and Embedded Systems	3	2	2	2	3	3	-	2	2	2
	Minor Elective – V										
	Minor Elective – VI										
UCS24P03L	Project Work	3	3	3	2	3	2	2	3	2	2
UCD24V02T	Universal Human Values	--	3	-	3	-	-	3	-	-	-
UCS24D09J	Mobile Application Development	3	2	2	2	3	3	-	2	2	2
USA24D10T	Wireless Communication and Mobile Computing	3	2	2	2	3	3	-	2	2	2
UCS24D11J	Web Application Framework	3	2	2	2	3	3	-	2	2	2

UCS24D12J	Computer Vision	3	2	2	2	3	3	-	2	2	2
UCS24D13J	Big Data Analytics	3	2	2	2	3	3	-	2	2	2
UCS24D14J	Cryptography and Network Security	3	2	2	2	3	3	-	2	2	2
	Minor Elective – VII										
	Minor Elective – VIII										
UCS24D15J	AI and Business Analytics	3	2	2	2	3	3	-	2	2	2
USA24D18J	Cyber Security	3	2	2	2	3	3	-	2	2	2
USA24D20J	Blockchain Technology	3	2	2	2	3	3	-	2	2	2
UCS24D18T	Introduction to Cyber Physical Systems	3	2	2	2	3	3	-	2	2	2
UCS24P04L	Research Project and Dissertation	3	3	3	2	3	2	2	3	2	2
UCS24P05L	Professional Internship	3	3	3	2	3	2	2	3	2	2
	Average	3	2	2	2	3	3	1	2	2	2

Abbreviations

CLR – Course Learning Rationale
CLO – Course Learning Outcomes
PLO – Programme Learning Outcomes
SLO – Session Learning Outcomes
BLoT – Bloom's Level of Thinking
CLA – Continuous Learning Assessment

SEMESTER - I

Course Code	ULT24AE1J	Course Title	Tamil - I	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

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

CLR	The purpose of learning this course is to:
CLR-1	மரபிலிருந்துமாற்றம்பெற்றபுதுக்கவிதைமரபின்சிந்தனைகளைஅறியச்செய்தல்
CLR-2	நவீனகவிதையின்வழிமனிதவாழ்வியல்விழுமியங்களைத்தெரியச்செய்தல்
CLR-3	சிற்றிலக்கியங்கள், காப்பியங்கள்கற்பிக்கும்தமிழ்ச்சமூகத்தின்வாழ்வியலைஅறியச்செய்தல்
CLR-4	நவீனதமிழ்இலக்கியவளர்ச்சிவரலாற்றைப்புரியச்செய்தல்
CLR-5	மொழிப்பயிற்சிவழிமொழியின்பல்வேறுநுட்பங்களைத்தெரியச்செய்தல்

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes									
		1 Conceive	2 Design	3 Implement	4 Operate	1 Bloom's Level of Thinking	2 Expected Proficiency (%)	3 Expected Attainment (%)	1 Problem Solving, Critical Thinking,	2 Communication Skills, Collaborating	3 Independent Thinking, Analytical Reasoning, Learning to Learn, Research	4 Leadership Qualities, Professionalism, Autonomy, Accountability	5 Digital Technology Skills	6 Value Inculcation, Multicultural	7 Environmental Action, Community	8 Entreprenurieal Risk Taking	9 PSO - 1	10 PSO -2
CLO-1	புதுக்கவிதைஉருவாக்கித்தந்தபுதியசிந்தனைக்களங்களைஅறிந்துகொள்ளுதல்	✓	✓	-	-	2	75	60	3	-	3	-	-	-	-	3		
CLO-2	நவீனகவிதைகள்வழிமாற்றம்பெற்றுவரும்மானுடவிழுமியங்களைத்தெரிந்துகொள்ளுதல்	✓	✓	✓	-	2	80	70	-	-	-	2	-	3	3	-	-	-
CLO-3	தமிழ்ச்சமூகத்தின்இடைக்காலவாழ்வியல்முறைகளைஉணர்ந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	65	3	-	3	-		3	-	-	-	-
CLO-4	நவீனஇலக்கியவரலாறுவழிதமிழ்க்கல்விவரலாறு, சமூகவரலாறுபெற்றவளர்ச்சிநிலைகளைத்தெரிந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	70	-	3	-	-	1	3	-	-	-	-
CLO-5	மொழியின்நுட்பங்களைத்தெரிந்துமொழிஆளுமையோடுசெயல்படும்திறன்பெறுதல்	✓	✓	✓	✓	3	80	70	3	3	-	3	-		-	-	-	-

Sessions	CLO – 1	CLO – 2	CLO - 3	CLO - 4	CLO - 5
	12	12	12	12	12
SLO-1	தமிழ்க்கவிதைமரபு	நவீனகவிதைதோற்றம், வரலாறு	தமிழரின்வீரமரபு - போர்விழுமியங்கள்	சிற்றிலக்கியத்தோற்றம் – வகைமை	தமிழ்உரைநடைமரபு – உ.வே.சா. வின்பங்களிப்பு
SLO-2	புதுக்கவிதைஉருவாக்கம், புதுக்கவிதைவளர்ச்சிநெறிகள்	நவீனகவிதைகளில் செல்நெறிகள்	பரணிஅறிமுகம் பரணிஇலக்கியங்கள்	பிள்ளைத்தமிழ் -உலா - தூது	உ.வே.சா. வின்ராஜவைத்தியம்

SLO-3	பாரதியார்பன்முகஆளுமைத்திறன்	கவிதைமொழி - நவீனகவிஆளுமைகள்	தலைவனின்வீரம் - கலிங்கத்துப்பரணி 477,490	புதுக்கவிதையின்தோற்றமும் மொழியும்	நாட்டுப்புறமரபில்சிறுதெய்வவழிபாடு
SLO-4	பாரததேசம் பாரததேசத்தின்வளம்	கவிதையில்நாட்டுப்புறவடிவம்	தமிழ்இலக்கியமரபில் தூதுஇலக்கியங்கள்	புதுக்கவிதையில்சமூகம் - புதுக்கவிதையும்இதழ்களும்	கழனியூரனின்பொன்காத்தஜயனார்
SLO-5	வெள்ளிப்பனிமலையின்மீதுலவுவோம்…	பெண்களின்கல்விநிலை - இளம்பிறை – அம்மா	தமிழின்பெருமை – தமிழ்விடுதூது (184 – 186)	மணிக்கொடிஇதழ்,எழுத்துஇதழ், வானம்பாடிஇதழ்	பிழைநீக்கிஎழுதும்நுட்பங்கள்
SLO-6	20 ஆம்நூற்றாண்டுக்கவிதைமரபில் பாரதிதாசன்	ஆண்பெண்சமத்துவமும் ப.கல்பனா – கீறல்விழுந்தமாலைக்காலங்கள்	செய்யுள்மரபில் கலம்பகஇலக்கியங்கள்	சிறுகதைதோற்றம் - சிறுகதைவளர்ச்சி	எழுத்துப்பிழை – ந - ண -ன ல,ள,ழ, ர, றவேறுபாடுஅறிதல்
SLO-7	பாரதிதாசன் - அழகின்சிரிப்பு ஆல் - ஆயிரம்கிளைகள்கொண்டஅடிமரம்	விளிம்புநிலைவாழ்வியல்: திருநர்களும்சாதனைகளும்	கையறுநிலை – நந்திக்கலம்பகம்- வானுறுமதியை (110)	சிறுகதைவரலாறு - சிறுகதைஆசிரியர்கள்	தொடர்பிழை ஒருமைபன்மைவேறுபாடு
SLO-8	ஆல் - ஆயிரம்கிளைகள்கொண்டஅடிமரம்	திருநங்கைகுணவதி – சமூகப்பார்வை	தமிழ்இலக்கியமரபில் குறவஞ்சிஇலக்கியங்கள்	இதழ்களும்சிறுகதையும்	பிறமொழிச்சொற்களைநீக்கிஎழுதுதல், ஷ,ஜ,ஸ,ஹமாற்றொலிகள்
SLO-9	வானம்பாடிக்கவிஞர்களும்மு.மேத்தாவும்	புலம்பெயர்வாழ்வியல் – வலியும்நம்பிக்கையும்	குற்றாலக்குறவஞ்சி – ஆடுமரவீனுமணி (3)	புதினம்தோற்றம் - புதினம்வளர்ச்சிவரலாறு	தமிழில்சொல்வகைகள் சொல்லும்பயன்பாடும்
SLO-10	மனிதநேயம் - மு.மேத்தாவின் மனிதனைத்தேடி	ஸர்மிளாஸெய்யித் – புராதனஊர்	காப்பியஇலக்கணம் - காப்பியவகைமைகள்	புதினத்தின்வகைமை புதினஆசிரியர்கள்	பெயர்ச்சொற்கள் பெயர்ச்சொற்களும்வகைகளும்
SLO-11	தமிழ்க்கவிதையில்சுற்றுச்சூழலியல்	காலந்தோறும்கவிதைவடிவில் மாற்றங்கள். ஹைக்கூ – மு.முருகேஷ்	சிலப்பதிகாரம் – அறிமுகம் கட்டுரைக்காதை	தமிழ்இலக்கியத்தில்உரைநடைக்கூறுகள் - உரைநடையின்தோற்றம்	வினைச்சொற்கள்அறிதல்
SLO-12	இயற்கையும்சமத்துவமும் பழனிபாரதியின்காடு	லிமரைக்கூ – ஈரோடுதமிழன்பன் சென்ரியூ – மாமதயானை	ஊழ்வினை - கோவலனின்முற்பிறப்பு வரலாறு	தமிழில்உரைநடை வளர்த்தஅறிஞர்கள்	தமிழில்பெயரடை, வினையடை அறிதல்

Resources			
1	முல்லைக்காடு, தொகுப்பும்பதிப்பும் - தமிழ்த்துறைஆசிரியர்கள், எஸ்.ஆர்.எம். அறிவியல்மற்றும்தொழில்நுட்பக்கல்விநிறுவனம், காட்டாங்குளத்தூர், 603203, 2023	4	வல்லிக்கண்ணன், புதுக்கவிதைதோற்றமும்வளர்ச்சியும், ஆழிபதிப்பகம், சென்னை, 2018
2	கா. சிவத்தம்பி, தமிழில்சிறுகதைதோற்றமும்வளர்ச்சியும், என்.சி.பி.எச்., சென்னை, 2013	5	மு.வரதராசன், தமிழ்இலக்கியவரலாறு, சாகித்தியஅக்காதெமி, 1972.
3	மதுரைதமிழ்இலக்கியமின்தொகுப்புத்திட்டம் -https://www.projectmadurai.org/	6	தமிழ்இணையக்கல்விக்கழகம் - http://www.tamilvu.org/

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4* (10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr.P.R.Subramanian, Director, Mozhi Trust, Thiruvanmiyur, Chennai – 600 041	1	Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language &Literaturel, Pondicherry University, Pondicherry	1	Dr.B.Jaiganesh, Associate Professor and Head, Departmenttof Tamil, FSH, SRMIST, Kattankulathur
				2	Dr. R. Ravi, Assistant Professor and Head, Dept.artment of Tamil, FSH, SRMIST, Vadapalani
				3	Mr. G. Ganesh, Assistant Professor, Department of Tamil, FSH, SRMIST, Ramapuram
				4	Dr. T.R.Hebzibahbeulah Suganthi, Assistant Professor, Department of Tamil, FSH, SRMIST, Kattankulathur
				5	Dr.S.Saraswathy, Assistant Professor, Department of Tamil, FSH, SRMIST, Kattankulathur

Course Code	ULH24AE1J	Course Title	Hindi – I	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	To Communicate in Hindi without any inhibition	Conceive	Design	Implement	Operate	Level of	Expected Proficiency (%)	Expected	Problem	Communication	Independent	Leadership	Digital	Value	Environmental	Entreprenurieal	PLO-9	PLO-10
CLR-2	To appreciate the Hindi language in its various forms																	
CLR-3	To analyze the different writing styles																	
CLR-4	To display moral and social values in the field of social Responsibility and Integrity																	
CLR-5	To be willing listeners and Translators-where need be																	
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	85	75	3	2	3			3				
CLO-2	To Examine Travelogue writing and Sketch	✓	✓	✓	-	2	85	75	3		2		3		3			
CLO-3	To Identify Irony and essay - based writing	✓	✓	✓	✓	3	85	75		3		3	3	2				
CLO-4	Evaluate the various social issues depicted in the prose	✓	✓	✓	✓	3	85	75	2		2	3			2			
CLO-5	To Understand the fundamental principal of Translation	✓	✓	✓	✓	3	85	75		3		3	3	2				

Sessions	CLO – 1	CLO - 2	CLO – 3	CLO – 4	CLO - 5
	12	12	12	12	12
SLO-1	KAHANI KI AVDHARNA	REKHACHITRA & YATRAVITRANT	NIBANDH	NATAK	ANUVAD& PARIBHASHIK SHABDAVALI
SLO-2	SWARUP AUR PARIBHASHA	AVDHARNA EVM SWAROOP	NIBANDH KI AVDHARNA EVM SAWROOP	AVDHARNA EVM SAWROOP	ARTH EVM PARIBHASHA
SLO-3	KAHANI KE TATVA EVM MAHATWA	MAHATVA AUR UDDESHYA	MAHATVA EVM UDDESHYA	TATWA EVM PRAKAR	SWARUP EVM PRAKAR
SLO-4	PARIKSHA- PREMCHAND	GESHA REKHACHITRA	KUTAJ- NIBANDH HAJARI PRASHAD DIVEDI	UDDESHYA	MAHATVA
SLO-5	VISLESHAN	PATH KA VISHLESHAN	LEKHIAK PARICHAY	NATAK KA MAHATVA	UDDESHYA
SLO-6	UDDESHYA	GURU SHISHYA KA SAMBANDH	SHANGHARSHIL JEEVAN	RANGMANCH KA PARICHAY	ANUVAD KA PRAYOJAN EVM PRAYOG
SLO-7	MALBE KA MALIK- MOHAN RAKESH	THELE PAR HIMALAY (YATRAVITRANT)	PATH KA MAHATVA	LEKHAK PARICHAY	SHROT EVM LAKSHYA BHASHA KA GYAN

SLO-8	LEKHAK PARICHAY	YATRAVITRANT KA MAHATVA	BHOLARAM KA JEEV-(VYANGYA) HARISHANKAR PARSHAI	NATAK KA VISLESHAN	ANUVAD KA DAYITVA
SLO-9	BATWARE KA YATHARTH VARNAN	YATRA KA YATHARTH CHITRAN	VYANGYA KI AVADHARNA	LALCH KA DUSHPARINAM	PARIBHASHIK SHABDAVALI
SLO-10	TATKALIN PARISHTHITI KA VARNAN	PATH KA VISLESHAN	PATH KA VIHLESHAN	GURU SHISHYA SAMBANDH	TAKANIKI SHABDAVALI KA MHATVA
SLO-11	KAHANI KA VISHLESHAN	HIMALAY KA LOK JEEVAN	SARKARI TANTRA KA KHOKHLA RUP	MAHATTAKANKSHI KA DUSHPARINAM	VIVIDH PRAYOG
SLO-12	KAHANI KA UDDESHYA	HIMALAY KA VARNANA	SANVEDANSHIL BHAVANA	TATKALIN SAMAJIK VYAVASTHA KI CHARCHA	SHABDAVALI KI AVSHYAKTA

Resources			
1	Samanya Hindi, Srijonlok Publication, 2023, New Delhi	4	Bhakti Andolan Aur Surdas Ka Kavya – Manager Pandey
2	Kabir – Hazari Prasad Dwedi	5	Bihari – Vishvnath Prasad Mishr
3	Surdas – Ram Chandra Shukl	6	Aadhunik Vigyapan Aur Jansampark – Taresh Bhatia

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*		
		(10 %)		(10 %)		(20 %)		(10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Ms. Reetha Govindan, Senior Manager (Rajbhasha)	1	Dr. S.Padmapriya, Professor and Head, Pondichery University, Kalapet, Puducherry-605014	1	Dr. S Preeti. Associate Professor, SRMIST
2	Mr. Vipin Kumar Jha, Senior Translation Officer (ALUMNI)			2	Dr. Md.Shwahidul Islam, Assistant Professor, SRMIST
				3	Dr. S. Razia Begum, Assistant Professor, SRMIST
				4	Dr.Nisha Murlidharan Assistant Professor,SRMIST

Course Code	ULF24AE1J	Course Title	French – I	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborative Skills	Independent Thinking, Analytical Reasoning, Learning to Learn	Leadership Qualities, Professionalism, Autonomy	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PLO-9	PLO-10
CLR-1	Extend and expand their savoir-faire through the acquisition of current scenario																	
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																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	To acquire knowledge about French language	✓	✓	-	-	2	85	75	3	2	3			2				
CLO-2	To strengthen the knowledge on concept, culture, civilization, and translation of French	✓	✓	✓	-	2	85	75	3		2		3		3			
CLO-3	To develop content using the features in French language	✓	✓	✓	✓	3	85	75		3		3	3	2				
CLO-4	To interpret the French language into other language	✓	✓	✓	✓	3	85	75	2		2	3			2			
CLO-5	To improve the communication, intercultural elements in French language	✓	✓	✓	✓	3	85	75		3		3	3	2				

Sessions	CLO – 1	CLO - 2	CLO – 3	CLO - 4	CLO – 5
	12	12	12	12	12
SLO-1	Contacts, Emma la championne	Les verbes du premier groupe	Qu'est-cequ'ils font?	Portraits	Les verbes du deuxième groupe –
SLO-2	Les nombres à partir de 31	La liaison	Oùestmon sac	Un casting	Les pronoms personnels toniques
SLO-3	Les pays, les nationalités	Entreren contact	Quelquesobjets	Le Petit Spirou	Les verbes faire et lire
SLO-4	Les jours de la semaine, Les jours	Présenter et se presenter	Les professions	L'aspect physique	Les Sons
SLO-5	Les mois de l'année, Les animaux domestiques	Demander et dire la date	La formation du féminin (2)	Le caractère	Décrirel'aspect physique
SLO-6	La famille (1)	Une rencontre.	Qu'est-ce que c'est?	les états d'âme	Demander et dire l'heure
SLO-7	La formation du féminin (1)	Contacts	C'est / Il est (1)	Les prépositions de lieu (1)	Elle est comment?

SLO-8	Les adjectifspossessifs	Emma la Championne	La phrase négative (1)	La famille (2)	Portraits
SLO-9	La phrase interrogative	Mots et expressions	Les verbes aller et venir	La formation du féminin	Mots et Expressions
SLO-10	Les nombres	Grammaire	Les formules de politesse	La formation du pluriel (2)	Grammaire.
SLO-11	Intonation et est-ce que	Communication	C'est qui?	Il y a	Communication
SLO-12	Les exemples	Les verbes du ER –groupe	Mots et Expressions	Les articles contractés	Les concepts

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

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4* (10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Mr. Kavaskar Danasegarane, Language Specialist, Process Expert Maersk Global Service Center Pvt. Ltd	1	Dr. C Thirumurugan, Professor, Department of French, Pondicherry University	1	Mr. Kumaravel K. Assistant Professor and Head, SRMIST
2	Mr. Shrivathsan S, Journalist, Senior Sports Reporter/Sub-Editor, Times of India, Chennai			2	Ms. Abigail A, Assistant Professor, SRMIST
				3	Mrs. Mahalakshmi, Assistant Professor, SRMIST

Course Code	ULE24AE1J	Course Title	English	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

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

CLR	The purpose of learning this course is to:
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.

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborative Skills	Independent Thinking, Analytical Reasoning, Leadership Qualities, Professionalism, Autonomy	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PLO-9	PLO-10	
CLO-1	Analyze different literary texts to identify the representation of issues related to gender, and class	✓	✓	-	-	2	85	75	3	3	3	3	-	3	3	2	3	3
CLO-2	Apply critical thinking skills to analyze and respond to academic texts.	✓	✓	✓	-	2	85	75	3	2	3	2	-	3	1	-	3	2
CLO-3	Critically evaluate and discuss contemporary issues through online articles.	✓	✓	✓	✓	3	85	75	3	3	3	3	3	3	2	1	3	3
CLO-4	Refine their general writing skills	✓	✓	✓	✓	3	85	75	1	2	2	1	3	3	2	2	3	1
CLO-5	Improve their language application skills	✓	✓	✓	✓	3	85	75	3	3	2	3	1	1	1	3	3	1

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	POETRY	SHORT STORIES	LEARNING ABOUT WRITING	LEARNING ABOUT SPEAKING	REFLECTION OF THE LANGUAGE LEARNING
	12	12	12	12	12

SLO-1	Introduction to the poet- Sukirtharani- Reading and recitation of the poem – Debt Analysis and Critical interpretation of the poem.	Introduction to the short story writer Katherine Mansfield. Reading the story- The Doll's House Explaining the story through depiction of characters and representation of injustices.	Introduction to Creative Writing. Explaining the elements of creative writing. Grouping the Students belonging to States other than Tamilnadu	Building the discourse- The significance of conversation and the key elements of discourse- Art of conversation in digital and verbal discourse- Lee Mockobe'sA Powerful Poem of what it means to be a Transgender. TEDX TALK- POEM RECITATION	Reflecting the learning. - Review writing Explaining the process of reviewing and the method of reviewing. Choosing the subject for reviewing.
SLO-2	Introduction to the poet Kalki Subramaniyam. Reading and recitation of the poem Phallus I cut. Analysis and Critical interpretation of the poem. Part-1	Analysis and critical interpretation of the short story Doll's House.	Stand-up comedy show - translate the audio content in English. (any regional language) Practice the writing activity - creative ways of engaging in translation.	Reflecting on the style and the tone of the poem. Practicing conversation	Choosing and planning the topic for students- group 1 and group 2
SLO-3	Analysis and Critical interpretation of the poem. Phallus I cut- Part-2	Class room activity- reviewing characters Group Discussion- social consciousness	Correction of errors- attempting to translate. Identifying equivalent terms to certain regional words - learn the art of translation.	Classroom- Speaking activity- reflection about the issues regarding gender expression and gender identity. Reviewing activity- group discussion- communicating effectively- importance	Choosing and planning the topic for students- group 3 and group 4
SLO-4	Introduction to the poet -Imtiaz Dharker. Reading and reciting the poem Purdah 1. Analysis and Critical interpretation of the poem- Purdah 1- part 1	Speaking activity- society and its portrayal in the short story- Magnifying and analyzing the characters from contemporary perspective	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. Understanding the art works- Part 1	Introducing Content writing in Social Media- the importance of content writing.	Introducing the students to the review of the various works. Understand the review process how effectively a review of any work can be done.
SLO-5	Analysis and Critical interpretation of the poem- Purdah 1- part 2	Introduction to the writer Haruki Murakami. Reading the Confessions of a Shinawaga monkey. Discussion and analysis of the Confessions of a Shinawaga monkey.	Understanding the art works- Part 2 creative and/ or thoughtful writing - contemporary themes of modern day	BLOG WRITING - Subtleties Of Workplace Inclusion: Mental Health And Queer Community- Salik Ansari. Reading the text- content in the blog by the students- Reading Activity	Reviewing -record -post in the social media pages of SRMIST

SLO-6	Reading and reciting the poem Purdah 2 Analysis and Critical interpretation of the poem- Purdah 2- part 1	Group discussion activity reflecting the understanding of the character Shinagwa monkey Speaking activity- review on life and existentialism and identity crisis	Course instructor guidance- Classroom activity for creative writing- discussion on generation of ideas discussion on working and reflection of ideas	Analysing the text- content in the blog by the students- Discussion Activity writer's conversation with the readers - the blog in other blog articles.. Practice blog writing	Thoughtful conversation with your team member post the same in the official social media page of SRMIST. Choosing the team based on the abilities that are comfortable to match the peer members
SLO-7	Analysis and Critical interpretation of the poem- Purdah 2- part 2	Introduction to Crystal Wilkinson Reading Endangered Species: Case 47401.	Elements of writing Incorporate the elements of story in story writing	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 Planning and preparation for the script of conversation with a team member
SLO-8	Introduction to the poet Arundathi Subramanian. Reading and reciting the poem- Home Student activity- recitation Analysis and Critical interpretation of the poem- Home	Discussion and analysis of Endangered Species: Case 47401.	Students -writing abilities- building stories- a visual treat of variety of pictures.	Class discussion- essay by the author -subjective depiction of life. Understand -subjective opinions - perspectives- Practising the task multiple times with all the students in the classroom.	Drafting , editing and revising the script of conversation and enacting the conversation with the team members Enactment -proper rehearsal - final performance -conversation- whole performance should be recorded. The recording should be posted in the official media page and social handles of SRMIST.
SLO-9	Recollection of study of the writing styles and intentions of the poets prescribed in the syllabus.	Introduction to C.S Lakshmi also known as Ambai. Reading the short story- In a Forest, A Deer.	Practice -write stories - pictures given or shown . Classroom activity- evaluation of writings ansd reflections for suggesting, correction and improvement	Interposing opinions in famous interviews- FII Interviews: Tasveer Co-Founder And Filmmaker Rita Meher On The Seattle Legislation, Minority Rights And The Fight Against Oppression- INTERVIEW- Analayisng the text and discussing the aspects of an 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	Group Discussion activity for students to reflect up on gender consciousness	Discussion and Analysis of In a Forest, A Deer.	A writing task to write a script is introduced in the classroom.	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-11	Revision of the poems Debt and Phallus I cut, Purdah 1 and Purdah 2	Classroom activity- speaking about identity, power of women and contemporary issues and perspectives up on women like Thangam Atthai	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. Creative writing -writing news reports. recreated with new characters, places, scenes, incidents.	Certain role plays like celebrity personalities, political personalities -conduct the interview and be the interviewer and interviewee. The art of conversation and the ability to build a discourse Reflecting on the points- Student reviewing activity- art of conversation in the text	Discussion of ideas and generation of creative ideas- Preparation for next semester. Assignment on any piece of creative writing (OR) Presentation- Mastering the art of Public Speaking. (OR) Project on compiling the real life influential events on gender inclusive issues and a presentation of the same. Interview Scripting /Blog writing.- Guidance
SLO-12	Revision of the poem Home. Creative activity for the students to reflect up on gender consciousness, influence of religion on women freedom.	Retrospecting the writing styles of the authors- Katherine Mansfield, Haruki Murakami, Crystal Wilkinson and Ambai. Overall Revision- The Doll's House, Confessions of a Shinawaga Monkey, Endangered Species: Case 47401 Classroom activity- speaking about racism in contemporary society- an attempt to understand the issues prevailing in the society from the perspectives of students	Watch debate shows - summarising the arguments Enhance -descriptive writing skill. Repetitive practice and continuous assessment - writing skiills-master the writing skill.	Reflecting on the points- Student reviewing activity- art of conversation in the text The evaluation and assesment of the conversation -constructive feedbacks to the students.	Reflection, Evaluation and Assessment of ideas- Students can opt any of the project from the given choice. Ready for the next semester- reflection of the learning through assignments practiced

Resources			
1	Horizon- English Text Book – Compiled and Edited by the Faculty of English Departement, FSH, SRMIST, 2023	5	The Art of Public Speaking by Stephen E. Lucas- 2019
2	The Creative Writing Coursebook: Forty Authors Share Advice and Exercises for Fiction and Poetry by Julia Bell and Paul Magrs- 2001	6	Talk Like TED: The 9 Public-Speaking Secrets of the World's Top Minds by Carmine Gallo – 2014
3	On Writing: A Memoir of the Craft by Stephen King 2000	7	The Anatomy of a Book Review: A Guide for College Students by Ronald J. Weber 1994
4	The Writing Life: Writers on How They Think and Work edited by Marie Arana -2003	8	How to Write a Simple Book Review: It's easier than you think! by Allyson R. Abbott 2013

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4* (10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Krishna Raj, Sutherland Technologies	1	Dr. J Mangayarkarasi Associate Professor and Head, Department of English, Ethiraj College for Women, Chennai	1	Dr. Pushpanjali Sampathkumar, Assistant Professor, Department of English, FSH, SRMIST
		2	Dr. K S Antonysamy Associate Professor and Head, Department of English, Loyola College, Chennai	2	Dr. Dr. Shanthichitra, Associate Professor, & Head, Department of English, FSH, SRMIST
				3	Dr Anchal Sharma, Professor and Head, Department of EFL SRMIST
				4	Dr T Sridevi, Assistant Professor, FSH, SRMIST
				5	Dr Shanmuga Priya, Assistant Professor SRMIST

Course Code	UCS24101J	Course Title	Digital Electronics	Category	C	Core	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:
CLR-1	To learn the concepts of basics of Digital Logics
CLR-2	To impart in-depth knowledge of Logic Gates
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

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating	Independent Thinking, Analytical Reasoning Learning to Learn, Research	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Incubation, Multicultural Inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2	
CLO-1	Have a thorough Understanding of the Fundamentals of Digital Logic and it Fundamentals	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1	
CLO-2	Understand the concepts of logic gates and its uses	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1	
CLO-3	Real time applications of Boolean Algebra	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2	
CLO-4	Design and implementation knowledge of Combinational Circuits	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3	
CLO-5	Design and implementation knowledge of Sequential Circuits	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3	

Sessions	CLO - 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	18	18	18	18	18
SLO-1	Number System and its types Base conversions	Minterms and Maxterms Sum of Products	Combinational Logic - Introduction Designing of a Logic Circuit Diagram	Sequential Circuit - Introduction Latches	Counters - Introduction A Basic Design Counter
SLO-2	Binary codes and its types Code conversions	Product of Sums methods Conversions of SOP to POS	Adders : Quarter, Half and Full Adders Subtractors: Half, Full Subtractors	Flip Flops - Introduction RS Flip Flop	Classification of Counters Asynchronous Counters
SLO-3	Basics of Logic Gates and Derived Gates Truth Tables	Simplifying Boolean Expressions using theorems Derivation of a Boolean Functions	Design of Adder Circuits Design of Subtractor Circuits	JK Flip Flop D Flip Flop	Synchronous Counters Syn Vs Asyn Counters
SLO 4-6	**Lab1 : Verification of Basic Gates and Derived Gates**	**Lab 4: Verifications of Distributive Law**	**Lab 7: Half Adder and Full Adder**	**Lab 10: Implementation of DeMultiplexer**	**Lab 13: Ring Counters**

SLO-7	Universality of NAND Gate Universality of NOR Gate	Karnaugh Map - Introduction and its usesTypes of K-Map	Multiplexer Implementation of a Boolean expression using a Multiplexer	T - Flip Flop Edge Triggered	Ripple Counters MOD Counters
SLO-8	Duality of Logic Gate Representation Boolean Algebra - Introduction	Rules for constructing K-Map Two and Three Variable K-Map	De Multiplexer Encoder	Master Slave Flip Flop Registers Architecture	UP DOWN Counters Ring Counter
SLO-9	Logical Operations AND OR NOT Hierarchy of Logic Circuits	Four Variable K-Map Simplifying Boolean Expressions using K-Map	Decoder Decimal -to- BCD encoder	Shift Registers Register with parallel load	Shift Counters Decade
SLO 10-12	**Lab2:NAND as Universal Gate NOR as Universal Gate**	**Lab 5-Simplifying Boolean Expressions using theorems**	**Lab 8:Half Subtarctor and Full Subtractor**	**Lab 11: Implementation of Shift Registers and Serial Transfer**	**Lab 14: Implementation of DOWN Counter**
SLO-13	Evaluating Logic Circuits Implementing Circuits from Boolean Expressions	Don't Care conditions Determination Prime Implicant Method	Parity Generator Parity Checker	Four-bit Serial in Serial Out Shift register Shift Registers Operations	Memory - Introduction Basic terms and ideas
SLO-14	Boolean Functions Duality Principle, Complements	Boolean Arithmetic - Introduction Binary Addition	Checksum Code Conversions	Serial-to-Parallel Shift Register Design of Serial to Parallel	Magnetic Memories Memory Addressing
SLO-15	Laws and Theorems Laws of Intersection, Union, Absorption, Involution, Demargan's Theorems	Binary Subtractions Various Representation of Binary Numbers	Programmable Array Logic Programmable Logic Array	Parallel-to-Serial Shift Register Design of Parallel to serial	Types of ROM Types of RAM
SLO 16-18	**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**

Resources

1	AnanthiSheshasaayee,J.G. Sheshasaayee, Digital Logic Fundamentals, Margham Publications, 2005	3	Leach D.P, Malvino A.P, Digital Principles and Applications, TM, 2002
2	Vijayendran.V, Digital Fundamentals, S.V. Publishers, 2003	4	Moris ManoM, Digital Logic and Computer Design, Pearson, 2001

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 (10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts	Higher Institution Experts	Internal Experts
1 Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1 Dr. Neela Narayanan V, Professor, VIT Chennai	1 Dr. G. Kalpana, Professor, FSH, SRMIST

Course Code	USA24102J	Course Title	Programming for Problem Solving	Category	C	Core	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:	Depth			
		1	2	3	4
		Conceive	Design	Implement	Operate
CLR-1	Introduction to programming language.				
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				

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Evaluation of programming language	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Choose operators, control structures to solve the problem optimally	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Analyze the problem thoroughly and choose the prebuilt functions/ customize functions to solve the problem	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Able to use dynamic memory allocation concepts for problems that demand	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Defend the need for files storage and the access privilege modes	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	18	18	18	18	18
SLO-1	Evolution of Programming Languages Problem solving through programming	Arithmetic operators, Assignment operator, Increment and decrement operator, Comma, Arrow and Bitwise and sizeof operator Relational and logical Operators Character and Numbers: Manipulation	Understanding contiguous memory allocation Array : Advantages and Limitations	Formal and Actual Parameters Functions: Returning values	File Types: text and binary, File operations: basics File permissions and access privileges, Changing permissions

SLO-2	Writing algorithms/pseudo codes Drawing flowcharts	Expressions with pre / post increment operator Expression with conditional and assignment operators	String Basics String Declaration and Initialization	Advantages of using Functions Passing Array to Function	Writing contents to file , Reading file contents, Appending an existing file Difference: Append and write
SLO-3	Evolution of C language Program structure	Ternary operator L value and Rvalue in expression	Understanding String Functions: gets(), puts(), getchar(), putchar(), printf() String Functions: atoi, strlen, strcat, strcmp	Call by Value Call by Reference (An introduction on pointers shall be effective)	Writing contents to file, Reading file contents fscanf(),fprintf()
SLO 4-6	**Lab 1: Basic Program**	**Lab 4: Operators and Expressions**	**Lab 7: Arrays : Multi dimensional**	**Lab 10: Functions**	**Lab 13: File: reading and writing**
SLO-7	Need for file header files Need for linkers and loaders	Operator precedence Type conversion	String Functions: sprint, sscanf, strrev, strcpy, strstr, strtok Need for tokenization	Nested functions Functions: advantages and limitations	fscanf(),fprintf(),fseek(),ftell(), fputc(),
SLO-8	Input and output statements: scanf,printf Identifiers, Variables and Scope and lifetime of variables,	Control Statements : Sequential, Branching, looping andJjump If, if ..else, else if ladder	Need for user-defined data types Structures	Pointers and address operator sizeof Pointer Variable and Pointer Operator	fgetc(),fputs(),fgets() fputw(),fgetw(),
SLO-9	Keywords, Literals	Nested if, switch case for loop	Unions Accessing members of the structure	Pointer Declaration and dereferencing pointers void Pointers and sizeof void Pointers	feof(), remove(),ferror() End_of_file in file handling
SLO 10-12	**Lab 2: Program using 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-13	Expressions Single line and multiline comments	while loop do while	Accessing members of the structure Structure and arrays	Function and call by reference Functions and Returning array(use of pointers)	Processor Directives Predefined macros and macros
SLO-14	Data types classification: Basic,data type, Derived data type, and User-defined data type	goto, break, continue, exit: Jump statements Understanding jump statements with branch and iterative statements	Structure and arrays Nested structures	Structures and pointers :dynamic creation of data structures(list) Incrementing Pointers, Constant Pointers	conditional compilation Processor Directives
SLO-15	Constants and its types	Array Basic , Array Declaration, Initialization, manipulating one dimensional arrays with indices, Methods: sort, append, reverse, traverse, Manipulating two dimensional arrays with indices, Problems: matrix manipulations	Functions declaration and definition, Function prototypes, Defining and calling functions Prebuilt and user defined functions, Multiple functions, Recursion , recursive Functions, Scope of variables across functions	Pointers and strings, Function Pointers, Array of Function Pointers Null Pointers, Using sizeof(),malloc,calloc() File Handling, Open(),close()	#pragma , Creating include and macros
SLO 16 - 18	**Lab 3: Program using Operators**	**Lab 6: Arrays – One Dimensional**	**Lab 9: Functions**	**Lab 12: Pointers**	**Lab 15: Creating Macros**

Resources			
1	R. G. Dromey, “How to solve it by Computer”, Pearson Education, ISBN 0-13-433995-9	3	Reema Thareja, “Python Programming: Using Problem Solving Approach”, Oxford University Press;
2	The ‘C’ programming language by Kernighan and Ritchie, Prentice Hall	4	Stephen G. Krantz, “Problem Solving Techniques” , Universities Pres

Assessment

Bloom’s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
Total (%)		100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT Chennai	1	Dr. G. Kalpana, Professor, FSH, SRMIST

Course Code	UMS24101T	Course Title	Discrete Mathematical Structures	Category	C	Core	L	T	P	C
							4	0	0	4

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

CLR	The purpose of learning this course is to:
CLR-1	To provide a strong foundations in discrete mathematics
CLR-2	To apply mathematical techniques for solving real life problems
CLR-3	Apply Boolean algebra, truth table, logic gates, in computer science and communication.
CLR-4	To enable the use of logical, graphical and algebraic techniques wherever relevant.
CLR-5	Understanding of computer science through the applications of Discrete Mathematics

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcome										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborative Skills	Independent Thinking, Analytical Reasoning, Learning to Learn	Leadership Qualities, Professionalism, Autonomy	Digital Technology Skills	Value Inculcation, Multicultural Inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2	
CLO-1	Problem solving in sets and relations. Gaining knowledge, solving the simple problems using elementary concepts.	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1	
CLO-2	Understand the concepts of Graphs terminology Sub graphs, Acyclic, Euler path, Hamiltonian Path	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1	
CLO-3	Logical knowledge through the Statements, connectives, arguments, validity of arguments and Normal forms using truth tables	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2	
CLO-4	Gain the knowledge about Trees , Labeled Trees, Binary trees ,Rooted Trees , Spanning Trees Minimal Spanning Trees	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3	
CLO-5	Apply the concepts of Boolean Algebra in real world problems related to Computer Science	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3	

Sessions	CLO – 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	12	12	12	12	12
SLO-1	Introduction to Sets – simple examples.	Logic – Basic explanations	Graphs and Their Representation-Basic Terminology	Trees – Basic properties of tress	Partition of a set - Relation concepts
SLO-2	Properties of sets, Types of sets	Statements- simple compound	Drawings of Graphs – Special families of graph – Simple problems	Labeled trees	Matrix representation of relation – Hasse Diagrams - Lattices as posets
SLO-3	Venn diagram – Problems using Venn Diagram	Symbolic representation and Connectives explanations	Incidence graphs -Adjacency matrices –Vertex degree matrices	Undirected Trees – Binary trees	Definition of Lattices- Properties of Lattices - Problems on Lattices as posets
SLO-4	Tutorial	Tutorial	Tutorial	Tutorial	Tutorial

SLO-5	Relation definitions – Types of Relations	Problems using Truth Tables – logical equivalence	Isomorphism of Graphs – Sub graph	Rooted Trees and Branches –	Introduction to Boolean Algebra- basic definitions.
SLO-5	Problems on Relations	Tautological implications	Acyclic graph –Digraph – Simple problems	problems based on concepts	Problems using the postulates of Boolean Algebra
SLO-7	Reflexive-Symmetric-Transitive – basic Explanations	Arguments- validity of arguments and normal forms	Euler path and circuits	Spanning Trees - Minimal Spanning Trees	Expression of a Boolean function By Truth table method – Properties of Boolean Algebra
SLO-8	Tutorial	Tutorial	Tutorial	Tutorial	Tutorial
SLO-9	Functions-Types of functions – Comparison of Relations and Functions	Minterms and maxterms with examples	Eulerian cycles	Kruskal's Algorithm - Rooted Tree	Boolean function in canonical form by Truth table method.
SLO-10	Composite of two functions	Principal disjunctive normal form	Hamiltonian Path and Circuits.	binary Tree and Simple Problems	DNF by Truth table method
SLO-11	Composite of three functions – Simple problems	Principal conjunctive normal form - Problems using Truth Tables	Hamiltonian Path and Circuits – problems using graph – simple problems	Expression of Trees and Simple Problems	CNF by Truth table method – Simple problems
SLO-12	Composite of three functions – Simple problems	Principal conjunctive normal form - Problems using Truth Tables	simple problems	Expression of Trees and Simple Problems	CNF by Truth table method – Simple problems

Resources			
1	Discrete Mathematics with Graph Theory and Combinatorics by T.Veerajan, McGraw Hill Education(India) Pvt Limited, 2007	2	.Dr. A. Singaravelu, Allied Mathematics, 7th edition, A. R. Publications, 2015.

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 % weightage)
		CLA – 1 (10 %)	CLA – 2 (10 %)	CLA – 3 (20 %)	CLA – 4 (10%)	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	15	15	10	10	15
2	Understand	15	15	10	10	15
3	Apply	20	25	25	25	25
4	Analyze	20	25	25	25	25
5	Evaluate	15	10	15	15	10
6	Create	15	10	15	15	10
Total (%)		100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. D. Arivudai nambi, Anna University, Chennai	1	Dr. N.Viswanathan, , Presidency college , Chennai	1	1.Dr.L.Sivakami, SRMIST
				2	2.Dr.S.Lakshmipriya, SRMIST

CourseCode	UCD24S01J	Course Title	Verbal Ability and Skill Development	Category	S	Skill Enhancement Course	L	T	P	C
							1	0	2	2

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
CLR-1	Exposestudentstorightattitudinalandbehavioralaspectsandtobuildthesamethroughactivities																		
CLR-2	Developandnurtureinterpersonalskillsofthestudentsthroughindividualandgroupactivities.																		
CLR-3	Increase efficiency and leadership skills to improve team results.																		
CLR-4	Use the basic mechanics of Grammar.																		
CLR-5	Instill confidence in students and develop skills necessary to face the challenges of competitive exams and placements																		
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entreprenurieal Risk Taking	PLO-9	PLO-10	
CLO-1	Re-engineer their attitude and understand its influence on behavior	✓	✓	-	-	2	85	75	2	3	2	2	-	1	2	3	-	-	
CLO-2	Acquire inter-personal skills and be an effective goal-oriented team player	✓	✓	✓	-	2	85	75	3	3	2	3	-	1	2	1	-	-	
CLO-3	Learn the importance of inner management and creativity	✓	✓	✓	✓	3	85	75	3	2	2	3	-	1	2	2	-	-	
CLO-4	Understand the correct usage of grammar	✓	✓	✓	✓	3	85	75	3	-	3	-	3	1	1	-	-	-	
CLO-5	Help the students succeed in competitive exams and placements	✓	✓	✓	✓	3	85	75	3	-	3	-	3	1	1	-	-	-	

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	9	9	9	9	9
SLO-1	Introduction to IKIGAI, IKIGAI – Key concepts	Networking skills – relationship building, value exchange, active listening, friendliness and positivity, clear communication	Time management skills - Value of Time, Pomodoro technique.	Basics of Grammar	Sentence Correction
SLO-2	Attitude, Attitude formation and Factors influencing Attitude	**Negotiation skills – building rapport and problem-solving**	Weekly Planner, To do list, Prioritizing work, Time management activity	Spotting Errors	Sentence completion (Grammar based)
SLO-3	SWOT Analysis, individual SWOT Analysis -SWOT Analysis activity	Entrepreneurial Skills, Entrepreneurial knowledge, Focus, Investment, Risk tolerance, Resilience, Ethics	Creative thinking skills – divergent thinking, Synthesis and collaboration, out-of -the -box thinking	Error spotting based on Parts of Speech	Sentence completion (Vocabulary based)
SLO-4	Presentation skills, Types of presentation, Structure of presentation, Delivery techniques	Creating brands – activity (posters, flyers, business cards)	Creative thinking skills Activity session	Errors how to avoid in Nouns & Pronouns	Cause and Effect - Introduction
SLO-5	Extempore Practice Session I	Stress Management - Causes of Stress and Its Impact	Brainstorming, use of groups and individual brainstorming techniques to promote idea generation	Common Errors: Subject - verb Agreement	Cause and Effect – Practise Session
SLO-6	Extempore Practice Session II	How to Manage Stress and distress, Understanding the circle of control, stress busters	Intercultural communication – beliefs, customs and attitudes of people in different countries (US, UK, Japan, West Asia, China, Russia), Social and cultural etiquettes	Vocabulary - Synonyms - Antonyms - Phrasal verbs-	Theme detection – Introduction - Practice session
SLO-7	Interpersonal Skills, Emotional Intelligence	Conflict Management - Conflict in human relations – reasons, Approaches to conflict resolution	Communication etiquettes, Telephone etiquettes	One Word Substitution - Homophones - Homonyms	Critical Reasoning and Verbal deduction
SLO-8	Importance of Team Work, Team Building activity	Conflict resolutions – Case studies	Ice breaking, Designing ice breaker games	Words often confused	Types of Critical Reasoning- Tips and Tricks
SLO-9	Leadership skills, Leadership skills - based activity	Importance of decision making, Process of decision making, Practical ways of decision making, weighing positives and negatives	Resume writing skills	Idioms and Idiomatic Expressions – Introduction	Word Analogy - Types of Word analogy

Resources			
1	JeffButterfield,SoftSkillsforEveryone, CENGAGE,India,2015	5	ThomasAHarris,Iamok,youareok,Arrow,London,2012
2	Dr.K.Alex,SoftSkills,S. ChandPublishing&Company,India,2014	6	DanielColeman, EmotionalIntelligence,Bloomsbury,India,2016
3	CoveySean,Sevenhabits ofhighlyeffectiveteens,Simon&Schuster,NewYork,2014	7	Norman Lewis, Word Power Made Easy New Revised and Expanded Edition, Goyal publication, 2011
4	CarnegieDale,Howtowinfriendsandinfluencepeople,SimonandSchuster,NewYork,2016	8	Bhatnagar R P, English for Competitive Examinations, Trinity Press, 2016.

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)							
		CLA – 1		CLA – 2		CLA – 3		CLA – 4 *	
		(20 %)		(20 %)		(30 %)		(30%)	
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	15	15	20	20	20	20
2	Understand	20	20	15	15	20	20	20	20
3	Apply	15	15	15	15	15	15	20	20
4	Analyze	15	15	15	15	15	15	20	20
5	Evaluate	15	15	20	20	15	15	10	10
6	Create	15	15	20	20	15	15	10	10
Total (%)		100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. P. Chockalingam, Senior Lead Software Engineer, Virtusa Consulting Services Private Ltd, DLF IT Park SEZ, Chennai – 600089 p.chockalingam1986@gmail.com -	1	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita Vishwa Vidhyapeetham, Coimbatore - 641112 g_saravanaprabu@cb.amrita.edu -	1	Dr.SathishK,HOD,DepartmentofCareerGuidanceCell,FSH,SRMIST hod.dcgc.ktr@srmist.edu.in
				2	Mrs.Deepalakshmi S, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST, deepalas@srmist.edu.in
				3	Dr. Sam Israel S, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST, samisras@srmist.edu.in

Semester - II

Course Code	ULT24AE2J	Course Title	Tamil – II	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

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

CLR	The purpose of learning this course is to:
CLR-1	சங்கஇலக்கியங்கள்வழிதொன்மைஅக, புறவாழ்வியலைஅறியச்செய்தல்
CLR-2	தமிழ்ச்சமூகத்தின்அறவியல்குறித்துதெரியச்செய்தல்
CLR-3	பக்திஇலக்கியங்கள்போதித்தமனிதமாண்புகளைஉணரச்செய்தல்
CLR-4	பண்டைத்தமிழ்ச்சமூகத்தின்தொல்இலக்கியங்கள்வளர்ச்சிபெற்றவரலாற்றைப்புரியச்செய்தல்
CLR-5	சிறுகதைகள்சொல்லும்வாழ்வியல்நெறி, மொழியின்நுட்பங்கள்ஆகியவற்றைத்தெரியச்செய்தல்

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme learning Outcomes									
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving,	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology	Value Inculcation,	Environmental Action,	Entrepreneurial Risk	PSO-1	PSO-2
CLO-1	பண்டைத்தமிழ்ச்சமூகத்தின்அக, புறவாழ்வியல்இன்றையசமூகமேம்பாட்டிற்குவழிகாட்டிநிற்பதைஅறிந்துகொள்ளுதல்	✓	✓	-	-	2	75	60		3	3				2			
CLO-2	தமிழ்ச்சமூகம்அறத்தைவலியுறுத்தியசமூகம்என்பதன்வழிமானுடஅறத்தைத்தெரிந்துகொள்ளுதல்	✓	✓	✓	-	2	80	70	2		3			3				
CLO-3	பக்திஇலக்கியம்மூலம்இறைத்தந்துவங்களைஅறிந்துமானுடஒற்றுமைமேம்பாட்டைஅறிந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	65		3		3		1				
CLO-4	தொல்தமிழ்ச்சமூகம்இலக்கியம், அரசியல், அறம், பக்திஆகியவற்றில்தழைத்தோங்கியதைத்தெரிந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	70	3		3			3				
CLO-5	வாழ்வியலின்நெறிகளைச்சொல்லும்கதைகளைப்படைக்கும்திறனோடுமொழிஆளுமையையும்அறிந்துகொள்ளுதல்	✓	✓	✓	✓	3	80	70	3			2				3		

Sessions	CLO – 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	12	12	12	12	12
SLO -1	காலந்தோறும்தமிழ்அகத்திணைமரபு - உள்ளடக்கம்	சங்கமருவியகாலம் அறமும்வாழ்வியலும்	பல்லவர்காலஇலக்கியங்கள்	பண்டைக்காலத்தமிழகம் சங்ககாலமக்களின்வாழ்வியல்	தமிழ்ச்சிறுகதையும்தமிழ்ச்சமூகவாழ்வியலும்
SLO -2	எட்டுத்தொகைநூல்களும்பகுப்புமுறையும்	உலகப்பொதுமறை - திருக்குறள்கட்டமைப்பு	பக்தியும்தமிழும் - பக்திஇலக்கியத்தோற்றநிலை	முச்சங்கஅறிமுகமும் வரலாறும்	புதுமைப்பித்தன் - சங்குத்தேவனின்தர்மம்
SLO -3	ஐங்குறுநூறு – 375, 391	திருக்குறள்வான்சிறப்பு (2)	சைவசமயஇலக்கியங்கள் - சைவக்குரவர்நால்வர்	சங்கஇலக்கியப்பாடுபொருளும்வடிவமும்	ந.பிச்சமூர்த்தி – வேப்பமரம் - மரபும்நம்பிக்கைகளும்

SLO -4	குறுந்தொகை – 02, 03	திருக்குறள் – புலவிநுணுக்கம் (132) -	தேவாரம் – திருஞானசம்பந்தர் - 2834 திருநாவுக்கரசர் – 4262	எட்டுத்தொகைநூல்களின்வரலாறும்கட்டமைப்பும்	தமிழருவிமணியன் – ஒற்றைச்சிறகு - உறவின்மேன்மை
SLO -5	அகநானூறுநூல்கட்டமைப்பு	தமிழ்இலக்கியமரபில்நீதிஇலக்கியங்கள்	திருவாசகம்- மாணிக்கவாசகர்ஆனந்தபரவசம் – பாடல் 10	பத்துப்பாட்டுநூல்களின்வரலாறும்வாழ்வியலும்	ஆர். சூடாமணி – மூடநம்பிக்கை.
SLO -6	அகநானூறு -238	நாலடியார் வைகலும் - பாடல்எண் 39	வைணவசமயவளர்ச்சிப்போக்கு	பதினெண்கீழ்க்கணக்கும்தமிழர்அறமரபும்	கிருஷ்ணாடாவின்ஸி – காலாஅருகேவாடா
SLO -7	கலித்தொகை –11	நீதிஇலக்கியத்தில்மருந்துநூல்கள்	நாலாயிரத்திவ்யப்பிரபந்தம் குலசேகராழ்வார்பாடல் – 678	பதினோருநீதிஇலக்கியங்கள்	மொழிப்பயிற்சி சொற்களைஉருவாக்குதல்
SLO -8	தமிழர்புறமரபு- புறநானூறு- 107	சிறுபஞ்சமூலம் -64	ஆண்டாள்பாடல் – 574. திருமழிசைஆழ்வார்பாடல்	காப்பியஇலக்கணம் - காப்பியங்களின்வகைமை	எழுத்துகளில்இருந்துசொற்களைக் கண்டுபிடித்தல்
SLO -9	புறநானூறு -110, 112	பழமொழிநானூறுஅறிமுகம்–தனித்தன்மைகள்	தமிழில்இஸ்லாமிய இலக்கியங்கள்	ஐம்பெருங்காப்பியங்கள்	படம்பார்த்துக்கதைஎழுதுதல்
SLO -10	பத்துப்பாட்டும்ஆற்றுப்படைநூல்களும்	பழமொழிநானூறு - 184	சீறாப்புராணம் - விடமீட்டப்படலம் - 10பாடல்கள்	தமிழ்ச்சமூகமும்சமயத்தத்துவங்களும்	படம்பார்த்துக்கவிதைஎழுதுதல்
SLO -11	சிறுபாணாற்றுப்படை: 84-115	பண்டைக்காலப்போரும்வாழ்வும் - புறம்	தமிழில்கிறித்தவ இலக்கியங்கள்	பன்னிருதிருமுறை – அறிமுகம், வரலாறு	கற்பனையும்படைப்பும் - தமிழில்வாசகம்
SLO -12	பட்டினப்பாலை: 40-50	களவழிநாற்பது - 40	கிறித்துவின்அருள்வேட்டல் – திரு.வி.க. அலகிலொளி- 5பாடல்	நாலாயிரத்திவ்வியப்பிரபந்தம் – அறிமுகம், வரலாறு	விளம்பரத்திற்குவாசகம்எழுதுதல்

Resources			
1	கொன்றை, தொகுப்பும்பதிப்பும் - தமிழ்த்துறைஆசிரியர்கள், தமிழ்த்துறை, எஸ்.ஆர்.எம். அறிவியல்மற்றும்தொழில்நுட்பக்கல்விநிறுவனம், காட்டாங்குளத்தூர், 603203, 2023	2	தமிழண்ணல், புதியநோக்கில்தமிழ்இலக்கியவரலாறு, மீனாட்சிபுத்தகநிலையம், மதுரை, 2017
3	மு. அருணாசலம், தமிழ்இலக்கியவரலாறு, நூற்றாண்டுமுறை (9ஆம்நூ. முதல் 16 வரை), திபார்க்கர், சென்னை, 2005	4	தமிழ்இலக்கியத்தொடரடைவு – http://tamilconcordance.in/
5	மதுரைதமிழ்இலக்கியமின்தொகுப்புத்திட்டம் -https://www.projectmadurai.org/	6	தமிழ்இணையக்கல்விக்கழகம் - http://www.tamilvu.org/

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 * (10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
	Total (%)	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. P.R.Subramanian, Director, Mozhi Trust, Thiruvanmiyur, Chennai – 600 041.	1	Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language & Literaturel, 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	ULH24AE2J	Course Title	Hindi – II	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborative Skills	Independent Thinking, Analytical Reasoning, Learning to Learn	Leadership Qualities, Professionalism, Autonomy	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	They get to learn Ancient ,Medieval,and Modern poetry																	
CLR-2	To understand the Significance of poems of great poets like Kabir,Tulsidas,Bihari and Dhananand																	
CLR-3	To Enhance and Enrich their knoeledge through poetry																	
CLR-4	Media based understanding for employability																	
CLR-5	Job Oriented writing skills																	

CLO	At the end of this course, learners will be able to:																	
CLO-1	To provide a brief Introduction of Hindi poetry(Bhaktikal,Reetikal and Aadhunikkal)	✓	✓	-	-	2	85	75	3	2	3			2				
CLO-2	To Discuss the origin and development of various forms of poetry in Hindi	✓	✓	✓	-	2	85	75	3		2		3		3			
CLO-3	Focus on Evaluating the social changes through poetry	✓	✓	✓	✓	3	85	75		3		3	3	2				
CLO-4	To Examine Transcreation in advertisement	✓	✓	✓	✓	3	85	75	2		2	3			2			
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	✓	✓	✓	✓	3	85	75		3		3	3	2				

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO – 4	CLO - 5
	12	12	12	12	12
SLO-1	BHAKTI KALIN KAVITA	RITI KALIN KAVITA	ADHUNIK KAVITA	VIGYAPAN	PATRA LEKHAN&PARIBHASHIK SHABDAVALI
SLO-2	BHAKTIU KALIN KAITA KI AVADHARNA	AVADHARNA EVM SAWROOP	AVADHARNA EVM SAWROOP	AWADHARNA EVM SAROOP	AVADHARNA EVM SAROOP
SLO-3	SWARUP EVM MAHATWA	RITI KAL VIBHAJAN	MAHATVA EVM UDDESHYA	ARTH EVM PARIBHASHA	ARTH EVM PARIBHASHA
SLO-4	BHAKTIKAL KI PRASANGIKTA	MAHATVA EVM UDDESHYA	MATHLI SHARAN GUPT- NAR HO NA NIRASH KARO MAN KO	VIGYAPAN KE PRAKAR	PRAYOJAN EVM PRYOG
SLO-5	DOHE- KABIRDAS	DOHE- BIHARI	KAVI PARICHAYA EVM KAVITA KA VISHLESHAN	VIGYAPAN KI VISHESHTAYEN	PRAKAR EVM MAHATVA
SLO-6	SANT PARICHAY	KAVI PARICHAYA	SURYAKANT TRIPATHI NIRALA- VAR DE VEENAVADINI VAR DE	VIGYAPAN KA MAHATVA	VYAKTIGAT PATRA
SLO-7	DOHE KA VISLESHAN	DOHE KA VISLESHAN	KAVI PARICHAYA EVM VISHLESHAN	VIGYAPAN KI BHASHA	AUPCHARIK PATRA
SLO-8	GURU KA MAHATVA	DOHE- GHANANAND	NAGARJUN-- AKAL AUR USKE BAD	VIGYAPAN AUR ROZGAR	PARIBHASHIK SHABDAVALI
SLO-9	DOHE- TULSHIDAS	SNEH KI SARLTA KA VARNAN	AKAL KA VASHTAVIK CHITRAN	PRINT EVM ELECTRONIC VIGYAPAN	SHABDAVALI KI AVSHYAKTA

SLO-10	DOHE KA VISLESHAN	PREM KA MAHATVA	KATTIS- BADRINARAYAN	VIGYAPAN KI VYAPAKTA	KARYALYIN SHABDAVALI
SLO-11	DAYA KA MAHATVA	GHANANAND KI KAVYA SHAILI KA MAHATVA	SAMBAND VICCHED KI PARICHARCHA	VIGYAPANLEKHAN KI KALA	EK DIN EK SHABD
SLO-12	RAM KI MAHIMA	DHOHA PARICHARCHA	KAVYA PARICHARCHA	UDDESHYA	HINDI SE ANGREJI AUR ANGREJI SE HINDI SHABD

Resources			
1	"Samanya Hindi", Srijonlok Publication, 2023, New Delhi.	4	Bhakti Andolan Aur Surdas Ka Kavya – Manager Pandey
2	Kabir – Hazari Prasad Dwedi	5	Bihari – Vishvnath Prasad Mishr
3	Surdas – Ram Chandra Shukl	6	Aadhunik Vigyapan Aur Jansampark – Taresh Bhatia

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1		CLA – 2		CLA – 3		CLA - 4		
		(10 %)		(10 %)		(20 %)		(10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	MS.REETHA GOVINDAN,Senior Manager (Rajbhasha) ritushivani@yahoo.com	1	Dr. S. PADMAPRIYA, PROF& HEAD, PONDICHERRY University, kalapet, puducherry-605014 padmapriya.srirka@gmail.com	1	Dr.S Preeti. Associate Professor & Head, SRMIST- hod.hindi.ktr@srmist.edu.in
				2	. Dr. Md.Shwahidul Islam Assistant Professor, SRMISTshwahidj@srmist.edu.in
				3	Dr. S. Razia Begum, Assistant Professor, SRM IST raziabes@srmist.edu.in
4	ALUMINI - VIPIN KUMAR JHA, Senior Translation Officer anju.bipin.jha@gmail.com			4	Dr.Nisha Murlidharan Assistant Professor, VDP,SRM IST Murulidharan- nishamup@srmist.edu.in

Course Code	ULF24AE2J	Course Title	French – II	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborative Skills	Independent Thinking, Analytical Reasoning, Learning to Learn	Leadership Qualities, Professionalism, Autonomy	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	Strengthen the language of the students both in oral and written																	
CLR-2	Express their sentiments, emotions, and opinions, reacting to information, situations																	
CLR-3	Make them learn the basic rules of French Grammar.																	
CLR-4	Develop strategies of comprehension of texts of different origin																	
CLR-5	Enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French																	

CLO	At the end of this course, learners will be able to:																	
CLO-1	To acquire knowledge about French language	✓	✓	-	-	2	85	75	3	2	3			2				
CLO-2	To strengthen the knowledge on concept, culture, civilization, and translation of French	✓	✓	✓	-	2	85	75	3		2		3		3			
CLO-3	To develop content using the features in French language	✓	✓	✓	✓	3	85	75		3		3	3	2				
CLO-4	To interpret the French language into other language	✓	✓	✓	✓	3	85	75	2		2	3			2			
CLO-5	To improve the communication, intercultural elements in French language	✓	✓	✓	✓	3	85	75		3		3	3	2				

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	12	12	12	12	12
SLO-1	Temps libre	Le pronom indéfini on	Vendre	Il faut	Les gallicismes
SLO-2	Les loisirs	Les adjectifs interrogatifs	Acheter	Le verbe devoir	Les pronoms personnels COI
SLO-3	Les moments de la journée	Les prépositions avec les noms géographiques	Les aliments	Le verbe pouvoir	Le pronom Y
SLO-4	Les matières scolaires	Les verbes prendre et sortir	Les emballages	Le verbe vouloir	Des pronoms compléments
SLO-5	Les activités quotidiennes, Les quotidiennes	Les sons	Les quantités	Demander et dire le prix	Les nombres ordinaux
SLO-6	Le temps, L'heure	Parler de ses gouts	Les commerces	Faire des achats	Les verbes écrire et voir
SLO-7	La fréquence	Parler de ses préférences	Les commerçants	Les activités	Le E caduc ou instable
SLO-8	Les sons [u], Les sons [y]	Parler de sa routine	L'impératif	Les activités	Présenter ses vœux
SLO-9	L'heure, Quelle heure est-il ?	A la recherche d'un cadeau	Les articles partitifs	Mots et expressions	Présenter ses félicitations
SLO-10	Les pronoms personnels COD	Temps libre	Très ou beaucoup (de)	Communication	Répondre à une invitation

SLO-11	Les pronominaux, Se promener, se coucher etc…,	Mots et expressions	Le pronom en (la quantité)	Les sorties	Écrire un message amical
SLO-12	Les verbes du premier groupe, Parler, Demander, Poser	Grammaire– Communication	La phrase négative (2	Les fêtes	Parler au téléphone

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

Assessment

Bloom’s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1		CLA – 2		CLA – 3		CLA - 4		
		(10 %)		(10 %)		(20 %)		(10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Mr. Kavaskar Danasegarane, Language Specialist, Process Expert Maersk Global Service Center Pvt. Ltd Mailkavas18@gmail.com	1	Dr. C.Thirumurugan ,Professor, Department of French, Pondicherry University drcthirumurugan@gmail.com	1	Mr. Kumaravel K. Assistant Professor & Head, SRMIST,KTR., hod.french.ktr@srmist.edu.in
2	Mr. Shrivathsan S, Journalist, Senior Sports Reporter/Sub-Editor, Times of India, Chennai shrivathsangilramhanga@gmail.com			2	Miss. Abigail A, Assistant Professor , SRMIST,,VDP abigaila@srmist.edu.in
				3	Mrs.M.Mahalakshmi, Assistant Professor , SRMIST,,RMP mahalakm2@srmist.edu.in

Course Code	USA24201J	Course Title	Data Structures and Algorithms	Category	C	Core	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:
CLR-1	Utilize the different data types; Utilize searching and sorting algorithms
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

CLO	At the end of this course, learners will be able to:	Depth				7	Attainment			7	Programme Learning Outcomes									
		1	2	3	4		1	2	3		1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Communication Skills, Collaborating Skills	Communication Skills, Collaborating Skills	Communication Skills, Collaborating Skills	Communication Skills, Collaborating Skills	Communication Skills, Collaborating Skills	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn	Leadership Qualities, Professionalism, Autonomy	Digital Technology Skills	Value Inculcation, Multicultural Inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Identify linear and non-linear data structures. Create algorithms for searching and sorting	✓	✓	-	-		2	85	75		3	-	-	1	-	3	-	2	2	1
CLO-2	Create the different types of linked lists and evaluate its operations	✓	✓	✓	-		2	85	75		3	2	1	2	2	3	-	1	2	1
CLO-3	Construct stack and queue data structures and evaluate its operations	✓	✓	✓	✓		3	85	75		3	1	3	1	3	3	-	1	1	2
CLO-4	Create tree data structures and evaluate its types and operations	✓	✓	✓	✓		3	85	75		3	3	2	3	3	3	-	2	3	3
CLO-5	Create graph data structure, evaluate its operations, implement algorithms to identify shortest path	✓	✓	✓	✓		3	85	75		3	3	2	3	3	3	-	3	3	3

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	18	18	18	18	18
SLO-1	Introduction to theory of data structures Data representation	Introduction to stack Representation of stack through array	Tree Traversals – In order, preorder Tree Traversals - Post order	Introduction to sorting Different types of sorting	Graph Terminology Representation of graph – Arrays
SLO-2	Abstract Data type Classification of data types	Representation of stack through linked list Operations on stack	Binary Search Tree Threaded Binary Search Tree	Bubble sort Example	Representation of graph – Linked list Graph Traversal – BFS

SLO-3	Asymptotic Notation Algorithm Analysis, Recursion	Disadvantages of Stack, Polish notations Applications – Evaluation of Expression, Tower of Hanoi, Infix to Postfix expression	Binary Search Tree :Construction Binary Search Tree : Insertion, Searching	Insertion Sort Quick sort Example	Example Graph Traversal – DFS, Topological Sorting
SLO 4-6	**Lab1:Recursion**	**Lab4:Implementation ofstackanditsapplications**	**Lab7: Implement all the three type of TreeTraversals**	**Lab10:ImplementationofBubbleandInsertionsort**	**Lab13:ImplementationofGraphusingArray**
SLO-7	Introduction to Data structures Data Structures and its uses	Queue, Representation of Queue using Arrays and Linked list	Applications of trees Applications of BST	Selection sort Example	Shortest Path Algorithm- Introduction Shortest Path Algorithm: Dijkstra
SLO-8	Linear and Non Linear Data Structures, Operations on data structure	Operations on Queue, Circular Queue	Expression trees, Example	Merge sort, Example	Applications of Graph,
SLO-9	Array types Array operations, Applications of arrays Dynamic memory allocation	Double ended Queue Priority Queue, Reversing a Queue using another queue, Applications of Queue	AVL Tree AVL Tree Rotations, Applications of AVL tree	Radix sort Heap Sort Example, Comparison of sorts	Minimum spanning tree – Prims Minimum Spanning Tree – Kruskals
SLO 10-12	**Lab2:Arrays**	**Lab 5:Queue implementation usingarrayandpointers**	**Lab8:ImplementationofBST HeapDataStructure**	**Lab11:ImplementationofQuicksortandmergesort**	**Lab14:Implementationofshortestpathalgorithm**
SLO-13	Introduction to lists Linked list operations	Introduction to nonlinear data structures Tree ADT and Terminologies	Minimum Heap Construction Example	Introduction to searching , Linear search Binary search	Algorithm Design And Analysis Greedy Algorithms
SLO-14	Types of Linked Lists Linked list vs. Arrays	Tree Terminologies Tree Representation	Minimum Heap Deletion Construction Example	Comparison of different search Define Hashing, Hash functions	Backtracking Example

SLO-15	Application of linked list, Performance Analysis and Measurement of algorithm Efficiency of algorithm, Time complexity and space complexity	Tree Types and Operations Binary Tree Representation, Properties of binary tree	Maximum Heap Construction Maximum Heap Deletion Construction Applications of Heaps and AVL trees	Hashing : Collision avoidance Hashing : Separate chaining, Open addressing, Advantages of Hashing	Divide And Conquer Example
SLO 16 - 18	**Lab3: Implementation of LinkedList**	**Lab6:ImplementationofbinarytreeusingArrays**	**Lab9:Implementation of Min and Max Heap**	**Lab12:LinearsearchandBinarysearch**	**Lab15:Implementationofminimumspanningtree**

Resources			
1	SeymourLipschutz,(2014),"DataStructureswithC",McGrawHillEducation,SpecialIndianEdition	4	SRDGroup,(2013),"DatastructuresusingC",McGrawHill,2ndEdition,
2	R.F.Gilberg,B.A.Forouzan,(2005),"DataStructures",ThomsonIndi,2ndEdition,	5	A.V.Aho,J.EHopcroft,J.D.Ullman,(2003),"DatastructuresandAlgorithms",1stEdition,PearsonEducation
3	MarkAllenWeiss,"DataStructuresandAlgorithmAnalysisinC",2nd Edition,PearsonEducation	6	ReemaThareja,(2011),"DataStructuresUsingC",1stEdition,Oxford3erEducation

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 (10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Valliyappan, Full Stack Developer, Lentra Technologies, Chennai	1	Dr.S.Gopinathan,Professor,UniversityofMadras,Chennai	1	Dr.R.Aruna Rani, Assistant Professor, FSH, SRMIST

Course Code	UCS24202J	Course Title	Object Oriented Programming using Java	Category	C	Core	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:
CLR-1	To learn the fundamentals of object-oriented programming
CLR-2	Learning to write object-oriented programs in Java
CLR-3	Developing skills in creating graphical and database applications through Java
CLR-4	Build Resilient code using Exception Handling mechanism
CLR-5	Be able to apply object oriented or non-object-oriented techniques to solve bigger real world computing problems

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving,	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology	Value Inculcation,	Environmental Action,	Entrepreneurial Risk	PSO-1	PSO-2	
CLO-1	Remember and understand Java program and application structureand understand Java program and application structure	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	-	-	
CLO-2	Apply the principles of OOPs and develop simple Java program or application	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	-	-	
CLO-3	Analyze the problem specific requirements and develop java programs	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	-	-	
CLO-4	Evaluate the program using extended functionalities	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	-	-	
CLO-5	Create and Design an interactive application using swing and event handling	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	-	-	

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	18	18	18	18	18
SLO-1	Overview of Java Programming: History and Evolution, Features of Java, JVM	Introduction: Classes, Objects	Understanding Exceptions: Types of Exception Exception Hierarchy	Understanding Thread: Creating a thread Running Thread	Undestranding Java Swing
SLO-2	Structure of Java Program:Main Method, Statements and Expressions Declaring Variables and Initializing variables	Functions Inheritance and its types	Try-Catch Blocks: Handling Exception Throwing Exception	Thread Life Cycle Extending thread class	Adding components: Layouts, Buttons and Textareas
SLO-3	Primary Data types: int, flot, char, Boolean	Polymorphism, Encapsulation, Abstraction	: Multiple catch clauses	Creating multiple thread	Custom components: Simple Toolbars
SLO 4-6	**Practice: Work with IDE and writing simple programs**	**Practice: Programs using Classes and objects**	**Practice: Program using Exception Handling**	**Practice: Program to create multi thread**	**Practice: Creating Basic Swing Application**

SLO-7	Scope and Lifetime of variable	Constructors & Destructors, Default &Parameterized constructor	Working with finally, throw and throws	Synchronization and Coordination	Communication between components, Listeners, Events
SLO-8	Opearators: Arithmetic, Relational and Logical Operators	Garbage Collection Passing Arguments, object as arguments	User defined exception	Thread safety and deadlock	Component settings: size, setting borders
SLO-9	Operator precedence	Oveloading: Method, Constructor Overriding: Method	Understanding Packages	Inter-Thread Communication	Custom events, Form submissions
SLO 10-12	**Practice: Program using various operators**	**Practice: Program using Constructors and Destructors**	**Practice: Program using simple packages**	**Practice: Program to Inter Thread Communication**	**Practice:Creating applications using events**
SLO-13	Flow Control Statements: Conditional Statements: if, else if, else statements Switch-case statements	Recursion, Understanding Static variables, methods	Importing Packages	File Handling: Reading and Writing to files	Menus, Tables
SLO-14	Looping Statements for or while, do-while loops Enhanced for loop	Introduction: String Class String functions	Bult-in Packages User Defined Packages	Working with Input and Output Stream	File Choosers, Color Choosers, Dialog boxes
SLO-15	Working with break, continue and return statements	Command Line Arguments	Sample Packages	StringbufferInput stream	MVC Architecture
SLO 16-18	**Practice: Programs using control statements**	**Practice:Program using string class and functions**	**Practice: Program using buit-in and user defined packages.**	**Practice: Program to read and write on files**	**Practice: Program to implement MVC in swing.**

Resources			
1	Java : The Complete Reference, Twelfth Edition, Herbert Schildt,	4	Head First Java, A Brain Friendly Guide, Kathy Sierra,
2	Core JavaFundamentals, Volume 1	5	Introduction to Java Programming and Data Structures, Comprhensive Version Y :Liang
3	Java All in One for Dummies, Dong Lowe		

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 (10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts	Higher Institution Experts	Internal Experts
1 Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1 Dr. Neela Narayanan V, Professor, VIT chennai	1 Dr. M. Ramesh, Assistant Professor, FSH, SRMIST

Course Code	UMS24202T	Course Title	Mathematical Foundation	Category	C	Core	L	T	P	C
							4	0	0	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcome									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Skills, Communication Collaborating Skills	Thinking, Reasoning, Independent Analytical	Qualities, Autonomy, Leadership Professionalism,	Digital Technology Skills	Inculcation, Multicultural inclusivity Value	Action, Environmental Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	To apply the basic concepts and theorems of matrices																	
CLR-2	To learn the concepts of polynomial equations, reciprocal equations and approximation of roots.																	
CLR-3	To learn the basic concepts of differentiation, successive differentiation and partial differentiation																	
CLR-4	To learn the basic concepts of integration and to apply Bernoulli's formula and reduction formula.																	
CLR-5	To understand how a function is transformed by Laplace and inverse Laplace methods and how they are related.																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Gaining knowledge in basic concepts of matrix method.	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Gaining knowledge in the concepts of polynomial equations and reciprocal equations and applying Horner's and Newton's methods for finding roots	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Understanding the concepts of differentiation and to solve the problems of Radius of curvature and Euler's theorem	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Understanding the concepts of integration and to evaluate reduction formula.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Getting the knowledge of Laplace and Inverse Laplace transformation and their application.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	12	12	12	12	12
SLO-1	Definition and types of matrix - Examples of types of Matrix	Introduction to algebraic equations	Introduction to Differentiation	Introduction to integration - Basic problems on integration	Introduction to Laplace Transforms- Basic Properties
SLO-2	Symmetric matrix - Skew- symmetric matrix	**Types of algebraic equations**	Solving basic problems – more examples	Integration of polynomial functions and Irrational Functions	Problems on Laplace Transforms
SLO-3	Hermitian matrix - Skew-Hermitian matrix	Relation between roots and coefficients of equation	Maxima- Minima of functions of single variable	Integration by the method of partial fractions Type I, Type II, Type III	Problems based on Shifting property
SLO-4	Tutorial	Tutorial	Tutorial	Tutorial	Tutorial

SLO-5	Orthogonal matrix	Problems on irrational roots	Problems based onMaxima- Minima of functions of single variable	Bernoulli's formula	Solving problems of type $L\left[e^{at}f(t)\right]$
SLO-6	Unitary matrix	Complex roots	Introduction to curvature	Simple Problems	Problems based on derivative method
SLO-7	Eigen values of a matrix	**Reciprocal equations-Definition**	Radius of Curvature	Reduction formula for $\int \sin^n x dx$	Solving problems of type $L[tf(t)]$
SLO-8	Tutorial	Tutorial	Tutorial	Tutorial	Tutorial
SLO-9	Eigen values and eigen vectors of a matrix	Solving Reciprocal equation of degree four with like and unlike signs for its coefficients-Type I,Type II , Type III , Type IV	Problems based on radius of curvature	Reduction formula for $\int \cos^n x dx$	Solving problems of type $L\left[t^n f(t)\right]$ and type $L\left[e^{at}tf(t)\right]$
SLO-10	Cayley Hamilton theorem - Problems	Newton-Raphson method – Problems	Partial differentiation-Introduction	Reduction formula for $\int_0^{\frac{\pi}{2}} \sin^n x dx$	Solving problems of type $L\left[\frac{f(t)}{t}\right]$
SLO-11	Cramer's rule	Horner's Methods	Euler's theorem	Reduction formula for $\int_0^{\frac{\pi}{2}} \cos^n x dx$	Basic problems on Inverse Laplace Transforms
SLO-12	Problems based on Cramer's rule	Problems based on Horner's Methods	Problems based on Euler's Theorem	Simple problems	Finding inverse Laplace transforms by the method of partial fractions – problems based on that concepts.

Resources			
1	Dr.A.Singaravelu, Allied Mathematics, 7th edition, A.R.S.Publicatiions, 2015	2	P.R.Vittal, Margham Publications, Latest edition,2002

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 % weightage)
		CLA – 1	CLA – 2	CLA – 3	CLA – 4	
		(10 %)	(10 %)	(20 %)	(10%)	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)
7	Remember	15	15	10	10	15
8	Understand	15	15	10	10	15
9	Apply	20	25	25	25	25
10	Analyze	20	25	25	25	25
11	Evaluate	15	10	15	15	10
12	Create	15	10	15	15	10
	Total (%)	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. D. Arivudai nambi, Anna University, Chennai	2	Dr. N.Viswanathan, , Presidency college , Chennai	1	Dr.S.Poongodisathiya,SRM IST, KTR, poongods@srmist.edu.in
				2	Dr.S.Saravanakumar,SRM IST, KTR, saravans14@srmist.edu.in

Course Code	UCD24V01T	Course Title	Essentials of Artificial Intelligence	Category	V	Value Added Course	L	T	P	C
							1	0	0	1

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

CLR	The purpose of learning this course is to:
CLR-1	Study the basics of designing intelligent agents that can solve general purpose problems'
CLR-2	Discover appropriate AI methods to solve a given problem
CLR-3	Perform intellectual task as decision making, problem solving, perception, understanding
CLR-4	Formalize a given problem using different AI methods
CLR-5	Provides adaptive learning

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes									
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Demonstrate fundamental understanding of the history of artificial intelligence and its foundations	✓	✓	-	-	2	85	75	3	-	-	1	2	1	-	-	-	1
CLO-2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning	✓	✓	✓	-	2	85	75	2	-	1	-	2	2	-	1	-	1
CLO-3	Identify systems with Artificial Intelligence. evaluation of different algorithms on a problem formalization	✓	✓	✓	✓	3	85	75	2	3	2	-	2	1	-	1	-	2
CLO-4	Use classical Artificial Intelligence techniques, such as search algorithms,	✓	✓	✓	✓	3	85	75	3	-	2	-	2	2	-	2	-	-
CLO-5	Ability to apply Artificial Intelligence techniques for problem solving.	✓	✓	✓	✓	3	85	75	2	2	-	-	2	-	-	-	-	-

Session	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	Introduction to Artificial Intelligence	Logical Reasoning and First order logic	Unification and State Space Search	Planning Graphs	Probability Theory and Temporal Models
	3	3	3	3	3
SLO-1	Introduction to Artificial Intelligence, History of Artificial Intelligence- AI models	Logical Reasoning-Introduction-Knowledge Representation	Unification and Conditions, Unification algorithm	Partial-order planning, planning graphs	Probability Theory, Uncertain Knowledge, Axioms of probability.
SLO-2	Problem Solving with Artificial Intelligence- ProblemSolving Process	Logical Agents, Knowledge basedAgents, Syntax of First order logic, Basic elements of First order logic	Planning: designing programs to search for data or solutions to problem.	Uses of planning graph, Planning and acting in the realworld	Bayes Theorem, Bayes' Rules & uses, Bayesian networks, Types of Bayesian Network

SLO-3	Problem Types, Characteristics and Representation-Agents- Examples of Agents, Types of agents	Forward chaining andBackward Chaining- Properties Examples	State-space search, Problems to solve: Water Jug Problem, State representation: Initial, operator, goal state	Forward march, Backward march and Limited resources	Temporal models, Hidden Markov models, HMM components

Resources			
1	Russel.SandNorvig.P, (2003), "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education	2	S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)			
		CLA – 1	CLA – 2	CLA – 3	CLA – 4
		(20 %)	(20 %)	(40 %)	(20%)
		Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	15	15	10	10
2	Understand	15	15	10	10
3	Apply	20	25	25	25
4	Analyze	20	25	25	25
5	Evaluate	15	10	15	15
6	Create	15	10	15	15
Total (%)		100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Clarification/Pauses	✓	Good Health & Well Being	
Presentation Tools	✓	Group Discussion		Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	
		Debate			
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor and Head, Department of Computer Science, University of Madras, Guindy Campus,,Chennai-600025	1	Dr.S.Belina V J Sara, SRMIST Kattankulathur

Course Code	UCD24S02L	Course Title	Quantitative Aptitude and Logical Reasoning	Category	S	Skill Enhancement Course	L	T	P	C
							0	0	2	1

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Illustrate the application of different principles in solving mathematical problems	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PLO-9	PLO-10
CLR-2	Foster students' curiosity and understanding of concepts related to profit/loss, interest computation, and averages																	
CLR-3	Analyze fundamental mathematical concepts concerning permutation and combination, as well as time and work, with a critical perspective																	
CLR-4	Equip students with the abilities essential for generating and comprehending data, focusing on topics such as cubes, dices and blood relations																	
CLR-5	Empower students to grasp the fundamentals of reasoning																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Grasp, evaluate, and tackle problems involving numbers and percentages	✓	✓	-	-	2	85	75	3	1	3	-	2	2	-	-	-	-
CLO-2	Develop, solve, interpret, and apply fundamental mathematical models relevant to everyday situations	✓	✓	✓	-	2	85	75	3	1	3	-	2	2	-	-	-	-
CLO-3	Realize the principles of permutation and combination, probability, time and work, and adopt simplified and innovative approaches to problem- solving	✓	✓	✓	✓	3	85	75	3	1	3	-	2	2	-	-	-	-
CLO-4	Comprehend the concepts of data interpretation, data sufficiency, coding and decoding	✓	✓	✓	✓	3	85	75	3	1	3	-	2	2	-	-	-	-
CLO-5	Solve logical puzzles and reasoning challenges	✓	✓	✓	✓	3	85	75	3	1	3	-	2	2	-	-	-	-

Sessions	CLO - 1	CLO -2	CLO - 3	CLO - 4	Unit V / CLO – 5
	6	6	6	6	6
SLO-1	Classification of numbers and Test of divisibility	Profit and Loss	Permutation and Combination	Cubes and Dice	Direction Sense
SLO-2	Unit digit and Trailed zeroes	Ratio and Proportions	Problems on Probability	Data Interpretation	Number Series and Word Series
SLO-3	Problems on HCFand LCM	Simple Interest and Compound Interest	Time and work - Men and Work	Data sufficiency	Odd man out Missing Number and Wrong Number
SLO-4	Problems on Partnership	Word problems on Linear and Simultaneous Equations	Time and Work - Pipes and Cisterns	Seating Arrangements – Linear and Circular	Puzzles - Concepts & Problems Syllogisms - Concepts & Problems
SLO-5	Problems on Percentage	Problems on Averages	Time, Speed and Distance - Problems on Trains	Problems on Blood Relations	Problems on Clocks
SLO-6	Percentage - Increasing & Decreasing functions	Mixtures and Alligations	Time, Speed and Distance - Boats & Streams	Coding – Decoding	Problems on Calendars

Resources

1	Abhijit Guha,QuantitativeAptitudeforCompetitiveExaminations,TataMcGrawHill,5thEdition	**4**	Dr. Agarwal. R. S,QuantitativeAptitudeforCompetitiveExaminations,S.ChandandCompanyLimited,2018Edition
2	ArchanaRam,Place Mentor:TestsofAptitudeforPlacementReadiness,OxfordUniversityPress,Oxford,2018	**5**	EdgarThrope,TestofReasoningforCompetitiveExaminations,TataMcGrawHill,6thEdition
3	DineshKhattar,ThePearsonGuidetoQuantitativeAptitudeforcompetitiveexaminations, Pearson,3rd Edition	**6**	PAAnand,QuantitativeAptitudeforcompetitiveexaminations,Wileypublications,ebook,2019

Assessment					
Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)			
		CLA – 1	CLA – 2	CLA – 3	CLA – 4
		(20 %)	(20 %)	(30 %)	(30%)
		Practice (%)	Practice (%)	Practice (%)	Practice (%)
1	Remember	20	10	20	10
2	Understand	20	10	20	10
3	Apply	20	20	20	20
4	Analyze	20	20	20	20
5	Evaluate	10	20	10	20
6	Create	10	20	10	20
	Total (%)	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Clarification/Pauses	✓	Good Health & Well Being	
Presentation Tools	✓	Group Discussion		Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	
		Debate			
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. P. Chockalingam, Senior Lead Software Engineer, Virtusa Consulting Services Private Ltd, DLF IT Park SEZ, Chennai – 600089 p.chockalingam1986@gmail.com	1	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita Vishwa Vidhyapeetham, Coimbatore - 641112 g_saravanaprabu@cb.amrita.edu	1	Dr.SathishK,HOD,DepartmentofCareerGuidanceCell,FSH,SRMIST hod.dcgc.ktr@srmist.edu.in
				2	Dr.AarthiS,AssistantProfessor,DepartmentofCareerGuidanceCell,FSH,SRMIST aarthis4@srmist.edu.in

Course Code	UNS24Y01L/UNC24Y01L/UNO24Y01L/UYG24Y01L	Course Title	NSS/NCC/NSO/YOGA	Category	Y	Mandatory Course	L	T	P	C
							0	0	0	0

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Understand themselves in relation to their community	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity, Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning	Leadership Qualities, Professionalism, Autonomy,	Digital Technology Skills	Value Inculcation, Multicultural Industivity	Environmental Action, Community Engagement	EntrepreneurialRITaking	PSO 1	PSO 2
CLR-2	Develop among themselves a sense of social and civic responsibility																	
CLR-3	Utilize their knowledge in finding practical solution to individual and community problems																	
CLR-4	Develop competence required for group-living and sharing of responsibilities																	
CLR-5	Acquire leadership qualities and democratic attitude																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	realize themselves in relation to their community	✓	✓	-		2	85	75	3	-	-	1		3	3	2		
CLO-2	Develop among themselves a sense of social and civic responsibility	✓	✓	✓		2	85	75	3	2	1	2		3	3	1		
CLO-3	find practical solution to individual and community problems	✓	✓	✓	✓	3	85	75	3	1	3	1		3	3	1		
CLO-4	Develop competence required for group-living and sharing of responsibilities	✓	✓	✓	✓	3	85	75	3	3	2	3		3	3	2		
CLO-5	develop leadership qualities and democratic attitude	✓	✓	✓	✓	3	85	75	3	3	2	3		3	3	3		

Assessment is Fully Internal

Assessment

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

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses		Good Health & Well Being	✓
Presentation Tools		Group Discussion	✓	Quality Education	
Learning Management System		Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming			

***CLA s are evaluated based on (i) participation in awareness programmes, (ii) participation in outreach programme, (iii) Community Services (iv) Camps (National, State, Regional)**

Resources	
1.	NSS Manual (Revised), Government of India

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr Samuel Chellaiya C Regional Director, NSS Government of India	1	State Officer, NSS Tamil Nadu NSS	1	Dr Prakash V, NSS Coordinator, SRMIST, AP, department of Economics, FSH, SRMIST Prakashv2@srmist.edu.in
				2	Dr Yogalakshmi, NSS Programme Officer, FSH, SRMIST.

SEMESTER - III

Course Code	UCS24301J	Course Title	Operating System	Category	C	Core	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:
CLR-1	Utilize operating systems based on its features and utility
CLR-2	Utilize the Process Management functions of an Operating system
CLR-3	Utilize the features of Memory Management concepts of an Operating system
CLR-4	Analyze how Device Management part of an Operating system functions
CLR-5	Utilize the File Management functions of an Operating system

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes									
		1 Conceive	2 Design	3 Implement	4 Operate	1 Level of Thinking	2 Expected Proficiency (%)	3 Expected Attainment (%)	1 Problem Solving, Critical Thinking, Creativity	2 Communication Skills, Collaborating	3 Independent Thinking, Analytical Reasoning, Learning to Learn, Research	4 Leadership Qualities, Professionalism, Autonomy, Accountability	5 Digital Technology Skills	6 Value Inculcation, Multicultural inclusivity	7 Environmental Action, Community Engagement	8 Entrepreneurial Risk Taking	9 PSO-1	10 PSO-2
CLO-1	Identify functions of an operating system, analyze the process management functions	✓	✓	-	-	2	85	75	3	-	-	-	-	-	-	-	-	-
CLO-2	Analyze CPU scheduling and synchronization process of an operating system	✓	✓	✓	-	2	85	75	3	-	-	-	-	-	-	-	-	-
CLO-3	Analyze the need of Memory management functions of an operating system	✓	✓	✓	✓	3	85	75	3	-	-	-	3	-	-	-	-	-
CLO-4	Identify the significance of device management and file management's role of an operating system	✓	✓	✓	✓	3	85	75	3	3	-	-	-	-	-	-	3	3
CLO-5	Identify the essentials of inter process communication in an operating system, evaluate hypervisors	✓	✓	✓	✓	3	85	75	3	3	-	-	3	-	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	18	18	18	18	18
SLO-1	**Introduction Operating Systems (OS): Operating System overview .Operating system as a resource management**	**Process concept : Introduction,** Process states : Process creation and process termination	Process Synchronization – Background, The Critical section problem	Deadlocks - System model	**Memory management: Introduction**
SLO-2	Operations, Assembler, Compiler, loader, linker,**Evolution of Operating Systems ,serial processing and batch processing**	Process state transition diagram, Operation on process	Two process Solutions ,Multi process Solutions	Deadlock characterization, Necessary conditions	Logical, physical address space, Comparison of Logical, physical Address
SLO-3	Batch: Simple, Multiprogramming, Multiprocessor, Time Sharing, parallel systems	Symmetric multiprocessing	Synchronization hardware solution	Resource Allocation Graph, Methods for handling deadlocks	Swapping, Organization : physical and logical organization
SLO 4&5	**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-6	Distributed (client-server, peer-to-peer), Real-Time (hard, soft Clustering (symmetric, asymmetric, parallel)) , Network,)	Concurrent process, Usage	Semaphores – Usage	Deadlock Prevention, Mutual exclusion, Hold and Wait No Preemption, Circular Wait	Memory allocation method, Single partition allocation
SLO-7	Microkernel: Architecture, Kernel mode, user mode, Monolithic, differences, System Call Types	**CPU Scheduling: Process Scheduler (long, short, medium term),** Scheduling criteria	Semaphores –Implementation, Binary semaphores	Deadlock Avoidance – Safe state, Resource Allocation Graph Algorithm	Multiple partition memory management, contiguous (fixed, dynamic)
SLO-8	process control: fork(), exit(), wait(),file manipulation: open(), close()	CPU utilization, throughput, time: (a) turnaround (b) waiting (c) response, Scheduling Types: FCFS, SJF	Classic Problems of Synchronization - The Bounded Buffer problem, The Readers - Writers Problem	Banker's Algorithm - Safety Algorithm	Contiguous Types: memory protection, allocation, fragmentation , partitioned, Compaction
SLO 9&10	**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-11	File operations , read(), write()	Priority , Round Robin Scheduling	The Dinning philosophers problem , Examples	Resource request algorithm , Examples	Paging,Segmentation
SLO-12	Operating System services, System Programs:	Other Scheduling Types, Real Time Scheduling	Critical Regions: Race condition and process synchronization	Deadlock Detection - introduction	Page Replacement Algorithms, Types of Replacement algorithms, , Examples
SLO-13	file management, status information	multilevel queue, multilevel feedback queue	Implementation of Critical region, Mutual Exclusion Algorithm: Peterson , Monitors	Single instance of each resource type, Several instances of a Resource type	, Demand paging
SLO 14-15	**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**

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

ssessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
7	Remember	15	15	15	15	10	10	10	10	15	15
8	Understand	15	15	15	15	10	10	10	10	15	15
9	Apply	20	25	25	20	25	25	25	25	25	25
10	Analyze	20	25	25	20	25	25	25	25	25	25
11	Evaluate	15	10	10	15	15	15	15	15	10	10
12	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT Chennai	1	Dr. Arul Lena Rose P J,Professor, FSH

Course Code	USA24302J	Course Title	Database Management System	Category	C	Core	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:
CLR-1	Understand the fundamentals of Database Management Systems and Its architecture
CLR-2	To impart in-depth knowledge of database design process through ER Model and Relational Model
CLR-3	Understand the using Structure Query Language (SQL) and PL/SQL
CLR-4	Basic knowledge of Improvement of the database design using normalization criteria and optimize queries
CLR-5	Basic knowledge of the practical problems of concurrency control and gain knowledge about failures and recover

CLO	At the end of this course, learners will be able to:	Depth: Conceive	Depth: Design	Depth: Implement	Depth: Operate	Attainment: Level of Thinking	Attainment: Expected Proficiency (%)	Attainment: Expected Attainment (%)	PLO 1: Problem Solving, Critical Thinking, Creativity	PLO 2: Communication Skills, Collaborating	PLO 3: Independent Thinking, Analytical Reasoning, Learning to Learn, Research	PLO 4: Leadership Qualities, Professionalism, Autonomy, Accountability	PLO 5: Digital Technology Skills	PLO 6: Value Inculcation, Multicultural Inclusivity	PLO 7: Environmental Action, Community Engagement	PLO 8: Entrepreneurial Risk Taking	PLO 9: PSO-1	PLO 10: PSO-2
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLO-1	Have a thorough Understanding of the Database Systems	✓	✓	-	-	2	85	75	3	-	-	-	-	-	-	-	-	-
CLO-2	Realize the concepts of ER Model and Relational Model	✓	✓	✓	-	2	85	75	3	-	-	-	-	-	-	-	-	-
CLO-3	Create real time applications of SQL and PL/SQL	✓	✓	✓	✓	3	85	75	3	-	-	-	3	-	-	-	-	-
CLO-4	Design and implementation knowledge of a Normalized Database	✓	✓	✓	✓	3	85	75	3	3	-	-	-	-	-	-	3	3
CLO-5	Design and implementation knowledge of Concurrency Control	✓	✓	✓	✓	3	85	75	3	3	-	-	3	-	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	18	18	18	18	18
SLO-1	What is a DBMS	Introduction to Entity Relationship	Defining Constraints through SQL	CODD Rules	Recoverability in Transaction
SLO-2	Advantage of DBMS over File Systems	E-R Model Construction	SQL Aggregate Functions Introduction	Normalization: 1Nf, 2Nf, 3Nf	Concurrent Execution
SLO-3	Applications of DBMS	Case Study	Built Functions : In Numeric, Date	BCNF 4Nf and 5Nf	Concurrency Control – Lock Based, Two-Phase Control Commit
SLO 4-6	**Lab1 : Creating a Simple DB**	**Lab 4: Working with Built In SQL Functions**	**Lab 7: Working with Aggregate Functions**	**Lab 10: Normalize a DB**	**Lab 13: Working with Transactions**
SLO-7	DBMS Architecture	Issues in E-R Model	Built Functions: String, Set	Referential Integrity	DB Stored Procedures : PL/SQL

SLO-8	Over View of SQL	Keys, Attributes, Constraints	SQL Joins	Indexing: Primary, Secondary, Multilevel	Multilevel Granularity
SLO-9	SQL : Data Definition- DDL	Mapping Cardinality	Creating Sub Queries	ISAM, B-Trees	**Deadlock Prevention**
SLO 10-12	**Lab2: Working with DDL**	**Lab 5- Working with Primary and Secondary Key**	**Lab 8: Working With Sub Queries**	**Lab 11: PL/SQL work with Iterative Statements**	**Lab 14: Creating DB Stored Procedures**
SLO-13	SQL : Data Manipulation -DML	Extended ER - Aggregation	Transaction Control Commands : Commit, Roll Back, Save Point	PL/SQL Variables and Control Structures	PL/SQ: Exception Handling, Triggers
SLO-14	Evolution of Data Models	Extended ER – Generalization, Specialization	Relational Algebra : Fundamental Operations	Cursors and Functions in PL/SQL	Need For DB Security
SLO-15	Comparison of Data Models	Conversion of ER to Relational Table	Functional Dependency : Trivial, Non Trivial	Transactions : ACID Property	Mandatory Access control and SLO-2 Multilevel Security
SLO 16-18	**Lab 3: Working with DML**	**Lab 6: Working with Nested Queries**	**Lab 9: Correlated Sub Queries**	**Lab 12: PL/SQL Working with Cursors**	**Lab 15: Implementation of Payroll Processing, Student Mark Report**

Resources

1	AnanthiSheshasaayee,J.G. Sheshasaayee, Digital Logic Fundamentals, Margham Publications, 2005	3	Leach D.P, Malvino A.P, Digital Principles and Applications, TM, 2002
2	Vijayendran.V, Digital Fundamentals, S.V. Publishers, 2003	4	Moris ManoM, Digital Logic and Computer Design, Pearson, 2001

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
Total (%)		100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT Chennai	1	Dr. E. Sweety Bakyarani, Assistant Professor, FSH,

Course Code	UMS24303T	Course Title	Statistical Methods	Category	D	Discipline Core/ Elective Course	L	T	P	C
							4	0	0	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency	Expected Attainment (%)	Problem Solving, Critical	Communication Skills	Independent Thinking,	Leadership Qualities,	Digital Technology	Value Inculcation,	Environmental Action,	Entrepreneurial Risk	PSO-1	PSO-2
CLR-1	To provide foundations in Bio Statistics																	
CLR-2	To provide a strong foundations of organizing the data, diagrammatic and graphical presentation.																	
CLR-3	To apply Statistical techniques for biological problems.																	
CLR-4	To understand the characteristics of biological problems.																	
CLR-5	To provide the application of correlation and regression in biological sciences.																	

CLO	At the end of this course, learners will be able to:																	
CLO-1	To understand the statistical modeling and its limitations, and have skill in description, interpretation and exploratory analysis of data by graphical and other means;	✓	✓	-	-	2	85	75	3	-	-	-	-	-	-	-	-	-
CLO-2	To calculate and apply measures of central tendency - grouped and ungrouped data cases.	✓	✓	✓	-	2	85	75	3	-	-	-	-	-	-	-	-	-
CLO-3	To understand and apply measures of dispersion - grouped and ungrouped data cases.	✓	✓	✓	✓	3	85	75	3	-	-	-	3	-	-	-	-	-
CLO-4	Find the relationship between two or more variables using correlation and regression.	✓	✓	✓	✓	3	85	75	3	3	-	-	-	-	-	-	3	3
CLO-5	Perform Test of Hypothesis for small sample. Learn non-parametric test such as the Chi-Square test for Independence and Goodness of Fit.	✓	✓	✓	✓	3	85	75	3	3	-	-	3	-	-	3	3	3

Title & Content	Introduction to Operations Research	Linear Programming	Transportation & Assignment Problems	Sequencing Problems	Game Theory
Duration (hour)	12	12	12	12	12
SLO-1	Nature and scope of statistical methods Definition of statistics Nature and scope of Statistical methods- Definition of Statistics-Numerical Data	Measures of Central tendency – Definitions-functions-characteristics of average	Measures of Dispersion - Range – Individual, Discrete series and Continuous series	Correlation Analysis: Correlation - Definition and uses Types of correlation	Testing of Hypotheses -Testing Procedures
SLO-2	Nature of statistics	Arithmetic mean Individual series	Quartile Deviation - Individual and Discrete series	Methods for Finding Correlation Coefficient, Properties of correlation coefficient	Definition of test statistic t and its uses- t-test-Small Sample tests

SLO-3	Importance of Statistics – Function of Statistics	Arithmetic mean Discrete series	Quartile Deviation - Continuous series	Karl Pearson's Correlation Co-efficient - **Spearman's Rank Correlation Coefficientwith non-repeated Ranks**	**t-test** **- Test for Single Mean**
SLO-4	Limitations - **Distrust of Statistics**	Arithmetic mean Continuous series	Mean Deviation about Mean – Individual Series- Discrete series- Continuous series	**Spearman's Rank Correlation Coefficientwith repeated Ranks**	**t-test** **- Test for two sample Means**
SLO-5	Classification-Types of classification and its good Characteristics	Arithmetic mean Cumulative series	Standard Deviation – Individual and Discrete Series	Spearman's Rank Correlation Co-efficient	**t-test** **- t Test Statistic, when sample standard deviations are not known, but Population Standard Deviations are known**
SLO-6	Tabulation-Types of Tabulation – Parts of Tabulation - **Components of Good Table - Rules of construction of the table.**	Arithmetic mean Meritsand Demerits	Standard Deviation-Continuous Series	**Problems on finding the best pair of judgments**	Chi-Square distribution **- Definition and its Uses-Testing procedure**
SLO-7	**Components of Good Table Rules of construction of the table.-Difference between classification and tabulation.**	Median Individual series -- Discrete series- Continuous series	Standard Deviation-Continuous Series	**Bivariate Distribution**	**Test based on Goodness of fit-Testing the Independence of Attributes using** Chi-Square
SLO-8	Diagrammatic representation of various types of statistical data : **Bar Diagram**	Median Merits and Demerits	Coefficient of Variation	**Regression Analysis: Regression - Definition and Uses - Regression Coefficients- Regression Equations- Types of Regression Equations**	**F-test** **- Test Statistic of F-test-**
SLO-9	**Types of Bar diagram - One dimensional Diagrams**	Mode Individual series -- Discrete series- Continuous series Merits and Demerits	Graphical solution of Dispersion Lorenz curve	**Regression Equation of X on Y and Regression Equation of Y on X**	**Uses and testing Procedures**
SLO-10	**Two dimensional Diagrams-Histogram-pie chart**	**Empirical Relation**	Graphical solution of Dispersion Lorenz	**Relationship between Correlation and Regression Coefficients**	Testing the equality of variance using F distribution
SLO-11	Frequency Polygon - **Frequency Curve-** Less than O gives-more than O gives	Graphical solution of Median	Skewness- Bowley's coefficient of Skewness	- **Problems on the Relationship between the Coefficients**	**Analysis of Variance – Definition and Uses**
SLO-12	**Lorenz Curve**	Graphical solution of Mode	Concept of Kurtosis	- **Finding the corrected Correlation Coefficient values by correcting the wrongly entered inputs**	**ANOVA - One Way Classification**
Assessment	Continuous Learning Assessment 1		Continuous Learning Assessment - 2		
	Continuous Learning Assessment - 3				

Resources			
1	Pillai, R.S.N, Bagavathi, V. (2009),Statistics,Theory and Practice,7th Edition,S.ChandLtd,NewDelhi.	3	Gupta, S.P. (2012), Statistical Methods, 4th Edition, Sultan Chand & Sons, New Delhi.
2	Khan and Khanum, (2008), Fundamentals of Bio Statistics, 3rd Edition, Ukaaz Publications, Hyderabad.	4	Ken Black, (2013), Business Statistics for Contemporary Decision Making, 7th Edition, John Wiley Publications

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	-	15	-	10	-	10	-	15	-
2	Understand	15	-	15	-	10	-	10	-	15	-
3	Apply	20	-	25	-	25	-	25	-	25	-
4	Analyze	20	-	25	-	25	-	25	-	25	-
5	Evaluate	15	-	10	-	15	-	15	-	10	-
6	Create	15	-	10	-	15	-	15	-	10	-
Total (%)		100		100		100		100		100	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. D. Arivudai nambi, Anna University, Chennai	1	Dr.N.Viswanathan, , Presidency college , Chennai	1	Dr.S.Lakshmi Priya, SRMIST
				2	Dr.J.Madhumitha,SRMIST

Course Code	UCS24P01L	Course Title	Internship - 1	Category	P	Project Work/Internship	L	T	P	C
							0	0	0	1

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

Course Rationale (CLR)	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Demonstrate skills learnt in the real time environment.	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PLO-9	PLO-10
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 insight of an industry and organization/company	✓	✓	-	-	2	85	75	3	2	1	3	3	-	3	2	3	3
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	-	2	85	75	2	1	1	3	2	-	2	1	3	3
CLO-3	To make professional connections and enhance networking	✓	✓	✓	✓	3	85	75	2	3	3	3	2	3	3	1	3	3
CLO-4	To get experience in a field to allow the student to make a career transition	✓	✓	✓	✓	3	85	75	2	3	2	3	2	-	3	2	3	3
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	3	85	75	1	2	2	3	3	-	2	2	3	3

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.

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

SEMESTER - IV

Course Code	USA24401J	Course Title	Python Programming	Category	C	Core	L	T	P	C
							3	0	3	4

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

Course Rationale (CLR)	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Understand the basic concepts and features of Python Programming	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning,	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community	Entrepreneurial Risk Taking	PLO-9	PLO-10
CLR-2	Use basic flow control, including for loops and conditionals and function and string																	
CLR-3	Obtain Basic Knowledge about The List And Dictionaries																	
CLR-4	Understand the Designing application withClasses																	
CLR-5	Gain knowledge about the Exceptions And Creating the GUI Application																	
Course Learning Outcomes (CLO)	At the end of this course, learners will be able to:																	
CLO-1	Write, Test and Debug Python Programs	✓	✓	-	-	2	85	75	3	3	3	1	2	3	-	2	2	3
CLO-2	Implement Conditionals and Loops for Python Programs	✓	✓	✓	-	2	85	75	3	3	2	2	2	3	-	1	2	1
CLO-3	Use functions and represent Compound data using Lists, Tuples and Dictionaries	✓	✓	✓	✓	3	85	75	3	3	3	1	3	3	-	2	1	2
CLO-4	Read and write data from & to files in Python and develop Application using oops concepts	✓	✓	✓	✓	3	85	75	3	3	3	3	3	3	-	2	3	3
CLO-5	Identify Exceptions And Creating the GUI Application	✓	✓	✓	✓	3	85	75	3	3	3	2	3	3	-	3	3	3

Title & Content	Introduction to Python Programming	Functions and String	List and Dictionaries	Designing with Classes	Exceptions and Creating the GUI
Duration (hour)	18	18	18	18	18
SLO-1	Introduction: The need of Python Programming Language, History and features of Python Programming	Functions: Function Calls, Type Conversion Functions Math Functions.	IntroductiontoLists- Listliterals, Basiclistoperators- ReplacinganElementinaList	Introductiontoclasses, ObjectsandClasses, Example program forclass	Exception Basics Exception Handler, User-Defined Exceptions, Default Exception Handler
SLO-2	The first Python program, Running and Debugging Python program.	Composition, Adding New Functions. Definitions and Uses, Flow of Execution	ExampleprogramtoReplacean ElementinaList. ListMethodsforInsertingElements	Do strings- Method Definitions The init Method	Exception Coding Details Exception objects. Built-in-Exception Categories.
SLO-3	Syntax Errors, Runtime Errors and Semantic Errors, Introducing python object types	Parameters and Arguments, Variables and Parameters are Local, Functions and Void Functions	ProgramtoListMethodsfor InsertingElements, ListMethodsforRemoving Elements.	Instance Variables, The str Method	Creating the GUI Form and Adding Widgets Button, Canvas, Check button Entry, Frame, Label, List box.
SLO-4-6	**Lab 1: Write a Python code to display systeminformationusingpywhois.**	**Lab 4: Write a Python code to implement asimplecalculator.**	**Lab 7: Implement Transpose a Matrix Program to List Methods for Inserting Elements**	**Lab 10: Programusingclassesand methods.**	**Lab 13: Crate GUI based Application using python**
SLO-7	Numbers and String, List and types, Dictionaries- Mapping Operations- Tuples.	Importing with from, Return Values, Composition- Boolean Functions	Method for SearchingaList and SortingaList.	Accessor- Mutators The Lifetime of Objects, RulesforDefiningaSimpleClass	Crating Menu and Menu button, Message, Radio button, Scale, Scrollbar, text, Top-level
SLO-8	Variables and Variable Names rules, Expressions and Keywords, Type conversion.	Recursion - Checking Types, String: String Literals.	Mutator Methods Aliasing- Aliasing side effects	RationalNumberArithmeticand OperatorOverloading	TkMessagebox. Handling Standard attributes Properties of Widgets
SLO-9	Operators and Operands-Order of Operations.	String Indexing and Slicing, String Methods	Equality:ObjectIdentity,	ComparisonMethods, EqualityandtheeqMethod	Spinbox, PanedWindow, LabelFrame
SLO-10-12	**Lab 2: Write a python program to implement Magic 8Ball is a toy used for fortune-tellingorseekingadvice.**	**Lab 5: Write a program to Find the Factorial of a given Number, Convert Decimal to Binary, Octal and**	**Lab 8: Write a program usingaListtoFind the Median of a Set of NumbersProgram using sorting andsearching**	**Lab 11: Write a PythonProgramforOperatoroverloading.**	**Lab 14: Designing GUI applications with proper Layout Management features.**

		Hexadecimal.			
SLO-13	Conditional Statements And Looping Statements	Testing for a Substring with in Operator, Program using substring	Tuples, Creationofseveraltuples	FunctionsasFirst-ClassData Objects, Mapping Methods.	Layout Management
SLO-14	Working of if Statement If, if-else, nested if –else statements.	String formatting Expression	Dictionaries Dictionary Literals	Filtering, Reducing function	InputofObjectsandthetry-exceptStatement
SLO-15	Demonstration of programusingwhile – do loop and do while loop	String formatting method calls. Example Program for slicing substrings	AddingKeysandReplacing Values. Accessing Values Removing Keys Traversing a Dictionary	UsinglambdatoCreateAnonymousFunctions. Creating Jump Tables	Designing GUI using different appearances of widgets -Storage of Objects.
SLO-16-18	**Lab 3: i. Write a program to checkwhether a number is prime or not, ii. Write a PythonProgramtoGenerateaRandom Number**	**Lab 6: Write a Programto read and write textand numbers.**	**Lab 9: Write a Programto Adding Keys and Replacing Values python programming**	**Lab 12: Write the codefor a filtering that generates alist of the positive numbers in alistnamednumbers.Youshoulduse a lambda to create theauxiliaryfunction.**	**Lab 15: Write a Program usingpolymorphism,abstractclasses .**

Resources			
1	Mark Lutz, Learning Python, O'Reilly Media, 2009	2	KennethA.LambertFundamentals of Python: First Programs, Course Technology, Cengage Learning,2012

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

Strategies					
Technology	✓	Pedagogy / Andragogy	✓	Sustainable Development	✓
Simulations	✓	Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools		Group Discussion	✓	Quality Education	✓
Learning Management System		Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathinamani P, Co-Founder/COO ,Datayaan Solutions Pvt. Ltd. Chennai, mani@datayaan.com	1	Dr. Neelanarayanan, Professor, School of Computer Science and Engineering, VIT Chennai,neelanarayanan.v@vit.ac.in	1	Dr. D.Elangovann, elangovd@srmist.edu.in

Course Code	UMS24D01T	Course Title	Resource Management Techniques	Category	D	Discipline Core/ Elective Course	L	T	P	C
							4	0	0	4

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

CLR	The purpose of learning this course is to:
CLR-1	To provide foundations in Operations Research
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

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes									
		1 Conceive	2 Design	3 Implement	4 Operate	1 Level of Thinking	2 Expected Proficiency	3 Expected Attainment (%)	1 Problem Solving, Critical	2 Communication Skills	3 Independent Thinking,	4 Leadership Qualities,	5 Digital Technology	6 Value Inculcation,	7 Environmental Action,	8 Entrepreneurial Risk	9 PSO-1	10 PSO-2
CLO-1	To recognize the scope and models of Operations research methods for decision making process.	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	To apply Operations research techniques for solving real life problems	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	To know optimization through various transportation and assignment problems	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	To schedule jobs through machines using the prescribed algorithm	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	To calculate saddle point, strategy and value of the game by various methods	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

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

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

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	-	15	-	10	-	10	-	15	-
2	Understand	15	-	15	-	10	-	10	-	15	-
3	Apply	20	-	25	-	25	-	25	-	25	-
4	Analyze	20	-	25	-	25	-	25	-	25	-
5	Evaluate	15	-	10	-	15	-	15	-	10	-
6	Create	15	-	10	-	15	-	15	-	10	-
Total (%)		100		100		100		100		100	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. D. Arivudai nambi, Anna University, Chennai	1	Dr.N.Viswanathan, , Presidency college , Chennai	1	Dr.S.Saravanakumar, SRM IST, KTR, saravans14@srmist.edu.in
				2	Dr.S.Poongodisathiya, SRM IST, KTR, poongods@srmist.edu.in

Course Code	UMS24D02T	Course Title	Numerical Methods	Category	C	Core	L	T	P	C
							4	0	0	4

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

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

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes									
		1 Conceive	2 Design	3 Implement	4 Operate	1 Level of Thinking	2 Expected Proficiency (%)	3 Expected Attainment (%)	1 Problem Solving, Critical Thinking, Creativity	2 Communication Skills, Collaborating Skills	3 Independent Thinking, Analytical Reasoning, Learning to	4 Leadership Qualities, Professionalism, Autonomy,	5 Digital Technology Skills	6 Value Inculcation, Multicultural inclusivity	7 Environmental Action, Community Engagement	8 Entrepreneurial Risk Taking	9 PSO-1	10 PSO-2
CLO-1	Gain knowledge about Bisection, Regulafalsi Newton's method	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Appreciate the concepts of simultaneous equations	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Understand the basic ideas about Interpolation and extrapolation	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Acquire the knowledge on Numerical solutions of Ordinary differential equations of first and second order	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
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	75	3	3	2	3	3	3	-	3	3	3

Title & Content	Algebraic Equations	Numerical solution	Finite difference operator	Numerical solutions ODE	Euler's method
Duration (hour)	12	12	12	12	12
SLO-1	Basic concepts of the algebraic	Numerical solution of	Finite difference operator -	Numerical differentiation -	Numerical solution of ordinary

	equation	simultaneous equations - solution of simultaneous linear algebraic equations	introduction	Introduction - Newton's forward difference formula to get the derivative	differential equation-**Point wise methods**
SLO-2	Basic concepts of the transcendental equations - Finding of the range of the given equation	Gauss elimination method-Di**rect method explanation - Problems solved based on**Gauss elimination method	**Forward and Backward difference operator -** Relation between the operators - **Relation between d and delta**	Newton's backward difference formula to get the derivative- First derivative **using** Stirling's formula	Solution by Taylor series method-Taylor series method for simultaneous first order differential equations
SLO-3 &4	Bisection method explained - Solving Bisection method based problems with two decimal places	Gauss elimination method with unique solution-Gauss elimination method with negative roots-Computation of the inverse of a matrix using Gauss elimination method- More problems solved by this method	Newton-Gregory forward interpolation definition - Newton-Gregory forward difference table explanation	**Problems solved based on** First derivative Stirling's formula - **Problems solved based on** second derivative Stirling's formula	Taylor series method for simultaneous second order differential equations - **Problems solved based on** Taylor series method
SLO-5	Bisection method based problems upto three decimal places	Jacobi method of iteration (Gauss-Jacobi Method) - Difference between the above methods	Newton-Gregory forward interpolation concept - Expression of any value y in terms of $y_n$and the corresponding backward differences of y_n	Numerical integration basic concept - **A general quadrature formula for equidistant ordinates-**	Euler's method - **Improved euler's method-Modified euler's method**
SLO-6	Bisection method based problems upto four decimal places-problems solved from these concepts	Iterative methods Jacobi method of iteration (Gauss-Jacobi Method) – basic problems	Newton-Gregory backward interpolation concept explanation - **Problems solved based on the above two concept**	Numerical integration using Trapezoidal rule- Trapezoidal rule formula given	**Problems solved based on Modified euler's method-Problems solved based on** Euler's method
SLO-7 & 8	Successive approximation method	Convergence condition for	Newton's divided difference	Geometrical interpretation of	**Problems solved based**

	- The condition for the convergence method- Order of convergence of an iterative method- problems solved from these concepts	Gauss-Jacobi Method-Gauss-Jacobi Method based problems up to two decimal places-	formula-**Problems solved based on** Newton's divided difference formula-Lagrange's interpolation formula for uneven intervals and its difference –problems based on these concepts	Trapezoidal rule - Truncation error in Trapezoidal rule - **Problems solved based on** Trapezoidal rule	**onImproved** Euler's method-Runge-Kutta method-second -order Runge-Kutta method-**Concept-based Simple Problems on** second -order Runge-Kutta method
SLO-9	Regular falsi method Introduction-Basic concepts of Regular falsi method-**Problems solved basedon**Regular falsi method by two decimal places	Gauss-Jacobi Method based problems up to three decimal places - Problems solved based on these concept	Lagrange's inverse interpolation formula for uneven intervals	Simpson's 1/3 rule –introduction - Difference between Trapezoidal rule Simpson's 1/3 rule-Truncation error in Simpson's 1/3 rule - **Problems solved based on**Trapezoidal rule and Simpson's 1/3 rule	Two decimal places based simple problems on second -order Runge-Kutta method - four decimal places based simple problems on second -order Runge-Kutta method
SLO-10	**Problems solved basedon**Regular falsi method by three decimal places - **Problems solved basedon**Regular falsi method by four decimal places - More problems based on Regular falsi method	Gauss Seidel iteration method- Introduction and formula explanation	**Problems solved based on the** Lagrange's inverse interpolation-**Problems solved based on the**Lagrange's inverse interpolation	Numerical integration using Simpson's 3/8 rule - Truncation error in Simpson's 3/8 rule	**Problems solved based on** second -order Runge-Kutta method
SLO-11	Newton-Raphson method – Introduction	Procedure and difference between the above two methods explanation	Lagrange's inverse interpolation formula for even intervals - explanation	Truncation error in Simpson's 3/8 rule	Runge-Kutta method of fourth order
SLO-12	Geometrical meaning of Newton-Raphson method-Criterian for the convergence in the above method and problems solved based on these concepts	Finding the solution by Gauss Seidel iteration method	**More Problems solved based on the**Lagrange's forward and inverse interpolation	**Problems solved based on**Simpson's 3/8rule- **Problems solved based on the above three methods**	Formula given for Runge-Kutta method of fourth order-**Problems solved based on fourth**-order Runge-Kutta method
Assessment	Continuous Learning Assessment - 1		Continuous Learning Assessment - 2		
	Continuous Learning Assessment - 3				

Resources			
1	Numerical methods, Dr.P. Kandasamy, Dr. K.Thilagavathy, Dr. K.Gunavathy, S Chand and Company Reprint 2020	2	Kandasamy P, Thilagavathy. K and G. Gunawathy, Numerical Methods, S.Chand& Sons, 3rd Revised Edition, 2013
3	Isaacson E. and Keller, H.B., "Analysis of Numerical Methods" Dover Publication, 1994	4	Philips G.M and Taylor P.J., "Theory and Applications of Numerical Analysis", Academic Press, 1996

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	-	15	-	10	-	10	-	15	-
2	Understand	15	-	15	-	10	-	10	-	15	-
3	Apply	20	-	25	-	25	-	25	-	25	-
4	Analyze	20	-	25	-	25	-	25	-	25	-
5	Evaluate	15	-	10	-	15	-	15	-	10	-
6	Create	15	-	10	-	15	-	15	-	10	-
Total (%)		100		100		100		100		100	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. D. Arivudai nambi, Anna University, Chennai	1	Dr.N.Viswanathan, , Presidency college , Chennai	1	Dr.S.Lakshmipriya, Assistant Professor, Department of mathematics & Statistics, FSH, SRM IST, Kattankulathur
				2	Dr.L.SIVAKAMI, Assistant Professor, Department of mathematics & Statistics, FSH, SRM IST, Kattankulathur

CourseCode	UEN24S01L	CourseTitle	Communication Skills	Category	A	Ability Enhancement Course	L	T	P	C
							0	0	4	2

CourseOfferingDepartment	English,FSH,KTR	Pre-requisiteCourses	Nil	Co-requisiteCourses	Nil	ProgressiveCourses	Nil	DataBook/Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
CLR-1	Bridge the theoretical language knowledge with practical communication skills, essential for academic and professional contexts.	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
CLR-2	focus on enhancing listening, speaking, reading, and writing skills, crucial for effective interaction and teamwork.																		
CLR-3	prepare students for employability by building competence in interviews, group discussions, and professional communication.																		
CLR-4	promote understanding and sensitivity towards linguistic and cultural diversity, key to thriving in a globalized world.																		
CLR-5	articulate ideas and emotions clearly, overcoming language barriers.																		
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	LevelofThinking	ExpectedProficiency(%)	ExpectedAttainment(%)	ProblemSolving,CriticalThinking,CreativitySolving	CommunicationSkills,CollaboratingSkills	IndependentThinking,AnalyticalReasoning,	LeadershipQualities,Professionalism,Autonomy,	DigitalTechnologySkills	ValueInculcation,MulticulturalInclusivity	EnvironmentalAction,CommunityEngagement	EntrepreneurialRiskTaking	PSO - 1	PSO - 2	
CLO-1	acquire basic proficiency in listening, speaking, reading, and writing, enabling effective interaction in everyday and academic scenarios.	□	□	-	-	2	85	75	3	-	-	1	3	3	-	2	2	1	
CLO-2	express ideas clearly using appropriate verbal cues and non-verbal signals in social, academic, and professional contexts.	□	□	□	-	2	85	75	3	-	1	2	3	3	-	1	2	1	
CLO-3	enhance their ability to comprehend, evaluate, and respond to diverse forms of written and spoken communication critically.	□	□	□	□	3	85	75	3	-	3	1	3	3	-	1	1	2	
CLO-4	produce well-organized written documents and oral presentations, showcasing logical thinking and clarity of expression.	□	□	□	□	3	85	75	3	-	2	3	2	3	-	2	3	3	
CLO-5	demonstrate awareness and sensitivity towards linguistic and cultural diversity, effectively navigating multicultural interactions.	□	□	□	□	3	85	75	3	3	2	3	2	3	-	3	3	3	

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	12	12	12	12	12
SLO-1	Introduction to Communication. Types of Communication- verbal and non-verbal communication	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	Introduction to appreciation of texts.
	Barriers of Communication dynamics of interpersonal communication, Interpret Cross-Cultural Differences in Non-Verbal	Reading Skills.(Barriers of reading skills and strategies of effective communication through reading)	Speaking Skills.(Barriers of speaking skills and strategies of effective communication through speaking)	Writing Skills.(Barriers of writing skills and strategies of effective communication through writing)	Encouraging the students to share a few of their favourite lines from any sources they have read or sharing a few lines from

	Communication Develop and Demonstrate Effective Non-Verbal Communication Skills	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:.	paditthadhil piditthadhu.
SLO-2	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.
	Equipping the listening skill of the learners Listening Skills.(Barriers of listening skills and strategies of effective communication through listening) Exploring Effective Ways of Listening.	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.
SLO-3	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- 4	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
SLO-5	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.
	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.	meachnaics of writing - assessed and evaluated.	Mathrubootham's humour and the language of code switching from Tamil to English and vice –versa.

SLO-6	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
	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.
SLO-7	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-8	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.
SLO-9	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.	Analyisng the text for regional relevance and National significance.
	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
SLO-10	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	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

			playing scattergories.		Mathrubootham.
	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.
SLO-11	Interested students can complete listening and reflecting the complete audio listening practice and speaking.	Cross check with misunderstanding if any and rectify- match the question and answers.	Spur of the moment speech.:	Selecting any news article and learning the writing style in it.	Talk about their favourite letter from the letters of Mathrubootham by recollecting the appreciation of the text according to their perception and understanding.
SLO-12	Group activities and games can be conducted to test the listening skills by responding to the speech given by other students	Passages for reading comprehension are to be given for practice that tests their reading skills.	Prepared speech : Giving a speaking task to the students to speak on their own choice	Students are given chances to write reports on various topics.	Enabling the students to share their appreciation of any of their favourite lines form the books they have read.

Resources			
1	Horizon-EnglishText Book –CompiledandEditedbytheFacultyofEnglishDepartement,FSH, SRMIST, 2023	5	TheArtofPublicSpeakingbyStephen E.Lucas-2019
2	TheCreativeWritingCoursebook:FortyAuthorsShareAdviceandExercisesforFictionand Poetry by Julia Bell and Paul Magrs- 2001	6	TalkLikeTED:The9Public-SpeakingSecretsoftheWorld's Top MindsbyCarmine Gallo – 2014
3	OnWriting:AMemoiroftheCraftbyStephenKing2000	7	The AnatomyofaBookReview:AGuide forCollege StudentsbyRonaldJ.Weber1994
4	The WritingLife:Writers onHowTheyThinkandWorkeditedbyMarieArana-2003	8	HowtoWriteaSimpleBookReview:It's easierthanyouthink!byAllysonR. Abbott2013

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

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✔	Good Health & Well Being	✔
Presentation Tools	✔	Group Discussion	✔	Quality Education	✔
Learning Management System	✔	Hands-on Practice	✔	Gender Equality	✔
		Debate	✔		
		Interactive Lecture	✔		
		Brainstorming	✔		

*The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences

Designers					
ProfessionalExperts		HigherInstitutionExperts		InternalExperts	
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		2	Dr.KSAntonysamyLoyolaCollegeChennai antonysamyks@loyolacollege.edu	2	Dr.Shanthichitra,Professor,Departmentof

Course Code	UCD24S03J	Course Title	Industry Oriented Employability and Leadership Skills	Category	S	Skill Enhancement Course	L	T	P	C
							1	0	2	2

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

Course Rationale (CLR)	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes										
CLR-1	Help students to develop essential skills to influence and motivate others	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PLO-9	PLO-10
CLR-2	Inculcate emotional and social intelligence and integrative thinking for effective leadership																	
CLR-3	Create and maintain an effective and motivated team to work for the society																	
CLR-4	Nurture a creative and entrepreneurial mindset																	
CLR-5	Make students understand the personal values and apply ethical principles in professional and social contexts																	
Course Learning Outcomes (CLO)	At the end of this course, learners will be able to:																	
CLO-1	Examine various leadership models and understand/assess their skills, strengths and abilities that affect their own leadership style and can create their leadership vision	✓	✓	-	-	2	85	80	3	2	3	2	-	-	2	3	-	-
CLO-2	Learn and master a set of practical skills such as time management, self-management, handling conflicts, team leadership	✓	✓	✓	-	3	85	80	2	2	1	2	2	1	2	3	-	-
CLO-3	Understand the basics of entrepreneurship and develop business plan	✓	✓	✓	✓	3	85	80	2	3	3	3	-	3	2	3	-	-
CLO-4	Apply the design thinking approach for leadership	✓	✓	✓	✓	3	85	80	-	3	2	-	2	2	1	1	-	-
CLO-5	Appreciate the importance of ethics and moral values for making of a balanced personality & be an integral human being	✓	✓	✓	✓	3	85	80	3	3	2	2	2	2	2	3	-	-

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	9	9	9	9	9
SLO-1	Leadership - definition & Qualities	Team building & dynamics	Management – definition & Manager traits	Innovative leadership – Concept of emotional and social intelligence	Entrepreneurship
SLO-2	Leadership – styles	Work delegation with activity	Work schedule with activity	Synthesis of human and Artificial intelligence	Successful Indian entrepreneurs – case study
SLO-3	Difference between leader and boss	Decision making with activity	Strategic planning	Design thinking	Ethics – definition & Corporate ethics
SLO-4	Case study (based on leadership styles)	Motivation & Motivation for results	Conflict management	Measuring and Sustaining innovation	Importance of ethics
SLO-5	Leadership in diverse organizational hierarchy , cultures and communications	Argumentation, Persuasion, Negotiation, Networking	Energy Management & Novel Ways to manage energy in work place – activity	Case study: Organizations with sustained innovation.	Essential elements of business ethics
SLO-6	Leading the organisation through stability and turbulence	Interpersonal communication	Workforce management	Key elements of design thinking	Creating a harmonious life with work-life balance
SLO-7	Understanding Leadership and its importance.	Budget planning	Time Management	How to transform challenges into opportunities	Ethics and Conduct : Ethical decision-making
SLO-8	Models of Leadership	Workflow optimization	Recruiting and Retaining Talent	How to develop human-centric solutions for creating socially good humans	Importance of ethical principles in professional and social contexts.
SLO-9	Basic Leadership Skills	Critical thinking and Multitasking	Conflict & Stress Management	Emerging trends in design thinking	Building ethical culture: promoting ethical behavior in organization.

Resources

1	Craig E Johnson, Meeting the ethical challenges of leadership, Sage publications, 2018	4	Alexander Osterwalder, Business Model Generation, Wiley, 2013
2	T V Rao, Managers who make a difference: Sharpening your management skill, Random House India, 2016	5	Deborah Tannen, Talking from nine to five: Women and men in the workplace, Harper Collins Publishers, 2010
3	Allan R Cohen, David L Bradford, Influence without authority, Wiley, 2018	6	Dr Carrie Picardi Leadership Essentials you always wanted to know Vibrant Publishers,2021

Assessment									
Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)							
		CLA – 1 (20 %)		CLA – 2 (20 %)		CLA – 3 (30 %)		CLA – 4 (30%)	
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	5	5	5	5	15	15	10	10
2	Understand	5	5	5	5	15	15	10	10
3	Apply	25	25	25	25	20	20	20	20
4	Analyze	25	25	25	25	20	20	20	20
5	Evaluate	20	20	20	20	15	15	20	20
6	Create	20	20	20	20	15	15	20	20
Total (%)		100	100	100	100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***Theevaluation canbedoneon theone or moreparametersthatinclude,(i)Seminars,(ii)Mini-Project,(iii)Case-Studies,(iv)MOOCCertification,(v)PublicationofArticle,(vi)Presentation ofResearch Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
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				2	Dr. Elamathiyan E, Assistant Professor, Department of Career Guidance, FSH, SRMIST, elamathe1@srmist.edu.in

Course Code	UMI24Y01L	Course Title	My India Project	Category	Y	Mandatory Courses	L	T	P	C
							0	0	0	0

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

(Assessment Method - Fully Internal)

Assessment Tools	Marks
Review I (Activities)	50
Review II (Project Report & Presentation)	50
Total	100

SEMESTER - V

Course Code	UCS24D01J	Course Title	Software Engineering	Category	D	Discipline Core / Elective course	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency	Expected Attainment	Problem Solving,	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology	Value Inculcation,	Environmental Action,	Entrepreneurial Risk	PSO-1	PSO-2
CLR-1	Familiarize the software life cycle models and software development process																	
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																	

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

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	18	18	18	18	18
SLO-1	The Evolving Role of Software Software Engineering Definition	Computer-Based Systems The System Engineering Hierarchy – System Modeling	Project Management Spectrum, Four P's	Principles of Testing Introduction-Testing Definition	Integration testing Top down Integration testing

SLO-2	Software Characteristics Software Applications and A Crisis	System Simulation Comparison of various Software Development	Role of People Process and the Project	Phases of software Error, Fault, Bug-Failure of the system –Comparison of the terms	Bottom up Integration testing Bi-Directional Integration
SLO-3	Software Myths Types of Myths, Software Engineering : Layered Technology	Business Process Engineering: An Overview Requirements Engineering process	The project Planning process Resources	Types of testing- Quality assurance, Quality Control	System Integration System Acceptance Testing Functional Testing
SLO 4-6	Laboratory1:Identifing Project Objective and Scope	Laboratory 4:Project Planning	Laboratory 7: Function Oriented Diagram	Laboratory 10:Test Case design for unit testing	Laboratory 13: Preparation of Timeline charts and Tracking the Scheduling
SLO-7	Software Process Software Process Models	Characteristics of Good Requirements Types of Requirements	Risk Managemenr Re active and Proactive Risk Strategies	Testing verification and validation White Box Testing	Non Functional testing Functional Vs Non Functional Testing
SLO-8	Linear Sequential Model Advantages And Disadvantages	Requirements Elicitation Requirements Analysis and Negotiation	Software Risks, Risk Identification and Risk Projection	Techniques of White Box Testing Black box testing	System Testing Design and Architectural Verification
SLO-9	Prototyping Model Advantages And Disadvantages Rapid Application Development Model	Requirement Documentation Requirement Specification and Analysis, Software Requirement Specification and System Requirement Specifications Drawing E-R Diagram for any project	Risk Refinement, Risk Mitigation Risk Monitoring and Management	Techniques of Black box testing Static Testing, Dynamic Testing	Deployment Testing Beta TestingCertification, Standards
SLO 10-12	Laboratory 2:Selection of Suitable software process Model of the suggested system	Laboratory 5:Performing Various Requirement Analysis	Laboratory 8:User's View Analysis	Laboratory 11:Test Case design for Integration testing	Laboratory 14: Estimation of Effort and Risk Identification
SLO-13	Evolutionary Process Models Incremental Model	Characteristics of Good SRS Document Requirement Management	Quality Concepts SQA Activities	Challenges in white box testing Black Box Testing	Testing for Compliance Scalability Testing
SLO-14	Spiral Model, WIN WIN Model Advantages and Disadvantages	Software Prototyping Selecting the prototyping approach	Software Reviews and FTR Statistical Quality Assurance	Techniques of Black Box Testing, Structural testing	Reliability testing Stress testing

SLO-15	Concurrent Development Model Component Based Development, Comparison of Process models	Specification Principles, Representation Specification Review,	The software Configuration Management SCM Repository	Static testing Verification & Validation Techniques, Cyclomatic complexity, Control flow graph	Acceptance Testing Acceptance Criteria
SLO 16-18	Laboratory 3:Problem Statement Preparation	Laboratory 6:Develop Software Requirement Specification Sheet (SRS)	Laboratory 9:Structure view diagram	Laboratory12:Perforing Testing and Debugging for a sample code	Laboratory 15: Software Quality Assurance Components.

Resources			
1	BehrouzA.Forouzan,(2010), ”Data Communications and Networking”, 5th Edition	5	ToddLammle,(2011), “CCNA Study Guide”, Seventh Edition
2	WilliamStallings,(2010), ”Data and Computer Communications”, Ninth Edition	6	https://www.netacad.com/courses/packet-tracer
3	AS Tanenbaum, DJ Wetherall, Computer Networks, 5th Ed., Prentice-Hall, 2010	7	JF Kurose, KW Ross, Computer Networking: A Top-Down Approach, 5th Ed., Addison-Wesley, 2009.
4	Peterson and Davie, Computer Networks: A Systems Approachi, Larry Peterson and Bruce Davie,2019	8	James D. McCabe ,Network Analysis, Architecture, and Design (The Morgan Kaufmann Series in Networking) 3rd Edition,Morgan Kaufmann,2007.

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT chennai	1	Dr. P. Yogalakshmi, Assistant Professor, FSH, SRMIST

Course Code	UCS24D02J	Course Title	Computer Networks and Data Communication	Category		Discipline Core/ Elective Course	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:	Depth			
		1	2	3	4
CLR-1	Understand the evolution of computer networks using the layered network architecture				
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				

CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Communication Skills, Collaborating Skills	Problem Solving, Critical	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology Skills	Value Inculcation,	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Understand the need for Network and various layers of OSI and TCP/IP reference model	✓	✓	-	-	2	85	75	7	1	-	-	-	3	3	-	2	2	3
CLO-2	Explain various Data Communications media	✓	✓	✓	-	2	85	75		1	2	3	-	3	3	-	1	2	3
CLO-3	Identify the different types of network topologies and Switching methods	✓	✓	✓	✓	3	85	75		1	3	3	-	3	3	-	1	1	3
CLO-4	Identify the different types of network devices and their functions within a network	✓	✓	✓	✓	3	85	75		1	3	3	-	3	3	-	2	3	3
CLO-5	Analyze and Interpret various Network and Transport Layer protocols.	✓	✓	✓	✓	3	85	75		1	3	3	-	3	3	-	3	3	3

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	18	18	18	18	18
SLO-1	Evolution of Computer Networks, The Internet	Data Link Layer , Functionalities	Network Layer, Functionalities	Transport Layer, Functionalities	Physical Layer – Functionalities, Transmission Terminology
SLO-2	The Internet today, Computer Network Architecture	MAC Addressing, Framing	Network Addressing, Classfull Addressing	Port Numnber, TCP	Frequency, Spectrum, And Bandwidth, Data and Signals

SLO-3	Categories of Networks (LAM, WAN,MAN),A data Communications Model-Networks	Data Link Control, Line Discipline	Routers and Their Functions, Routing Metrics	TCP Functionalities, UDP	Analog And Digital Transmission, Transmission Impairments
SLO 4 - 6	**Practice: Basic Network Commands and their functionalities**	**Practice: Construct N/W using bus topology, Star tolpology**	**Practice: Multi-routing connection with static router**	**Practice: Implementing a simple application using UCP**	**Practice: : Analyse the Working of a DNS**
SLO-7	Protocols, Elements of Protocol	Flow Control – Stop and Wait, Sliding Window	Routing Table, Routing Algorithms	UDP Functionalities, TCP Vs UDP	Analog to Digital and Digital to Analog Conversion
SLO-8	Network Topologies, Transmission Modes in a Network	Error Control – Stop and Wait, Go back N	Distance Vector Routing, Distance Vector Routing with an Example	Application Layer Functionalities, HTTP	Noise in transmission Attenuation,Twisted Pair-Physical Description- Applications-Unshielded And Shielded Twisted Pair
SLO-9	N/W Layered Architecture, OSI Reference Model	Error Control –Selective Reject	Link State Routing	: HTTP Messages	Coaxial Cable and Optical Fiber Physical Description-Applications-Transmission Characteristics
SLO 10-12	**Practice: Introduction to CISCO Packet Tracer (CPT)**	**Practice: Construct N/W using Ring topology, Mesh tolpology**	**Practice: Connecting 2 Lans Using Dynamic Routing**	**Practice: Analying the Working of RIP**	**Practice: Implementing a simple web server**
SLO-13	Functions of the Various Layers of OSI reference model , TCP/IP Reference Model	Errors in Transmission – Types	Switching in N/W, Electronic Mail, Circuit-Switching	DNS, Electronic mail	Compare the various features of Guided Transmission media, Radio Waves -Applications-Transmission Characteristics
SLO-14	Functionalities of the Various layers of the TCP/IP reference model Comparison of the OSI and TCP/IP Reference Models	Error Detection – Parity, Checksum Error Detection - CRC	Circuit-Switching Advantages Packet-Switching Principles	Basic Electronic Mail Operation SMTP & MIME	Micro Waves Applications-Transmission Characteristics Infrared Waves Charecteristics-Application
SLO-15	Comparison of Layers Comparison of the services	Error Correction -Types Hamming Code	Advantage of Packet Switching Comapare Circuit and Packet Switching	SMTP Overview-Connection Setup- Mail Transfer	Satillite Communication Compare Feature of Guided Vs UnGuided Transmission Media
SLO 16-18	**Practice: Build a Peer to Peer N/W using Hub and Switch. Analyse the difference between the working of a Hub and a Switch**	**Practice:Connecting two lans using router with static Router**	**Practice:Implementing a simple application using TCP**	**Practice:ARP simulation in CPT**	**Practice:Emulate Working of a complete N/W using CPT**

Resources			
1	BehrouzA.Forouzan,(2010), "Data Communications and Networking", 5th Edition	5	ToddLammle,(2011), "CCNA Study Guide", Seventh Edition
2	WilliamStallings,(2010), "Data and Computer Communications", Ninth Edition	6	https://www.netacad.com/courses/packet-tracer
3	AS Tanenbaum, DJ Wetherall, Computer Networks, 5th Ed., Prentice-Hall, 2010	7	JF Kurose, KW Ross, Computer Networking: A Top-Down Approach, 5th Ed., Addison-Wesley, 2009.
4	Peterson and Davie, Computer Networks: A Systems Approachi, Larry Peterson and Bruce Davie,2019	8	James D. McCabe ,Network Analysis, Architecture, and Design (The Morgan Kaufmann Series in Networking) 3rd Edition,Morgan Kaufmann,2007.

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT chennai	1	Dr. B. Mahalakshmi, Assistant Professor, FSH, SRMIST

Course Code	UCS24D03J	Course Title	Object Oriented Analysis and Design	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	7	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency	Expected Attainment	Communication Skills,	Problem Solving,	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology	Value Inculcation,	Environmental Action,	Entrepreneurial Risk	PSO-1	PSO-2
CLR-1	Understanding Object Basics, Classes and Objects, Inheritance																		
CLR-2	How software objects are altered to build software systems that are more robust																		
CLR-3	Gaining enough competence in object-oriented analysis and design (OOAD) to tackle a Complete object oriented project																		
CLR-4	Understanding the issues and options in reuse																		
CLR-5	Using UML, a common language for talking about requirements, designs, and component Interfaces																		
CLO	At the end of this course, learners will be able to:																		
CLO-1	Student will be able to demonstrate the importance of modelling in the softwaredevelopment life cycle	✓	✓	-	-	2	85	75		3	-	-	1	-	3	-	2	2	1
CLO-2	Become familiar with the Unified modelling Language	✓	✓	✓	-	2	85	75		3	-	-	2	-	3	-	2	2	1
CLO-3	Understand the object-oriented approach to analyzing and designing systems andsoftware solutions	✓	✓	✓	✓	3	85	75		3	1	3	1	3	3	-	1	1	2
CLO-4	Employ the Unified modelling Language notations to create effective and efficient	✓	✓	✓	✓	3	85	75		3	3	2	3	3	3	-	2	3	3
CLO-5	Understand the difference between writing programs for the software and doing analysisand design	✓	✓	✓	✓	3	85	75		3	3	2	3	3	3	-	3	3	3

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	18	18	18	18	18
SLO-1	Introduction to Object Oriented development Concepts	Reification, Constraints	Special Constructs for Activity Models	Breaking a System into Subsystems - Identifying Concurrency	Advanced OOAD Concepts- Refactoring and code optimization.

SLO-2	,Evidence for Usefulness of Object Oriented development	Derived Data, Packages	Process Overview: Development Stages	Allocation of Subsystems - Management of Data Storage	Design for extensibility and scalability.
SLO-3	Modeling Concepts: Modeling, Abstraction	State Modeling: Events – States – Transitions & Conditions	Development Life Cycle	Handling Global Resources	Principles of domain-driven design (DDD).
SLO 4 - 6	The Three Models	State diagrams - State Diagram Behavior	System Conception: Devising a System Concept	Choosing a Software Control Strategy	Service-oriented architecture (SOA) and microservices.
SLO-7	Overview of Unified Modeling Language and introduction to UML diagrams	Advanced State Modeling: Nested State Diagrams	Elaborating a Concept, Preparing a problem Statement	Handling Boundary Conditions, Setting Trade-off Priorities	Tools for OOAD- Introduction to tools for OOAD Rational Rose, StarUML, Enterprise Architect,
SLO-8	Class Modeling: Object and Class Concepts	Nested States	Domain Analysis: Overview of Analysis	Common Architectural Styles - Architecture of the ATM System	Use of integrated development environments (IDEs) in OOAD (Eclipse, IntelliJ IDEA, Version control tools (Git)
SLO-9	Laboratory 1: Develop an SRS document	Laboratory 3 : Create a Domain model for business activities	Laboratory 5: Design a state chart diagram for passport automation application	Laboratory 7 : Develop a usecase diagram for Bank ATM system	Laboratory9 : Develop a sequence diagram for Foreign Trading system
SLO 10- 12	Link and Association Concepts	Signal Generalization	Domain Class Model	Class Design: Bridging the Gap	Testing in OOAD- Unit testing and test-driven development (TDD).
SLO-13	Inheritance, Sample Class Model	Concurrency	Domain State Model, Domain Interaction Model	Realizing Use Cases	Integration testing in object-oriented systems
SLO-14	Navigation of Class Models	Sample State Model	Iterating the Analysis	Designing Algorithms - Recusing Downward – Refactoring	Automation testing tools and techniques

SLO-15	Advanced Class Modeling: Advanced Object & Class, Concepts,	Relation of Class & State Models, Interaction Modeling: Use Case Models, Sequence Models	Application Analysis: Application Interaction Model, Application Class Model, State Model	Design Optimization, Reification of Behavior,	Common design patterns and their application in software development.
SLO 16 - 18	Association Ends -N-ary Associations, Aggregation	Activity Models, Advanced Interaction Modeling: Use Case Relationships	Operations, System Design: Overview of System Design	Adjustment of Inheritance – Organizing Class Design	Anti-patterns and how to avoid them.

Resources			
1	OBJECT-ORIENTED ANALYSIS AND DESIGN With applications SECOND EDITION Grady Booch Rational Santa Clara, California, ADDISON-WESLEY	3	Object-OrientedModelingandDesignwithUML,JamesRumbaugh,2005
2.	Object-Oriented Analysis and Design , Ramnath, Sarnath, Dathan, Brahmi,2011		

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT chennai	1	Dr. S. Revathi, Assistant Professor, FSH, SRMIST

Course Code	UCS24D04J	Course Title	Machine Learning	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	7	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Communication Skills, Collaborating Skills	Problem Solving, Critical	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology Skills	Value Inculcation,	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	To provide basic concepts of machine learning																		
CLR-2	To provide deeper understanding of various tools and techniques for Machine learning Algorithms and outputs																		
CLR-3	Understand and Implement the major classification techniques																		
CLR-4	Understand and Implement the various Clustering Methods																		
CLR-5	Learn and Understand the other machine Learning Algorithms																		

CLO	At the end of this course, learners will be able to:																		
CLO-1	Understand the basics of machine learning	✓	✓	-	-	2	85	75		3	1	2	-	3	3	-	-	-	-
CLO-2	Learn and understand the tools and libraries used for machine learning	✓	✓	✓	-	2	85	75		3	1	2	-	3	3	-	-	-	-
CLO-3	Learn and understand the supervised learning models and classification in machine learning	✓	✓	✓	✓	3	85	75		3	1	2	-	3	3	-	-	-	-
CLO-4	Understand the unsupervised learning techniques and their utilization in machine learning	✓	✓	✓	✓	3	85	75		3	1	2	-	3	3	-	-	-	-
CLO-5	Study the other machine learning techniques and to appreciate their capability	✓	✓	✓	✓	3	85	75		3	1	2	-	3	3	-	-	-	-

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	18	18	18	18	18
SLO-1	Machine Learning: What and Why?	Principal Component Analysis(PCA) - Regularization	Linear Regression with multiple variables	Multi class classification	Random Forest
SLO-2	Types of Machine Learning	Machine learning python libraries	Logistic Regression	Case study on Multi class classification problem	Random Forest with scikit-learn
SLO-3	The Curse of dimensionality	training data – testing data – validation data	spam filtering with logistic regression	Evaluation matrix for multi class problem	Multivariate adaptive regression trees (MART

SLO 4-6	Practice: : Practice elementary mathematical operations and control statements	Practice: Creating Various types of plots /charts from various data source	Practice : Implementation of Linear regression with multiple regression	Practice:Implementation of Multi class classifier problem	practice : Implementation of Random Forest
SLO-7	Model Over fitting and under fitting	Ensemble learning:-Bagging, Boosting	Data Preprocessing methods	Unsupervised Vs. Supervised Machine learning	Introduction to Artificial Neural Networks
SLO-8	Bias and Variance tradeoff	Maximum likeliwood estimation (least squares)	Feature scaling , Feature Selection	Introduction to clustering	Perceptron Learning
SLO-9	Linear Algebra for machine learning	cross validation Features	Correlation matrix Introduction to classifiers	K nearest neighbor and K-Means clustering	Back propogation Algorithm
SLO 10-12	Practice:Operations on Matrices and Vectors	Practice:Create subplots and color plots	Practice: Implementation of Data preprocessing methods , Correlation matrix	Practice:: Implementation of K-Mean Clustering	Practice: Implementation of ANN algorithm
SLO-13	Gradient Descent , Boot Strapping	Statistical methods and probability for machine learning	Naïve Baiyes Method Baiysean Classifier	Decision tree representation	Reinforcement Learning
SLO-14	Linear Discrimant Analysis	Performance metrics	Support Vector Machine classifier	Classification and regression trees (CART	Ensembled models
SLO-15	Parametric vs. non-parametric models	Linear regression with one variable	SVM classification model Example	Issues in decision tree	Case study for ensemble models
SLO 16-18	Practice : Vectorized operation on simple matrix operations	Practice:Implement Linear regression problem	Practice:Implementation of SVM and Naïve Bayes classifier methods.	Practice:Implementation of decision tree	Practice: Implementation of ensembled models

Resources

1	Kevin P. Murphy, “Machine Learning: A Probabilistic Perspective”, MIT Press, 2012	4	EthemAlpaydin, “Introduction to Machine Learning”, Prentice Hall of India, 2005
2	Tom Mitchell, "Machine Learning", McGraw-Hill, 1997.	5	Sebastian Raschka, VahidMirjilili,”Python Machine Learning and deep learning”, 2nd edition, kindle book, 2018
3	Carol Quadros,”Machine Learning with python, scikit-learn and Tensorflow”, Packet Publishing, 2018.	6	Gavin Hackeling,” Machine Learning with scikit-learn”, Packet publishing, O’Reily, 2018.

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts	Higher Institution Experts	Internal Experts
1 Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1 Dr. Neela Narayanan V, Professor, VIT chennai	1 Dr. E.Aarthi, Assistant Professor, FSH, SRMIST

Course Code	UES24V01T	Course Title	Environmental Studies	Category	V	Value Added Course	L	T	P	C
							2	0	0	2

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

CLR	The purpose of learning this course is to:
CLR-1	To create awareness on environment and renewable and non-renewable resources
CLR-2	To understand about ecosystem and biodiversity
CLR-3	To understand the natural and anthropogenic impact of the environmental pollution
CLR-4	To create awareness on different environmental problems
CLR-5	To create awareness on various environment protection acts and the impact of human population on environment

CLO	At the end of this course, learners will be able to:	Depth				Attainment			PLO										
		1 Conceive	2 Design	3 Implement	4 Operate	1 Level of Thinking	2 Expected Proficiency (%)	3 Expected Attainment (%)	1 PLO 1	2 PLO 2	3 PLO 3	4 PLO 4	5 PLO 5	6 PLO 6	7 PLO 7	8 PLO 8	9 PSO 1	10 PSO 2
CLO-1	Applying knowledge on renewable and non-renewable resources	✓	✓	-	-	1	75	70		-	1	-	-	2	1	-	-	-
CLO-2	Understanding about ecosystem and biodiversity	✓	✓	-	-	1	80	75	3	2	-	1	-	-	2	-	-	-
CLO-3	Gathering knowledge on impact of environmental pollution	-	✓	✓	-	2	80	75	-	3	2	-	3	-	3	-	-	-
CLO-4	Understanding of different environmental problems	✓	-	✓	-	3	80	75	-	2	3	-	-	3	2	-	-	-
CLO-5	Having knowledge on various environment protection acts and the impact of human population on environment problems	✓	-	✓	✓	3	80	75	-	-	3	-	3	2	1	-	-	-

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO – 4	CLO - 5
	6	6	6	6	6
SLO-1	Multidisciplinary nature of environmental studies, definition, scope and importance of environmental studies	Energy flow in the ecosystem, energy flow in the ecosystem, ecological succession	Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity	Disaster management- floods, earthquakes, cyclones, landslides	Air, water, wildlife - environment protection act
SLO-2	Need for public awareness. institutions in environment, people in environment	Food chains, food webs and ecological pyramids	Environmental pollution-definition, causes, effects and control measures of air, water, and soil pollution	Social issues and the environment: From unsustainable to sustainable development	Forest conservation act; issues involved in enforcement of environmental legislation, public awareness
SLO-3	Introduction to natural resources-renewable and nonrenewable resources - associated problems	Ecosystem, introduction, types, characteristic features, structure and functions: forest, grassland and desert ecosystems	Causes, effects and control measures of marine, and noise	Urban problems related to energy, waterconservation, rain water harvesting, watershed	Human population and the environment:population growth, variation among nations

SLO-4	Forest, water, mineral, food resources	Aquatic ecosystems; biodiversity and its conservation-genetic, species and ecosystem diversity	Causes, effects and control measures of thermal pollution and nuclear hazards	Environmental ethics: issues and possible solutions, climate change & global warming	Population explosion – family welfare programme, human rights, value education
SLO-5	Energy and land resources; role of an individual in conservation of natural resources; equitable use of resources for sustainable lifestyles	Biogeographical classification of India, value of biodiversity, biodiversity at global, national and local levels	Role of individuals in pollution prevention	Acid rain & ozone layer depletion	HIV/AIDS, women and child welfare
SLO-6	Concept of an ecosystem, structure and functions of an ecosystem, producers, consumers and decomposers	India as a mega diversity nation, hot-spots of biodiversity, threats to biodiversity: habitat loss, poaching of wildlife man-wildlife conflicts, endangered and endemic species of India	Solid waste management Causes, effects and control measures of urban and industrial waste	Nuclear accidents and nuclear holocaust; wasteland reclamation	Role of information technology in environment and human health

Resources

1	Bharucha, E (2013).Textbook of environmental studies for undergraduate courses(2nd ed.).Orient BlackSwan.	3	Jeyalakshmi, R. (2014).Text book of environmental studies, Devi publications
2	Basu,M., & Savarimuthu, X., (2017), SJ Fundamentals of environmental studies.Cambridge University Press, Cambridge, United Kingdom	4	Bharucha, E (2002).The Biodiversity of India, Mapin Publishing Pvt. Ltd.

Assessment								Strategies					
	Bloom's Level of Thinking	Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 %weightage)		Technology		Pedagogy / Andragogy		Sustainable Development	
		CLA – 1	CLA– 2	CLA– 3	CLA– 4 *			Presentation Tools	✓	Clarification/Pauses	✓	Good Health & Well Being	✓
		(10%)	(10%)	(20%)	(10%)			Learning Management System	✓	Group Discussion	✓	Quality Education	✓
		Theory (%)	Theory(%)	Theory (%)	Theory (%)	Theory(%)			✓	Hands-on Practice	✓	Gender Equality	✓
1	Remember	20	20	20	20	20				Debate	✓	Life on Land	✓
2	Understand	20	20	20	20	20				Interactive Lecture	✓	Clean Water and Sanitation	✓
3	Apply	20	20	20	20	20				Brainstorming	✓	Affordable and clean energy	✓
4	Analyze	20	20	20	20	20							
5	Evaluate	20	-	20	20	20							
6	Create	-	20	-	-	-							
	Total (%)	100	100	100	100	100							

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. Arumugam Perumal, ARMATS BIOTEK Training and Research Institute, Chennai	1	Dr. N. Banu, Bharathi Women's College (Autonomous), Chennai	1	Dr. P. Parthipan,Assistant Professor, Department of Biotechnology, FSH, SRMIST, KTR

Course Code	UCD24S04J	Course Title	Career Readiness and Professional Skills	Category	S	Skill Enhancement Course	L	T	P	C
							1	0	2	2

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

Course Rationale (CLR)	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes										
CLR-1	Develop resume building practice	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research skills	Leadership Qualities, Professionalism, Autonomy, Ethics	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PLO-9	PLO-10
CLR-2	Prepare for interviews and group discussion																	
CLR-3	Understand the significance of team skills																	
CLR-4	Help students improve their speaking and presenting abilities																	
CLR-5	Acquire career planning skills and fully pursue a successful career path																	
Course Learning Outcomes (CLO)	At the end of this course, learners will be able to:																	
CLO-1	Understand the importance of resume preparation and face interview confidently	✓	✓	-	-	2	85	80	2	3	2	3	-	-	-	-	-	-
CLO-2	Perform appropriately and effectively in group discussions	✓	✓	✓	-	3	85	80	2	3	2	3	-	1	2	3	-	-
CLO-3	Empathize with and trust colleagues for improving interpersonal skills	✓	✓	✓	✓	3	85	80	3	3	3	3	1	-	3	2	-	-
CLO-4	Prepare effective presentations considering the important strategies	✓	✓	✓	✓	3	85	80	1	3	2	3	-	2	2	-	-	-
CLO-5	Explore sources of (online/offline) opportunities	✓	✓	✓	✓	3	85	80	-	3	2	3	-	1	2	2	-	-

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	9	9	9	9	9
SLO-1	Introduction of resume and its Importance - Difference between a CV, Resume and Bio Data	Mock interview – face to face	Listening as a Team Skill	Types of Presentation - Informative, Instructional, Arousing, Persuasive, Decision-making - Structure of a presentation – Introduction of the event, Introducing the speaker, vote of thanks	Process of Career Exploration - Knowing Yourself - Personal Characteristics
SLO-2	Essential components of a good resume, common errors people make while preparing a resume	Mock interview- Feedback	Trust and Collaboration - Importance of Collaboration in Organization	Improvisation and unprepared presentations, man-woman view, feedback – appreciation and critique - Dos and Don'ts	Knowledge about the World of Work - Requirements of Jobs including Self-employment
SLO-3	Resume building format -Video resume – Tips and tricks – Do's and Don'ts	Meaning and Importance of Group Discussion - types of Group Discussion	The Secret to be a high performing Team	PowerPoint presentation–body language and stage etiquette –practice session	Sources of Career Information - Career Opportunities
SLO-4	Meaning and types of interview (face to face, telephonic, video) - Dress code, background research	Procedure of Group Discussion - Ground rules - Evaluation of Group Discussion	Creativity - Meaning - Strategies to increase Creativity - creativity skills at the Workplace	PowerPoint presentation–practice session	Critical Thinking Skills - Problem Solving Skills - Ability to Learn
SLO-5	STAR Technique (situation, task, approach and response) for facing an interview	Group Discussion - Common Errors Group Discussion Rubric	Methods and Process of Creativity Skills	PowerPoint presentation–practice session	Non- Cognitive Skills - Types of non-cognitive Skills and Strategies
SLO-6	Interview procedure (opening, listening skills, closure, asking questions)	Group discussion – Types and Tips to follow	Social Skills - Peer Pressure	Presentation for Internal and External Communication - online & offline Meetings	Non-Cognitive Skills and Gaps I Socio Economic Status
SLO-7	Keys to attain success in an interview	Group Discussion Practice	Stress and Stress Management - Meaning Stress Management Techniques	Visual elements in Presentation	Brainstorming
SLO-8	Rules and Elements of an Interview	Email Drafting – formal and informal	Social and Cultural Etiquette	Oral Skills and Public Speaking Skills	Logic and Rationality of Critical Thinking
SLO-9	Preparation and Practice	Writing Email – Practice	Characteristics and Enhancing Social Skills	Speaking Skills – Practice	Habits and Traits of the Mind

Resources

1	Scott Bennett, The Elements of Resume Style: Essential Rules for Writing Resumes and Cover Letters That Work, AMACOM, 2014	4	Paul Newton, How to deliver a presentation e-book
2	David John, Tricks and Techniques of Group Discussions, Arihant, 2012	5	Eric Garner, A-Z of Presentation, Eric Garner and Ventus Publishing ApS, 2012, bookboon.com
3	Singh O.P., Art of Effective Communication in Group Discussion and Interview, S Chand & Company, 2014		

Assessment									
Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)							
		CLA – 1 (20 %)		CLA – 2 (20 %)		CLA – 3 (30 %)		CLA – 4 (30%)	
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
7	Remember	5	5	5	5	15	15	10	10
8	Understand	5	5	5	5	15	15	10	10
9	Apply	25	25	25	25	20	20	20	20
10	Analyze	25	25	25	25	20	20	20	20
11	Evaluate	20	20	20	20	15	15	20	20
12	Create	20	20	20	20	15	15	20	20
Total (%)		100	100	100	100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*Theevaluation canbedoneon theone or moreparametersthatinclude,(i)Seminars,(ii)Mini-Project,(iii)Case-Studies,(iv)MOOCCertification,(v)PublicationofArticle,(vi)Presentation ofResearch Work in Conferences

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. P. Chockalingam, Senior Lead Software Engineer, Virtusa Consulting Services Private Ltd, DLF IT Park SEZ, Chennai – 600089 p.chockalingam1986@gmail.com -	1	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita Vishwa Vidhyapeetham, Coimbatore - 641112 g_saravanaprabu@cb.amrita.edu -	1	Mrs.Deepalakshmi S,HOD,DepartmentofCareerGuidance,FSH,SRMIST hod.dcgc.ktr@srmist.edu.in
				2	Dr. Muthu Deepa, Assistant Professor, Department of Career Guidance, FSH, SRMIST, muthudem@srmist.edu.in

Course Code	UCS24P02L	Course Title	Internship – II	Category	P	Project Work/Internship	L	T	P	C
							0	0	0	1

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

Course Rationale (CLR)	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Demonstrate skills learnt in the real time environment.	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to	Leadership Qualities, Professionalism, Autonomy,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PLO-9	PLO-10
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 insight of an industry and organization/company	✓	✓	-	-	2	85	75	3	2	1	3	3	-	3	2	3	3
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	-	2	85	75	2	1	1	3	2	-	2	1	3	3
CLO-3	To make professional connections and enhance networking	✓	✓	✓	✓	3	85	75	2	3	3	3	2	3	3	1	3	3
CLO-4	To get experience in a field to allow the student to make a career transition	✓	✓	✓	✓	3	85	75	2	3	2	3	2	-	3	2	3	3
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	3	85	75	1	2	2	3	3	-	2	2	3	3

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.

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

SEMESTER VI

Course Code	UCS24D05J	Course Title	Fundamentals of Business Application Development	Category	D	Discipline Core / Elective course	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Lifelong Research	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	This module aims to introduce the students to some concepts of advanced programming and practice on reusing components.																	
CLR-2	The course covers Graphical User Interface (GUI) networking, and database manipulation																	
CLR-3	To work with Web and Application Servers like Apache Tomcat, Glassfish etc and understand the communication over HTTP protocol.																	
CLR-4	Enterprise application using JavaBeans l																	
CLR-5	Develop web application using Java Servlet and Server Pages technology																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Advanced technology in Java such as Internationalization, and Remote method Invocation	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	-	-
CLO-2	To write sophisticated Java applications	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	-	-
CLO-3	To use Java language for writing well-organized, complex computer programs with both command-line and GUI	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	-	-
CLO-4	Develop a JSP code to create a Web site	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	-	-
CLO-5	Construct Web Application using Servlets	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	-	-

Sessions	CLO - 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	18	18	18	18	18
SLO-1	Remote method invocation : Overview & Introduction to RMI	Result and Result Sets	Methods of Servlet Interface Single Thread Model	Request Dispatching: Anatomy of Request Processing JSP - Directives	When to use Entity Bean Use of Entity Bean

SLO-2	Developing an RMI Application Setting up RMI	Commit and Rollback , Transaction Control	Thread Model Session Tracking: Cookies	Forwarding Requests , JSP Client Request	Life Cycle of Entity Bean , Message Driven Beans:
SLO-3	RMI , Architecture and RMI Application	JDBC - Exception Handling	Cookies , URL Rewriting, Hidden Fields, The Session API	Request Dispatcher Object JSP Server Response	Create Message driven Beans EJB Annotations
SLO 4-6	Practice: Create distributed applications using RMI	Practice: Develop Web Applications using Servlet	Practice: Web Application using JSP	Practice: An EJB application that demonstrates Session Bean-Stateless Bean	Practice: MVC Architecture(i) Implementing MVC with Request Dispatcher(ii) Data Sharing Approaches
SLO-7	RMI over IIOP. Database Access	Servlet – Introduction	JSP Overview , Why to Learn JSP	JSP Model1 and Model2 Architectures -, Actions in JSP	Describe Meta data using Annotations , EJB – Access Database
SLO-8	Overview of JDBC Presentation to JDBC connection	Types : Generic Servlet, Generic Servlet class	How JSP works JSP Working Principle	EJB Architecture: Logical Architecture EJB overview	Database Using JDBC API Exception Handling in EJB
SLO-9	JDBC Drivers	HttpServlet	Components of a JSP page	Software Architecture	Understanding the need for MVC
SLO 10-12	Practice: Crete applications which can demonstrate the use of JDBC for Database Connectivity.	Practice: Develop Web Applications Using Servlet	Practice: Web Applications using JSP	Practice: An EJB application that demonstrates Session Bean-Stateless Bean	Practice: MVC Architecture(i) Implementing MVC with Request Dispatcher
SLO-13	Connecting to a Database , Statement Interface	Servlet Life Cycle , Servlet Classes, Servlet request	JSP life Cycle, JSP API, JSP Syntax	EJB Stateful Bean	MVC - frameworks , Architecture
SLO-14	Statement Interfaces	Servlet Request	JSP : Scripting Elements	constraints on session beans	implementing MVC with request dispatcher
SLO-15	Using Meta data, Statement Objects	Servlet Context, Servlet Config	JSP Implicit Objects, Predefined variables	Life Cycle of EJB with example, Entity Bean	Spring MVC, Spring Controller Laboratory.
SLO 16-18	Practice: Create applications which can demonstrate the use of JDBC for Database Connectivity.	Practice: Program that demonstrates the use of session management in Servlet.	Practice: Create a JSP based Web application which allows the user to edit his/her database Information.	Practice: An EJB application that demonstrates Entity Bean	Practice: Build a Web Application using Struts2 Framework.

Resources			
1	Elliotte Rusty Harold, (2013), “Java Network Programming”, O’Reilly Publishers. (For Unit I to III)	4	Antonio Goncalves, (2010), Beginning Java EE 6 Platform with GlassFish 3”, Apress, Second Edition. For Units IV to V)
2	“H. M. Deitel,P. J. Deitel,,S. E. Santry,”Advanced Java 2 Platform H OW TO P ROGRAM” PRENTICE HALL, Upper Saddle River, New Jersey	5	Richard Steflik, Prashant Sridharan,Advanced JAVA Networking , Pearson,2000
3	Richard M Reese, Learning Network Programming with Java,Packt Publishing**,2015**	6	Elliotte Rusty Harold,Java Network Programming, 4th Edition, Elliotte Rusty Harold,2013

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
13	Remember	15	15	15	15	10	10	10	10	15	15
14	Understand	15	15	15	15	10	10	10	10	15	15
15	Apply	20	25	25	20	25	25	25	25	25	25
16	Analyze	20	25	25	20	25	25	25	25	25	25
17	Evaluate	15	10	10	15	15	15	15	15	10	10
18	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT Chennai	1	Dr.B.Mahalakshmi, Assistant Professor, Department of Computer Science, mahalakb1@srmist.edu.in

Course Code	UCS24D06J	Course Title	NLP and Language Models	Category	D	Discipline Core / Elective course	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:
CLR-1	To provide basic concepts of NLP
CLR-2	To provide deeper understanding of various stages of NLP technique
CLR-3	To understand parsing , preprocessing and feature extraction methods for NLP
CLR-4	Able to design, implement, and analyze NLP algorithms
CLR-5	Able to apply the NLP techniques for various purposes

CLO	At the end of this course, learners will be able to:	Depth: Conceive	Depth: Design	Depth: Implement	Depth: Operate	Attainment: Level of Thinking	Attainment: Expected Proficiency (%)	Attainment: Expected Attainment (%)	PLO 1: Problem Solving, Critical Thinking, Creativity	PLO 2: Communication Skills, Collaborating	PLO 3: Independent Thinking, Analytical	PLO 4: Leadership Qualities, Professionalism,	PLO 5: Digital Technology Skills	PLO 6: Value Inculcation, Multicultural	PLO 7: Environmental Action, Community	PLO 8: Entrepreneurial Risk Taking	PLO 9: PSO-1	PLO 10: PSO-2
CLO-1	To provide basic concepts of NLP	✓	✓	-	-	2	85	75	3	1	2	-	3	3	-	-	-	-
CLO-2	To provide deeper understanding of various stages of NLP technique	✓	✓	✓	-	2	85	75	3	1	2	-	3	3	-	-	-	-
CLO-3	To understand parsing , preprocessing and feature extraction methods for NLP	✓	✓	✓	✓	3	85	75	3	1	2	-	3	3	-	-	-	-
CLO-4	Able to design, implement, and analyze NLP algorithms	✓	✓	✓	✓	3	85	75	3	1	2	-	3	3	-	-	-	-
CLO-5	Able to apply the NLP techniques for various purposes	✓	✓	✓	✓	3	85	75	3	1	2	-	3	3	-	-	-	-

Sessions	CLO - 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	18	18	18	18	18
SLO-1	Introduction to NLP	Textual sources and formats	**Tagged corpora**	ML Basics	Feed forward Neural networks
SLO-2	Finding the Structure of Words	Web Scraping from online sources	**N-Gram tagging**	Logistic regression	Feed forward neural network model for text classification
SLO-3	Morphological models	Building your corpus	**Transformation based tagging**	Word Embeddingsc – word , Sentence	iD CNN for text classification model

SLO 4-6	Practice: Introduction to Python text operations	Practice: Webscraping and building the corpus for NLP process .	**Practice : Determine the category of a word**	Practice : Implementation of word embedding and logisitic regression	Practice: Implementation of iD CNN for text classification
SLO-7	Finding the Structure of Documents	Measures of words association	**Text features**	Text classification	Applications of NLP
SLO-8	Complexity of the approaches	Text retrieval methods	**Bow and TF-IDF**	N-Gram Models	Named Entity Recognition Model
SLO-9	Stages in NLP	Regular expresions	N-gram model	Text classification models using BoW , TFIDF	**Sentiment analysis**
SLO 10-12	Practice: Python code for text provessing	Practice : Implementation of Text retrieval and regular expression .	Practice : Implementation of TF-IDF and N-gram models.	Practice : Implementation of text classification models.	**Practice :Implementation of Sentiment analysis and NER classification in Text**
SLO-13	Parsing natural language	Text preprocessing - Tokenization, N-grams	Semantic Interpretation , System Paradigms	Predicaate – argument structure	**Document clustering and word vectors**
SLO-14	Tree banks	Stemming and Lemmatization, Synsets and Hypernyms	, Word Sense Systems and its disambiguation	Discurse processing - cohesion	**Word2vec. Doc2Vec**
SLO-15	Parsing Algorithms	POS Tagging and Stopwords	Lexical semanitics – wordnet and framenet	Reference resolution , Discourse cohesion and structure	**Large language models - overview**
SLO 16-18	Practice : Implementation of parsing algorithm using NLTK in Python	Practice :Implemetation of preprocessing techniques to the corpus.	Practice : Word sense systems	Practice " Implmentation of N-Gram model	**Practice :Implementaion of document classification using word vectors.**

Resources

1	Steven Bird, Ewan Klein, Edward Loper, Natural Language Processing with Python – Analyzing Text with the Natural Language Toolkit (O'Reilly 2009, website 2018), http://www.nltk.org/book/	4	Dipanjan Sarkar, Text Analytics with Python (Apress/Springer, 2016) https://link-springer-com.proxy.uchicago.edu/book/10.1007%2F978-1-4842-2388-8
2	Daniel Jurafsky& James H Martin , Speech and Natural Language Processing, , Pearson Publications.	5	Carol Quadros,"Machine Learning with python, scikit-learn and Tensorflow", Packet Publishing, 2018.

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
19	Remember	15	15	15	15	10	10	10	10	15	15
20	Understand	15	15	15	15	10	10	10	10	15	15
21	Apply	20	25	25	20	25	25	25	25	25	25
22	Analyze	20	25	25	20	25	25	25	25	25	25
23	Evaluate	15	10	10	15	15	15	15	15	10	10
24	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT Chennai	1	Dr.Aarthi E , Assistant Professor , Computer Science

Course Code	USA24D07J	Course Title	Cloud Computing	Category	D	Discipline core / Elective course	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	Understand and analyze the cost metrics, handle the security threats and construct different cloud delivery design models																	
CLR-2	Understand the architecture of cloud																	
CLR-3	Understand the need for virtualization																	
CLR-4	The concepts behind scheduling and load balancing that is happening across heterogeneous resources in the environment																	
CLR-5	Justify the need for improved hardware and software infrastructures (servers, protocols, security algorithms)																	

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	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Understand and figure out the necessities of middleware technologies	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Practically create a virtual environment (lab purpose using VMware)	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Implement crytoalgorithms that may be used in the computing environment	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Know the commercial functioning of cloud computing	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	18	18	18	18	18
SLO-1	Introduction to Networking	Roles and Boundaries, Cloud Characteristics	Data in Cloud, Data as a Service	Cloud Usage Monitor, Resource Replication, Ready-Made environment	Simulation Tools: Cloud Sim, Cloud Analyst
SLO-2	Data Communication	Cloud Delivery models, Cloud Deployment models	DaaS: Architecture, Advantages, Disadvantages	Load Balancer, SLA Monitor, Hypervisor, Resource Cluster	Cloud based Web Applications & Service Testing Tools

SLO-3	Introduction to Cloud computing	Cloud enabling technologies, Data center technologies, Web technologies, Multitenant technologies	Cloud Based data storage	Cloud Management Mechanisms: Remote Administration systems, SLA Management System	Cloud Applications and New Opportunity
SLO 4-6	**Lab 1:** Create a virtual machine	**Lab 4:** Create a drop box using Google APPs	**Lab 7:** Security mechanisms: Encryption: Hashing: Digital Signature	**Lab 10:** Create GAE Launcher	**Lab 13: File:** Create a Warehouse Application inn Salesforce.com
SLO-7	Origin of Cloud Computing	Operator precedence Type conversion	Security Risks and Best Practice, Security Cloud: CIA Concept	Platform as a Service, Evolution, Introduction, Service Providers	Advanced Cloud, Mobile Cloud, Green Cloud
SLO-8	Basic Concepts and Terminology	Hardware and Infrastructure, Client network	Types of Security Attacks	Service Quality Metrics, SLA Guidelines	Strategies for Resource Allocation
SLO-9	Goals and Benefits, Risks and Challenges	Web browsers, Cloud storage	Security Policy Implementation, Techniques to Secure Data	Software as a Services: Evolution, Advantages, Unification Technologies	Resource Allocation policies and Algorithms
SLO 10-12	**Lab 2:** Install virtual box	**Lab 5:** Transfer Data using Google APPs	**Lab 8:** Simple Experiments in Cloud Sim	**Lab 11:** Client Server communication between two virtual machine instances, execution of chat application	**Lab 14:** Create a Warehouse Application in Salesforce.com using Apex proLang
SLO-13	Download Linux	Cloud Storage Provider	Cloud Encryption, Symmetric Encryption	Integrated Products, Product Selection Criteria	Performance-based RAS, Importance of Cloud Computing
SLO-14	How to install Virtual box	Infrastructure services	Cloud Computing Security Architecture	Infrastructure as a Service: Architecture	Performance-based RAS, Importance of Cloud Computing
SLO-15	Install Linux using Virtual box	Client services	Cloud Security Alliance	IaaS Provider	Cost based RAS
SLO 16-18	**Lab 3:** Installing C environment	**Lab 6: Arrays –** upload and download using Google APPs	**Lab 9:** Encryption and Decryption of Text	**Lab 12:** Then run the communication between the terminals	**Lab 15:** Implementation of SOAP Web Services

Resources

1	Thomas Erl, ZaighamMahmood,RichardoPuttini, "Cloud Computing: Concepts,Technology& Architecture", Fourth Printing, Prentice Hall/PearsonPTR, 2014,ISBN: 780133387520.	3	K.Chandrasekaran, "Essentials of Cloud Computing", Chapman and Hall/CRC Press, 2014, ISBN 9781482205435.
2	ArshdeepBahga, Vijay Madisetti, "Cloud Computing: A Hands-On Approach", University Press, 2016, ISBN: 9780996025508.	4	Thomas Erl, Robert Cope, Amin Naserpour, “Cloud Computing Design Patterns”,Prentice Hall/Service Tech Press, Pearson, 2015, ISBN: 978-0133858563.

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
25	Remember	15	15	15	15	10	10	10	10	15	15
26	Understand	15	15	15	15	10	10	10	10	15	15
27	Apply	20	25	25	20	25	25	25	25	25	25
28	Analyze	20	25	25	20	25	25	25	25	25	25
29	Evaluate	15	10	10	15	15	15	15	15	10	10
30	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT Chennai	1	Dr G Kalpana, Professor, FSH, SRMIST

Course Code	UCS24D08J	Course Title	Microprocessors and Embedded Systems	Category	D	Discipline core / Elective course	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	Illustrate the internal architecture of 8085 microprocessor																	
CLR-2	Explain the interfacing of PPI and DMA with 8085 microprocessor																	
CLR-3	Illustrate the Architecture and serial interface																	
CLR-4	Outline the programming model and interfacing devices with Arduino																	
CLR-5	Evaluate the various analog sensors and output devices																	

CLO	At the end of this course, learners will be able to:																	
CLO-1	Explain the architecture of 8085 , Discuss various addressing modes and instruction set of 8085	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Describe the architecture of 8085 , Discuss various addressing modes and instruction set of 8085, Illustrate the importance of I/O, Memory and PPI interfacing with 8085	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Describe the Timer/Clock I/O and external interrupts of Arduino , Determine the serial interface device with Arduino	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	describe the Arduino software architecture (L2) 2. explain the designs using Bluetooth, USB and CAN control , Demonstrate Stepper, PWM and Servo control with Arduino	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	describe various analog sensors interfacing with Arduino microcontroller , Illustrate vibration and motion sensors with Arduino	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	18	18	18	18	18
SLO-1	An introduction to microprocessors and their applications	Memory hierarchy and types	Definition and characteristics of embedded systems	Design requirements and constraints	IoT architecture overview
SLO-2	Overview of 8085/8086 architecture	Memory interfacing in 8085	Examples in real-world applications	Hardware-software co-design	IoT layers and devices

SLO-3	Microprocessor vs. Microcontroller	I/O interfacing and peripheral devices	Components of embedded systems	Overview of system specifications	Embedded systems in IoT
SLO 4-6	Key components: ALU, registers	I/O ports	Embedded systems in computing	System partitioning techniques	IoT hardware platforms (ESP8266)
SLO-7	Data transfer instructions	Interfacing methods	Overview of 8051 architecture	Basics of UART and serial communication	Basics of MQTT and HTTP protocols
SLO-8	Arithmetic and logical instructions	Concept of stack and subroutine	Key features of 8051	UART examples and applications	Cloud integration for IoT
SLO-9	Branching instructions	Stack operations	Registers, I/O ports, and memory in 8051	I2C communication protocol	Data logging and monitoring
SLO 10-12	Addressing modes and examples	Subroutine calls	Differences between 8051 and ARM	Interfacing using I2C	Sending data to the cloud
SLO-13	Introduction to Assembly Language	Writing subroutines in ALP	Introduction to embedded C programming	Basics of SPI communication protocol	Applications of IoT in healthcare
SLO-14	Basic ALP examples	Stack pointers in microprocessors	Variables, loops, and functions	SPI applications and interfacing	Automotive applications
SLO-15	Writing simple ALP programs	Types of interrupts	Writing embedded C programs	Interfacing sensors: ADC and DAC	Smart homes and automation
SLO 16-18	Debugging and testing ALP	Handling interrupts in 8085	Debugging techniques in C	Reading sensor data	Consumer electronics and wearables

Resources

1	Gaonkar, Ramesh S. Microprocessor Architecture, Programming and Applications with the 8085-8080a. ,6th Edition, Prentice Hall PTR, 2013.	3	Mano, M. Morris, Digital logic and computer design.1st Edition, Pearson Education India, 2016
2	Hughes, John M. Arduino: a technical reference: a handbook for technicians, engineers, and makers. " O'Reilly Media, Inc.", 2016.	4	Ray, Ajoy Kumar, and Kishor M. Bhurchandi. Advanced Microprocessors and Peripherals. 3rd Edition, Tata McGraw-Hill, 2006.

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT Chennai	1	Dr.Meenakshi, Dept. of Computer Science, FSH, SRMIST

Course Code	UCS24P03L	Course Title	Project Work	Category	P	Project work / Internship	L	T	P	C
							0	0	4	2

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	7	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Communication Skills, Collaborating Skills	Problem Solving, Critical	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology Skills	Value Inculcation,	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2
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																		
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	✓	✓	-	-	2	85	75		**3**	-	-	-	-	-	-	-	-	-
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	-	2	85	75		**3**	-	-	-	-	-	-	-	-	-
CLO-3	To make professional connections and enhance networking	✓	✓	✓	✓	3	85	75		**3**	-	-	-	**3**	-	-	-	-	-
CLO-4	To get experience in a field to allow the student to make a career transition	✓	✓	✓	✓	3	85	75		**3**	**3**	-	-	-	-	-	-	**3**	**3**
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	3	85	75		**3**	**3**	-	-	**3**	-	-	**3**	**3**	**3**

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

Course Code	UCD24V02T	Course Title	Universal Human Values	Category	V	Value added Course	L	T	P	C
							2	0	0	2

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

CLR	The purpose of learning this course is to:
CLR-1	Help the students to understand need of value education, appreciate the essential complimentarily between 'values' and 'skills' and to ensure sustained happiness and prosperity which are the core aspirations of all human beings,
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.

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	7	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Communication Skills, Collaborating Skills	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning,	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Evaluate the significance of value inputs in formal education and start applying them in their life and profession	✓	✓	-	-	2	85	75		-	1	1	2	-	3	2	-	-	-
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.	✓	✓	✓	-	2	85	75		-	-	1	2	-	3	2	-	-	-
CLO-3	Analyze the value of harmonious relationship based on trust and respect in their life and profession	✓	✓	✓	✓	3	85	75		-	1	1	2	-	3	2	-	-	-
CLO-4	Examine the role of a human being in ensuring harmony in society and nature.	✓	✓	✓	✓	3	85	75		-	-	1	2	-	3	2	-	-	-
CLO-5	Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.	✓	✓	✓	✓	3	85	75		-	-	1	2	-	3	2	-	-	-

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

Learning Resources	1. Gaur R.R., Sangal R., Bagaria G.P., 2019 (2nd Revised Edition), A Foundation Course in Human Values and Professional Ethics, Excel Books, New Delhi. 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.

Assessment						Strategies					
Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)				Technology		Pedagogy / Andragogy		Sustainable Development	
		CLA – 1	CLA – 2	CLA – 3	CLA – 4	Simulations	✓	Clarification/Pauses	✓	Good Health & Well Being	
		(20 %)	(20 %)	(30 %)	(30%)	Presentation Tools	✓	Group Discussion		Quality Education	✓
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	
7	Remember	20	10	20	10			Debate			
8	Understand	20	10	20	10			Interactive Lecture	✓		
9	Apply	20	20	20	20			Brainstorming	✓		
10	Analyze	20	20	20	20						
11	Evaluate	10	20	10	20						
12	Create	10	20	10	20						
	Total (%)	100	100	100	100						

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Prof. Rajiv Kumar, Member Secretary, NCC-IP as member at AICTE	Mrs. V Sumathi, Associate Professor, Sri Sairam Engineering College, Chennai, Tamil Nadu	Dr. Supraja P, UHV University Coordinator, SRMIST
		Dr. Deepalakshmi S, HoD, Department of Career Guidance Cell, FSH, SRMIST
		Dr. Sweety Bakyarani E, Department of Computer Science, FSH, SRMIST

SEMESTER VII

Course Code	UCS24D09J	Course Title	Mobile Application Development	Category	D	Disciplinary Core / Elective course	L	T	P	C
							3	0	3	4

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

CLR	The purpose of learning this course is to:
CLR-1	Learn and apply software patterns for the development of the application models
CLR-2	Learn and work within the capabilities and limitations of mobile devices
CLR-3	Design, implement and deploy mobile applications using an appropriate software development environment.
CLR-4	Understand the need for cross platform tools to build rich commercial mobile applications
CLR-5	Develop, distribute and monetize the mobile applications

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes										
		1 Conceive	2 Design	3 Implement	4 Operate	1 Level of Thinking	2 Expected Proficiency	3 Expected Attainment	1 Problem Solving,	2 Communication Skills,	3 Independent Thinking,	4 Leadership Qualities,	5 Digital Technology	6 Value Inculcation,	7 Environmental Action,	8 Entrepreneurial Risk	9 PSO-1	10 PSO-2
CLO-1	Build mobile applications	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Use the reusability concepts to rebuild the existing applications for the present day need without losing the nature of the app's behavior	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Understand the concept of virtualization for running the code using emulators	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Experiment the application in the mobile device	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Simulate existing applications with rich UIs	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	18	18	18	18	18
SLO-1	What is mobile computing? History of mobile environments, Early mobile phones to smart phones and tablets	Mobile Development: Introduction, Advantages, Limitations,	Android Overview, Features,	Understanding Activity	Animations
SLO-2	Development for mobile environments,	Features useful for mobile phones	Android Architecture	Activity Lifecycle	OpenGL
SLO-3	Differences from traditional application development	Geolocation, Offline applications	Android applications	Multi device support	Wireless Connections
SLO 4&5	Practice: Understanding the installation procedure of android environment	Practice: Animations and Graphics (2D/3D)	Practice: Android libraries	Practice: Intents	Practice: Location Aware Applications
SLO-6	Trends in mobile development,	Offline storage	Android framework	Fragments	Data Syncing
SLO-7	Understanding emulator Knowledge about build tools	Audio and Video	Android Kernal	MediaPlayer: Audio	Best Practices for the development of remarkable applications
SLO-8	Web applications and mobile applications	Framework: Phone Gap	Application stores and publishing	Image Capture	Mobile App Distribution
SLO 9&10	Practice: Understanding Virtualization and enabling it in the Operating system to support emulation process	Practice: Framework: HTML5	Practice: Android Ecosystem	Practice: MediaPlayer: Video	Practice: Using Color, Font, Intent
SLO-11	Understanding SDK tools	Jquery Mobile Framework	Android Development Tools, SDK, Emulator,	Color	Focusing on security
SLO-12	Mobile websites	Comparison of framework	Android Activity Lifecyle	Font	Monetization Models
SLO-13	Google services for mobile Applications,	Features and utilities	Android Layouts	Information Design Tools	Knowing Monetization tools
SLO 4&15	Practice: Installing Android and setup environment	Practice: Using HTML5 implement geolocation, cookies	Practice: Using Android implement Activity methods, Layout, TextView, Password, Button	Practice: Using Android implement MediaPlayer, Images ProgressBar, RatingBar	Practice: Monetization

Resources			
1	Ed Burnette, “Hello Android: Introducing Google's Mobile DevelopmentPlatform”, 2010, The Pragmatic Programmers, 3rd edition. (For Units I to III)	4	Jeff McWherter and Scott Gowell,Professional Mobile Application Development", 2012, Wrox. (For Units IV to V)
2	Reto Meier, “Professional Android 4 Application Development”, 2012, Wrox Publications	5	ZigurdMednieks, Laird Dornin, Blake Meike G, Masumi Nakamura, “Programming Android: Java Programming for the 2011, New Generation of Mobile Devices”, OReilly
3	WeiMeng Lee , “Beginning Android Application Development”, 2012, Wrox Publications		

Assessment

Bloom’s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT chennai	1	Dr.P.Muthulakshmi, Professor, SRMIST,

Course Code	USA24D10T	Course Title	Wireless Communication and Mobile Computing	Category	D	Discipline core / Elective course	L	T	P	C
							4	0	0	4

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

CLR	The purpose of learning this course is to:
CLR-1	Build robust applications
CLR-2	High performance applications
CLR-3	Create modular programs and reusable code
CLR-4	Emphasis on the fundamentals of structured design with classes.
CLR-5	Build the base for learning mobile application and enterprise application development

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency	Expected Attainment	Problem Solving,	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology	Value Inculcation,	Environmental Action,	Entrepreneurial Risk	PSO-1	PSO-2	
CLO-1	Develop, document, and debug modular java programs	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	-	-	
CLO-2	Select a suitable programming construct and data structure for a situation.	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	-	-	
CLO-3	Define classes and use them in applications	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	-	-	
CLO-4	Use built-in packages, exception in applications.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	-	-	
CLO-5	Apply inheritance and interfaces to encourage reusablity of code	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	-	-	

Sessions	CLO – 1	CLO – 2	CLO – 3	CLO - 4	CLO - 5
	18	18	18	18	18
SLO-1	Short history of wireless communication, Applications,	Network Concepts Communication Networks	Personal Communication Services	Mobile Data Services and Short Range Network , Mobile Data Services Introduction Messaging, wireless web, WAP, site design	File systems: Consistency, Examples; World Wide Web: Hypertext transfer protocol
SLO-2	Frequency for radio transmission,	LANs, MANs, WANs,	Introduction, HSCSD, GPRS	Short-Range Wireless Networks: Unlicensed spectrum, WLANs, cordless telephony, IrDA, Bluetooth Smart Phones:	Mobile File System, Mobile databases
SLO-3	Frequency for the Signals amd Antennas	Circuit switching, Packet switching,	Introduction- CDMA One- CDMA Two	: Future phones, mobile OSs, smartphone applications	Language Support: Hypertext markup language (XHTML)-MP,
SLO-4	Signal propagation	: ATM Cellular Networks	D-AMPS, CDMA One,	Data Services- Messaging- Wireless web- WAP- Site design-	: Wireless markup language; WML script,
SLO-5	Working of wireless ad hoc network	Introduction, Cells, Duplexing	: CDMA Two	Short-Range Wireless Networks-	Mobile Application Languages- XML
SLO-6	Transmission Fundamentals	, Multiplexing, Voice coding	Packet Data Systems- GSM- HSCSD-	Unlicensed spectrum- WLANs- Cordless telephony- IrDA	Voice XML. Java, J2ME and JavaCard.
SLO-7	Cellphone Generations- 1G and 2G- 2.5G- 3G	Multiple Access Techniques: FDMA, TDMA,	GPRS- D-AMPS	Bluetooth Smart Phones- Future phones	WAP Developer Toolkits and application environment
SLO-8	Transmission Introduction- 4G	, SDMA, CDMA,	Packet Data Systems	Unlicensed spectrum- WLANs- Cordless telephony- IrDA- Bluetooth Smart Phones- Future phones	Wireless telephony application, Mobile agents,
SLO - 9	TTransmission Fundamentals	Spectral efficiency	Hard and Soft Handoff	Mobile Oss- Smart phone applications	WAP Developer Toolkits and application environment, Wireless telephony application, Mobile agents,
SL0-10	Time domain concepts	Polling, Inhibit sense multiple access	Network Signaling :	Mobile Computing Architecture: Three Tier Architecture for mobile computing,	TApplication Server, Gateways, Portals, Service Discovery, Device Management

SLO-11	Radio Media- Analog Vs Digital-Channel	CDMA: Spread Aloha multiple access	Interconnection and Message Routing,	Design considerations	Operating System : PalmOS; Windows CE; EPOC; Symbian OS; Linux for Mobile Devices.
SLO-12	Frequency domain concepts-	Spread Aloha multiple access	Mobility Management	Mobile Computing through the Internet.	Mobile Agents Threats and Security
Assessment	Continuous Learning Assessment – 1		Continuous Learning Assessment - 2		
	Continuous Learning Assessment - 3				

Resources			
1	**Wireless communications**: Principles and practice the odores. Rappaport pearson Education 2nd Edition (2002)	2	Mobile communications jochenschiller pearson education 2nd edition(2003)

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15		15		10		10		15	
2	Understand	15		15		10		10		15	
3	Apply	20		25		25		25		25	
4	Analyze	20		25		25		25		25	
5	Evaluate	15		10		15		15		10	
6	Create	15		10		15		15		10	
Total (%)		100		100		100		100		100	

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT chennai	1	Dr.Revathi.S,AssistantProfessor,FSH,SRMIST

Course Code	UCS24D11J	Course Title	Web Application Framework	Category	D	Discipline core / Elective course	L	T	P	C
							3	0	2	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
CLR-1	To learn the fundamentals of web design and web development																		
CLR-2	Learning to write program using HTML5																		
CLR-3	Developing skills to create web site using CSS																		
CLR-4	Build Resilient code using java script																		
CLR-5	Be able to use ruby to design dynamic web page																		

CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	7	1	2	3	4	5	6	7	8	9	10
CLO-1	Remember and understand web application, HTML5	✓	✓	-	-	2	85	75		3	-	-	1	-	3	-	2	2	1
CLO-2	Apply the features of CSS to design dynmaic web page	✓	✓	✓	-	2	85	75		3	2	1	2	2	3	-	1	2	1
CLO-3	Analyze the problem specific web application using Java script	✓	✓	✓	✓	3	85	75		3	1	3	1	3	3	-	1	1	2
CLO-4	Evaluate the program using ruby language	✓	✓	✓	✓	3	85	75		3	3	2	3	3	3	-	2	3	3
CLO-5	Create and Design an interactive application using ruby	✓	✓	✓	✓	3	85	75		3	3	2	3	3	3	-	3	3	3

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	15	15	15	15	15
SLO-1	Introduction to Internet, Internet and its applications	Introduction : CSS and its types, Advantages of CSS	Introduction: Java Script, Advantages of Java Script	Introduction to Ruby, Ruby Syntax, Variables	Introduction to testing framwork
SLO-2	Client-Server Model, Protocols: HTTP/HTTPs, Telnet, FTP.	Inline CSS, Internal CSS, External CSS	Client Side Java Script Server Side Java Script	Operators, Control structures and loops	Testing and Debugging Ruby code

SLO-3	: E-Mail, Internet Service Provider, DNS Web page, Web site: Types of web sites.	: CSS syntax, Selector, Property, values	: Java Script Objects, Security	: Functions and Methods	: Writing and running tests for ruby code
SLO 4&5	**Practice: Identify and differentiate between static and dynamic website**	**Practice: Design a Simple web page using three types of CSS.**	**Practice: Design a web page using java script objects**	**Practice: Write a simple program using control structures in ruby**	**Practice: Design a web page for testing debugging**
SLO-6	Languages used for website development Embedding multimedia in Web pages	CSS comments, Colors, Bacgrounds	Data types, Java Script Operators	OOPs with Ruby: Classes and Object	Coding Style standard
SLO-7	Basics of web developer tools, Uniform Resource Locator (URL)	CSS Borders, Margins	Control structures,	Inheritance and Polymorphism	Documentation using RDoc
SLO-8	: WWW, HTML Basics	: CSS Padding, CSS Text, CSS Fonts	: Arrays, Dialog boxes	: Abstraction and Encapsulation	: Working with API
SLO 9&10	**Practice: Simple web page using HTML Tags**	**Practice: Design a simple web page using Text properties**	**Practice: Design a web application using operators and arrays**	**Practice: Write a simple web application using OOPs concepts**	**Practice: Simple application using APIs**
SLO-11	HTML5 : Document Structures, Text formatting, Paragraphs, Lists	CSS Lists	Documents and its assoicated objects: Math, String,	Web Development using Ruby on Rails: Introduction	Meta programming
SLO-12	Working with multimedia tag: image, audi, video, Frames.	CSS Tables	Functions, Events and Event Handlers,	Setting up a Rail Application	Performance optimization
SLO-13	Forms and user input, Advanced form elements	CSS Image Gallery	Defining Event handlers: on Click, on Dbl Click, on Drag Drop, on Error, on Focus, on Key Down, on Key Press, on Key Up, on Load, on Mouse Down, on Mouse Move.	MVC Architecture Database Integration	Integration Ruby with other Languages
SLO 14&15	**Practice: Simple web site using Frames, Forms**	**Practice: Design a web page using CSS tables**	**Practice: Design a web page using event handler**	**Practice: Design a web application using database**	**Practice: Web application to demonstrate integration with other language.**

Resources			
1	Tanenbaum, Wetherall, " Computer Networks", Pearson, Fifth	3	Douglas Crockford, Java Script: The Good Parts, O Reilly Media
2	Anne Boehm, "HTML 5 and CSS 3", Ninth Edition	4	David Flanagan, The Ruby Programming Language Everything You need to know, O'Reilly.

Assessment											
Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
Total (%)		100	100	100	100	100	100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT chennai	1	Dr. Ramesh. M, Assistant Professor, FSH, SRMIST

Course Code	UCS24D12J	Course Title	Computer Vision	Category	D	Discipline Core / Elective course	L	T	P	C
							3	0	2	4

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

CLR	The purpose of learning this course is to:
CLR-1	Inculcate the participants with the fundamentals of computer vision, their working principles and their functions in a business scenario.
CLR-2	To teach the participants the functions of a Computer vision techniques involved in training the Computer vision models on different problems like image classification, image detection, Object recognition, object detection etc, with a deep dive into the role the computer visiontechniques play in building a scalable enterprise machine learning solutions.
CLR-3	To teach the participants to build intelligent and automated real-world Computer vision applications and use cases spanning healthcare, retail, energy verticals by intelligentlyanalyzing different datasets collected from diverse data sources.
CLR-4	To introduce the participants to the modelling pedigree of Text classification, Image classification, Image detection, Object recognition, and Object detection techniques.
CLR-5	To bring the learners to an alignment, applies their learning to a real-world business problem, and then performs research, design, development, and delivers an end-to-end Computer vision for a given industry problem. The students will be working either in a groupor individually.

CLO	At the end of this course, learners will be able to:	Depth				Attainment			7	Programme Learning Outcomes										
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Communication Skills, Collaborating Skills	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning	Leadership Qualities, Professionalism, Autonomy,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
		1	2	3	4	1	2	3		1	2	3	4	5	6	7	8	9	10	
CLO-1	Have a strong control over the fundamental concepts of Computer vision including the ability to clearly define Computer vision from both academic and industry perspective.	✓	✓	-	-	2	85	75		3	-	-	-	-	-	-	-	-	-	
CLO-2	Gain hands-on solid skills, knowledge and expertise of real-world situations the applicability of tools and techniques in extracting valuable insights from the data of different formats on time.	✓	✓	✓	-	2	85	75		3	-	-	-	-	-	-	-	-	-	
CLO-3	Have solid hands-on skills, knowledge and expertise in Data gathering, Data collection, Model training, and model evaluation with domain-specific components.	✓	✓	✓	✓	3	85	75		3	-	-	-	3	-	-	-	-	-	
CLO-4	Have a good Hands-on skills, knowledge and expertise on applying all the computer vision techniques to real -world industry problems.	✓	✓	✓	✓	3	85	75		3	3	-	-	-	-	-	-	3	3	
CLO-5	Have solid hands-on skills, knowledge and expertise in applying the right computer vision techniques for the problem statement at hand.	✓	✓	✓	✓	3	85	75		3	3	-	-	3	-	-	3	3	3	

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	15	15	15	15	15
SLO-1	ComputerVision Overview	Computer Vision in Various Field	Computer Vision Frame Work, Feature of Computer Vision	Image Detection, Image Segmentation	Source System, Target system, Training Data, Validation Data
SLO-2	Computer Vision derived from academic perspective and industry perspective, Challenges of Computer Vision, Tasks in Computer Vision	Computer Vision Workflow Steps, Business Problem Identification, Success Criteria Definition, Right Computer Vision Techniques	PopularComputerVision frameworks: OpenCV,TensorFlow, Matlab, CUDA, YOLO	Image Classification, Object Detection, Object Recognition, Object Classification	Building a Computer Vision Hardware system Benefits, Choosing the software components, Choosing the OS, AddingPackages
SLO-3	Optical character recognition (OCR), Medical Imaging	Collect Training Data, Label Train and Test Datasets, Train the computer vision model, Evaluate the computer vision model, Test the model, Deploy the model, Iterate the steps process	Image Processing Techniques Image Restoration,LinearFiltering, Independent, Component Analysis, Pixelation, Template Matching	Computer Vision Model	Challenges , High level decisions ‘ Choosing the hardware components (GPU, TPU) , Building a CV Software system
SLO 4&5	**Practice: Image Reading**	**Practice: Image Filters**	**Practice: Apply Different FlilteringTechiques to Images**	**Practice: Image Thresholding**	**Practice: Face Detection**
SLO-6	Surveillance, Fingerprintrecognitionandbiometrics	Components of Computer vision solution	Image GenerationTechnique(GAN)FilteringTechniquesinImageProcessing LinearFilter,Non-LinearFilter	ImageProcessingModels CannyEdgeDetectors	Benefits and Challenges
SLO-7	IntroductiontoComputer Vision	Data Ingestion, Data Pre-processing, Multiprocessing	MedianFilter	HoughTransformers, SURF, ImageClassificationModels	High level decisions,CustomerImageSegmentation, Problemstatement, Problemtype
SLO-8	ObjectRecognition	Transfer Learning/Model Processing	Featuredetectionandmatching	ImageNet, CIFAR, MNIST	Dataengineering, Datapipeline, Modelselection, Modelengineering
SLO 9&10	**Practice: Image Display**	**Practice: Increase Filter strength**	**Practice: Image Blurring**	**Practice: Image Detection**	**Practice: Image Segmentation**
SLO-11	Medical ImageAnalysis	Data Transformation	Harris Corner Detector, SIFT (scale invariant feature transform), SURF (speeded-up robust features), FAST (features from accelerated segment test)	ObjectDetectionModels, FastR-CNN	Modeloutcome, Modelanalysis

SLO-12	Content-BasedImageRetrieval	Parallel Processing	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)	Requirements of data in Computer Vision	Modeloptimization
SLO-13	VirtualRealityandAugmentedReality, ImageProcessing	User Interface and Advanced Analytics	Text Classification	Data Structure, Data Format Data Type	Model pipelineData visualization
SLO 4&15	**Practice: Image Conversion**	**Practice: Image Smoothing**	**Practice: Morphology**	**Practice: Contour Detection**	**Practice: Video processing**

Resources			
1	R.Jain, R. Kasturi, and B.G.Schunck, Machine Vision, McGraw-Hill, Inc. 1995	4	Digital Image Processing and Analysis: Application with MATLAB and CVIPtools, 3rd Edition, SE Umbaugh, Taylor & Francis/CRC Press, 2018
2	Computer Vision: Algorithms and Applications by Richard Szeliski	5	Computer Vision: A Modern Approach(Second Edition) by David Forsyth and Jean Ponce.
3	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).

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT chennai	1	Dr.S.Kanchana, SRMIST, KTR

Course Code	UCS24D13J	Course Title	Big Data Analytics	Category	D	Discipline core / Elective course	L	T	P	C
							3	0	2	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency	Expected Attainment	Problem Solving,	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology	Value Inculcation,	Environmental Action,	Entrepreneurial Risk	PSO-1	PSO-2	
CLR-1	Understand the evolution of computer networks using the layered network architecture																		
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																		
CLO	At the end of this course, learners will be able to:																		
CLO-1	Acquire the basics of computer network and its architecture	✓	✓	-	-	2	85	75		-	-	1	-	3	-	2	2	1	
CLO-2	Acquire the knowledge of various networks devices and addressing methods	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1	
CLO-3	Design the network routing methods	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2	
CLO-4	Find the error type that may happen during data transportation	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3	
CLO-5	Understand the physical layer functions and components	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3	

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	15	15	15	15	15
SLO-1	Introduction to Big Data platform	Null and Alternative Hypotheses. Type-I and Type-II ErrorCriticalRegion and Level of Significance	History of Hadoop, The Hadoop Distributed File System	Setting up a Hadoop Cluster - Cluster specification -	Applications on Big Data
SLO-2	Challenges of Conventional Systems	One tailed and two tailed tests, Critical values of significant values	Components of Hadoop	Cluster Setup Installation	Data processing operators in Pig

SLO-3	Intelligent data Analysis	: Tests of Significance for Large Samples	Analyzing the Data with Hadoop	Cluster Installation	Hive QL,Tables
SLO 4&5	**Practice 1: Practice elementary mathematical operations and control statements**	**Practice 4: Creating Various types of plot/charts from various data source**	**Practice 7: Implementation of Linear regression with multiple regression**	**Practice 10: Implementation of classifier problem**	**Practice 13: Implementation of decision tree**
SLO-6	Nature of data	Test of Significance for Single Proportion	Scaling Out- Hadoop Streaming	Hadoop Configuration	Structure of Hbase
SLO-7	Analytic process and tools, Analysis Vs Reporting,	Test of Significance for Difference of Proportions, Test of Significance for Single Mean,	Java interfaces to HDFS	Security in Hadoop	Hbase QL
SLO-8	Modern Data analytic tools	Chi-Square Distribution	How Map Reduce Works	Administering Hadoop	Comparing base with Relational Database
SLO 9&10	**Practice 2: Operations on Matrices and Vector**	**Practice 5: Create subplots and color plots**	**Practice 8: Implementation of Data preprocessing methods, Correlation matrix**	**Practice 11: Implementation of K-Mean Clustering**	**Practice 14: Implementation of Random Forest**
SLO-11	Parameter and Statistic, Sampling Distribution	Test of Significance for Difference of Means. To test the goodness of fit- To test the independence of Attributes. Student's" t" - "t" Distribution- To test for Single Mean- To test for Difference of Means	Anatomy of a Map Reduce Job run - Failures	Administering Hadoop - HDFS	Structure of Zoo Keeper
SLO-12	Meaning-Standard Error and its uses.	F-Distribution- Definition- To Test for Equality of Two Population variances.	Job scheduling shuffle and sort - Task Execution –Map read and Map write anatomy	Monitoring	The Zoo keeper services
SLO-13	Tests of Significance	Meaning of Resampling and its uses, Prediction Error and its uses.	Map reduce features	Maintenance	Zoo keeper Case study
SLO 14&15	**Practice 3: Vectorized operation on simple matrix operations**	**Practice 6: Implement Linear regression problem**	**Practice 9: Implementation of spam and non-spam classification problem.**	**Practice12: Implementation of K-Mean Clustering**	**Practice 15: Implementation of CART**

Resources			
1	Michael Berthold, David J. Hand, (2007), "Intelligent Data Analysis", Springer.	4	RSN Pillai, Bagavathi, "Statistics Theory and Practice", S.Chand
2	Tom White (2012), " Hadoop:The Definitive Guide" Third Edition, O'reilly Media	5	Anand Rajaraman and Jeffrey David Ullman, (2012) "Mining of Massive Datasets", Cambridge University Press.
3	Viktor Mayer,Schonberger,KennethCukier , "BIg Data : A Revolution That Will Transform How We Live, Work and Think"	6	

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT chennai	1	Dr.T.Nathiya, Assistant Professor,FSH, SRMIST

Course Code	UCS24D14J	Course Title	Cryptography and Network Security	Category	D	Disciplinay core/ Elective course	L	T	P	C
							3	0	2	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
CLR-1	Understand cryptography basics, algorithms and mathematical background for cryptography.	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology Skills	Value Inculcation,	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2	7
CLR-2	Analyze the important cryptographic algorithms																		
CLR-3	Understand the BasicknowledgeofNetworksecurity.																		
CLR-4	Understand the various IPSECURITY concepts.																		
CLR-5	To impart knowledge on Advanced Encryption Standard																		

CLO	At the end of this course, learners will be able to:																		
CLO-1	Understand the Overview Of Cryptography	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	-	-	
CLO-2	Do research in the emerging areas of cryptography and network security.	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	-	-	
CLO-3	Implement various NetworkSecurity Algorithm.	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	-	-	
CLO-4	Gain knowledge on IP Security Architecture	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	-	-	
CLO-5	Understand the OverviewonSystemSecurity	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	-	-	

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	15	15	15	15	15
SLO-1	OverviewonSymmetricCipher Model	OverviewonBlockciphersandthe data encryption standard	BasicknowledgeofNetworksecurity – Authentication Application	IPSecurity Overview	OverviewonSystemSecurity
SLO-2	Overview on Classical Encryption Techniques	Block Cipher Principles	Kerberos	IP Security Architecture	Intruders
SLO-3	: Brief on SymmetricCipherModel	: The Data Encryption Standard	: KerberosAuthenticationService	: AuthenticationHeader	: Intrusion Detection

SLO 4&5	**Laboratory**1:Performencryption,decryptionusing the following substitution techniques i) Ceaser cipher	**Laboratory**4: VigenereCiphers	**Laboratory**7:ApplyDESalgorithm for practicalapplications	**Laboratory**10:ImplementtheSIGNATURESCHEME-Digital SignatureStandard.	**Laboratory**13:ApplyAESalgorithm for practicalapplications
SLO-6	Techniquesinvolvedin–Cryptography	Describe the procedure of DES Encryption	OverviewonElectronicMailSecurity	Encapsulating Security Payload	PasswordManagement
SLO-7	Techniquesinvolvedin-Cryptanalysis	DescribetheprocedureofDESDecryption	OperationalDescription	CombiningSecurityAssociations	Discuss on Malicious Software
SLO-8	SubstitutionTechniques-CaesarCipher	ThestrengthofDES	CryptographicKeysandKeyRings	KeyManagement	VirusesandRelated Threats
SLO 9&10	**Laboratory**2:playfaircipher	**Laboratory**5:Perform encryption and decryption usingfollowingtranspositiontechniques. Rail fence	**Laboratory**8:ExampleonDES	**Laboratory**11:ApplyRSAalgorithm for practical Applications.	**Laboratory**14:exampleonAES
SLO-11	Mon alphabetic Ciphers PlayfairCipher	DifferentialandLinearCryptanalysis	Public-KeyManagement	OverviewonWebSecurity	Virus Countermeasures
SLO-12	Hill Cipher	Block Cipher Design Principles	S/MIME(Secure/MultipurposeInternet Mail Extension)	WebSecurityConsiderations	Overviewon Firewall
SLO-13	PolyalphabeticCiphers,One-TimePad				
SLO 14&15	OverviewofTranspositionTechniques	PrinciplesofPublic-KeyCryptosystems	S/MIME Functionality	Secure Socket Layer andTransportLayerSecurity	FirewallDesignPrinciples

Resources

1	AndersonB.H.,DursatonandPoole, M:Thesisand assignmentwriting,WileyEastern 1997	4	Walpole,R.A.,Myers,R.H.,Myers,S.L.andYe,King:ProbabilityandStatisticsforEngineersandScientists,PearsonPrenticeHall,PearsonEducationInc.,2012
2	Bordens,K.S.andAbbott,B.B:ResearchdesignandMethods,McGrawHill,2008	5	Kothari,C.K.[2004],2.e,ResearchMethodology–MethodsandTechnique3s[NewAgeInternational,New Delhi]
3	Leedy,P..:PracticalResearch–Planninganddesign,NinthEdition,Pearson, 2010		

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT chennai	1	Dr.D.Elangovan Assistant Professor, FSH, SRMIST

SEMESTER VIII

Course Code	UCS24D15J	Course Title	AI and Business Analytics	Category	D	Discipline core / Elective course	L	T	P	C
							3	0	2	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
CLR-1	Understand the Foundations of Business Analytics and Artificial Intelligence	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Communication Skills, Collaboration Skills, Problem Solving, Critical	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology Skills	Value Inculcation,	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2	7
CLR-2	Understand the concepts of data processing and visualization																		
CLR-3	Understand the Statistical Analysis and Machine Learning Fundamentals																		
CLR-4	Familiarize the Advanced Machine Learning techniques and Responsible AI																		
CLR-5	Familiarize the Integration of Business Analytics and AI																		

CLO	At the end of this course, learners will be able to:																		
CLO-1	Apply Data Handling and Preprocessing Techniques	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1	
CLO-2	Analyze Data Using Statistical Methods	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1	
CLO-3	Visualize Data for Effective Communication and Develop Predictive Models for Business Forecasting	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2	
CLO-4	Apply AI Techniques to Solve Business Problems	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3	
CLO-5	Integrate Business Analytics and AI for Holistic Analysis	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3	

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	15	15	15	15	15
SLO-1	Introduction to Generative AI	Data Analytics using Python	Introduction of Power BI	Definition and Importance in Business Analytics	Key Concepts in ML: Data, Models, Algorithms
SLO-2	Prompt Engineering, ChatGPT	Introduction to Numpy	Business Intelligence with Power BI	Correlation and Regression	Supervised and Unsupervised Learning
SLO-3	Importance of business analytics	Working with Numpy	Power BI project	Full project in Regression	Techniques for implementing various learning

SLO 4-5	**Lab 1:** Prompt Engineering	**Lab 4:** Numpy	**Lab 7:** Working with Web APIs in python	**Lab 10:** linear Regression using python	**Lab 13: File:** Supervised learning using python
SLO-6	Python Fundamentals	Introduction of R Programming	Introduction of Extract Transform and Load	Popular Data Mining Techniques: Clustering, Classification, Association Rule Mining	Data Ethics
SLO-7	Python Installation	Data Analytics with R	Extract Transform and Load	Role of Data Mining in Decision Making	Examine ethics in ML and AI development
SLO-8	Applications of Generative AI in Business and Data Analytics	R programming project	ETL- a complete project	Data mining in business analytics	**Modeling Optimization Problems**:
SLO 9-10	**Lab 2:** Python Basics	**Lab 5:** Pandas	**Lab 8:** Data Visualization using Python	**Lab 11:** logistic Regression using python	**Lab 14:** Unsupervised learning using python
SLO-11	Basic Statistics	Introduction of Tableau	Data Visualization	Role of Data Mining in Decision Making	Mathematical optimizations
SLO-12	Python control statements	Data Visualization with Tableau	Statistical Analysis using Excel	Data classification in business analytics	fundamentals of optimization modeling
SLO-13	looping statements	Tableau – a complete project	Data Analysis using Excel- a practical outlook	Tools for Data classification in business analytics	Applications of Optimization in Machine Learning
SLO 14-15	**Lab 3:** Python control statements and looping statements	**Lab 6:** Working with CSV, EXCEL files in python	**Lab 9:** SciPy and Seaborn	**Lab 12:** Data classification using python (SVM)	**Lab 15:** Capstone project

Resources			
1	Foster Provost, Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking 1st Edition, O'Reilly Media; 1st edition, 2013	4	Andrew Ng, Machine Learning Yearning
2	William McKinney, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython, 2nd Edition, Shroff/O'Reilly; Second edition ,2017	5	Luiz Paulo Favero, Patricia Belfiore,Data Science for Business and Decision Making, Academic Press Inc ,2019

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT chennai	1	Dr. S SABEEN, Dept. of Computer Science, FSH, SRMIST

Course Code	USA24D18J	Course Title	Cyber Security	Category	D	Discipline core / Elective course	L	T	P	C
							3	0	2	4

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

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	7	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Communication Skills, Collaborating Skills	Problem Solving, Critical	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology Skills	Value Inculcation,	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	To become familiar with objective of cyber technologies																		
CLR-2	To become familiar with threats in OS																		
CLR-3	To gain knowledge on security issues																		
CLR-4	To understand Security technologies and functions																		
CLR-5	To gain hands on experience in security related treads and techniques																		
CLO	At the end of this course, learners will be able to:																		
CLO-1	Have a clear picture about cyber security	✓	✓	-	-	2	85	75		3	-	-	1	-	3	-	2	-	-
CLO-2	Analyze the current security threats	✓	✓	✓	-	2	85	75		3	2	1	2	2	3	-	1	-	-
CLO-3	Understandings on security related issues	✓	✓	✓	✓	3	85	75		3	1	3	1	3	3	-	1	-	-
CLO-4	Analyse and gain knowledge on technologies	✓	✓	✓	✓	3	85	75		3	3	2	3	3	3	-	2	-	-
CLO-5	Improves working skills with technologies	✓	✓	✓	✓	3	85	75		3	3	2	3	3	3	-	3	-	-

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	15	15	15	15	15
SLO-1	Introduction to cyber security	Overview of OS Threats	basics of digital security,	Introduction to cyber-attacks	Security Planning
SLO-2	Define Confidentiality -integrity, and availability	Security in Operating Systems	protecting personal computers and devices	Network- Security- Systems- Storage	Business Continuity Planning
SLO-3	Computer Security - Threats	Security in the Design of Operating System	protecting devices from Virus and Malware	application security design, development and testing	Handling Incidents
SLO 4&5	Practice: Perform encryption, decryption	Practic : Vigenere Ciphers	Practice: Apply DES algorithm for practical applications	Practice: Implement the secutiytriats	Practice: Apply AES algorithm for practical applications

SLO-6	Vulnerabilities - Controls - Authentication in computer security	OS security Rootkit	Authentication and Authorization,	operations security, monitoring	Dealing with Disaster
SLO-7	Cyber security policy - ESSP, ISSP, SYSSP.	Networking basics	need for strong credentials	identifying threats and remediating them	Emerging Technologies
SLO-8	define Cryptograpthy	home network	keeping credentials secure,	Principles of data security	The Internet of Things
SLO 9&10	Practice:playfair Cipher	Practice: Perform encryption and decryption using following transposition techniques. Rail fence	Practice: Perform authentication	Practice : example on RSA	Practice: Laboratory: example on AES
SLO-11	Techniques involved in – Cryptography	large-scale business networks	protecting servers using physical and logical security	Confidentiality – integrity - avalability	Economics - Electronic Voting
SLO-12	Need for Cryptogrpahy	Networking protocols	World Wide Web (www),	Data Privacy, Data breaches,	Cyber Warfare- Cyberspace and the Law
SLO-13	, Threats to Information System	security protocols	the Internet and the HTTP protocol, security of browser to web server interaction,	- preventing attacks and breaches with security controls	International Laws - Cyber crime
SLO 14&15	Practice: HillCipher	Practice: . Row & Column , Transformation	Practice: example on DES	Practice: Implement the Digital Signature Standard.	Practice: Implement theDiffie-Hellman Key ExchangeAlgorithm

Resources

1	Joseph Muniz, Gary McIntyre, Security Operations Center, Cisco press 2015	3	Behrouz A. Forouzan, Cryptography and Network Security:6th Ed. McGraw Hill,2017
2	Bordens, K. S. and Abbott, B.B : Research design and Methods, Mc Graw Hill, 2008	4	William Stallings, “Cryptography and Network Security”, PHI/Pearson Education.
3	Michael E. Whitman, Herbert J. Mattord, (2018). Principles of Information Security, 6th edition, Cenage Learning, N. Delhi.		

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT chennai	1	Dr. Ramesh. M, Assistant Professor, FSH, SRMIST

Course Code	USA24D20J	Course Title	Blockchain Technology	Category	D	Disciplinary core/ Elective course	L	T	P	C
							3	0	2	4

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

CLR	The purpose of learning this course is to:
CLR-1	TounderstandthedesignprinciplesofBitcoinandEthereum.
CLR-2	TolearnNakamotoconsensus
CLR-3	Interactwithablockchainsystembysendingandreadingtransactions
CLR-4	Todesign,build,anddeployadistributedapplication
CLR-5	Toevaluatesecurity,privacy,andefficiencyofagivenblockchainsystem.

CLO	At the end of this course, learners will be able to:	Depth				Attainment			7	Programme Learning Outcomes									
		1 Conceive	2 Design	3 Implement	4 Operate	1 Level of Thinking	2 Expected Proficiency (%)	3 Expected Attainment (%)	Communication Skills, Collaborative Skills	1 Problem Solving, Critical	2 Communication Skills,	3 Independent Thinking, Analytical	4 Leadership Qualities,	5 Digital Technology Skills	6 Value Inculcation, Multicultural	7 Environmental Action,	8 Entrepreneurial Risk Taking	9 PSO-1	10 PSO-2
CLO-1	Understandhowblockchainsystems(mainlyBitcoinandEthereum)work	✓	✓	-	-	2	85	75		3	-	-	1	-	3	-	2	2	1
CLO-2	Tosecurelyinteractwithblockchainnodes	✓	✓	✓	-	2	85	75		3	2	1	2	2	3	-	1	2	1
CLO-3	ToBroadcastthetransactions	✓	✓	✓	✓	3	85	75		3	1	3	1	3	3	-	1	1	2
CLO-4	Designbuildanddeploysmartcontractsanddistributedapplications	✓	✓	✓	✓	3	85	75		3	3	2	3	3	3	-	2	3	3
CLO-5	Integrateideasfromblockchaintechnologyintotheirownprojects	✓	✓	✓	✓	3	85	75		3	3	2	3	3	3	-	3	3	3

Sessions		CLO -1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
		15	15	15	15	15
S-1	SLO-1	Blockchain Introduction	Database Vs. Blockchain Architecture	The Structure of Blockchains	Introduction to Cryptocurrency	Ethereum
	SLO-2	Blockchain Architecture	Types of Blockchain Architecture	Blockchain Data Structure	Blockchain and Cryptocurrency	Overview of Ethereum
S-2	SLO-1	Blockchain Working	Public Blockchains	Transactions	Double Spending	Need for Ethereum
	SLO-2	Blockchain Transactions	Private Blockchains	Blocks	Double Spending Example	Purpose of Ethereum
S-3	SLO-1	Need for Blockchain	Consortium Blockchains	Types of Blocks	Cryptography in Blockchain	Ethereum Vs Bitcoin
	SLO-2	Applications of Blockchain	Hybrid Blockchains	Peer-to-Peer(P2P) Network	Types	Ethereum Blockchain
S4-5	SLO-1	Laboratory 1: Making the Blockchain Network nodes to run	Laboratory 4: Broadcasting the transactions	Laboratory 7: Implementation of an Interface with search functionality	Laboratory 10: Interact with a blockchain system by sending and reading transactions.	Laboratory 13: Smart Contract Construction in Solidity
	SLO-2					
S-6	SLO-1	Blockchain Versions	Main components of Blockchain	Difference between Blockchain and Normal Database	Applications	Features of Ethereum
	SLO-2	Blockchain Variants	Challenges in Blockchain	Consensus	Public Key Cryptography	Applications of Ethereum
S-7	SLO-1	Public	Centralized System	Consensus Algorithm	Use of Cryptography in Blockchain	Smart Contracts on Ethereum
	SLO-2	Private	De-centralized System	Mining	Cryptographic hash functions	Ethereum Vs Ether
S-8	SLO-1	Consortium	Key Elements of Blockchain	Proof of Work (PoW)	Types of cryptographic hash functions	Ether- Gas
	SLO-2	Blockchain Use Cases	Distributed ledger technology	Proof of Work Mining	Bitcoin	How Ethereum is different from Bitcoin?
S-9	SLO-1	Laboratory 2: Implementation of Broadcasting	Laboratory 5: Broadcasting multiple	Laboratory 8: Implementation of PoW	Laboratory 11: Mining puzzles	Laboratory 14: Interact with Solidity

Duration (Hour)		15	15	15	15	15
9-10	SLO-2	Nodes	transactions	algorithm		Contract in nodejs console
S-11						
	SLO-2	Bitcoin Cyrptocurrency	Smart contracts	How Proof of Stake (PoS) works?	Blockchain Hashing	Ethereum and Solidity
S-12	SLO-1	Most Popular Application of Blockchain	Components of Blockchain Architecture	Difference between PoW and PoS		Testing in Solidity
	SLO-2	Blockchain Vs. Shared Database	Key Characteristics of Blockchain Architecture	SHA256 Algorithm	Bitcoin Mining	Debugging in Solidity
S-13						
	SLO-2	Limitations of Blockchain Technology	Blockchain Applications	Simplified Byzantine Fault Tolerance (SBFT)	Process of Mining	Disadvantages of Ethereum
S 14-S15	SLO-1	Laboratory 3: Synchronizing the nodes	Laboratory 6: Implementation of Mining	Laboratory 9: Implementation of POS algorithm	Laboratory 12: Design, build, and deploy a distributed application	Laboratory 15: Interact with solidity Contract in web browser

Resources			
1	Tiana Laurence, BlockchainforDummies,(2017),Wiley India Pvt. Ltd.	3	Bikramaditya Singhal, Gautam Dhameja, Priyansu Sekhar Panda, Beginning Blockchain :A Beginner's Guide to Building Block chain Solutions(2018),Apress Media.
2	Tim Mathis, Block chain: The Technology Behind Bitcoin And Other Cryptocurriences(EBook).		

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	15	15	15	15	10	10	10	10	15	15
2	Understand	15	15	15	15	10	10	10	10	15	15
3	Apply	20	25	25	20	25	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10	10
6	Create	15	10	10	15	15	15	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT Chennai	1	Dr.Kalpana. G, Professor,FSH,SRMIST

Course Code	UCS24D18T	Course Title	Introduction to Cyber Physical Systems	Category	D	Discipline Core / Elective Course	L	T	P	C
							4	0	0	4

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

Course Rationale (CLR)	The purpose of learning this course is to	Depth				Attainment			Program Learning Outcomes										
CLR-1	Obtain Physical Cyber Systems fundamentals and principles knowledge as building blocks to promote further design and implementation of more complex real time systems.	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Understand Physical Cyber Systems design for synchronous model with specific case study for arm processor.	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills,	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PLO-9	PLO-10
CLR-3	Understand the necessity of Cyber physical systems to have optimal performance of asynchronous model																	
CLR-4	Comprehend the physical cyber systems design and implementation in dynamic models																	
CLR-5	Hybridization of Cyber physical systems which will help the students to anticipate upcoming technologies																	
Course Learning Outcomes (CLO)	At the end of this course, learners will be able to																	
CLO-1	Understand the Basics of Physical system	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Design synchronous models for Real Time applications	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Design Asynchronous models for real time applications	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Develop Deep Understanding on selection of hardware and software for designing dynamical systems.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Come up with cost effective, reliable, robust and feasible designs for real world problems.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	12	12	12	12	12
SLO-1	Introduction To Cyber-Physical Systems	Synchronous model overview, Reactive Components,	Asynchronous Process overview, States, Internal Actions,	Overview of dynamic systems	Introduction to Hybrid systems
SLO-2	Interoperability, Survivability	Variables, Valuations	Operations On Process	Continuous Time Model	Hybrid Dynamical Model,
SLO-3	Cyber-Physical System Requirements	Expression and Execution,	Blocking Vs Non-Blocking Synchronization	. Continuously Evolving Inputs and Outputs	Zeno Behavior
SLO-4	Interoperability,Survivability	Extended-State Machines,	Deadlocks	Models with Disturbance,	Designing Hybrid Systems
SLO-5	Real Time System, Internet of Things (IOT),	Properties of Components	Shared Memory,	Composing Components Stability	Automated Guided Vehicle,
SLO-7	Radio Frequency Identification Technology and its use in CPS,	Various Types of components,	Fairness Assumptions	Linear Systems Linearity	Obstacle with Multi Robot Coordination
SLO-8	Application in CPS,	Composing Components	Leader Election,	Equations and stability,	Multi Hop Control Networks
SLO-9	Power line Communication	Output Hiding	Reliable Transmission	Designing Controllers	Linear Hybrid Automata,
SLO-10	Smart Cities And Internet Of Everything	Synchronous Designs (Synchronous Circuits, Cruise Control Systems, Synchronous Networks).	Wait Fee Consensus, Safety Specifications	Open Loop Vs Feedback Controller	Pursuit Game problem,
SLO-11	Ubiquitous Computing Fundamentals	Cruise Control Systems, Synchronous Networks).	Invariants Of Transition Systems,	PID Controllers, Analysis Techniques,	Timed Automata,
SLO-12	Autonomous Systems in Ubiquitous Computing	Case Study	Safety Monitors	Barrier Certificates	Model of Timed Automata

Resources			
1	Rajeev Alur, "Principles of Cyber Physical Systems", 1st Edition, MIT Press 2015	3	Raj Rajkumar, " Cyber Physical Systems" , 2nd Edition Elsevier 2015
2	Edward D Lamie, " Computing Fundamentals of Cyber Physical Systems", 2 nd Edition, Newnes Elsevier Publication		

Assessment

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

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools		Group Discussion	✓	Quality Education	✓
Learning Management System		Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i)Seminars, (ii)Mini-Project, (iii)Case-Studies, (iv)MOOC Certification (v)Publication of Article (vi)Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathnamani, Datayan Solutions (P) Ltd., Chennai	1	Dr. Neela Narayanan V, Professor, VIT Chennai	1	Dr. Yoga Lakshmi .P

Course Code	UCS24P04L	Course Title	Research Project and Dissertation	Category	P	ProjectWork /Internship	L	T	P	C
							0	0	24	12

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

Course Rationale (CLR)	The purpose of learning this course is to	Depth				Attainment			Program Learning Outcomes									
CLR-1	Demonstrate skills learnt in the real time environment.	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Explore the different industries that are using IT	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical	Communication Skills,	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	Project Management	Individual & Team work
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	✓	✓	-	-	2	85	75	3	-	3	3	3	-	-	-	3	3
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	-	2	85	75	3	-	3	3	3	-	-	-	3	3
CLO-3	To make professional connections and enhance networking	✓	✓	✓	✓	3	85	75	3	-	3	3	3	-	-	-	3	3
CLO-4	To get experience in a field to allow the student to make a career transition	✓	✓	✓	✓	3	85	75	3	-	3	3	3	-	-	-	3	3
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	3	85	75	3	-	3	3	3	-	-	-	3	3

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

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

Course Code	UCS24P05L	Course Title	Professional Internship	Category	P	ProjectWork /Internship	L	T	P	C
							0	0	24	12

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

Course Rationale (CLR)	The purpose of learning this course is to	Depth				Attainment			Program Learning Outcomes										
CLR-1	Demonstrate skills learnt in the real time environment.	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Explore the different industries that are using IT	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical	Communication Skills,	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	Project Management	Individual & Team work
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	✓	✓	-	-	2	85	75	3	-	3	3	3	-	-	-	3	3
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	-	2	85	75	3	-	3	3	3	-	-	-	3	3
CLO-3	To make professional connections and enhance networking	✓	✓	✓	✓	3	85	75	3	-	3	3	3	-	-	-	3	3
CLO-4	To get experience in a field to allow the student to make a career transition	✓	✓	✓	✓	3	85	75	3	-	3	3	3	-	-	-	3	3
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	3	85	75	3	-	3	3	3	-	-	-	3	3

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

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

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