

FACULTY OF SCIENCE AND HUMANITIES

ACADEMIC CURRICULA

UNDERGRADUATE DEGREE PROGRAMME

Bachelor of Computer Applications (Honors)

Generative Artificial Intelligence

Four Years

National Education Policy

Learning Outcome-based Curricula Framework

National Credit Framework

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					
Stmnt - 1	Imparting quality education in Computer Applications with the knowledge of Generative Artificial Intelligence and prepare young minds to serve community				
Stmnt - 2	Contributing effectively to produce globally competent quality professionals in the field of Computer Applications with the sound knowledge in Generative Artificial Intelligence				
Stmnt - 3	Prioritizing adaptability and industry alignment for a unique learning experience				
2. Mission Statement					
Stmnt - 1	Impart student’s essential knowledge and skills required for a successful career in Computer Applications with the specialization in Generative Artificial Intelligence				
Stmnt - 2	Cultivate and foster a conducive environment for scholarly research				
Stmnt - 3	Inculcate in the students a sense of commitment to professional ethics, moral values with emphasis on team work and leadership qualities				
Stmnt - 4	Instill the students with a clear awareness of environmental issues and their relevance to their profession				
Stmnt - 5	Impress upon the students the impact of their work on the nation’s economic and social progress				
“Stmnt” stands for Statement					
3. Programme Education Objectives (PEO)					
PEO - 1	To develop skills and domain knowledge to solve real world problems in diverse applications				
PEO - 2	To facilitate professional skills and competencies for successful career in the field of Computer Applications				
PEO - 3	To possess the knowledge for pursuing advanced studies and entrepreneurial opportunities in the field of Computer Applications				
PEO - 4	To kindle the minds of students to take up research and development in Computer Applications with missionary zeal				
PEO - 5	To prepare the students as balanced individuals who are keen to leave a mark by excelling in their profession				
4. Consistency of Programme Education Objectives with Mission					
	Mission Stmnt. - 1	Mission Stmnt. – 2	Mission Stmnt. - 3	Mission Stmnt. - 4	Mission Stmnt. – 5
PEO - 1	High	High	High	High	Medium
PEO - 2	High	High	Medium	High	High
PEO - 3	High	Medium	Medium	Medium	Low
PEO - 4	Medium	Low	High	Low	Medium
PEO - 5	Low	High	Low	Medium	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	Problem Solving, Critical Thinking, Creativity				
PLO - 2	Communication Skills, Collaborating Skills				
PLO - 3	Independent Thinking, Analytical Reasoning, Learning to Learn ,Research Skills				
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				

PSO - 1	Encompassing both theoretical knowledge and real-world applications to solve problems, to evaluate information and to develop software tools
PSO - 2	Practical, analytical, and proficient programming skills, and innovative solutions in various domains of Generative Artificial Intelligence

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	3	3	3	2	3	1	1	3	3	3
PEO - 2	3	3	3	3	3	2	3	2	3	3
PEO - 3	2	2	2	1	2	2	2	3	3	3
PEO - 4	3	2	3	2	3	3	3	2	3	3
PEO - 5	2	3	2	3	2	3	2	2	2	3

7. Programme Structure						
Discipline Core Courses (C)						
Course Code	Course Title	Sessions/Week			C	
		L	T	P		
UDS24101J	Programming using Java	3	0	3	4	
UGI24102J	Generative Artificial Intelligence	3	0	3	4	
UMS24103T	Mathematics for Artificial Intelligence	4	0	0	4	
UGI24201J	Machine Learning for Natural Language Processing	3	0	3	4	
UDS24202J	Data Structures and Algorithms	3	0	3	4	
UMS24203T	Statistics for Artificial Intelligence	4	0	0	4	
UGI24301J	Python with Django Framework	3	0	3	4	
UDS24302J	Database Management System	3	0	3	4	
UGI24303T	Deep Learning	4	0	0	4	
UGI24401J	Generative AI and LLM Frameworks	3	0	3	4	
Total Learning Credits					40	

Discipline Core/ Elective Courses (D)					
Course Code	Course Title	Sessions/Week			C
		L	T	P	
UDS24D01J	Advanced Computing with Python	3	0	2	4
UGI24D02J	Artificial Neural Networks				
UGI24D03J	Generative Adversarial Network	3	0	3	4
UDS24D04J	Big Data Analytics with Applications				
UGI24D05J	Large Language Model	3	0	3	4
UDS24D06J	Computer Vision				
UDS24D07J	Advanced Analytics and Data Visualization	3	0	3	4
UGI24D08J	Prompt Engineering				
UGI24D09J	Image Generative Models	3	0	3	4
UGI24D010J	Advanced Web Application Development				
UGI24D11T	Research Methodology in Generative AI	4	0	0	4
UDS24D12T	Data Analytics for Project Management	4	0	0	
UGI24D013J	Human Machine Interaction	3	0	3	4
UGI24D014J	Working with Industrial Internet of Things				
UGI24D015J	Artificial Intelligence and Machine Learning for Robotics	3	0	3	4
UGI24D016J	Web Intelligence and Mining				
UGI24D017J	Security, Ethics and Bias in Generative AI	3	0	2	4
UDS24D18J	Social Media and Text Analytics				
UGI24D019T	Reinforcement Learning	4	0	0	4
UDS24D20T	Applications of Edge IoT and Machine Learning				
Total Learning Credits					40

Elective Courses (Minor) (E)						
Course Code	Course Title	Sessions / Week			C	
		L	T	P		
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	Sessions/ Week			C	
		L	T	P		
UGI24M01J	Advance Excel and Power BI	2	0	2	3	
UGI24M02J	Cyber Security	2	0	2	3	
UGI24M03J	Game Theory and AI	2	0	2	3	
Total Learning Credits					9	

Value Added Courses (V)						
Course Code	Course Title	Sessions/ Week			C	
		L	T	P		
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	Sessions/ Week			C	
		L	T	P		
ULT24AE1J	Tamil – I	2	0	2	3	
ULH24AE1J	Hindi – I					
ULF24AE1J	French – I					
ULE24AE2J	Business 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	Sessions/ Week			C	
		L	T	P		
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	Sessions/ Week				
		L	T	P		
UGI24P01L	Internship - I	0	0	0	1	
UGI24P02L	Internship – II	0	0	0	1	
UGI24P03L	Project Work	0	0	4	2	
UGI24P04L	Research Project and Dissertation	0	0	24	12	
UGI24P05L	Professional Internship					
Total Learning Credits					16	

Mandatory Courses (Y)						
Course Code	Course Title	Sessions/ Week				
		L	T	P		
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				
ULE24AE2J	Business English	2	0	2	3
UDS24101J	Programming using Java	3	0	3	4
UGI24102J	Generative Artificial Intelligence	3	0	3	4
UMS24103T	Mathematics for Artificial Intelligence	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				
UGI24201J	Machine Learning for Natural Language Processing	3	0	3	4
UDS24202J	Data Structures and Algorithms	3	0	3	4
UMS24203T	Statistics for Artificial Intelligence	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 Course of FIRST Year = 40

Semester – III					
Course Code	Course Title	Sessions Per Week			C
		L	T	P	
UGI24301J	Python with Django Framework	3	0	3	4
UDS24302J	Database Management System	3	0	3	4
UGI24303T	Deep Learning	4	0	0	4
	Minor Elective – I				4
UGI24P01L	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	
UGI24401J	Generative AI and LLM Frameworks	3	0	3	4
UDS24D01J	Advanced Computing with Python	3	0	2	4
UGI24D02J	Artificial Neural Networks				
	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 Course of SECOND Year = 40

Semester – V					
Course Code	Course Title	Sessions Per Week			C
		L	T	P	
UGI24D03J	Generative Adversarial Network	3	0	3	4
UDS24D04J	Big Data Analytics with Applications				
UGI24D05J	Large Language Model	3	0	3	4
UDS24D06J	Computer Vision				
	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
UGI24P02L	Internship – II	0	0	0	1
Total Learning Credits					20

Semester – VI					
Course Code	Course Title	Sessions Per Week			C
		L	T	P	
UDS24D07J	Advanced Analytics and Data Visualization	3	0	3	4
UGI24D08J	Prompt Engineering				
UGI24D09J	Image Generative Models	3	0	3	4
UGI24D010J	Advanced Web Application Development				
	Minor Elective – V				4
	Minor Elective – VI				4
UGI24P03L	Project Work	0	0	4	2
UCD24V02T	Universal Human Values	2	0	0	2
Total Learning Credits					20

Total Learning Credits of Course of THIRD Year = 40

Semester – VII					
Course Code	Course Title	Sessions Per Week			C
		L	T	P	
UGI24D11T	Research Methodology in Generative AI	4	0	0	4
UDS24D12T	Data Analytics for Project Management				
UGI24D013J	Human Machine Interaction	3	0	3	4
UGI24D014J	Working with Industrial Internet of Things				
UGI24D015J	Artificial Intelligence and Machine Learning for Robotics	3	0	3	4
UGI24D016J	Web Intelligence and Mining				
	Minor Elective – VII				4
	Minor Elective – VIII				4
Learning Credits					20

Semester – VIII					
Course Code	Course Title	Sessions Per Week			C
		L	T	P	
UGI24D017J	Security, Ethics and Bias in Generative AI	3	0	2	4
UDS24D18J	Social Media and Text Analytics				
UGI24D019T	Reinforcement Learning	4	0	0	4
UDS24D20T	Applications of Edge IoT and Machine Learning				
UGI24P04L	Research Project and Dissertation	0	0	24	12
UGI24P05L	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 Applications to other Departments (Excluding Department of Computer Applications)

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 Spread Sheet	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 Applications to all departments (Including Department of Computer Applications)

Multidisciplinary Courses (M)						
Semester	Course Code	Course Title	Sessions Per Week			C
			L	T	P	
II	UGI24M01J	Advance Excel and Power BI	2	0	2	3
III	UGI24M02J	Cyber Security	2	0	2	3
V	UGI24M03J	Game Theory and AI	2	0	2	3
Total Learning Credits						9

9. Programme Articulation Matrix												
Course Code	Course Title	Programme Learning Outcomes (PLO)										
		1	2	3	4	5	6	7	8	PSO 1	PSO 2	
ULT24AE1J	Tamil – I	2	1	1	1	-	1	1	1	-	-	
ULH24AE1J	Hindi – I	2	2	1	2	2	1	1	-	-	-	
ULF24AE1J	French – I	2	2	1	2	2	1	1	-	-	-	
ULE24AE2J	Business English	-	3	3	3	2	1	-	2	-	-	
UDS24101J	Programming using Java	3	1	2	2	3	-	-	2	3	3	
UGI24102J	Generative Artificial Intelligence	3	3	3	3	3	3	-	2	3	3	
UMS24103T	Mathematics for Artificial Intelligence	1	1	-	-	1	-	-	-	-	-	
UCD24S01J	Verbal Ability and Skill Development	3	2	1	1	-	2	1	-	-	-	
ULT24AE2J	Tamil – II	2	1	2	1	-	1	1	1	-	-	
ULH24AE2J	Hindi – II	2	2	1	2	2	1	1	-	-	-	
ULF24AE2J	French – II	2	2	1	2	2	1	1	-	-	-	
UGI24201J	Machine Learning for Natural Language Processing	3	3	2	3	3	3	-	2	3	3	
UDS24202J	Data Structures and Algorithms	3	2	2	2	3	-	-	2	2	3	
UMS24203T	Statistics for Artificial Intelligence	1	1	-	-	1	-	-	-	-	-	
UCD24V01T	Essentials of Artificial Intelligence	2	1	1	1	2	-	-	2	1	1	
	Multidisciplinary Course – I											
UCD24S02L	Quantitative Aptitude and Logical Reasoning	2	1	3	-	2	2	-	-	-	-	
UNS24Y01L	NSS	1	2	3	1	1	2	1	1	0	0	
UNC24Y01L	NCC	1	2	3	1	1	2	1	1	0	0	
UNO24Y01L	NSO	1	2	3	1	1	2	1	1	0	0	
UYG24Y01L	YOGA	1	2	3	1	1	2	1	1	0	0	
UGI24301J	Python with Django Framework	3	2	1	1	-	-	2	3	3	3	
UDS24302J	Database Management System	3	1	2	2	3	-	-	2	3	3	
UGI24303T	Deep Learning	3	1	3	2	3	-	-	2	3	2	
	Minor Elective – I											
UGI24P01L	Internship – I	3	2	2	1	2	2	2	2	3	3	
	Multidisciplinary Course – II											
UGI24401J	Generative AI and LLM Frameworks	3	3	2	2	1	2	2	2	3	3	
UDS24D01J	Advanced Computing with Python	3	1	2	2	3	-	-	2	2	3	
UGI24D02J	Artificial Neural Networks	3	1	2	2	2	-	-	2	3	3	
	Minor Elective – II											
	Minor Elective – III											
UEN24S01L	Communication Skills	2	3	1	2	-	-	2	1	-	-	
UCD24S03J	Industry Oriented Employability and Leadership Skills	3	2	2	1	2	2	-	2	2	2	
UMI24Y01L	My India Project	2	2	3	2	2	2	1	1	-	-	
UGI24D03J	Generative Adversarial Network	3	2	2	1	-	-	1	2	2	3	
UDS24D04J	Big Data Analytics with Applications	3	1	1	1	2	-	-	2	3	3	
UGI24D05J	Large Language Model	3	2	2	1	2	-	2	3	-	-	
UDS24D06J	Computer Vision	3	1	2	2	2	-	-	2	3	3	
	Minor Elective – IV											
	Multidisciplinary Course - III											
UES24V01T	Environmental Studies	3	2	1	-	2	1	-	2	2	-	
UCD24S04J	Career Readiness and Professional Skills	2	3	1	2	-	-	2	1	-	-	
UGI24P02L	Internship – II	3	2	2	3	2	2	3	2	3	3	
UDS24D07J	Advanced Analytics and Data Visualization	3	1	1	2	2	-	-	2	3	3	
UGI24D08J	Prompt Engineering	3	2	2	2	2	3	2	-	1	3	

UGI24D09J	Image Generative Models	3	1	1	-	2	2	3	1	2	3
UGI24D010J	Advanced Web Application Development	2	3	2	1	1	-	-	2	3	3
	Minor Elective – V										
	Minor Elective – VI										
UGI24P03L	Project Work	3	2	2	2	2	1	1	2	3	3
UCD24V02T	Universal Human Values	1	2	3	2	3	2	2	2	1	1
UGI24D11T	Research Methodology in Generative AI	3	1	1	2	2	-	-	2	1	3
UDS24D12T	Data Analytics for Project Management	3	2	1	2	2	2	-	2	1	2
UGI24D013J	Human Machine Interaction	3	1	1	2	2	-	-	2	3	3
UGI24D014J	Working with Industrial Internet of Things	3	2	2	1	1	-	-	2	3	3
UGI24D015J	Artificial Intelligence and Machine Learning for Robotics	2	3	3	1	1	2	2	3	1	-
UGI24D016J	Web Intelligence and Mining	1	2	2	3	3	-	-	2	3	3
	Minor Elective – VII										
	Minor Elective – VIII										
UGI24D017J	Security, Ethics and Bias in Generative AI	2	1	2	2	-	-	3	2	2	2
UDS24D18J	Social Media and Text Analytics	3	1	2	2	2	-	-	2	3	3
UGI24D019T	Reinforcement Learning	3	2	2	2	3	1	1	1	3	3
UDS24D20T	Applications of Edge IoT and Machine Learning	2	1	2	2	2	-	-	2	2	3
UGI24P04L	Research Project and Dissertation	3	2	3	2	3	2	2	2	3	3
UGI24P05L	Professional Internship	3	2	3	2	3	2	2	2	3	3

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
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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	மரபிலிருந்து மாற்றம் பெற்ற புதுக்கவிதை மரபின் சிந்தனைகளை அறியச் செய்தல்																	
CLR-2	நவீனகவிதையின் வழி மனித வாழ்வியல் விழுமியங்களைத் தெரியச் செய்தல்																	
CLR-3	சிற்பிலக்கியங்கள், காப்பியங்கள் கற்பிக்கும் தமிழ்ச் சமூகத்தின் வாழ்வியலை அறியச் செய்தல்																	
CLR-4	நவீன தமிழ் இலக்கிய வளர்ச்சி வரலாற்றைப் புரியச் செய்தல்																	
CLR-5	மொழிப் பயிற்சி வழி மொழியின் பல்வேறு நுட்பங்களைத் தெரியச் செய்தல்																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's 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	PSO-1	PSO-2
CLO-1	புதுக்கவிதை உருவாக்கித் தந்த புதிய சிந்தனைக் களங்களை அறிந்துகொள்ளுதல்	✓	✓	-	-	2	75	60	3	-	3	-	-	-	-	3	-	-
CLO-2	நவீன கவிதைகள் வழி மாற்றம் பெற்று வரும் மானுட விழுமியங்களைத் தெரிந்துகொள்ளுதல்	✓	✓	✓	-	2	80	70	-	-	-	2	-	3	3	-	-	-
CLO-3	தமிழ்ச்சமூகத்தின் இடைக்கால வாழ்வியல் முறைகளை உணர்ந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	65	3	-	3	-	-	3	-	-	-	-
CLO-4	நவீன இலக்கிய வரலாறு வழி தமிழ்க் கல்வி வரலாறு, சமூக வரலாறு பெற்ற வளர்ச்சி நிலைகளைத் தெரிந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	70	-	3	-	-	1	2	-	-	-	-
CLO-5	மொழியின் நுட்பங்களைத் தெரிந்து மொழி ஆளுமையோடு செயல்படும் திறன்பெறுதல்	✓	✓	✓	✓	3	80	70	3	3	-	3	-	-	-	-	-	-

Session	CLO - 1 12	CLO - 2 12	CLO - 3 12	CLO - 4 12	CLO - 5 12
SLO-1	தமிழ்க்கவிதைமரபு	நவீனகவிதைதோற்றம், வரலாறு	தமிழரின்வீரமரபு - போர்விழுமியங்கள்	சிறுநிலக்கியத்தோற்றம் - வகைமை	தமிழ்உரைநடைமரபு - உ.வே.சா. விற்பங்களிப்பு
SLO-2	புதுக்கவிதைஉருவாக்கம், புதுக்கவிதைவளர்ச்சிநெறிகள்	நவீனகவிதைகளில் செல்நெறிகள்	பரணியறிமுகம் பரணியிலக்கியங்கள்	பிள்ளைத்தமிழ் - உலா - தூது	உ.வே.சா. விற்பாஜவைத்தியம்
SLO-3	பாரதியார்பன்முகஆளுமைத்திறன்	கவிதைமொழி - நவீனகவிஆளுமைகள்	தலைவனின்வீரம் - கலிங்கத்துப்பரணியுடைய 477,490	புதுக்கவிதையின்தோற்றம்மொழியும்	நாட்டுப்புறமரபில்சிறுநெய்யவழிபாடு
SLO-4	பாரததேசம் பாரததேசத்தின்வளம்	கவிதையில்நாட்டுப்புறவடிவம்	தமிழிலக்கியமரபில் தூதுஇலக்கியங்கள்	புதுக்கவிதையில்சமூகம் - புதுக்கவிதையும்தமிழ்களும்	கழனிபூரணியின்பொன்காத் தஜயனார்
SLO-5	வெள்ளிப்பனிமலையின்மீது லவுவோம்...	பெண்களின்கல்விநிலை - இளம்பிறை - அம்மா	தமிழின்பெருமை - தமிழ்விடுதூது (184 - 186)	மணிக்கொடிஇதழ், எழுத்து இதழ், வானம்பாடிஇதழ்	பிழைநீக்கிஎழுதும்நுட்பங்கள்
SLO-6	20 ஆம்நூற்றாண்டுக்கவிதைமரபில்பாரதிதாசன்	ஆண்பெண்சமத்துவமும் ப.கல்பனா - கீறல்விழுந்தமலைக்காலங்கள்	செய்யுள்மரபில் கலம்பகஇலக்கியங்கள்	சிறுகதைதோற்றம் - சிறுகதைவளர்ச்சி	எழுத்துப்பிழை - ந - ண - ன ல, ள, ழ, ர, றவேறுபாடுஅறிதல்
SLO-7	பாரதிதாசன் - அழகின்சிரிப்பு ஆல் - ஆயிரம்கிளைகள்கொண்ட அடிமரம்	விளிம்புநிலைவாழ்வியல்: திருநற்களம்சாதனைகளும்	கையறுநிலை - நந்திக்கலம்பகம் - வானுறுமதியை (110)	சிறுகதைவரலாறு - சிறுகதைஆசிரியர்கள்	தொடர்பிழை ஒருமைபன்மைவேறுபாடு

SLO-8	ஆல் - ஆயிரம்கிளைகள்கொண்ட அடிமரம்	திருநங்கைகுணவதி - சமூகப்பார்வை	தமிழ்இலக்கியமரபில் குறவஞ்சிஇலக்கியங் கள்	இதழ்களும்சிறுகதையும்	பிறமொழிச்சொற்களைநீ க்கிஎழுதுதல், ஷ,ஜ,ஸ,ஹமாற்றொலிகள்
SLO-9	வானம்பாடிக்கவிஞர்களும் மு.மேத்தாவும்	புலம்பெயர்வாழ்வியல் - வலியும்நம்பிக்கையும்	குற்றாலக்குறவஞ்சி - ஆடுமரவீனுமணி (3)	புதினம்தோற்றம் - புதினம்வளர்ச்சிவரலாறு	தமிழில்சொல்வகைகள் சொல்லும்பயன்பாடும்
SLO-10	மனிதநேயம் - மு.மேத்தாவின் மனிதனைத்தேடி	ஸர்மிளாஸெய்யித் - புராதனஊர்	காப்பியஇலக்கணம் - காப்பியவகைமைகள்	புதினத்தின்வகைமை புதினஆசிரியர்கள்	பெயர்ச்சொற்கள் பெயர்ச்சொற்களும்வகை களும்
SLO -11	தமிழ்க்கவிதையில்சுற்றுச்சூ ழலியல்	காலந்தோறும்கவிதைவடிவி ல்மாற்றங்கள். ஹைக்கூ - மு.முருகேஷ்	சிலப்பதிகாரம் - அறிமுகம் கட்டுரைக்காதை	தமிழ்இலக்கியத்தில்உரைந டைக்கூறுகள் - உரைநடையின்தோற்றம்	வினைச்சொற்கள்அறிதல்
SLO -12	இயற்கையும்சமத்துவமும் பழனிபாரதியின்காடு	லிமரைக்கூ - ஈரோடுதமிழன்பன் சென்ரியூ - மாமதயானை	ஊழ்வினை - கோவலனின்முற்பிற ப்புவரலாறு	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											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*			Simulations	Clarification/Pauses	✓	Good Health & Well Being	✓
		(10 %)		(10 %)		(20 %)		(10%)			Presentation Tools	✓	Group Discussion	✓	Quality Education
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality
1	Remember	15	15	15	15	10	10	10	10	15		Debate	✓		
2	Understand	15	15	15	15	10	10	10	10	15		Interactive Lecture	✓		
3	Apply	20	25	25	20	25	25	25	25	25		Brainstorming	✓		
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					

* 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	
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				3	Mr. G. Ganesh, Assistant Professor, Dept. of Tamil, FSH, SRMIST, RMP.
				4	Dr. T.R.Hezbibah beulah Suganthi, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.
				5	Dr. S.Saraswathy, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.

Course Code	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
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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	Bloom's 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	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Incultation, Multicultural Inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
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	-	-	2	-	-	-	-
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	2	2	-	-	-	-
CLO-4	Evaluate the various social issues depicted in the prose	✓	✓	✓	✓	3	85	75	2	-	2	3	-	-	2	-	-	-
CLO-5	To Understand the basic and fundamental principal of Translation	✓	✓	✓	✓	3	85	75	-	3	-	3	3	2	-	-	-	-

Session	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	LEKHIK PARICHAY	NATAK KA MAHATVA	UDDESHYA
SLO-6	UDDESHYA	GURU SHISHYA KA SAMBANDH	SHANGHARSHIL JEEVAN	RANGMANCH KA PARICHAY	ANUVAD KA PRAYOGAN 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	Edited Book: “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											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*			Simulations	Clarification/Pauses	✓	Good Health & Well Being		
		(10 %)		(10 %)		(20 %)		(10%)								
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality
1	Remember	15	15	15	15	10	10	10	10	15			Debate	✓		
2	Understand	15	15	15	15	10	10	10	10	15			Interactive Lecture	✓		
3	Apply	20	25	25	20	25	25	25	25	25			Brainstorming	✓		
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						

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

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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
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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	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	-	2	-	-	-
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	-	-	-	-

Session	CLO - 1 12	CLO - 2 12	CLO - 3 12	CLO - 4 12	CLO - 5 12
SLO-1	Contacts, Emma la championne	Les verbes du premier groupe	Qu'est-ce qu'ils font?	Portraits	Les verbes du deuxième groupe –
SLO-2	Les nombres à partir de 31	La liaison	Où est mon sac	Un casting	Les pronoms personnels toniques
SLO-3	Les pays, les nationalités	Entrer en contact	Quelques objets	Le Petit Spirou	Les verbes faire et lire
SLO-4	Les jours de la semaine, Les jours	Présenter et se présenter	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	Décrire l'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 adjectifs possessifs	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											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*			Simulations	Clarification/Pauses	✓	Good Health & Well Being	✓	
		(10 %)		(10 %)		(20 %)		(10%)								
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)				
1	Remember	15	15	15	15	10	10	10	10	15		Debate	✓			
2	Understand	15	15	15	15	10	10	10	10	15		Interactive Lecture	✓			
3	Apply	20	25	25	20	25	25	25	25	25		Brainstorming	✓			
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						

* 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				
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	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	ULE24AE2J	Course Title	Business 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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes(PLO)									
CLR-1	Understand the critical component for success in the workplace and Organize regular speaking practice sessions where students can engage in conversations and discussions related to business scenarios.	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Usage of Variables and their Datatypes																	
CLR-3	Provide students with a collection of audio recordings or online resources that cover various business-related topics. These exercises should include comprehension questions and activities to improve listening skills, such as identifying main ideas, specific details, and understanding different accents.																	
CLR-4	Practice drafting and editing and Focus on developing skills in organization, clarity, coherence, and the appropriate use of business language and conventions.																	
CLR-5	Prepare clear, precise, readable written document																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's 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 Incultation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Communication Proficiency for various business contexts, including emails, reports, presentations, and negotiations.	✓	✓	-	-	2	85	75	3	3	3	3	2	1	-	3	3	3
CLO-2	Conversant with the basic forms and formats of Writing	✓	✓	✓	-	2	85	75	3	2	2	3	2	1	-	-	3	3
CLO-3	Enhance professional writing skills	✓	✓	✓	✓	3	85	75	3	2	2	3	2	1	-	3	3	3
CLO-4	To Prepare precise business documents by evaluating information, formulating arguments, and expressing opinions persuasively in English.	✓	✓	✓	✓	3	85	75	3	3	3	3	2	1	-	-	3	3
CLO-5	Foster collaborative communication skills for teamwork and multicultural business environments	✓	✓	✓	✓	3	85	75	3	3	3	3	2	1	-	3	3	3

Session	CLO – 1 12	CLO – 2 12	CLO – 3 12	CLO – 4 12	CLO - 5 12
SLO-1	Introduction to Listening Skills as an important unit in communication Listening Process	Introduction to Communication Internal Communication	Introduction to Writing Business Letters Importance of writing skills	Introduction to Report Writing Features of Good Report	Importance of Business Meetings Types of Business Meetings
SLO-2	Listening is not the same as Hearing Time Spent Communicating	Stake Holders in Internal Communication Channels and methods to use different Channels	Difference between Personal and Business Letters Structure & Format	Purpose of Report Writing Differentiate between Business Report and Engineering report	Conducting Meetings Common Mistakes made at Meetings
SLO-3& 4	Purpose of listening and Principles of listening Listening activity- reflection of understanding of passive listening and active listening- presentation by students	Internal Tele-Conversation Self-Introduction Sample tele-conversation- role play	Types of Business Letters Writing E-Mails Email writing practice	Steps in Report Writing Structure of a Report Report writing practice- hands-on training	Students will be able to identify and correct common mistakes in sentence structure, grammar, and punctuation. Employment Communication Communication in official scenarios- role play and demo-activity
SLO- 5	Classification of Listening and the purpose Informational Listening and the art of listening	Seeking and Giving Information Giving Messages	Principles of E-mail E-mail Etiquette	Types of Reports Format of Reports	Students will be able to write a well- structured and professional resume that highlights their skills and experiences. Students will be able to create an appealing and professional design for their resumes, including proper formatting and layout.
SLO-6	Critical Listening Therapeutic or Empathetic Listening	Expression of Gratification External Communication	Overcoming problems in E-mail Communication	Oral Communication Skills	Reason for a Cover Letter to Apply for a Job
SLO-7 & 8	Other listening types Barriers to effective listening process Explaining listening barriers by students	Stake holders Presentation about stake holders	Writing memos, what is a memo? Principles of precise writing and purpose Memo writing example- activity	Oral business presentation Purpose, audience, locale Business presentation practice and presentation with ppt and demo	Format of cover letter Types of cover letter Cover letter practice writing
SLO-9	Categorization of Barriers to Communication How to resolve the barriers for communication?	Channels of External Communication Cross Organizational Video-Teleconferencing	Approaches to memo writing Format of a Memo	Steps in Making a Presentation Research and Planning	Group Discussion Understand the Nature of Discussion

SLO- 10	Reading Skills Effective Reading Strategies - 1 to 10	Briefing the Organization Description of Product	Circulars Guidelines for writing Circulars	Structure and Style Preparation and Presentation	Difference between Debate and Discussion Ways to form and present the arguments
SLO-11 & 12	Purpose of Reading Types of Reading Techniques for Effective Reading Improving Comprehension Reading Component- A Story of Bankruptcy Reading activity- pausing at right places and intonation- fluency and speed in reading- practice hour	Description of Process Description of Services Holding Meetings over Skype Communication Network: Scope Types of Communication Network Formal Communication Network Informal Communication Network Conducting a Elevator Pitch Round Types of communication- enacting in different scenarios	Format of Circulars Notices- Purpose Format of Notices Important Points to Note in a Notice Writing Component: Preparing Emails Preparing Memo and circulation Of the same Preparing circular Preparing notices and the purpose- writing activity- hands-on- training	Delivering a Presentation Making the Self Presentable Dressing Sense Clear Voice - Dos and Don'ts Planning & Analyzing Structuring Managing Body Language Managing Emotions Body language and managing emotions- demo and model enacting- activity	Ways to Defend Emotional Intelligence: Understanding Understanding Individual Nature Zohari Window Model Encouraging Fellow Participants Making Communication More Friendly Knapp's Relationship Escalation Model Convincing Others by using rhetorics Persuasion activity- role play on official scenarios

Resources:					
1	English for Business Studies Student's Book: A Course for Business Studies and Economics Students" by Ian MacKenzie, Cambridge University Press, 2010	5	"English for Business Communication" by Simon Sweeney, Cambridge University Press, 2015.		
2	"Business Communication: Building Critical Skills" by Kitty O. Locker and Stephen Kyo Kaczmarek, McGraw-Hill Education, 2021	6	"The Business Writer's Handbook" by Gerald J. Alred, Charles T. Brusaw, and Walter E. Oliu, Bedford/St. Martin's, 2021		
3	"Business English: A Complete Guide to Developing an Effective Business Writing Style" by Andrea B. Geffner (1997)	7	"English for Business Studies Teacher's Book: A Course for Business Studies and Economics Students" by Ian Mackenzie (1997)		
4	"Effective Business Writing: Strategies, Suggestions, and Examples" by Maryann V. Piotrowski (1998)	8	"Effective Business Communication" by Herta A. Murphy and Herbert W. Hildebrandt (1996)		

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*			✓	Good Health & Well Being	✓			
		(10 %)		(10 %)		(20 %)		(10%)								
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)						
1	Remember	15	15	15	15	10	10	10	10	15			Debate	✓		
2	Understand	15	15	15	15	10	10	10	10	15			Interactive Lecture	✓		
3	Apply	20	25	25	20	25	25	25	25	25			Brainstorming	✓		
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						

* 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

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Course Code	UDS24101J	Course Title	Programming using Java				Category	C	Discipline Core Course	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
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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
CLR-1	To understand the principles and concepts of Object Oriented Programming																	
CLR-2	To learn how to extend Java classes with inheritance and dynamic binding.																	
CLR-3	To learn how to produce robust programs in Java using Exception Handling																	
CLR-4	To achieve parallelism using threading concepts																	
CLR-5	To Develop the basics of Graphical User Interface Programming																	

CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's 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	Use an integrated development environment to write, compile, run, and test simple object-Oriented Java programs	✓	✓	-	-	2	85	75	3	-	1	2	-	2	-	2	2	1
CLO-2	Implement Java programs using classes, objects and also focused on garbage collection.	✓	✓	✓	-	2	85	75	3	2	2	2	2	3	-	1	2	1
CLO-3	Apply Exception handling and Parallelism in java applications	✓	✓	✓	✓	3	85	75	3	2	3	1	3	3	-	1	1	2
CLO-4	Identify and fixed facts and common security issues in code.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	To gain knowledge in Applets, Event handling using AWT controls.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Session	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Introduction to Java	Class & Constructors	Inheritance, Interface & Package	Multithreading, Utility Classes, Applet	Event Handling, AWT Control, I/O Streams
	18	18	18	18	18
SLO-1	Origin of Java, Impact of java over internet	Class fundamentals, Defining a Class, Creating Objects, Assigning object Reference Variables	Inheritance Basics, Understanding Types of Inheritance: Single, Multilevel, Hierarchical Inheritance	Introduction to java Thread model, Creating a Thread by Extending Thread Class	Introduction to Event Handling, Understanding Action Event & Item Event, Key Event & Mouse Even

SLO-2	Java's magic : Byte Code , JVM,	Introduction to method, Accessing class members	Using Super keyword	Creating a Thread by implementing Runnable Interface, Thread Class, Creating multiple threads - Assigning Thread priorities	Text Event, Window Event, Component Even, Introduction to Event Listener Interfaces - Working with Action Listener &, Adjustment Listener
SLO-3	Java Buzz words - Simple, Object Oriented, Robust, Multi-threaded, Architecture-Neutral, Interpreted and High performance, Distributed, Dynamic	Constructors, Characteristics of Constructors - Types of constructors - this Keyword	Method Overriding - Understanding Dynamic Method dispatch	Applying Synchronization - Inter-thread communication	Working with Container Listener, Item Listener, Component Listener - Working with Key Listener & Mouse Listener
SLO-4-6	Lab 1 : Basic Java Program	Lab 4 :Classes and Objects	Lab 7: Inheritance, Method Overriding, Abstract classes and methods	Lab 10: Multi-threading	Lab 13: Event Handling
SLO-7	Evolution of Java – Introduction to Object Oriented Concepts of Java	Java Destructor- Garbage Collection, Finalize () Method, Overloading methods	Introduction to Abstract Keyword - Working with Abstract class and Method & Using final with inheritance	Introduction to Legacy Classes, Working with Vector class, Examples using Vector class	Introduction AWT Controls, Working with Laboratory, Working with Buttons controls
SLO-8	Encapsulation, Polymorphism, Inheritance	Overloading constructors – Using objects as parameters – Argument Passing	Introduction to Package, Creating a Package, Understanding Access Protection	Understanding Stack class - Examples using Stack class	Working with Check Boxes - Working with Checkbox Group controls
SLO-9	Introduction to Lexical Issues of Java	Returning Objects, Recursion	Importing packages - Introduction to Interfaces - Defining an interface	Introduction to Legacy Interfaces - Understanding Enumeration Interface, Examples using Enumeration interface	Working with Choice controls - Working with Lists controls, Working with Text Field controls
SLO-10 - 12	Lab 2: Writing Simple Conversion Programs	Lab 5: Overloading Methods and Constructors, finalize() method	Lab 8: Packages and Interfaces	Lab 11: Legacy Classes and Interfaces	Lab 14: AWT Controls
SLO-13	White spaces, Identifiers, Literals Comments, Separators ,Keywords, Introduction to Data types of Java - Byte, short, int, long, float, double, chars, Boolean	Introducing Access Control, Understanding Static variables and methods, Understanding Final variables And methods	Implementing Interfaces, How Interfaces are extended?	Introduction to Utility classes, Working with String Tokenizer, Working with Date class, Working with Calendar	Introduction to Layout Manager, Understanding Flow Layout, Understanding Border Layout, Understanding Grid Layout
SLO-14	variable, Declaring a variable, dynamic initialization of variables - Scope and life time of variables	Working with Nested Class - Understanding Inner Class	What is Exception?, Understanding Exception Types, Introduction to Exception Handling - Working with try and catch	Working with Gregorian Calendar, Working with Random Class, Working with Scanner Class Examples using utility classes	Introduction to I/O Streams

SLO-15	Introduction to Operators, Working with Arithmetic, Relational, Logical, Bit wise, Conditional, Assignment Operators, Control Statements Overview of Array	Introduction to String Class and String Buffer Class - Working with String Handling Methods, Command Line arguments	Using multiple catch clauses, Working with Finally, Throw and throws, Understanding Built-in Exceptions - Creating user defined Exceptions	Introduction to Applets- Applet Life Cycle, Creating and Executing Applets - Applets Tags in HTML – Graphics Class	Byte Streams classes - Character Streams classes – Examples using Byte and Character
SLO-16 - 18	Lab 3:Arrays, Control Statements	Lab 6:String Class, Command Line Arguments	Lab 9:Exception Handling	Lab 12 :Utility Classes and Simple Applet Programs	Lab 15: Layout Managers, Byte and Character Streams

Resources					
1	Herbert Schildt,(2007),“Java:The Complete Reference”,TwelfthEdition,Tata McGraw publication	4	ArnoldandJ.Goslin,(2000),”The Java Programming Language”, Fourth Edition,Addison Wesley		
2	E. Balagurusamy, “Programming with Java”, TataMc-Graw Hill, 5th Edition	5	Horstmann S., Gray Cornell (2001), Core Java 2 Volume In, Fundamentals, Addition Wesley, New York.		
3	Arnold and Gosling, J. (2000), The Java Programming Language, Addition Wesley, 2nd Edition, New Delhi.	6	Art Gittleman (2002), Ultimate Java Programming, Wiley Publications, New York.		

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*				Simulations	Clarification/Pauses	✓	Good Health & Well Being	
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools	✓	Group Discussion	✓	Quality Education
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality
1	Remember	15	15	15	15	10	10	10	10	15	15		Debate	✓		
2	Understand	15	15	15	15	10	10	10	10	15	15		Interactive Lecture	✓		
3	Apply	20	25	25	20	25	25	25	25	25	25		Brainstorming	✓		
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					

* 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
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Course Code	UGI24102J	Course Title	Generative Artificial Intelligence				Category	C	Discipline Core Course	L	T	P	C
										3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses		Progressive Courses		Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcome									
CLR-1	Overview of Continual Learning: Concepts, challenges, and importance	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Fundamentals of classical generative models	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving	Critical Thinking	Creativity	Communication Skills	Analytical Reasoning	Research Skills	Collaborating Skills	Leadership Qualities	PSO-1	PSO-2
CLR-3	Review of traditional machine learning paradigms																	
CLR-4	Memory-augmented architectures for CL in Generative AI																	
CLR-5	Evaluation and Benchmarking for Continual Learning																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Introduction to Generative AI: Concepts, applications, and challenges	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Understanding the architecture and training process of GANs	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Challenges in applying CL to Generative AI	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Case studies and examples of dynamic architectures for CL in Generative AI	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Create project presentations and peer feedback sessions	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Session	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Foundation of AI	Introduction to Deep Learning	Introduction to TLLM	Cyber security and social engineering	Generative AI-generated text
	18	18	18	18	18
SLO-1	Foundation of Artificial Intelligence	Introduction to Deep Learning	Training Large Language Models	Misuse and adversarial attacks	Generative AI's footprint on education
SLO-2	The start: what does AI mean & the importance of data	Neural networks architecture	How are LLMs trained?, training data	Cybersecurity and social engineering	Generative AI-generated text
SLO-3	Neural network is simplified model of brain	Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs)	The unexpected: Emergent properties of LLMs	Information disorder: Adversarial narratives	Detecting AI-generated text, Making social connections with chatbots

SLO-4 -6	Working with Generative AI Tool: GPT-4	Working with Generative AI Tool: ChatGPT	Working with Generative AI Tool: GitHub Copilot	Working with Generative AI Tool: Claude	Working with Generative AI Tool: StyleGAN
SLO-7	History and evolution of AI	Generative Adversarial Networks (GANs)	Data Privacy and Safety with LLMs	Why do LLMs hallucinate?	Chatbots for social interaction
SLO-8	Key concepts and principles of AI, AI applications in various industries	Introduction to Generative AI	Safety-focused improvements for LLM generations	Using LLMs in the professional space Misuse of LLMs in the professional world	Why humans are turning to chatbots for relationship
SLO-9	Introduction to Machine Learning Fundamentals	Large Language Models: The power of AI, Evolution of natural language processing	Understanding the rules of the road: Data policies and regulations	Accelerating productivity: Machine-augmented work	Charting a path for beneficial chatbot interaction
SLO-10-12	Write an article using GPT-4	Content creators in generating text for articles using ChatGPT	Code Generation using GitHub	Produce an outline for a short story using Claude	Generate the digital art using StyleGAN
SLO-13	Supervised and unsupervised learning, Reinforcement learning	The birth of LLMs	The evolution of created content	LLMs assisting doctors with administrative tasks	Social and technical risks of LLMs
SLO-14	Model evaluation and selection	Explosion of LLMs	The rise of synthetic media	LLMs for legal research, discovery and documentation	Using LLMs responsibly: Best practices
SLO-15	Feature engineering and selection	LLMs usage , LLMs Fall Shorts	Generative AI: Transforming creative workflows	LLMs augmenting financial investing and bank customer service, LLMs as collaborators in creativity & LLMs in daily life	AI regulations: An ethics perspective, Toward an AI governance framework
SLO-16-18	Creating blog posts using GPT-4	Creating social media posts using ChatGPT	Generating test cases using GitHub	Upload a PDF of a novel and ask for the main plot points using Claude	Generate synthetic fashion images for clothing design using StyleGAN

Resources

1	Sahar Massachi, Introduction to Generative AI, Manning Publications Co., 2024	3	Ethan James Whitfield, Generative AI for Beginners, 2023
2	David Foster, Generative Deep Learning, 2nd Edition, O'Reilly Media, Inc., 2023	4	Bernard Marr, Generative AI in Practice, Wiley, 2023

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*				Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		7	Remember	15	15	15	15	10	10	10	10	15	15			Debate	✓
8	Understand	15	15	15	15	10	10	10	10	15	15			Interactive Lecture	✓		
9	Apply	20	25	25	20	25	25	25	25	25	25			Brainstorming	✓		
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						

* 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
1	Mr.Jothi Periyasamy, 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- 600025
		1 Dr.E.Srimathi, SRM IST,Ramapuram Campus, srimamca4@gmail.com

Course Code	UMS24103T	Course Title	Mathematics for Artificial Intelligence				Category	C	Discipline Core Course	L	T	P	C
										4	0	0	4

Course Offering Department	Mathematics & Statistics	Pre-requisite Courses	NIL	Co-requisite Courses	NIL	Progressive Courses	NIL	Data Book / Codes/Standards	NIL
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CLR	<i>The purpose of taking this course is to:</i>	Depth				Attainment			Programme Learning Outcome									
CLR-1	To apply the basic concepts and theorems of matrices.	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	To learn the basic concepts of differentiation, basic concepts of integration and to apply Bernoulli’s formula.					Bloom’s 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 Incubation, Multicultural Inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-3	To learn the concepts of connectives, validity of arguments and normal forms.																	
CLR-4	Apply Logic, truth table in computer science.																	
CLR-5	To Understand the concept of Graphs, isomorphism of graph, Eulerian graph and Hamiltonian graph.																	
CLO	<i>At the end of this course, learners will be able to:</i>	Conceive	Design	Implement	Operate													
CLO-1	Gaining knowledge in basic concepts of matrix method.	✓	✓	-	-	2	85	75	3	-	-	-	-	-	-	-	-	-
CLO-2	Understanding the concepts of differentiation and to solve the problems of Radius of curvature.	✓	✓	✓	-	2	85	75	-	3	-	-	-	-	-	-	-	-
CLO-3	Understanding the concepts of integration and to evaluate Bernoulli’s formula.	✓	✓	✓	✓	3	85	75	3	-	-	-	-	-	-	-	-	-
CLO-4	Logical knowledge through the Statements, connectives, arguments, validity of arguments and Normal forms using truth tables	✓	✓	✓	✓	3	85	75	-	3	-	-	-	-	-	-	-	-
CLO-5	Understand the concepts of Graphs terminology Sub graphs, Acyclic, Euler path, Hamiltonian Path	✓	✓	✓	✓	3	85	75	-	-	-	-	3	-	-	-	-	-

Session	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	Matrices	Differentiation and Integration	Logics	Introduction to Graph Theory	Trees
	12	12	12	12	12
SLO-1	Definition and types of matrix- Examples	Introduction to Differentiation- Solving basic problems	Logic -Basic explanation- Statements- simple compound- Symbolic representation	Graphs and Their Representation- Basic Graph terminology- Simple Problems	Trees- Basic Definitions-
SLO-2	Symmetric matrix - Skew symmetric matrix	Minima and maxima of functions of single variable	Connectives explanation- conjunction, disjunction, negation- Simple problems	Drawings of Graphs-Special Families of Graphs- Simple Problems	Basic properties of Trees- Labeled Trees
SLO-3	Hermitian matrix- Skew Hermitian matrix	Problems based on Minima and maxima of functions of single variable	Problems using Truth Tables- Tautology, contradiction- Problems using Truth Tables	Incidence graphs - Simple Problems	Problems based on the concepts- Undirected Trees- Simple Problems
SLO-4	Orthogonal matrix -Unitary matrix	Problems using maxima and minima	Logical equivalence- Simple truth table problems	Adjacency Matrices- Problems- vertex degrees matrices	Binary trees- Rooted Trees and Branches

SLO-5	Eigen vectors of a matrix	Introduction to curvature- Radius of curvature (Cartesian co-ordinate)	Tautological implications- Simple problems	Isomorphism of Graphs- Simple Problems	Spanning Trees- Simple problems
SLO-6	Eigen values and eigen vectors of a matrix	Problems based on radius of curvature	Arguments- validity of arguments- Simple problems	Sub graphs- Acyclic Graphs- Simple Problems	Minimal Spanning Trees- Simple Problems
SLO-7	Cayley Hamilton theorem	Introduction to integration- Basic problems on integration- Integration of polynomial functions- Problems based on Integration of polynomial functions	Normal forms –Minterms and maxterms	Digraphs- Problems using Graphs	Problems based on Minimal Spanning Trees
SLO-8	Problems of order 2 based on Cayley Hamilton theorem	Integration by the method of substitution- Problems based on Integration by the method of substitution	Maxterms with examples- Problems using Truth tables	Paths, cycles and connectivity- Euler path and circuits	Kruskal's Algorithm
SLO-9	Problems of order 3 based on Cayley Hamilton theorem	Integration of rational and irrational functions- Integration of the type $\int \frac{P(x)}{Q(x)} dx$ Integration by the method of partial fraction	Principal disjunctive normal form	Eulerian cycles- Euler path and Circuits-.	Rooted Tree
SLO-10	Cramer's rule- Problems order 2 based on Cramer's rule.	Integration of the form $\int \frac{dx}{ax^2 + bx + c}$	Problems using Truth tables	Hamiltonian Path and Circuits	binary Tree and Simple Problems
SLO-11	Problems of order 3 based on Cramer's rule.	Bernoulli's formula for Integral by parts	Principal conjunctive normal form	Problems using Hamiltonian Path- Simple Problems	Expression of Trees- Simple Problems
SLO-12	Problems of order 3 based on Cramer's rule.	Problems based on Bernoulli's formula for Integral by parts.	Problems using Truth tables	Problems using Hamiltonian Path- Simple Problems	Expression of Trees- Simple Problems

Resources				
1	Discrete Mathematics with Graph Theory and Combinatorics by T.Veerajan, McGraw Hill Education (India) Pvt Limited, 2007	3	Dr. A. Singaravelu, Allied Mathematics, 7 th edition, A. R. Publications, 2015	
2	Discrete Mathematics by V, Sundaresan, K. S. Ganapathy Subramanian, K.Ganesan, A. R. Publications. 1996.			

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*		Simulations	Clarification/Pauses	✓	Good Health & Well Being
	(10 %)	(10 %)	(20 %)	(10%)		Presentation Tools	✓	Group Discussion	✓
	Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)	Learning Management System	✓	Hands-on Practice	✓
1	Remember	15	15	10	10	15		Debate	✓
2	Understand	15	15	10	10	15		Interactive Lecture	✓
3	Apply	20	25	25	25	25		Brainstorming	✓
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			

* 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	Dr.S.Saravanakumar, SRM IST
				2	Dr.S.Poongodisathya, SRM IST

Course Code	UCD24S01J	Course Title	Verbal Ability and Skill Development	Category	S	Skill Enhancement Courses	L 1	T 0	P 2	C 2
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Course Offering Department	Career Guidance	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth	Attainment	Programme Learning Outcomes															
CLR-1	Expose students to right attitudinal and behavioral aspects and to build the same through activities																		
CLR-2	Develop and nurture interpersonal skills of the students through individual and group activities.																		
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														
CLO-1	Re-engineer their attitude and understand its influence on behaviour	✓	✓	-	-	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	Network skills – relationship building, value exchange, active	Time management skills -	Basics of Grammar	Sentence Correction

		listening, friendliness and positivity, clear communication	Value of Time, Pomodoro technique.		
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	Icebreaking, Designing icebreaker 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
2	Dr.K.Alex,SoftSkills,S. ChandPublishing&Company,India,2014
3	CoveySean,Sevenhabits ofhighlyeffectiveteens,Simon&Schuster,NewYork,2014
4	CarnegieDale,Howtowinfriendsandinfluencepeople,SimonandSchuster,NewYork,2016
5	ThomasAHarris,Iamok,youareok,Arrow,London,2012
6	DanielColeman, EmotionalIntelligence,Bloomsbury,India,2016
7	Norman Lewis, Word Power Made Easy New Revised and Expanded Edition, Goyal publication, 2011
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.dcgk.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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	சங்கஇலக்கியங்கள்வழிதொன்மைஅக, புறவாழ்வியலைஅறியச்செய்தல்	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	தமிழ்ச்சமூகத்தின் அறவியல் குறித்து தெரியச் செய்தல்	Conceive	Design	Implement	Operate	Bloom's 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 Incultation, Multicultural Inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-3	பக்தி இலக்கியங்கள் போதித்த மனித மாண்புகளை உணரச் செய்தல்																	
CLR-4	பண்டைத் தமிழ்ச்சமூகத்தின் தொல் இலக்கியங்கள் வளர்ச்சி பெற்ற வரலாற்றைப் புரியச் செய்தல்																	
CLR-5	சிறுகதைகள் சொல்லும் வாழ்வியல் நெறி, மொழியின் நுட்பங்கள் ஆகியவற்றைத் தெரியச் செய்தல்																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	பண்டைத் தமிழ்ச் சமூகத்தின் அக, புற வாழ்வியல் இன்றைய சமூக மேம்பாட்டிற்கு வழிகாட்டி நிற்பதை அறிந்துகொள்ளுதல்	✓	✓	-	-	2	75	60	-	3	3	-	-	-	2	-	-	-
CLO-2	தமிழ்ச் சமூகம் அறத்தை வலியுறுத்திய சமூகம் என்பதன் வழி மானுட அறத்தைத் தெரிந்துகொள்ளுதல்	✓	✓	✓	-	2	80	70	2	-	3	-	-	3	-	-	-	-
CLO-3	பக்தி இலக்கியம் மூலம் இறைத் தந்துவங்களை அறிந்து மானுட ஒற்றுமை மேம்பாட்டை அறிந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	65	-	3	-	3	-	L	-	-	-	-
CLO-4	தொல் தமிழ்ச்சமூகம் இலக்கியம், அரசியல், அறம், பக்தி ஆகியவற்றில் தழைத்தோங்கியதைத் தெரிந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	70	3	-	3	-	-	3	-	-	-	-
CLO-5	வாழ்வியலின் நெறிகளைச் சொல்லும் கதைகளைப் படைக்கும் திறனோடு மொழி ஆளுமையையும் அறிந்துகொள்ளுதல்	✓	✓	✓	✓	3	80	70	3	-	-	2	-	-	-	3	-	-

Session	CLO-1 12	CLO-2 12	CLO-3 12	CLO-4 12	CLO-5 12
SLO-1	காலந்தோறும் தமிழ் அகத்திணை மரபு - உள்ளடக்கம்	சங்க மருவிய காலம் அறமும் வாழ்வியலும்	பல்லவர் கால இலக்கியங்கள்	பண்டைக்காலத் தமிழகம் சங்ககால மக்களின் வாழ்வியல்	தமிழ்ச் சிறுகதையும் தமிழ்ச் சமூக வாழ்வியலும்
SLO-2	எட்டுத்தொகை நூல்களும் பகுப்புமுறையும்	உலகப்பொதுமறை - திருக்குறள் கட்டமைப்பு	பக்தியும் தமிழும் - பக்தி இலக்கியத் தோற்ற நிலை	முச்சங்கஅறிமுகமும் வரலாறும்	புதுமைப்பித்தன் - சங்குத்தேவனின் தர்மம்
SLO-3	ஐங்குறுநூறு - 375, 391	திருக்குறள் வான்சிறப்பு (2)	சைவ சமய இலக்கியங்கள் - சைவக்குரவர் நால்வர்	சங்க இலக்கியப் பாடுபொருளும் வடிவமும்	ந.பிச்சமூர்த்தி - வேப்பமரம் - மரபும் நம்பிக்கைகளும்
SLO-4	குறுந்தொகை - 02, 03	திருக்குறள் - புலவி நுணுக்கம் (132) -	தேவாரம் - திருஞான சம்பந்தர் - 2834 திருநாவுக்கரசர் - 4262	எட்டுத்தொகை நூல்களின் வரலாறும் கட்டமைப்பும்	தமிழருவி மணியன் - ஒற்றைச் சிறகு - உறவின் மேன்மை
SLO-5	அகநானூறு நூல் கட்டமைப்பு	தமிழ் இலக்கிய மரபில் நீதி இலக்கியங்கள்	திருவாசகம்- மாணிக்கவாசகர் ஆனந்த பரவசம் - பாடல் 10	பத்துப்பாட்டு நூல்களின் வரலாறும் வாழ்வியலும்	ஆர். சூடாமணி - மூடநம்பிக்கை.
SLO-6	அகநானூறு -238	நாலடியார் வைகலும் - பாடல் எண் 39	வைணவ சமய வளர்ச்சிப்போக்கு	பதினெண் கீழ்க்கணக்கும் தமிழர் அற மரபும்	கிருஷ்ணா டாவின்ஸி - காலா அருகே வாடா
SLO-7	கலித்தொகை -11	நீதி இலக்கியத்தில் மருந்து நூல்கள்	நாலாயிரத் திவ்யப் பிரபந்தம் குலசேகராழ்வார் பாடல் - 678	பதினோரு நீதி இலக்கியங்கள்	மொழிப்பயிற்சி சொற்களை உருவாக்குதல்
SLO-8	தமிழர் புறமரபு- புறநானூறு- 107	சிறுபஞ்சமூலம் -64	ஆண்டாள் பாடல் - 574. திருமழிசை ஆழ்வார் பாடல்	காப்பிய இலக்கணம் - காப்பியங்களின் வகைமை	எழுத்துகளில் இருந்து சொற்களைக் கண்டுபிடித்தல்

SLO-9	புறநானூறு -110, 112	பழமொழி நானூறு அறிமுகம்- தனித்தன்மைகள்	தமிழில் இஸ்லாமிய இலக்கியங்கள்	ஐம்பெருங்காப்பியங்கள்	படம் பார்த்துக் கதை எழுதுதல்
SLO-10	பத்துப்பாட்டும் ஆற்றுப்படை நூல்களும்	பழமொழி நானூறு - 184	சீறாப்புராணம் - விடமீட்டப் படலம் -10பாடல்கள்	தமிழ்ச் சமூகமும் சமயத் தத்துவங்களும்	படம் பார்த்துக் கவிதை எழுதுதல்
SLO -11	சிறுபாணாற்றுப்படை: 84-115	பண்டைக்காலப் போரும் வாழ்வும் - புறம்	தமிழில் கிறித்தவ இலக்கியங்கள்	பன்னிரு திருமுறை - அறிமுகம், வரலாறு	கற்பனையும் படைப்பும் - தமிழில் வாசகம்
SLO -12	பட்டினப்பாலை: 40-50	களவழி நாற்பது - 40	கிறித்துவின் அருள்வேட்டல் - திரு.வி.க. அலகிலொளி- 5பாடல்	நாலாயிரத் திவ்வியப் பிரபந்தம் - அறிமுகம், வரலாறு	விளம்பரத்திற்கு வாசகம் எழுதுதல்

Resources					
1	கொன்றை, தொகுப்பும் பதிப்பும் - தமிழ்த்துறை ஆசிரியர்கள், தமிழ்த்துறை, எஸ்.ஆர்.எம். அறிவியல் மற்றும் தொழில்நுட்பக் கல்விநிறுவனம், காட்டாங்குளத்தூர், 603203, 2023			4	தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை, 2017
2	மு. அருணாசலம், தமிழ் இலக்கிய வரலாறு, நூற்றாண்டு முறை (9ஆம் நூ. முதல் 16 வரை), தி பார்க்கர், சென்னை, 2005			5	தமிழ்இலக்கியத்தொடரடைவு - http://tamilconcordance.in/
3	மதுரை தமிழ் இலக்கிய மின் தொகுப்புத் திட்டம் - https://www.projectmadurai.org/			6	தமிழ் இணையக் கல்விக்கழகம் - http://www.tamilvu.org/

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*			Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
		(10 %)		(10 %)		(20 %)		(10%)			Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
1	Remember	15	15	15	15	10	10	10	10	15			Debate	✓		
2	Understand	15	15	15	15	10	10	10	10	15			Interactive Lecture	✓		
3	Apply	20	25	25	20	25	25	25	25	25			Brainstorming	✓		
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						

* 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, Thiruvanniyur, Chennai – 600 041.	1	Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language & Literature, Pondicherry University, Pondicherry	1 Dr. B.Jaiganesh, Associate Professor & Head, Dept. of Tamil, FSH, SRMIST, KTR.
				2 Dr. R. Ravi, Assistant Professor and Head, Dept. of Tamil, FSH, SRMIST, VDP.
				3 Mr. G. Ganesh, Assistant Professor, Dept. of Tamil, FSH, SRMIST, RMP.
				4 Dr. T.R.Hebzibah beulah Suganthi, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.
				5 Dr. S.Saraswathy, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.

Course Code	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme learning Outcomes									
CLR-1	They get to learn Ancient ,Medieval,and Modern poetry	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
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:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking			Problem Solving, Critical Thinking, Creativity Solving									
CLO-1	To provide a brief Introduction of Hindi poetry(Bhaktikal,Reetikal and Aadhunikkal)	✓	✓	-	-	2	85	75	H	M	H	-		M	-	-	-	-
CLO-2	To Discuss the origin and development of various forms of poetry in Hindi	✓	✓	✓	-	2	85	75	H	-	M	-	H	-	H	-	-	-
CLO-3	Focus on Evaluating the social changes through poetry	✓	✓	✓	✓	3	85	75	-	H	-	H	H	M	-	-	-	-
CLO-4	To Examine Transcreation in advertisement	✓	✓	✓	✓	3	85	75	M	-	M	H		-	M	-	-	-
CLO-5	To guide the students in the learning of the technical aspect of the Hindi Language,this would help them in the field administration	✓	✓	✓	✓	3	85	75	-	H	-	H	H	M	-	-	-	-

Session	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	Edited Book: “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

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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme learning Outcomes									
CLR-1	Strengthen the language of the students both in oral and written	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
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:	Conceive	Design	Implement	Operate	Bloom's 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 Incultation, Multicultural Inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
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	-	-	-	-

Session	CLO-1 12	CLO-2 12	CLO-3 12	CLO-4 12	CLO-5 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 goûts	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											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*			Simulations	Clarification/Pauses	✓	Good Health & Well Being		
		(10 %)		(10 %)		(20 %)		(10%)								
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	✓	Quality Education	
1	Remember	15	15	15	15	10	10	10	10	15			Debate	✓		
2	Understand	15	15	15	15	10	10	10	10	15			Interactive Lecture	✓		
3	Apply	20	25	25	20	25	25	25	25	25			Brainstorming	✓		
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						

* 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
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 drcthirusurugan@gmail.com
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Course Code	UGI24201J	Course Title	Machine Learning for Natural Language Processing				Category	C	Discipline Core Course	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme learning Outcomes																																												
CLR-1	Understand the working principles and their functions in a business scenario.	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10																																			
CLR-2	To build intelligent and automated real-world natural language processing applications																																																				
CLR-3	Understand the various layers of Natural Language processing																																																				
CLR-4	Identify the implementation framework natural language processing solutions																																																				
CLR-5	Apply Natural language processing models to business problems																																																				
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's 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 Incultation, Multicultural Inclusivity				Environmental Action, Community Engagement				Entrepreneurial Risk Taking				PSO-1		PSO-2	
CLO-1	Understand the Academic and Industry perspectives of NLP	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1																																			
CLO-2	Gain hands-on solid skills, knowledge and expertise of real-world situations	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1																																			
CLO-3	Able to understand the basics knowledge and expertise in Data gathering, Data collection	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2																																			
CLO-4	Hands-on skills and knowledge to apply all the required processes on texts	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3																																			
CLO-5	knowledge and expertise in setting up a data platform for building enterprise	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3																																			

Session	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	Introduction to Natural Language Processing	Frameworks in NLP	Build ML Models	Implementing Boosting	Data Visualization
	18	18	18	18	18
SLO-1	Natural Language Processing Defined - Academic and Industry Perspective	Natural Language Processing Architecture	Modeling, Text Classification, Keyword Classification	DeBERTa	Adding Packages, Natural Language Processing Data Requirements
SLO-2	What is Natural Language Processing?	Components of Machine Learning solution	Lemmatization, Stemming, Part of Speech tagging	Natural Language Processing Data Requirements	Patient Remittance with discharge summaries
SLO-3	Functions of NLP System, NLP in Business & Artificial Intelligence- NLP	Data Generation, Collection, Feature Engg.pipline, Training & Evaluation	what problem Natural Language Processing solves, Machine	How much data is needed, Is your data good enough?	Who is going to get readmitted? When will they get readmitted?

			Translation & Named Entity Recognition		Problem Statement, Problem Type & Data engineering, Data Pipeline
SLO-4-6	Lab 1: Write a python program to import and export data using Pandas library functions	Lab 4: Write a Python program to demonstrate various Data Visualization Techniques.	Lab 7: Develop Decision Tree Classification model for a given dataset and use it to classify a new sample.	Lab 10: Build Artificial Neural Network model with back propagation on a given dataset.	Lab 13: Write a python program to implement K-Means clustering Algorithm.
SLO-7	Natural Language Processing promises and challenges	Task Orchestration, Prediction	Automatic Image Annotation	Data structure, Data Format, Data Type	Model Selection, Model Engineering, Model outcome
SLO-8	Natural Language Processing Architecture	Infrastructure, Authentication	Information Retrieval	Source System	Model Analysis, Optimization, Pipeline
SLO-9	Libraries, Technologies and Framework, Components of Natural Language Processing & Phases of Natural Language	Interaction, Monitoring, Building your NLP Architecture	Tutorial: Natural Language Processing Models- BERT- GPT2, XLNET & Electra	Target System, Training Data, Validation Data, Test Data & Natural Language Processing Requirements	Data Visualization, User Interface, Data Exploration
SLO-10-12	Lab 2: Demonstrate various data pre-processing techniques for a given dataset	Lab 5: Implement Simple and Multiple Linear Regression Models.	Lab 8: Implement Naïve Bayes Classification in Python	Lab 11: Implement Random forest ensemble method on a given dataset.	Lab 14: Implement linear regression using python.
SLO-13	Natural Language Processing in Real World Applications	Natural Language Processing Implementation Framework	Text to Text Transfer Transformer	Building a NLP Hardware system	Visualizing n-grams
SLO-14	NLP in Healthcare, Automobile, Oil & Gas	Popular NLP Frameworks	Keyword Extraction	Benefits, Challenges, High Level Decisions	Qualitative Comparisons
SLO-15	Natural Language Processing workflow, Text Pre-Processing & Pattern Mining	NLTK, Gensim, Spacy, CoreNLP, Pattern Recognition & Named Entity Recognition	RoBERTa, ALBERTA	Choosing the hardware components (GPU, TPU), Challenges, Building a NLP Software system & Software Components, Choosing the OS	Natural Language Processing Dashboards, NLP :Text data visualization
SLO-16-18	Lab 3: Implement Dimensionality reduction using Principle Component Analysis (PCA) method.	Lab 6: Develop Logistic Regression Model for a given dataset	Lab 9: Build KNN Classification model for a given dataset.	Lab 12: Implement Boosting ensemble method on a given dataset.	Lab 15: Implement Naïve Bayes theorem to classify the English text

Resources					
1	James A. Natural language Understanding 2e, Pearson Education, 1994	3	Bharati A., Sangal R., Chaitanya V. Natural language processing: a Paninian perspective, PHI, 2000		
2	Siddiqui T., Tiwary U. S. Natural language processing and Information retrieval, OUP, 2008	4	https://www.nltk.org/book/		

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*				Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
1	Remember	15	15	15	15	10	10	10	10	15	15			Debate	✓		
2	Understand	15	15	15	15	10	10	10	10	15	15			Interactive Lecture	✓		
3	Apply	20	25	25	20	25	25	25	25	25	25			Brainstorming	✓		
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						

* 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
1	Mr.Jothi Periyasamy, 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- 600025
		1 Mr.D.B.Shanmugam, SRM IST Ramapuram Campus, shanmugd@srmist.edu.in

Course Code	UDS24202J	Course Title	Data Structures and Algorithms	Category	C	Discipline Core Course	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
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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	Utilize the different datatypes; Utilize searching and sorting algorithms																	
CLR-2	Utilize linkedlist 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 searching graphs for real-time application development																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's 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 Incultation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Identify linear and non-linear datastructures.Create algorithms for searching and sorting	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Create the different types of linkedlists and evaluate its operations	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Construct stack and queue datastructures and evaluate its operations	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Create tree datastructures and evaluate its types and operations	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Create graph datastructure, evaluate its operations, implement algorithms to identify shortest path	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Session	CLO-1 Introduction to Data Structures 18	CLO-2 Stack, Queues 18	CLO-3 Tree Traversals 18	CLO-4 Sorting 18	CLO-5 Graphs 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 SearchTree	Bubble sort, Example	Representation of graph– Linked list, Graph Traversal –BFS, Example
SLO-3	Tutorial: Asymptotic Notation, Algorithm Analysis – Recursion – Example	Tutorial: Disadvantages of Stack, Polish Notations, Applications – Evaluation of Expression - Infix to Postfix expression – Towers of Hanoi, Recursion	Tutorial: Binary SearchTree:Construction, BinarySearchTree:Insertion - Binary SearchTree:Searching - Binary SearchTree:Searching	Tutorial: Insertion Sort – Example, Quicksort -Example	Tutorial: Graph Traversal–DFS – Example - TopologicalSorting
SLO-4-6	Practice: Lab1: Recursion	Practice: Lab 4: Stack and its Applications	Practice: Lab7:TreeTraversals	Practice: Lab10: Implementation of Bubble and Insertion sort	Practice: Lab13:Implementation of shortest path algorithm
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, Minimum spanning tree
SLO-9	Tutorial: Array types, Array operations - Applications of arrays - Dynamic memory allocation	Tutorial: Double ended Queue, Priority Queue- Reversing a Queue using another queue - Applications of Queue	Tutorial: AVLTree, AVLTree Rotations - Applications of AVL tree	Tutorial: Radix sort, Heap Sort Example Comparison of sorts	Tutorial: Prims, Example
SLO-10 - 12	Practice: Lab2:Arrays	Practice: Lab 5:Queue implementation using array and pointers	Practice: Lab 8: Implementation of BST Heap Data Structure	Practice: Lab11:Implementationof Quick sort and merge sort	Practice: Lab14: Implementation of minimum Spanning tree
SLO-13	Introduction to lists, Linkedlist operations	Introduction on-linear data Structures, Tree ADT and Terminologies	Minimum Heap Construction, Example	Introduction to searching, Linear Search, Binary Search	Kruskals–Example, Algorithm Design And Analysis
SLO-14	Types of Linked Lists, Linkedlist vs. Arrays - Application of linkedlist	Tree Terminologies, Tree Representation - Tree Types and Operations	Minimum Heap Deletion Construction, Maximum Heap Construction	Comparison of different search, Define Hashing –Hash functions	Greedy Algorithms, Example
SLO-15	Tutorial: Performance Analysis and Measurement of algorithm, Efficiency of algorithm - Time complexity and space Complexity	Tutorial: Binary Tree Representation, Properties of binary tree	Tutorial: MaximumHeap Deletion Construction, Applications of Heap and AVLtrees	Tutorial: Hashing: Collision avoidance Hashing: Separate chaining, Open addressing Advantages of Hashing	Tutorial: Divide And Conquer – Example, Backtracking – Example

SLO-16 - 18	Practice: Lab3:LinkedList	Practice: Lab 6: Implementation of binary tree using Arrays	Practice: Lab9: Heap Implementation	Practice: Lab12:Implementation of Graph using Array	Practice: Lab 15: Implementation of binary search using divide and conquer strategy
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Resources					
1	SeymourLipschutz,(2014),“DataStructureswithC”,McGrawHillEducation,SpecialIndianEdition	4	SRDGroup,(2013),“DatastructuresusingC”,McGrawHill,2 nd Edition,		
2	R.F.Gilberg,B.A.Forouzan,(2005),“DataStructures”,ThomsonIndi,2 nd Edition,	5	A.V.Aho,J.EHopcroft,J.D.Ullman,(2003),“DatastructuresandAlgorithms”,1 st Edition,PearsonEducation		
3	MarkAllenWeiss,“DataStructuresandAlgorithmAnalysisinC”,2nd Edition,Pearson Education	6	ReemaThareja,(2011),“DataStructures Using C”,1 st Edition, Oxford Higher Education		

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
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.Jothi Periyasamy, 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- 600025	1 Dr. Aruna Rani, SRMIST, KTR

Course Code	UMS24203T	Course Title	Statistics for Artificial Intelligence				Category	C	Discipline Core 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
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CLR	The purpose of taking this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	To provide foundations in Statistics	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	To provide a strong foundation of organizing the data, diagrammatic and graphical presentation.																	
CLR-3	To apply Statistical techniques in AI																	
CLR-4	To provide the application of correlation and regression in AI.																	
CLR-5	To analyze the sample data in order to estimate or predict characteristics of the larger population from which the sample is drawn.																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking												
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	-	-	-	-	-	-	-	-	-
CLO-4	Find the relationship between two or more variables using correlation and regression.	✓	✓	✓	✓	3	85	75	-	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, Perform the Analysis of Variance - One way Classifications.	✓	✓	✓	✓	3	85	75	-	-	-	-	3	-	-	-	-	-

Session	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	Nature and scope of statistical methods	Measures of Central tendency	Measures of Dispersion	Correlation Analysis	Conditional Probability, Testing of Hypotheses
	12	12	12	12	12
SLO-1	Definition of statistics, Numerical Data, Nature and Importance of statistics, Functions of statistics	Measures of Central tendency i. Definition ii. Functions of average iii. Characteristics of a typical average Arithmetic mean, Individual series	Range – Individual, Discrete series and Continuous series	Correlation - Definition and uses, Types of correlation, Methods for Finding Correlation Coefficient, Properties of correlation coefficient	Random experiment, types of events with Examples, Definition of probability, addition and multiplication law
SLO-2	Limitations, Distrust of Statistics, Classification: Meanings, Objects	Arithmetic mean Discrete series, Arithmetic mean Continuous series	Quartile Deviation - Individual and Discrete series	Karl Pearson's Correlation Co-efficient	Problems based on addition and multiplication law, Conditional probability – formula

SLO-3	Rules of classification, Types of classification, Characteristics of good classification- Tabulation: Parts of Tabulation, Rules of Tabulation, Types of tables - Objective of Tabulation	Arithmetic mean Cumulative series	Quartile Deviation - Continuous series	Spearman's Rank Correlation, Coefficient with non-repeated Ranks	Problems on conditional probability, Definition of Baye's theorem
SLO-4	Components of Good Table, Rules of construction of the table	Arithmetic mean Merits and Demerits, Median Individual series, Median Discrete series,	Mean Deviation about Mean – Individual Series, Mean Deviation about Mean – Discrete series, Mean Deviation about Mean – Continuous series	Spearman's Rank Correlation, Coefficient with repeated Ranks	Problems on Baye's theorem, Definition of probability distribution and its Type- Testing of Hypotheses
SLO-5	Difference between classification and tabulation.	Median Continuous series- Median Merits and Demerits	Mean Deviation about Median – Individual series, Mean Deviation about Median – Discrete series, Mean Deviation about Median – Continuous series	Spearman's Rank Correlation Coefficient, Problems on finding the best pair of judgments- Bivariate Distribution	Testing Procedures Definition of test statistic t and its uses, t-test Small Sample tests, t-test - Test for Single Mean, t-test -Test for two Sample Means
SLO-6	Diagrammatic representation of various types of statistical data : Bar Diagram, Types of Bar diagram	Mode Individual series, Mode Discrete Series	Standard Deviation –Individual and Discrete Series	Regression Analysis: Regression - Definition and Uses, Regression Coefficients	t-test- t Test Statistic, when sample standard deviations are not known, but Population Standard Deviations are known
SLO-7	One dimensional Diagrams, Two dimensional Diagrams	Mode Continuous Series	Standard Deviation - Continuous Series	Regression Equations, Types of Regression Equations	Chi-Square distribution- Definition and its Uses, Chi-Square test- Testing Procedure
SLO-8	Pie chart, Histogram, Frequency Polygon, Frequency Curve	Mode Continuous Series	Coefficient of Variation,	Regression Equation of X on Y and Regression Equation of Y on X	Chi-Square test - Problems
SLO-9	Less than O gives, more than O gives	Mode Merits and Demerits, Empirical Relation	Graphical solution of Dispersion Lorenz curve-	Relationship between Correlation and Regression Coefficients,	F-test - Test Statistic of F-test, Uses and testing Procedures
SLO-10	Less than O gives, more than O gives	Graphical solution of Median	Skewness Bowley's coefficient of Skewness	Relationship between Correlation and Regression Coefficients,	Testing the equality of variance using F distribution- Problems based on F-test
SLO-11	Lorenz Curve	Graphical solution of Mode	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	Analysis of Variance – testing procedure, ANOVA - One Way Classification

Resources					
1	Pillai, R.S.N, Bagavathi, V. (2009), Statistics, Theory and Practice, 7th Edition, S.Chand Ltd, New Delhi.			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						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*		Simulations	Clarification/Pauses	✓	Good Health & Well Being
	(10 %)	(10 %)	(20 %)	(10%)		Presentation Tools	✓	Group Discussion	✓
	Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)	Learning Management System	✓	Hands-on Practice	✓
1	Remember	15	15	10	10	15		Debate	✓
2	Understand	15	15	10	10	15		Interactive Lecture	✓
3	Apply	20	25	25	25	25		Brainstorming	✓
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			

* 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.N.Viswanathan, Presidency College, Chennai		1	Dr.M.Vasantha, ICMR, Chennai	1 Dr.S.Parvathi, SRM IST
					2 Dr.S. Poongodisathya, SRM IST

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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	Study the basics of designing intelligent agents that can solve general purpose problems'	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
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:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking												
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 Introduction to Artificial Intelligence 3	CLO-2 Logical Reasoning and First order logic 3	CLO-3 Unification and State Space Search 3	CLO-4 Planning Graphs 3	CLO-5 Probability Theory and Temporal Models 3
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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						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%)	(40%)	(20%)	Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
1	Remember	15	15	10	10		Debate	✓			
2	Understand	15	15	10	10		Interactive Lecture	✓			
3	Apply	20	25	25	25		Brainstorming	✓			
4	Analyze	20	25	25	25						
5	Evaluate	15	10	15	15						
6	Create	15	10	15	15						
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

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 Courses				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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes							
CLR-1	Illustrate the application of different principles in solving mathematical problems															
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:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking			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 Incultation, Multicultural Inclusivity Environmental Action, Community Engagement Entrepreneurial Risk Taking #SO-1 #SO-2							
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	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 HCF and 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, Quantitative Aptitude for Competitive Examinations, Tata McGraw Hill, 5th Edition	4	Edgar Thrope, Test of Reasoning for Competitive Examinations, Tata McGraw Hill, 6th Edition		
2	Dr. Agarwal. R. S, Quantitative Aptitude for Competitive Examinations, S. Chand and Company Limited, 2018 Edition	5	Dinesh Khattar, The Pearson Guide to Quantitative Aptitude for competitive examinations, Pearson, 3rd Edition		
3	Archana Ram, Place Mentor: Test of Aptitude for Placement Readiness, Oxford University Press, Oxford, 2018	6	P. A. Anand, Quantitative Aptitude for competitive examinations, Wiley publications, ebook, 2019		

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 ✓
		Practice (%)	Practice (%)	Practice (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓ Gender Equality
1	Remember	20	10	20	10			Debate	
2	Understand	20	10	20	10			Interactive Lecture	✓
3	Apply	20	20	20	20			Brainstorming	✓
4	Analyze	20	20	20	20				
5	Evaluate	10	20	10	20				
6	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

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.dcgk.ktr@srmist.edu.in 2 Dr.AarthiS,AssistantProfessor,DepartmentofCareerGuidanceCell,FSH,SRMIST aarthi4@srmist.edu.in

Course Code	UNS24Y01L UNC24Y01L UNO24Y01L UYG24Y01L	Course Title	NSS/NCC/NSO/YOGA	Category	Y	Mandatory Courses	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
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Rationale (CLR)	The purpose of learning this course is to:	Depth	Attainment	Programme Learning Outcomes
CLR-1	Understand themselves in relation to their community	1 2 3 4	1 2 3	1 2 3 4 5 6 7 8 9 10
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			
		Conceive Design Implement Operate	Bloom's Level of Expected Proficiency (%) Expected Attainment (%)	Problem Solving, Critical Thinking, Communication Skills, Independent Thinking, Analytical Leadership Qualities, Digital Technology Skills Value Incultation, Multicultural Environmental Action, Community EntrepreneurialRiTaking PSO 1 PSO 2
Outcomes (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 *	CLA – 2 *	CLA – 3 *	CLA – 4 *
	(20%)	(30%)	(30%)	(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
1	Dr Samuel Chellaiya C Regional Director, NSS Government of India	1 State Officer, NSS Tamil Nadu NSS
		2 Dr Yogalakshmi, NSS Programme Officer, FSH, SRMIST.

SEMESTER-III

Course Code	UGI24301J	Course Title	Python with Django Framework			Category	C	Discipline Core Course	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
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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	Describe the core syntax and semantics of Python programming language.																	
CLR-2	Discover the need for working with the OOPS concepts																	
CLR-3	Illustrate the process of django																	
CLR-4	Infer the URL configurations in django																	
CLR-5	Indicate the Database Model with Django																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	PSO-1	PSO-2
CLO-1	Develop, document, and debug modular python programs to solve computational problems	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Use built-in strings, lists, sets, tuples and dictionary in applications.	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Select a suitable programming construct and data structure for a situation	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Use Advanced Views and URL configurations	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Create Database Model with Django	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Session	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	An Introduction to python programming	Object Oriented Programming with Python	Introduction to Django	Advanced Views and URL configurations	Database Model with Django
	18	18	18	18	18
SLO-1	Structure of a Python program	Overview of Classes and Objects	Installation of Django	URL configuration Tricks.	Object-Relational Mapper (ORM)

SLO-2	Using variables and Datatypes	Using Class	Django Admin, Commands and Shell	Streamlining Function Imports	Django model Field and field types
SLO-3	Operators	Using Methods	Django Architecture	Using Multiple View Prefixes	Django migrations
SLO-4-6	Lab 1: Make a simple calculator using python	Lab 4: Create python program for employee payroll calculation using inheritance	Lab 7: Create a simple Django project with one app and display "Hello, World!" on the homepage.	Lab 13: Django Views	Lab 10 : Create Django Query set
SLO-7	Control Statements	Strings	MVT Architecture	Passing Extra Options to View Functions	Configuring Django for Database Access
SLO-8	Looping	Inheritance	Django URLs	Special-Casing URLs in Debug Mode	Django QuerySet
SLO-9	Conditional Statements	Encapsulation, Data hiding	Django Views	Using Named Groups	Saving, updating, deleting, and querying django models
SLO-10-12	Lab 2: Find the Factorial of a Number Python Program to Convert Decimal to Binary, Octal and Hexadecimal	Lab 5: Searching , Sorting a List	Lab 8 : Creating Template Objects	Lab 14: Django URL	Lab 11 Create a Django app to perform CRUD (Create, Read, Update, Delete) operations on a simple model
SLO-13	Functions	Polymorphism	Django Templates	Capturing Text in URLs	Connect Django project to a database – MY SQL
SLO-14	Lambda functions	Lists	Django Models	Including Other URL configurations	Connect Django project to a database – MongoDB
SLO-15	Recursive functions	Tuples	Django Commands Overview	Understanding the Matching/Grouping Algorithm	Relationship between django models
SLO-16-18	Lab 3: Check whether a number is prime or not, Python Program to Generate a Random Number	Lab 6: Program to List Methods for Inserting , Removing Elements	Lab 9: Implement Django Commands	Lab 15 : Django Create Project	Lab 12: To Connect a django project to a database

Resources					
1	Kenneth A. Lambert, “The Fundamentals of Python: First Programs”, 2011, Cengage Learning, ISBN: 978-1111822705			3	Web Development with Django - Second Edition by Ben Shaw
2	Building Websites with Django By Awanish Ranjan ISBN: 9789389328288			4	Build websites with Python and Django” by William S. Vincent.

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*				Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
1	Remember	15	15	15	15	10	10	10	10	15	15			Debate	✓		
2	Understand	15	15	15	15	10	10	10	10	15	15			Interactive Lecture	✓		
3	Apply	20	25	25	20	25	25	25	25	25	25			Brainstorming	✓		
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						

* 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 Periyasamy, Founder/Chief Data Scientist, DeepSphere,AI 2 Venture Drive, #13-26 Vision Exchange,Singapore,608526					1	Dr. S. Gopinathan, Professor, Department of Computer Science, University of Madras, Chennai			1	Mrs M.Divya ,Assistant Professor, SRM IST, Ramapuram Campus, divyam1@srmist.edu.in
										2	Dr. N.Revathi , SRM IST,Ramapuram Campus, revathiphd3@gmail.com

Course Code	UDS24302J	Course Title	Database Management System	Category	C	Discipline Core Course	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes(PLO)									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	To understand the fundamentals of Database Management Systems and the applications																	
CLR-2	To design ER-models to represent simple database application scenarios																	
CLR-3	To gain knowledge about relational database model and language																	
CLR-4	To develop queries using Structure Query Language (SQL) and PL/SQL																	
CLR-5	To improve the database design by normalization.																	

CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking			Program Learning Outcomes(PLO)									
						1	2	3	1	2	3	4	5	6	7	8	9	10
CLO-1	Acquire the knowledge on DBMS concepts, Architecture and applications	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Acquire the skills to model an applications data requirements using tools like ER diagram	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Apply the knowledge to create, store and retrieve data using query language	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Ability to conceptualize data using Structure Query Language (SQL) and PL/SQL	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Implement the knowledge to improve database design using various normalization and optimize queries	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Session	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Introduction to Data Structures	Stack, Queues	Tree Traversals	Sorting	Graphs
	18	18	18	18	18
SLO-1	Introduction to Database Management System Characteristics of database System	Importance of Database Design Schemas, and Instances	SQL Queries Examples using SQL queries	Introduction to Normalizations Anomalies in DBMS	Concurrency control Concurrent Execution in DBMS

SLO-2	Advantages of DBMS over File Processing System Applications of DBMS	Three level Architecture of Database design Data Models	Nested Queries Joins	Non loss decomposition and functional dependencies Uses of normal forms in DBMS	Problems with concurrent execution Concurrency control protocols
SLO-3	Purpose of Database System Database Designing Process and View of Data Components of DBMS Database Environment	Types of data models Hierarchical Model Network Model. Relational model, Object Base Data Model	Types of joins Division Relational comparison operators, SQL Aggregate functions	Types of normal forms, First Normal Form Second Normal Form, Third Normal Form	Lock based concurrency control protocols, Time stamp-based concurrency control protocols Validation based concurrency control protocols, Recovery and atomicity in DBMS
SLO-4-6	Lab 1: Design a Database and create required tables	Lab 4: SQL Data Manipulation Language commands using employee database	Lab 7: SQL using Joins	Lab 10: PL/SQL Functions and Procedures	Lab 13: PL/SQL Trigger
SLO-7	Functions of DBMS Database Users, Data Independence, Physical and Logical data independence	Entity - Relationship Model ER Diagram concepts: Entity, Attributes and Relationship	Subqueries Views	BCNF Fourth Normal Form, Fifth Normal Form	Failure classifications Failure with loss of non-volatile storage
SLO-8	Database System Architecture Role of Database Administrator, Types of DBMS Architecture	Weak Entity Sets, Strong Entity Set, Attributes-types of attributes Relationship and Relationship Set, Constraints, Keys	Introduction to PL/SQL PL/SQL: variable declaration Characteristics of PL/SQL Advantages and disadvantages of PL/SQL	Inference Rules preservation, Advantages of functional dependencies Decomposition using FD – dependency	Multiple Granularity, Log based Recovery Recovery with concurrent transactions, Transaction Logs
SLO-9	1-tier, 2-tier and 3-tier, Introduction to relational databases and Relational Model Terminologies used in relational model	Mapping cardinality, Removing redundant attributes in entity sets Reduction in relational schema	Control Structures, Types of control structures PL/SQL Procedure, Passing parameters in procedure	Decomposition into BCNF, Decomposition into 3NF Properties of Decompositions, Lossless-Join Decomposition-Dependency	Backup techniques Remote Backup systems Advance Recovery systems
SLO-10 - 12	Lab 2: SQL Data Definition Language using student database	Lab 5: SQL Data Control commands	Lab 8: SQL using aggregate functions and set operations	Lab 11: Case study submission for normalization	Lab 14: Case study submission for recovery
SLO-13	SQL Fundamentals Basic structure of SQL queries	Generalization Aggregation and Specialization	PL/SQL Function PL/SQL Recursive function	Transaction management: ACID properties Transaction State	Recovery with Concurrent Transactions Buffer Management

SLO-14	Database languages. DDL, DML, DCL and TCL, Key constraints and its types Specifying Foreign Key Constraints in SQL	Relational Algebra-Fundamental Operators and syntax, relational algebra queries Pitfalls in Relational database Functional dependency	PL/SQL Cursors, Types of cursors Triggers, Examples of Triggers in SQL	Implementation of Atomicity and Durability Concurrent Executions, serializability	Indexing in databases Types of indexing, Structure of B-Tree
SLO-15	Integrity Constraints Over Relations Types of integrity constraints	Trivial and non-trivial FD Multivalued dependency Transitive dependency	Accessing Databases from Applications Embedded SQL	Recoverability, Implementation of Isolation Testing for serializability	Properties of B-Tree, Hashing Static and dynamic hashing
SLO-16 - 18	Lab 3: Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables	Lab 6: Case study submission for ER Diagram	Lab 9: PL/SQL Conditional and Iterative Statements	Lab 12: PL/SQL cursor	Lab 15: Case study submission for database backups

Resources				
1	Abraham Silberschatz, "Database System Concepts", 6th Edition, McGraw Hill.	3	Ramez Elmasri, Shamkant B. Navathe, (2011), "Fundamentals of Database Systems", Sixth Edition, Pearson Education	
2	James R. Groff and Paul N. Weinberg, "The complete Reference SQL". 3rd Edition			

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*				Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
1	Remember	15	15	15	15	10	10	10	10	15	15			Debate	✓		
2	Understand	15	15	15	15	10	10	10	10	15	15			Interactive Lecture	✓		
3	Apply	20	25	25	20	25	25	25	25	25	25			Brainstorming	✓		
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						

* 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
1	Mr.Jothi Periyasamy, 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- 600025
		1 Mr.D.B.SHANMUGAM, ASST.PROF, SRM IST, Ramapuram Campus, Chennai-89

Course Code	UGI24303T	Course Title	Deep Learning				Category	C	Discipline Core Course	L	T	P	C
										4	0	0	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainm ent	Program Learning Outcomes(PLO)													
CLR-1	Demonstrate various principles involved in solving mathematical concepts related to permutation and combination and probability and interpret data	1	2	3	4		1	2	3	1	1	2	3	4	5	6	7	8	9	10
CLR-2	Learn the basic mechanics of grammar and develop resume-building practice and presentation skills in students						Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)		Problem Solving	Critical Thinking	Creativity	Communication Skills	Analytical Reasoning	Research Skills	Collaborating Skills	Leadership Qualities	PSO-1	PSO-2
CLR-3	Understand the object oriented features																			
CLR-4	Prepare students for job interviews																			
CLR-5	Instill confidence in students and develop the necessary skills to face interview																			
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate															
CLO-1	Understand the concepts of permutation and combinations, probability and approach questions in a simpler and innovative method	✓	✓	-	-		2	85	75		3	-	1	1	-	1	-	-	2	-
CLO-2	Understand the different parts of speech and use them in sentences appropriately and also the importance of resume preparation	✓	✓	✓	-		2	85	75		3	2	3	2	1	3	-	1	2	-
CLO-3	Understand the importance of object oriented features	✓	✓	✓	✓		3	85	75		3	2	3	1	2	2	-	1	2	1
CLO-4	Face interviews confidently	✓	✓	✓	✓		3	85	75		3	3	1	1	1	2	-	1	2	2
CLO-5	Develop their domain skills	✓	✓	✓	✓		3	85	75		2	3	3	2	2	3	-	3	3	3

Session	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Introduction of Deep Learning	Deep Learning Workflow	Deep Learning Models Prediction and frameworks	Convolutional Neural networks	Hardware support for Deep learning
	12	12	12	12	12
SLO-1	Deep Learning Basics	Adding Another input, Adding more layers	Model Accuracy	Motivation for Neural Networks	Challenges
SLO-2	What is Deep Learning?	Error measurement in neural networks	Tune Hyper parameters	Biological Neural Networks	High level decisions

SLO-3	Deep Learning defined from Academic & Industry perspective	Gradient descent	Deploy Model	Neurons	Choosing the hardware Components (GPU,TPU)
SLO-4	Deep learning and machine Learning, Deep learning vs Data Science	Loss functions, Learning rates	Monitor Predictions, Manage your models	Connections and weights, Propagation functions	Building a Deep learning Hardware system
SLO-5	What are deep learning promises and challenges?	Advanced deep learning Concepts, Steps in Deep learning in Implementation	Components of a deep learning solution, Data Generation	Different layers of CNN, Max pooling, Average Pooling	Benefits, Challenges, High level decisions
SLO-6	Deep Learning Architecture	Data Collection	Evaluation	Hidden layers	Choosing the software components
SLO-7	Deep Learning Libraries	Public Datasets	Task Orchestration	Dropouts	Choosing the OS
SLO-8	Deep Learning Technologies	Web Scraping	Prediction, Infrastructure	Different CNN architectures	Problem statement, Problem type
SLO-9	Deep Learning Implementation Framework The core of deep learning	Crowd source labelling, Data Preparation	Authentication, Interaction	Lenet, m Alexnet, VGG-16	Data engineering
SLO-10	ANN Role of deep neural networks	Cleaning Data, Feature Scaling	Building your deep learning Architecture	VGG-19	Data pipeline, Model selection
SLO-11	Perceptron and its layers	Model Engineering	Features of a good deep learning framework	Building a own architecture	Model engineering, Mode l outcome, analysis, and optimization
Assessment	Continuous Learning Assessment – 1		Continuous Learning Assessment - 2		
	Continuous Learning Assessment - 3				

Resources			
1	Deep Learning from Scratch, by SethWeidman,ReleasedSeptember2019,Publisher(s):O'ReillyMedia,Inc.	2	Deep Learning: A Practical Approach, PB Paperback – 1 January 2018 by Rajiv Chopra Introduction to Deep Learning, Book by Eugene Charniak

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 (%)	
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.Jothi Periyasamy, Founder/Chief Data Scientist, Deepsphere,AI 2 Venture Drive, #13-26 Vision Exchange,Singapore,608526		1	Dr. S. Gopinathan, Professor, Department of Computer Science, University of Madras, Chennai	1 Dr.S.Karthiga, Assistant Professor. Karthigs2@srmist.edu.in

Course Code	UGI24P01L		Internship - I				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
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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																	
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:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking			Program Learning Outcomes									
CLO-1	To get an insight of an industry and organization/company	✓	✓	-	-	2	85	75	3	2	2	2	2	2	2	2	2	2
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	-	2	85	75	3	2	3	3	3	2	2	1	2	2
CLO-3	To make professional connections and enhance networking	✓	✓	✓	✓	3	85	75	3	2	3	3	3	3	2	1	3	3
CLO-4	To get experience in a field to allow the student to make a career transition	✓	✓	✓	✓	3	85	75	3	2	2	3	3	2	2	2	3	3
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	3	85	75	3	3	3	3	3	2	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.

Assessment Component	Expected outcome	Type	Evaluators	Criteria or basis	Marks
Review-1	Internship letter Submission Internship title to be described.	Internal	Supervisor / Guide & Internship Coordinator	Feasibility Study of the Internship	20
Review-2	A short presentation about the internship work	Internal	Supervisor / Guide & Project Coordinator	Clarity of the idea, Preliminary work done.	30
Internship Report	Evaluation of internship Report	External	Examiner(s)/ Reviewer(s)	Presentation, Handling Q&A	30
Viva-Voce	Final Presentation				20

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

SEMESTER IV

Course Code	UGI24401J	Course Title	Generative AI and LLM Frameworks	Category	C	Discipline Core Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Machine Learning, Python	Co-requisite Courses	Calculus and Linear Algebra	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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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
CLR-1	Overview of Generative AI with Large Language Model: Concepts and importance																	
CLR-2	Architecture of Large Language Models																	
CLR-3	Techniques for Language model and prompt engineering																	
CLR-4	Applications of generative AI and LLM																	
CLR-5	Ethical and Social Implications of generative AI																	
Software development AI		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency %	Expected Attainment (%)	Problem Solving.	Communication Skills.	Independent Thinking.	Leadership Qualities.	Digital Technology	Value Incultation.	Environmental Action.	Entrepreneurial Risk	PSO-1	PSO-2
CLO	At the end of this course, learners will be able to:																	
CLO-1	Understand the theoretical foundations of generative models and LLMs	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Gain hands-on experience with implementing and fine-tuning LLMs	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Explore applications of generative AI in various domains	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Understanding Neural Network and Deep Learning	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Discuss ethical issues and societal impacts of generative AI	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Session	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Unit I	Unit II	Unit III	Unit IV	Unit V
	18	18	18	18	18
SLO-1	Overview of AI and machine learning	Generative Adversarial Networks (GANs)- GAN architecture and components- Training GANs and challenges	Techniques for language modelling	Text-to-Text Prompt Techniques	Human-in-the-loop evaluation methods
SLO-2	Definition and types of generative models	Applications of GANs (e.g., image generation, style transfer)	n-gram, RNN, Pre-Training,	Few-shot learning	Multimodal Generative AI -Cross-modal generation and translation
SLO-3	Historical development of generative AI	Variational Autoencoders (VAEs)- VAE framework and mathematical foundations	RAG, Guardrail	zero-shot learning	Integration of LLMs with other modalities.

SLO-4-6	Devise Generative Model	Image generation, Style transfer	GPT 3	Text Generation	Text to Text
SLO-7	Overview of Generative AI and its applications	Training VAEs, Applications of VAEs (e.g., anomaly detection, data compression)	Understanding GPT and its Variants	Applications of Generative AI and LLMs	Ethical and Societal Implications* - Bias and fairness in generative AI
SLO-8	Fundamentals of Language Models and Large Language Models (LLMs) with their evolution	Transformer Architecture -self-attention, encoder-decoder structure	Detailed study of GPT architecture-	Text generation and completion	Misinformation and deepfakes
SLO-9	Architectural components of LLMs (transformer architecture, self-attention, pre-training, and fine-tuning)	GPT, Positional Encoding, T5	Training objectives and datasets- Variants of GPT (e.g., GPT-2, GPT-3, GPT-4)	Conversational AI and chatbots	Policy and regulatory considerations
SLO-10-12	Devise LLM Architecture	Implement RNN	Naive Prompting and Persona Pattern	Story telling	Text to image
SLO-13	Fundamentals of Probability and Statistics- Introduction about probability theory	LLM Architecture -Overview of LLM	Advanced Techniques in LLMs	Creative applications (e.g., poetry, storytelling)	Case Studies and Industry Applications- Case studies of generative AI in industry
SLO-14	Statistical inference and estimation - Applications in generative models	Maximum Likelihood estimation	Transfer learning and multitask learning	Evaluation and Metrics- Evaluating generative models	Working with Zero-shot and Few-shot Prompts
SLO-15	Neural Networks and Deep Learning Basics- Introduction to neural networks- Training deep neural networks- Backpropagation and optimization techniques	masked language modelling	Prompt engineering , concept of prompt engineering, Prompt Engineering for Generative AI	Metrics for text generation	Case studies – Health care and education
SLO-16-18	Devise Neural Network	Implementation of LLM Using libraries like Hugging Face Transformers, Fine-tuning LLMs on specific tasks, Experimenting with LLM outputs	Effective Text Prompts for Image Generation	Text Generation	Case study

Resources											
1	Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play" by David Foster , 2018, springer								3	Suhas Pai Designing Large Language Model Applications, O'Reilly Media, 2024	
2	Neural Networks and Deep Learning: A Textbook" by Charu C. Aggarwal,2023								4	LLMs and Generative AI for Healthcare by Kerrie Holley, Manish Mathur Released September 2024 Publisher(s): O'Reilly Media, Inc.	

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.Jothi Periyasamy, Founder/Chief Data Scientist, Deepsphere,AI 2 Venture Drive, #13-26 Vision Exchange,Singapore,608526	1 Dr. S. Gopinathan, Professor, Department of Computer Science, University of Madras, Chennai	1 Dr S.Umarani , Professor, BCA,SRMIST,Ramapuram

Course Code	UDS24D01J	Course Title	Advanced Computing with Python				Category	D	Discipline Core / Elective Course	L	T	P	C
										3	0	2	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes									
CLR-1	Demonstrate various principles involved in solving mathematical concepts related to permutation and combination and probability and interpret data	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Learn the basic mechanics of grammar and develop resume-building practice and presentation skills in student	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Leadership Qualities, Professionalism, Autonomy, Digital Technology Skills	Value Incultation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2		
CLR-3	Understand the object oriented features																	
CLR-4	Prepare students for job interviews																	
CLR-5	Instill confidence in students and develop the necessary skills to face interview																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Understand the concepts of permutation and combinations, probability and approach questions in a simpler and innovative method	✓	✓	-	-	2	85	75	3	1	1	1	2	-	-	2	2	3
CLO-2	Understand the different parts of speech and use them in sentences appropriately and also the importance of resume preparation	✓	✓	✓	-	2	85	75	3	1	1	2	2	-	-	1	2	3
CLO-3	Understand the importance of object oriented features	✓	✓	✓	✓	3	85	75	3	1	3	1	3	-	-	1	1	2
CLO-4	Face interviews confidently	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	2	3	3
CLO-5	Develop their domain skills	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	2	3	3

Session	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Working and Architecture of Cluster Computing Grid Computing And Cloud Computing	Cloud Computing Building Blocks, High Performance Computers	Real Time Computing, Open MP programming	Parallel Meshing and Remeshing, Google Cloud Platform Core Infrastructure And Services	Google Cloud Platform Compute, Kubernetes, AppEngine
	15	15	15	15	15

SLO-1	Working and Architecture of Cluster Computing Grid Computing And Cloud Computing, Cluster computing overview, Cluster Load Balancing, High Availability Clusters, High Performance Clusters	Cloud Computing Building Blocks, Software Building Blocks Application Workloads, VirtualWorkloads, PaaS, Identity Management, Virtualization	Examples of In-memory Computing, Real Time Computing Overview, Business Benefits Real Time Computing Overview	Working of Dynamic Load Balancing, Applications of Dynamic Load Balancing, Parallel Meshing and Remeshing, Meshing Overview, Mesh Topology and Parallel Meshing Overview,	Projects, networks, and subnet works, Routes and fire wall rules, VPC Networking
SLO-2	Working and Architecture of Cluster Computing, Grid computing overview, Computational Grid Computing, Data Grid Computing,	Hardware Building Blocks Compute Servers, Storage Servers, Hyper Converged Servers. Physical networks, High Performance Computing	Working of Real Time Computing, Examples of Real Time Computing Computing	Business Benefits, Challenges & Applications of Parallel Meshing, Partitioning and parallel meshing technique, Remeshing Overview, Business Benefits,	Common network designs, Virtual Machines, Google Cloud Platform Compute, Kubernetes, AppEngine, GCP Compute Engine overview
SLO-3	Collaborative Grid Computing, Manuscript Grid Computing, Working and Architecture of Grid computing, Cloud computing overview	High Performance Computers, High Performance Components, Compute, Network, Storage, Importance of High Performance Computers	Open MP programming, OpenMP programming Overview	Business Challenges, Applications of Remeshing, Partitioning and parallel meshing technique, Remeshing Overview, Business Benefits, Business Challenges, Applications of Remeshing, Networking and Storage Options for Advanced Computing	Advantages, Business Benefits, Applications of Compute Engine, Google Compute Engine features Machine Types, Persistent Disks, Local SSD
SLO 4&5	Lab 1: Create a Google Compute Engine virtual machine and understand zones, regions, and machine types.	Lab 4: Access files in Cloud Storage with the Spring Resource abstraction	Lab7: Set up and write simple programs on Apache Spark and Jupyter Notebooks on Cloud Data	Lab10: Calculate multiplicative inverse of five symmetric matrices of size 2000x2000.	Lab13: Use gcloud to create two custom VPC networks with subnets, firewall rules, and VM instances, then test the networks' ability to allow traffic from the public internet.
SLO-6	Private Cloud, Public Cloud, Hybrid Cloud and Multi cloud, Working of Cloud Computing,	Business Benefits of High Performance Computing, Business Challenges of High Performance Computing	Business Challenges of OpenMP Programming, Parallel programming overview, OpenMP parallel region, Worksharing	Networking Options for Advanced Computing Overview, Business Benefits, Business Challenges of Networking, Storage Options for Advanced Computing Overview	Introduction to Containers and Kubernetes, Containers and ContainerImages, Introduction to Kubernetes, Introduction to Google Kubernetes Engine
SLO-7	Architecture of Cloud computing, Difference between Cluster vs Grid computing, Cluster vs Cloud computing and Grid vs Cloud computing, Role of Cloud Computing in An AI Implementation	What can you do with High Performance Computing?, High Performance Computing in the cloud, High Performance Computing Building Blocks	OpenMP data environment, tasking, Creating Parallelism, Message Passing interface (MPI) parallel programming	Business Benefits Business Challenges for Advanced Computing, Google Cloud Platform Core Infrastructure And Services, Google Cloud Platform Core Infrastructure and Services	Kubernetes Architecture, Google Cloud App Engine environments

SLO-8	Merging AI and cloud computing, Machine learning cloud services, IoTcloud	High Performance Computing Building Blocks Overview, Why Is High-Performance Computing Important?, Business Benefits of High Performance Computing	Message Passing interface(MPI) parallel programming, Business Benefits of MPI Programming	Introduction to Google Cloud, Getting Started with Google Cloud, The Google Cloud resource hierarchy, Identity and Access Management (IAM)	Handson Python Lab on GCP, HelloWorld, Add Two Numbers
SLO 9&10	Lab 2:Creating and Manage IAM Roles on Google Cloud	Lab 5: Analyze Clinical Data using BigQuery and AI Platform Notebooks	Lab 8: Connect to computing resources hostedon Google Cloud Platform via the web	Lab11: Create Kubernetes Cluster in Google Cloud Kubernetes engine	Lab 14: Perform basic networking tasks on Google Cloud, including Compute Engine in stances
SLO-11	Business Intelligence, Alasa Service on cloud, Infrastructure as a Service and AI, Platform as a Service and AI	Components of High-Performance Computing Solutions, Compute, Network, Storage, In memory and Real Time Computing	Business Challenges of MPI Programming, Types of Parallel Computing Models, Error Handling	Interacting with Google Cloud,Virtual Machines in the Cloud, Storage, Containers, Applications in the Cloud, Advanced Computing in Google Cloud Platform	Square Root of a Number, Area of a Circle, Quadratic Equation,
SLO-12	Software as a Service and AI, Cloud technologies for AI applications,	Inmemory Computing Overview, Business Benefits In-memory Computing Overview	Running MPI Programs, Dynamic Load Balancing, Dynamic Load Balancing Overview	Interacting with Google Cloud, Using the Google Cloud,	Swap Two Variables, Mutiply Two Numbers, Divide Two Numbers
SLO-13	Containers, Kubernetes	Business Challenges In-memory Computing Overview, Working of In-memory Computing, Business Benefits of Open MP Programming	Business Benefits of Dynamic Load Balancing, Business Challenges of Dynamic Load Balancing	Working with GCP Cloud Console and Cloud Shell, Virtual Networks, Virtual Private Cloud	Generate random numbers between 0 and 100, Convert Kms to metre
SLO 14 & 15	Lab 3: Create Our First VPC in Google Cloud	Lab 6: Analyze production performance with Cloud Profiler	Lab9: Build a Fraud Detection modelon Cloud AI Platform with TensorFlow Enterprise and BigQuery	Lab12: Creating a Network Storage Solution Using Google Cloud File store	Lab15: Createas to rage bucket and then use it to store some files, retrieve files, and implement version control

Resources					
1	Google Cloud Platform for Developers: Build Highly ScalableCloud Solutions with the Power of Google Cloud Platform, BookbySteven Porterand TedHunter			3	Introduction to Computation and Programming Using Python,Bookby John Guttag
2	Python for Google App Engine, by Massimiliano Pippi			4	Python Programming: Using Problem Solving Approach, Book by Reema Thareja

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*				Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
1	Remember	15	15	15	15	10	10	10	10	15	15			Debate	✓		
2	Understand	15	15	15	15	10	10	10	10	15	15			Interactive Lecture	✓		
3	Apply	20	25	25	20	25	25	25	25	25	25			Brainstorming	✓		
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						

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.R.Jayashree,SRMIST	
												2	Mrs.S.Chandrakala,SRMIST	

Course Code	UGI24D02J	Course Title	Artificial Neural Networks				Category	D	Discipline Core / Elective Course	L	T	P	C
										3	0	2	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcome									
CLR-1	To Understand the biological background and basic concepts of neural networks	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	To Gain knowledge about perceptron and back propagation																	
CLR-3	To Know about various training rules and error minimization																	
CLR-4	To Learn the concepts of unsupervised neural networks																	
CLR-5	To Explore the fine-tuning procedures and case studies for designing neural network models																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving,	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology	Value Incultation,	Environmental Action,	Entrepreneurial Risk	PSO-1	PSO-2
CLO-1	Explain the basic concepts of neural networks	✓	✓	-	-	1	100	100	3	2	1	1	3	3	-	2	2	1
CLO-2	Describe perceptron and back propagation	✓	✓	✓	-	2	100	100	3	2	1	2	2	3	-	1	2	1
CLO-3	Apply various training rules in neural networks	✓	✓	✓	✓	3	100	100	2	1	3	1	3	3	-	1	1	2
CLO-4	Explain unsupervised neural networks	✓	✓	✓	✓	3	100	100	3	3	2	3	3	3	-	2	3	3
CLO-5	Fine tune the neural networks	✓	✓	✓	✓	3	100	100	3	3	2	3	3	3	-	3	3	3

Session	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Unit-I	Unit-II	Unit-III	Unit-IV	Unit-V
	15	15	15	15	15
SLO-1	Introduction to Artificial Neural Networks	Introduction to Perceptron, Perceptron Architecture	Paradigms of Learning, Using training samples	Unsupervised learning in neural networks, Hebbian learning rule	Pretraining the model, Data selection
SLO-2	Historical Development of Neural Network Principles	Single Neuron Perceptron, Multi Neuron Perceptron	Gradient Optimization Procedure, Batch Gradient Descent	Principle Component Learning, Learning Vector Quantizer-I	Preprocessing, Selection of network architecture, Training the network
SLO-3	Biological inspiration, Neural computation, Models of computation	Perceptron learning rule, Constructing Learning rules	Stochastic Gradient Descent, Mini-Batch Gradient Descent	Self Organizing Maps & Functionality	Initializing weight, Choice of training algorithm
SLO-4&5	Practice 1: Implementation of neural model	Practice 4: Implementation of Perceptron rule in neural framework	Practice 7: Implementation of Mini-Batch Gradient Descent	Practice 10 : Implementation of Hebbian learning rule	Practice 13: Implementation of Preprocessing, Selection of network architecture
SLO-6	Elements of computing models, Network of neurons: structure	Unified Learning rule, Training multi neuron perceptron	Hebbian learning rule, Delta learning rule	Training functionality , Topology Function	Stopping criteria, Choice Of performance function
SLO-7	Information processing at neurons	Complexity of perceptron learning,	Convergence and local minima,	Decreasing Learning, Rate Variations	Committees of Networks,Post Training Analysis

	and synapses, Information storage	Computational Limits of Perception	Representational power of feed forward networks	of SOMs	
SLO-8	Neurons as self-organizing systems, Artificial Neural Networks: Network of primitive functions	Linearly separable functions, Learning XOR-Feed forward Networks	hypothesis search space, inductive bias	Neural gas, Multi-SOM	Fitting, Pattern Recognition
SLO-9&10	Practice 2: Implement various neural network architectures	Practice 5: Implement Feed forward networks	Practice 8: Implementation of gradient descent	Practice 11: Implementation of Principle Component analysis	Practice 14: Implementation of Pattern Recognition
SLO-11	Approximation of functions, Neuron Model: Single and multiple input neurons	Back propagation, Difference between back propagation and perceptron	Generalization, Introduction to over fitting to the neural model	Multi-neural gas, Growing neural gas	Clustering- Time delay, Recurrent Neural Networks Case Studies
SLO-12	Transfer functions , Network architectures	Characteristics of Back propagation, Chain of rule Calculus	Error functions, overfitting and stopping criterion-Error functions	Adaptive Resonance Theory, Orienting subsystems	Smart Sensor system with function approximation, Myocardial
SLO-13	Single layered and multi layered neurons, Recurrent Networks	Back-Propagation Computation, Single layer, Back-Propagation Computation , Fully Connected Multi-layer Perceptron	Error minimizing, procedures Hebbian learning	Learning Laws, Self Organizing Maps	Infarction Recognition using pattern recognition with forest cover problem
SLO-14&15	Practice 3: Implement and study the effect of various activation functions	Practice 6: Implement back propagation	Practice 9: Implementation of delta learning rule	Practice 12: Implementation of Self Organizing Maps	Practice 15: Implementation of Forest cover problem using Clustering

Resources					
1	Martin T. Hagan, Neural Network Design, 2nd edition.			4	Andries P., Computational Intelligence: An Introduction, Second Edition, Wiley, 2007
2	Tom M. Mitchell, Machine Learning, McGraw-Hill Education (India) Private Limited.			5	David Kriesel, A Brief Introduction to Neural Networks, 2009
3	Ian Goodfellow, Yoshua Bengio, and Aaron Courville, Deep Learning, MIT Press, 2016			6	S. Sivanandam , “Introduction to Artificial Neural Networks”, Sangam Books Ltd; First Edition, September 2003. ISBN-10 : 9788125914259

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*				Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
1	Remember	15	15	15	15	10	10	10	10	15	15			Debate	✓		
2	Understand	15	15	15	15	10	10	10	10	15	15			Interactive Lecture	✓		
3	Apply	20	25	25	20	25	25	25	25	25	25			Brainstorming	✓		
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						

* 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.R.Jayashree,SRMIST
				2	Mrs.S.Chandrakala,SRMIST

Course Code	UEN24S01L	Course Title	Communication Skills				Category	S	Skill Enhancement Courses	L	T	P	C
										0	0	4	2

Course Offering Department	English	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes									
CLR-1	Bridge the theoretical language knowledge with practical communication skills, essential for academic and professional contexts.	Conceive	Design	Implement	Operate	Bloom's 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 Incultation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2		
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:																	
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	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	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	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	
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	

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 Barriers of Communication dynamics of interpersonal communication, Interpret Cross-Cultural Differences in Non-Verbal Communication Develop and Demonstrate Effective Non-Verbal Communication Skills	Introduction to Reading Skills. Discussion of techniques of Reading Skill Reading Skills.(Barriers of reading skills and strategies of effective communication through reading) Identifying common reading problems in students after making them read a few passages.	Introduction to Speaking Skills. Explaining the importance of phonetics and vocabulary Speaking Skills.(Barriers of speaking skills and strategies of effective communication through speaking) Explaining the usage of the Oxford Learner's Dictionary to learn phonetics of the words at the fundamental level.	Introduction to Writing Skills Importance of writing skills Writing Skills.(Barriers of writing skills and strategies of effective communication through writing) Explaining various forms of writing with examples:.	Introduction to appreciation of texts. Encouraging the students to share a few of their favourite lines from any sources they have read or sharing a few lines from paditthadhil piditthadhu.
SLO-2	Introduction to Digital language lab/ usage of mobile applications 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.	Learners are enabled to record their speech and listen to it in order to correct their problematic areas, repetitive practices of reading select paragraphs from web resources, their standard will be measured.	The right enunciation of certain words to be taught through phonetic representation and decoding the phonetic symbols by learning to use the dictionary.. Observe and repeat and learn the phonetic pronunciation of words by practicing continuously.	Introduction to letter writing. Types of letters- Formal and Informal letters with examples. Learning E-mail etiquette. Class Assignment - write a formal letter and informal letter and check for e-mail etiquettes in writing.	Explaining why appreciating texts creates a good reader. 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. Repetitive listening to enhance pronunciation skills	Students group 1- reads – group 2 identifies the flaws in reading. The roles have to be exchanged between the two groups and the activity should be practiced.	Identifying common errors in tenses, punctuation, and syntactical errors. Rectifying the common errors and instructing the learners about the right usage in order to avoid common errors.	Mechanics of writing like capitalization, punctuation, spelling, correct pronoun, preposition, concord usage can be taught. mechanics of writing - assessed and evaluated.	Reading of the second letter- Nobel? What Nobel, asks Mr. Mathrubootham. 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. Introducing to the audios of TED TALK British 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. encouraged to identify the key arguments in other passages on their own.	Practicing how to avoid common errors. The learners are introduced to collocations for quick choice of learning how to speak in short time and how to speak effectively.	Teaching effective writing by learning to avoid common errors in concord, preposition, conjunction, relative pronouns, question tags. Practicing 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, 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. Imitate the different sounds and accents - repeat it after listening to any of the videos from the library based on individual interest.	Loud reading and slow mind reading Pauses, pronunciation, comprehension and fluency can be checked for Improvement at this stage through repetitive practices.	A speaking task to learn- collocations, idioms and phrases, vocabulary and phonetic pronunciation 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 statement of purpose for admission to higher educations, and practicing the same. Teaching how to write a story by looking at a picture. Developing the writing skill through word ladders.	Analysing the text for regional relevance and National significance. 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 Choosing any particular time frame and practicing it.	Students -groups -checking the comprehension skills. Analyse the text of a passage. Brainstorming the comprehension Skills-questioning the key points in the passage.	Automating vocabulary through engaging the students in various activity games like solving crossword puzzle and Playing scattergories. Engaging the students to play the games in order to learn the vocabulary.	Introduction to blog writing and steps to become an effective blog writer. Encourage the readers to create their own blogs and post articles on a regular basis.	importance of bringing in the Indianized way of speaking the English Language in order to depict the character called Mathrubootham. 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- English Text Book – Compiled and Edited by the Faculty of English Department, 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							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*		Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
		(10%)	(10%)	(20%)	(10%)		Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
		Practice (%)	Practice (%)	Practice (%)	Practice (%)		Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality
1	Remember	20	20	15	20	20			Debate	✓		
2	Understand	20	20	15	20	20			Interactive Lecture	✓		
3	Apply	20	20	20	20	20			Brainstorming	✓		
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						

* 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 Krishna.Raj1@sutherlandglobal.com-	1	Dr. J Mangayarkarasi, Associate Professor and Head, Dept. of English Ethiraj College for Women, Chennai, jmbwilson97@gmail.com	1 Dr. Pushpanjali Sampathkumar, Assistant Professor, Department of English, FSH, SRMIST
		2	Dr. K S Antonyksamy, Associate Professor and Head, Dept. of English Loyola College, Chennai, antonyksamyks@loyolacollege.edu	2 Dr. Shanthichitra, Professor, & Head, Department of English, FSH,SRMIST

Course Code	UCD24S03J	Course Title	Industry Oriented Employability and Leadership Skills	Category	S	Skill Enhancement Courses	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
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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	Bloom's 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 Incultation, Multicultural Inclusivity Environmental Action, Community Engagement Entrepreneurial Risk Taking PSO-1 PSO-2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3
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	3	2	3	2	3	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										Strategies											
Bloom’s Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)								Technology		Pedagogy / Andragogy		Sustainable Development							
		CLA – 1 (20 %)		CLA – 2 (20 %)		CLA – 3 (30 %)		CLA – 4*		Simulations	Clarification/Pauses	✓	Good Health & Well Being	✓							
								(30%)													
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)						Presentation Tools	✓	Group Discussion	✓	Quality Education	✓	
1	Remember	5	5	5	5	15	15	10	10												Learning Management System
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												

* 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
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	-		-	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	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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(Assessment Method – Fully Internal)

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

SEMESTER V

Course Code	UGI24D03J	Course Title	Generative Adversarial Network	Category	D	Discipline Core / Elective Course	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes (PLO)											
CLR-1	Grasp the core principles of blockchain technology, including distributed ledger systems, decentralization, consensus mechanisms, and cryptography	1	2	3	4		1	2	3		1	2	3	4	5	6	7	8	9	10
CLR-2	Develop a working knowledge of blockchain architecture components like blocks, miners, and nodes, and their interactions within the network.	Conceive	Design	Implement	Operate		Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)		Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Leadership Qualities, Professionalism, Accountability, Accountability	Digital Technology Skills	Value Incubation, Multicultural Inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2	
CLR-3	Understand the role of cryptography in blockchain security, including hashing functions, digital signatures, and public-key cryptography																			
CLR-4	Gain proficiency in the concept of smart contracts, their functionalities, and how they are programmed and deployed on a blockchain platform																			
CLR-5	Explore how blockchain technology is being applied across various industries, such as education, industrial sector, and finance																			
CLO	At the end of this course, learners will be able to:																			
CLO-1	To understand the fundamental concepts and principles of GANs.	✓																		
CLO-2	To explore the architecture and components of GANs.	✓																		
CLO-3	To learn how to train and evaluate GANs.	✓	✓	✓	-	-	2	85	75		3	-	1	2	-	2	-	2	2	
CLO-4	To study various GAN variants and their applications.	✓	✓	✓	✓	-	2	85	75		3	2	2	2	2	3	-	1	2	
CLO-5	To develop skills to implement GANs for practical problems	✓	✓	✓	✓	✓	3	85	75		3	2	3	1	3	3	-	1	1	

Session	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	18	18	18	18	18
SLO-1	History and evolution of GANs	Deep Convolutional GANs (DCGAN)	BigGAN	Ethical implications of GANs	GANs for Data Privacy
SLO-2	Basic concepts: Generative models vs. Discriminative models	Conditional GANs (cGAN)	High-resolution GANs	Deepfakes and misuse of GAN technology	Generating synthetic data for privacy-preserving analytics

SLO-3	Tutorial: Overview of GANs: Generator, Discriminator, and Adversarial Process	Tutorial: Difference between DCGAN and cGAN	Tutorial: Challenges in Advanced GAN Techniques	Tutorial: Detecting and Mitigating Deepfake Threats: Technological Solutions and Tools	Tutorial: Anonymization techniques using GANs
SLO-4-6	Practice: Implementing a Simple GAN: Write code to implement a basic GAN architecture using TensorFlow or PyTorch	Practice: Generating Images with a Trained GAN: Use your trained GAN model to generate synthetic images and visualize the generated samples	Practice: Exploring Conditional GANs: Extend your GAN model to a conditional GAN architecture and train it on a dataset with labels	Practice: Adversarial Attacks on GANs: Implement and visualize adversarial attacks on GANs to understand their vulnerabilities	Practice: Image-to-Image Translation with CycleGAN: Implement a CycleGAN model for image-to-image translation tasks such as day-to-night image translation or style transfer
SLO-7	Detailed architecture of GANs	Wasserstein GANs (WGAN and WGAN-GP)	Image generation and super-resolution	Countermeasures and detection techniques	GANs in Edge Computing and IoT
SLO-8	Loss functions for GANs	Least Squares GAN (LSGAN)	Style transfer and artistic applications	Behavioural Analysis: Identifying Anomalies in Facial Expressions and Movements	Challenges of deploying GANs on edge devices
SLO-9	Tutorial: Training dynamics: Minimax game, convergence issues	Tutorial: Difference between WGAN and LSGAN	Tutorial: Implementing Deep Learning Models for Image Generation and Super-Resolution	Tutorial: Metadata Verification: Assessing the Authenticity of Digital Content	Tutorial: Optimizing GAN models for low-power consumption
SLO-10-12	Practice: Training a GAN on MNIST Dataset: Train your GAN model on the MNIST handwritten digits dataset to generate realistic digit images	Practice: Evaluating GAN Generated Images: Evaluate the quality of the generated images using metrics such as Inception Score or Fréchet Inception Distance (FID)	Practice: Generating Images from Text Descriptions: Implement a text-to-image synthesis model using GANs to generate images based on textual descriptions	Practice: Defense Mechanisms Against Adversarial Attacks: Implement defense mechanisms to protect GAN models against adversarial attacks and evaluate their effectiveness	Practice: Training Progressive GANs: Implement a Progressive GAN architecture and train it to generate high-resolution images progressively
SLO-13	Introduction to TensorFlow/PyTorch for GANs	Semi-Supervised GANs	Text-to-image synthesis	GANs for 3D data generation	Future trends in GAN research
SLO-14	Building a simple GAN: MNIST digit generation	CycleGAN and image-to-image translation	Applications in healthcare, finance, and other domains	GANs in reinforcement learning	Speculative future uses of GAN technology
SLO-15	Tutorial: Training and debugging tips	Tutorial: Progressive Growing of GANs (PGGAN)	Tutorial: Ethical Considerations and Data Privacy in Text-to-Image Synthesis Applications	Tutorial: GANs for data augmentation and imputation	Tutorial: Ethical Considerations and Societal Impacts of Speculative GAN Applications
SLO-16-18	Practice: Visualizing GAN Training Dynamics: Plot the generator and discriminator loss curves over epochs to observe the training dynamics of your GAN model.	Practice: Improving GAN Performance with DCGAN: Implement a Deep Convolutional GAN (DCGAN) architecture and compare its performance with the basic GAN model	Practice: Training a GAN on CIFAR-10 Dataset: Train your GAN model on the CIFAR-10 dataset to generate realistic color images of various objects	Practice: Exploring Style Transfer with GANs: Implement a style transfer model using GANs to transfer styles between images and visualize the results	Practice: Real-World Applications of GANs: Choose a specific domain such as healthcare, finance, or art, and apply GANs to solve a real-world problem or generate novel solutions

Resources											
1	Jakub Langr and Vladimir Bok, GANs in Action: Deep learning with Generative Adversarial Networks, Manning; First Edition (7 October 2019)						2	Navin K. Manaswi, Generative Adversarial Networks with Industrial Use Cases, BPB Publications; First Edition (1 January 2020)			
3	Kuntal Ganguly, Learning Generative Adversarial Networks, Packt Publishing Limited (30 October 2017)						4	David Foster, Karl Friston, Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play, Shroff/O'Reilly; Second edition (24 May 2023)			

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
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.Jothi Periyasamy, Founder/Chief Data Scientist, Deepsphere,AI 2 Venture Drive, #13-26 Vision Exchange,Singapore,608526	1 Dr. S. Gopinathan, Professor, Department of Computer Science, University of Madras, Chennai	1 Dr.K.Sutha, SRMIST, suthak@srmist.edu.in

Course Code	UDS24D04J	Course Title	Big Data Analytics with Applications				Category	D	Discipline Core / Elective Course				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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	Gain knowledge about the various tools and techniques used in big data analytics	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Learn the fundamentals of Hadoop and the related technologies	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn ,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-3	Understand the basics of development of applications using MapReduce, HDFS, YARN, Pig, Hive and Sqoop																	
CLR-4	Learn the basics of Apache Spark, Flink and understand the importance of NoSQL databases																	
CLR-5	Learn about Enterprise Data Science and data visualization tools																	
CLO	At the end of this course, learners will be able to:	✓	✓	-	-	2	85	75	3	1	1	1	2	-	-	2	2	2
CLO-1	Use the various tools and techniques in big data analytics	✓	✓	✓	-	2	85	75	3	1	1	2	2	-	-	1	3	2
CLO-2	Apply Hadoop and related technologies to big data analytics	✓	✓	✓	✓	3	85	75	3	-	3	-	3	-	-	1	3	3
CLO-3	Apply MapReduce, HDFS and YARN develop big data applications	✓	✓	✓	✓	3	85	75	3	2	2	-	3	-	-	2	3	3
CLO-4	Develop applications using Pig, Hive and Sqoop	✓	✓	✓	✓	3	85	75	3	2	-	3	3	-	-	2	3	3
CLO-5	Apply Apache Spark and Flink to applications and understand the importance of NoSQL databases	✓	✓	✓	✓	3	85	75	3	2	-	3	3	-	-	2	3	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Introduction to Apache and Mapreduce	YARN and Hadoop File System	Zookeeper and Sqoop	Flink and NoSql	Data Visualization Tools and Spark
	18	18	18	18	18
SLO-1	Overview and Introduction of Big Data Analytics	MapReduce, Analyzing data with Unix tools and Hadoop	Setting up a Hadoop cluster, Cluster specification and setup	Introducing Oozie, Apache Spark	Enterprise Data Science Overview
SLO-2	Big data mining, Technical	Scaling Out – Data Flow	Hadoop configuration, YARN	Limitations of Hadoop and	Data Science Solutions in the

	elements of the Big Data platform	Combiner Functions	configuration	overcoming the limitations	enterprise
SLO-3	Analytics Toolkit, Components of the analytics toolkit	Hadoop Streaming	Introduction, Installing and Running pig, Basics of Pig Latin,	Core components and architecture of Spark	Enterprise data science – Machine Learning and AI- Enterprise Infrastructure solutions
SLO 4-6	Lab 1: Install Apache Hadoop	Lab 4: Develop a MapReduce program to find the grades of student's.	Lab 7: Develop a MapReduce to analyze weather data set and print whether the day is shinny or cool day.	Lab 10: XYZ.com is an online music website where users listen to various tracks, the data gets collected which is given	Lab 13: Develop a MapReduce program to analyze Uber data set to find the days on which each basement has more trips using the given dataset.
SLO-7	Cloud computing and Big Data	HDFS, Java Interface to Hadoop	Introduction , Installing and running Hive, Introduction to HiveQL	Introduction, Installing Flink to Apache Flink.	Visualizing Big Data, Using Python and R for visualization
SLO-8	In-Memory Computing Technology for Big Data	YARN, Job Scheduling	Introduction to Zookeeper	Batch analytics using Flink	Big Data Visualization Tools, Data Visualization with Tableau
SLO-9	Data Product, Building Data Products	Hadoop I/O, Data Integrity, Compression, Serialization	Installing and running Zookeeper	Big Data Mining with NoSQL	Case Studies: Hadoop and Spark
SLO 10-12	Lab 2: Develop a MapReduce program to calculate the frequency of a given word in a given file.	Lab 5: Develop a MapReduce program to implement Matrix Multiplication.	Lab 8: Develop a MapReduce program to find the number of products sold in each country by considering sales data containing fields	Lab 11: Develop a MapReduce program to find the frequency of books published each year and find in which year maximum number of books were published using the given data.	Lab 14: Develop a program to calculate the maximum recorded temperature by yearwise for the weather dataset in Pig Latin
SLO-13	Leveraging large datasets, Bigdata workflows	File based Data Structures	The Zookeeper Service	Uses of NoSQL	Machine Learning, Scalable machine learning with Spark
SLO-14	The core modules of Hadoop, Fundamentals of Hadoop, Hadoop Ecosystem	Developing a MapReduce Application	Flume Architecture	Why NoSQL?, Introduction to HBase	Collaborative Filtering
SLO-15	Introduction to Hadoop MapReduce, Hadoop YARN	Working with a Distributed file system	Introduction to Sqoop	Introduction to MongoDB, Cassandra	Classification, Clustering
SLO 16-18	Lab 3: Develop a MapReduce program to find the maximum temperature in each year.	Lab 6: Develop a MapReduce to find the maximum electrical consumption in each year given electrical consumption for each month in each year.	Lab 9: Develop a MapReduce program to find the tags associated with each movie by analyzing movie lens data.	Lab 12: Develop a MapReduce program to analyze Titanic ship data and to find the average age of the people (both male and female) who died in the tragedy. How many persons are survived in each class.	Lab 15: Write queries to sort and aggregate the data in a table using HiveQL.

Resources			
1	Raj Kamal; Preeti Saxena, BIG DATA ANALYTICS: Introduction to Hadoop, Spark, and Machine-Learning, McGraw-Hill Education, 2019.	3	TomWhite, Hadoop: The Definitive Guide, 3 rd Edition, O'Reilly, 2012.
2	Sridhar Alla, Big Data Analytics with Hadoop 3, Packt, 2018.	4	Nataraj Dasgupta, Practical Big Data Analytics, Packt, 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.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. R. Ramyadevi, SRMIST, Ramapuram.

Course Code	UGI24D05J	Course Title	Large Language Model	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Progressive Courses	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes									
CLR-1	Overview of Large Language Model: Concepts and importance	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Evaluation of Large Language Models																	
CLR-3	Review of Large Language Models and its Types																	
CLR-4	Memory-augmented architectures for LLMs in Generative AI																	
CLR-5	Developing Software with Generative AI																	
CLO	At the end of this course, learners will be able to:	Software development AI				Bloom's Level of Expected Proficiency			Problem Solving, Critical Thinking, Communication Skills, Collaboration Skills, Independent Thinking, Leadership Qualities, Digital Technology Skills, Value Incubation, Multicultural Understanding, Environmental Action, Entrepreneurial Risk Taking, PEO-1, PEO-2									
CLO-1	Introduction to Large Language Model Development	✓	✓	✓	-	2	2	85	75	3	3	-	1	2	-	2	-	2
CLO-2	Fundamentals of Large Language Models	✓	✓	✓	✓	-	2	2	85	75	3	3	2	2	2	3	-	1
CLO-3	Overview of the training process to LLM	✓	✓	✓	✓	✓	3	3	85	75	3	3	2	3	1	3	3	1
CLO-4	Implement validation techniques for accurate model performance	✓	✓	✓	✓	✓	3	3	85	75	3	3	3	2	3	3	3	2
CLO-5	Using LLMs responsibly: Best practices	✓	✓	✓	✓	✓	3	3	85	75	3	3	3	2	3	3	3	3

Session	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	18	18	18	18	18
SLO-1	Introduction to Language Model Development	Understanding and implementing loss functions	Building capable Assistants	Course Management	Developing Software with Generative AI
SLO-2	What are the Limitations of LLMs	Backpropagation and gradient descent	Mitigating hallucinations through fact checking	Communication and Collaboration	Software development AI
SLO-3	History and evolution of NLP technologies	Transfer Learning and Fine-Tuning	Extracting Information from documents	Virtual Lab Environment	Writing Code with LLMs

SLO4-6	Lab: Introduction to Python for NLP using NLTK and SpaCy	Lab: Generating text with GPT-2	Lab Practical: Building a simple Chabot using a pre-trained LLM	Lab: Analyzing case studies and deploying a language model in a simulated environment	Lab: LLMs for Data Science
SLO-7	Fundamentals of Large Language Models	Introduction to Language Models (LMs)	Data Augmentation and Normalization	Analytics and Reporting	The Impact of Generative models on Data Science
SLO-8	Neural networks and deep learning basics	Types of Language Models	Introduction to data augmentation: techniques and applications	Integration and Scalability	Automated Data Science
SLO-9	Transformer architecture, Key LLMs: GPT, BERT, T5, etc.	Strengths and Weaknesses of Different Language Models	Implementing data augmentation in image, text, and tabular data	Security and Compliance	Customizing LLMs and their Output
SLO-10-12	Lab: Building a simple neural network for text classification	Lab: Compare and contrast different language models using a variety of NLP tasks.	Lab: Identifying and mitigating bias in language models	Lab: Analyzing case studies and deploying a language model in a simulated environment	Lab: Produce an outline for a short story using Claude
SLO-13	Importance of LLMs in NLP	Ethical Considerations in NLP	Model Architecture Design	Evaluation Metrics and Validation	Conditioning LLMs
SLO-14	Overview of the training process	Bias and Fairness in NLP Models	Frontend Interface	Understand metrics: perplexity, accuracy, F1 score	Fine Tunning
SLO-15	Cleaning and preprocessing text data	Privacy Concerns and Data Protection	User Authentication and Authorization	Implement validation techniques for accurate model performance	Prompt engineering
SLO-16-18	Lab: Preprocessing text data and training a basic language model	Lab: Discuss and analyze ethical dilemmas in NLP applications and propose solutions.	Lab: Experimenting with few-shot learning using GPT-3	Lab : AI regulations: An ethics perspective	Lab: Using LLMs responsibly: Best practices

Resources											
1	Et tu code: Building Large Language Model, Kindle Edition, 2023						3	Suhas Pai Designing Large Language Model Applications, O'Reilly Media, 2024			
2	Jay Alammur, Maarten Grootendorst, Hands On Large Language Models,, O'Reilly Media, Inc.,2024						4	Bernard Marr, Generative AI in Practice,Wiley, 2023			

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.Jothi Periyasamy, Founder/Chief Data Scientist, Deepsphere, AI 2 Venture Drive, #13-26, Vission Exchange, Singapore, 608626	1 Dr.S.Gopinath, Professor, Dept. of Computer Science, University of Madras, Chennai	1 Dr. N.Revathi , SRM IST,Ramapuram Campus, revathiphd3@gmail.com
			2 Mrs. M.Divya , SRM IST,Ramapuram Campus, divyam1@srmist.edu.in

Course Code	UDS24D06J	Course Title	Computer Vision				Category D	Discipline Core / Elective Course	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	Understand the basics of Computer Vision	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Learning the fundamentals of Image Processing Techniques	Conceive	Design	Implement	Operate	Bloom's 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, Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2	
CLR-3	Learn image smoothing techniques																	
CLR-4	Understanding the feature matching algorithm																	
CLR-5	Understanding the Deep Learning algorithm for computer vision																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Implement image processing techniques for computer vision	✓	✓	-	-	2	85	75	3	1	1	1	1	-	-	2	2	-
CLO-2	Gain knowledge to work with image processing techniques	✓	✓	-	-	2	85	75	3	-	1	2	2	-	-	1	2	-
CLO-3	Apply Hough Transformation & Recognition Methodology	✓	✓	✓	✓	3	85	75	3	-	3	-	2	-	-	1	3	-
CLO-4	Explore feature matching techniques.	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	2	3	-
CLO-5	Develop applications using Deep Learning algorithm.	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	2	3	-

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Computer Vision and OpenCV	Image Enhancement and Filtering	Image Gradients	Image segmentation	Image Classification Models & Tensorflow
	18	18	18	18	18
SLO-1	Introduction to Computer Vision, Definition and scope of computer vision	Overview of Binary Image Processing, Thresholding in Opencv	Image Smoothing Techniques, Box Blur, Gaussian Blur, Median Blur, Bilateral Filtering Comparison:	Feature Matching, Different Feature Matching Algorithms in OpenCV, RANSAC	Image Classification Models, Object Detection Techniques

			Median VS Bilateral		
SLO-2	Evolution of computer vision, Task of Computer Vision	Erosion and Dilation in OpenCV, Connected Component Analysis Technioques	Introduction to Image Gradients, First Order Derivative Filters Second Order Derivative Filters	Application: Image Alignment, Creating Panorama, Finding Known Objects using OpenCV	Pedestrian Detection in OpenCV, Face Detection using HAAR Cascade
SLO-3	Applications of computer vision in various fields, Virtual Reality & Augmented Reality	Connected Component Analysis in OpenCv, Contour Analysis in OpenCV	Application: Sharpening Filter, Canny Edge Detection in OpenCV	Image segmentation using GrabCut, Grabcut Theory Grabcut in OpenCV	Face Detection in OpenCV, Deep Learning with OpenCV: Image Classification
SLO 4-6	Lab 1-Read,Displaying, Write images using OpenCV	Lab 4: Implement different Morphological Operations	Lab7: Implement Canny Edge Detection	Lab 10 : Image segmentation using GrabCut in openCV	Lab13 :Face Detection using OpenCV
SLO-7	Techniques in Computer Vision, Challenge in computer vision	Blob Detection in OpenCV, Mouse and Trackbar using OpenCv	Hough Transforms, HoughLine: To detect a line in an image HoughCircle: To detect a circle in an image	Image Classification, Histogram of Oriented Gradients(HOG)	Image Classification using Caffé and Tensorflow, Object Detection : Single Shot Multibox Detector(SSD) You Only Look Once Detector(YOLO)
SLO-8	Image formation, Digital Image, Image as Matrix, Manipulating Pixels, Working with Color & Gray Scale images	Image Enhancement and Filtering, Color Spaces : RGB, HSV and Other Color Spaces	High Dynamic Range Imaging in OpenCV, Image Impainting	Eyeglass Classifier in OpenCV, Object Detections	Face Detection: SSD based Face Detector, Neural Networks Models for Image Classifications
SLO-9	Image Operations: Creating Image, Cropping images, Coping a region to another image, Resizing images creating Image mask	Applications: Finding Dominant Color in an image, Desaturation Filter	Seamless Cloning, Seamless Cloning in OpenCV	Motion Estimation using Optical Flow, Lucas-Kanade Optical Flow	Image Filtering Using Convolution in OpenCV, CNN architectures: region-based CNNs, Faster R-CNN
SLO 10-12	Lab 2:Working Basic Image operating using OpenCV	Lab 5 : Working with Contour Analysis	Lab 8 : Face Blending	Lab 11: Motion Detection in OpenCV	Lab 14 : Work with a YOLO/single shot object detection system.
SLO-13	Mathematical Operations on Images: Data Type Conversion, Contrast Enhancement, Brightness Enhancement	Color Transform, Histogram Equalization	Image In painting, Geometric Transforms: Affine Transform Homography	Object Trackers in OpenCV, Comparison of different trackers	Implementing a CNN in TensorFlow & Keras, Image Classification using Pre-Trained ImageNet Models in TensorFlow & Keras
SLO-14	Image Channels, Splitting & Merging Channels, Manipulating Color Pixels,	Advanced Histogram Equalization (CLAHE), Color Adjustment using Curves	Geometric Transforms in OpenCV, Image Features: Image Feature: ORB	Multiple Object Tracking using OpenCV, Kalman Filter Tracker	Implementing an MLP in TensorFlow & Keras, Video Analysis: Motion Estimation

	Images with Alpha Channels				using Optical Flow
SLO-15	Image Annotation: line over an image, Circle over an image, Rectangle over an image, Ellipse over an image text over an image	Image Filtering Techniques, Image filtering using Convolution in OpenCv	ORB Feature in OpenCV, Application: Image Alignment, Creating Panorama	Tracking using MeanShift, Tracking using CamShift	Object Trackers in OpenCV, Multiple Object Tracking using OpenCV
SLO 16-18	Lab 3: Working with Image Annotation using OpenCV	Lab 6 : Convert the images into different color spaces	Lab 9 : Implement Geometric Transforms in OpenCV	Lab 12: Tracking using MeanShift and CamShift	Lab 15: Image Classification using OpenCV

Resources					
1	Wesley E. Snyder, Fundamentals of Computer Vision , Cambridge University Press; 1st edition, 2017.	3	Computer Vision: Algorithms and Applications by Richard Szeliski. Available for free online.		
2	Computer Vision: A Modern Approach (Second Edition) by David Forsyth and Jean Ponce. Available for free online.				

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

* 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

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	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.Helen, SRMIST, Kattankulathur

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
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CLR	The purpose of learning this course is to:	Depth				Attainment			PLO									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
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:	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PSO 1	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 6	CLO - 2 6	CLO - 3 6	CLO - 4 6	CLO - 5 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, water conservation, 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 *							
		(10%)	(10%)	(20%)	(10%)							
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)						
1	Remember	20	20	20	20	20			✓	Clarification/Pauses	✓	Good Health & Well Being
2	Understand	20	20	20	20	20			✓	Group Discussion	✓	Quality Education
3	Apply	20	20	20	20	20			✓	Hands-on Practice	✓	Gender Equality
4	Analyze	20	20	20	20	20				Debate	✓	Life on Land
5	Evaluate	20	-	20	20	20				Interactive Lecture	✓	Clean Water and Sanitation
6	Create	-	20	-	-	-				Brainstorming	✓	Affordable and clean energy
	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
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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcome									
CLR-1	Develop resume building practice	Conceive Design Implement Operate				Bloom's 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	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																	
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

Course Code	UGI24P02L	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme 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	Bloom's 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,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-3	Enhance the skills in the system aspects																	
CLR-4	Understanding the professional connections with knowledge learnt.																	
CLR-5	Applying the skills in problem solving																	
CLO	At the end of this course, learners will be able to:	✓	✓	✓	✓	2	85	75	3	2	3	3	3	2	2	1	3	3
CLO-1	To get an insight of an industry and organization/company																	
CLO-2	To gain valuable skills and knowledge																	
CLO-3	To make professional connections and enhance networking.																	
CLO-4	To get experience in a field to allow the student to make a career transition																	
CLO-5	To get an inside view of an industry and organization/company																	

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.

Assessment Component	Expected outcome	Type	Evaluators	Criteria or basis	Marks
Review-1	Internship letter Submission Internship title to be described.	Internal	Supervisor / Guide & Internship Coordinator	Feasibility Study of the Internship	20
Review-2	A short presentation about the internship work	Internal	Supervisor / Guide & Project Coordinator	Clarity of the idea, Preliminary work done.	30
Internship Report	Evaluation of internship Report	External	Examiner(s)/ Reviewer(s)	Presentation, Handling Q&A	30
Viva-Voce	Final Presentation				20

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

SEMESTER-VI

Course Code	UDS24D07J	Course Title	Advanced Analytics and Data Visualization					Category	D	Discipline Core / Elective Course	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	To understand advanced analytics	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	To advance in Analytics and data visualization																	
CLR-3	To Get a strong hands on skill, knowledge and expertise in creating beautiful stories using Analytical applications that are an integral part of SAP analytics																	
CLR-4	To apply hybrid solutions																	
CLR-5	To use a hybrid solutions																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking			Programme Learning Outcomes									
CLO-1	Have a strong hands- on skills knowledge and expertise in transforming data into more useful visuals with the use of charts and visuals.	✓	✓	✓	✓	2	85	75	3	1	-	1	1	-	-	2	2	2
CLO-2	Get a strong hands-on skill, knowledge and expertise in creating beautiful stories that are an integral part of SAP analytics	✓	✓	✓	✓	2	85	75	3	1	-	2	2	-	-	1	2	2
CLO-3	Get a strong hands-on skill, knowledge and expertise in creating beautiful stories using analytical applications that area in integral part of SAP analytics	✓	✓	✓	✓	3	85	75	3	1	3	1	2	-	-	1	3	3
CLO-4	Be introduced to the scripting world in SAP analytics for cloud for creating analytical applications	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	2	3	3
CLO-5	Use a hybrid solution where SAC serves as a front-end on top of your BPC back bone called Financial Planning in SAP SAC.	✓	✓	✓	✓	3	85	75	3	2	-	3	3	-	-	2	3	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Foundations of Data Visualization	Charts	Data Modelling and Stories	Scripting in SAPSAC	Planning
	18	18	18	18	18
SLO-1	Foundations of Data Visualization, Data Visualization Overview	Bar Chart, Column Chart, Pie Chart	Data Modelling in SAP SAC, Data Visualization SAP SAC, Predictive modelling in SAP SAC	Creating Analytic Applications in SAP Data Warehouse Cloud. Defining Busy Indicator, Using Popups	Pall The Right Information On The Page, Select The Right Type of dashboard
SLO-2	Business Benefits of Data Visualization, Business Challenges of Data Visualization	Scatter Plot Entitle A Specific Audience And mark their needs	Creating Stories in SAP SAC Stories SAP SAC Overview	Scripting in SAPSAC Analytic Applications Scripting in SAP, SAP overview	Financial Planning in Analytics Designer and Financial Planning in Analytics Designer overview
SLO-3	When to use Data Visualization, Types of Data Visualization, Data Visualization tools and techniques, Why Would a Company Want to Visualize Data?	Choose The Right Visual, Apply Text Carefully and Intentionally, Use The Predictable Pattern For Layouts	Business Benefits of APSAC Stories, Steps to Create stories in SAP SAC, Save the Story	Create a new Scrip to object, Create A Function, Edit The Script Function	Business Benefits of Financial Planning SAPSAC, Cost center Planning ,Product Cost Planning, Sales and Profitability Planning
SLO 4-6	Lab1: Data Visualization Tools	Lab 4: Working with comment widgets and scripting objects	Lab 7: Business Benefits of APSAC Stories	Lab 10: Placing the Right information on the page	Lab 13: Model Creation
SLO-7	Solving Data Inefficiencies And Data Visuals, Speed of Decision Making	Select the right data visualization tool, Use Attractive Colors For Telling Data Stories	Typical Work flow in creating an Analytic Application?, Analytic Application , SAP SAC Overview, Place the widget in the canvas	Create A New Argument For The Function, Save the Analytic application	Project Planning, Internal Order Planning, Capital Expense Planning
SLO-8	Identify Data Inaccuracies, Access Real-time information	Types of Data Visualization, Types of Data Visualization	Choose the Data Visualization Component, Add More Widgets, Add Scripts to your widgets	Scripting in SAPSAC Analytic Applications, Widgets SAPSAC overview	Financial Statement Planning, Predictive Modelling in SAPSAC
SLO-9	Promote Storytelling, Exploring business Insights, Discover latest Trends, Tailor Made Reports	Business Benefits of Data Visualization, Charts, Tables, Graphs	Save the Analytic application, Creating Stories using Analytic Application in SAP SAC	Uses of Widgets in SAPSAC, Create a New Widget, Adding a Custom Widget, Modifying the Custom Widget	Predictive Modelling in SAPSAC Overview, Business Benefits of Predictive Analytics in SAPSAC
SLO 10-12	Lab 2: Visualizing location based data for business insights	Lab 5: Applying Color theory in Data Visualization	Lab 8: Data Modeling in SAPSAC	Lab 11: Scripting in SAPSAC Analytic Applications	Lab 14: Predictive Modeling in SAPSAC
SLO-13	What Does the Future Hold for	Maps, Infographics, Dashboards	Analytic Application SAPSAC	Scripting in SAPSAC Analytic	Steps to implement

	Visualizing Data, Future of Data Visualizations		Overview, Create New Analytic Application, Changing the Name of Widgets, Adding Comments to Widgets and Table Cells,	Applications, SAPSAC Best Practices,	Predictive modelling in SAPSAC, Identify the ML Scenario,
SLO-14	Location Based Analysis, Storytelling Will Become Crucial, Interactive Dashboards, Data Visualization for everyone	Types of Data Visualization, SAP Analytics for Cloud Overview	Working with the Comment Widget in an Analytic Application, Copying and Pasting Widgets and Scripting Objects, Features of APSAC	Determine Your Goals, Choose relevant KPIs,	Data Acquisition, Data Discovery, Data Processing
SLO-15	Techniques and Best Practices Techniques, Data Visualization techniques Overview	Features of APSAC, Business Benefits of APSAC, Key Capabilities of APSAC	Copying and Pasting Widgets from Story to Analytic Application Restoring Deleted Widgets or Scripting Objects	Tell a story With Your Data, Provide context, Pall the right information on the page	Model Creation, Generating Predictions
SLO 16-18	Lab3: Techniques and Best Practices Techniques	Lab6: Types of Data Visualization	Lab 9: Analytic Application SAPSAC	Lab12: Scripting in SAPSAC Analytic c Applic ations	Lab15: Model Creation

Resources					
1	Data Visualization :a successful design process by Andy Kirk Publisher(s): Packt Publishing inglink: https://www.oreilly.com/library/view/data-visualization-a/9781849693462/			2	SAPAnalyticsCloudbyAbassinSidiqpublisher:SAPpresswithRheinwerkpublisher

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

* 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.R.Thilagavathy, SRMIST, KTR

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	✓	

Course Code	UGI24D08J	Course Title	Prompt Engineering				Category	D	Discipline Core / Elective Course	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning									
CLR-1	Introduction to Large Language Model Development	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Fundamentals of Large Language Models																	
CLR-3	Overview of the training process to LLM																	
CLR-4	Implement validation techniques for accurate model performance																	
CLR-5	Using LLMs responsibly: Best practices																	
CLO	At the end of this course, learners will be able to:	Conceive				Bloom's Level of			Problem Solving, Critical Thinking, Creativity, Communication Skills, Collaborative Skills, Independent Thinking, Leadership Qualities, Digital Technology Skills, Value Incubation, Multicultural Understanding, Environmental Action, Entrepreneurial Risk Taking, PSO-1, PSO-2									
CLO-1	To acquire the knowledge to get best output from the right question.	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	To work efficiently with ChatGPT, UM-GPT and DALL-E.	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	To able to craft the prompt for the various conditions.	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	To implement the encoding and Decoding of Text	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	To construct variations of AI Applications using Web Interface	✓	✓	✓	✓	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	Prompt Engineering: Introduction	Types of Promts	Standard Practices for Text Generation with Chat GPT: Generating List and Hierarchical List Generation	Advanced Techniques for Text Generation with LangChain : Introduction to LangChain	Autonomous Agent with Memory and Tools: Chain of Thought
SLO-2	Role of Prompts in AI Model	How Does prompt engineering works	Generating JSON	Chat Models	Agents
SLO-3	What is Generative AI? Principles of Prompting	Benefits of Prompt Engineering	Diverse Format Generation with Chat GPT	Streaming Chat Models	Using LLMs as an API (Open AI functions)

		Future Directions and open Challenges	Chunking Test	Creating Multiple LLM Generations	Comparing Open AI functions and react
SLO4-5	<i>LAB 1- Apply 5 Principles of prompting and Generate a Image Prompt</i>	<i>LAB 4- Integer Prompt Program</i>	<i>LAB 7- Build a simple chunking algorithm in Python</i>	<i>LAB 10- Creating a generator in LangChain</i>	<i>LAB 13- Implement Simple reAct</i>
SLO-6	Evolution of AI: From Rule-Based to Generative Models	Why Prompt engineering?	Chunking Strategies	LangChain Prompt Template	Agent Toolkits
SLO-7	Text Generation Models Popular Use Cases for Generative AI	Parameters of Decoding. Prompt Engineering Techniques	Encoding	LangChain Expression Language (LCEL)	Customizing Standard Agents
SLO-8	Open AI's Generative Pre-Trained Transformers(Chat GPT, Google Bard, LSTMs and others)	Risks	Sentiment Analysis Least to most	Vector Database Retrieval Augmented Generation	Understanding and Using Memory Memory in LangChains
SLO-9-10	<i>LAB 2- Working with Chat GPT Prompt-I</i>	<i>LAB 5- Boundary Testing Prompt Program</i>	<i>LAB 8- Implement Encoding and Decoding of Text</i>	<i>LAB 11- Working with Prompt Template and Vector Database</i>	<i>LAB 14- Custom and Build the Agent</i>
SLO-11	Designing Effective prompt	Prompt Injection	Role Prompting	Embedding	Other Popular Memory types in LangChains
SLO-12	Prompt Generation Strategies	Prompt Leaking	GPT Best Practices	Document Loading	Open AI functions Agents with memory
SLO-13	Chat GPT Examples	Jail Breaking NLP and ML Foundation	Classification Model Mets Prompting	Memory Retrieval with FAISS Self Querying	Advanced Agent Framework Callbacks
SLO-14-15	<i>LAB 3- Working with Chat GPT Prompt-II</i>	<i>LAB 6- Security Risks in User Prompts Program</i>	<i>LAB 9- Build a Classification Model</i>	<i>LAB 12- Working with FAISS</i>	<i>LAB 15- Implement Callbacks with Constructors</i>

Resources		
1	Prompt Engineering for generative AI by James Phoenix and Mike Taylor, O'Reilly Media, Inc Publication, July 2024	3 Prompt Engineering for generative AI by Johnny M Hill
2	References: https://www.tutorialspoint.com/prompt_engineering/prompt_engineering_translate_prompt.html https://datasciencehorizons.com/pub/Mastering_Generative_AI_Prompt_Engineering_Data_Science_Horizons_v1.pdf	

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*				Simulations	Clarification/Pauses	✓	Good Health & Well Being		
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools	✓	Group Discussion	✓	Quality Education	
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	
		1	Remember	15	15	15	15	10	10	10	10	15	15		Debate	✓	
2	Understand	15	15	15	15	10	10	10	10	15	15		Interactive Lecture	✓			
3	Apply	20	25	25	20	25	25	25	25	25	25		Brainstorming	✓			
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						

* 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.JothiPeriyasamy, Founder/Chief Data Scientist, Deepsphere, AI 2 Venture Drive, #13-26, Vission Exchange, Singapore, 608626	1 Dr.S.Gopinath, Professor, Dept. of Computer Science, University of Madras, Chennai	1 Mr.A.Vignesh ,SRMIST,Ramapuram Campus, vignesha2@srmist.edu.in
			2 Mr.U.Udayakumar, SRMIST,Ramapuram Campus, udayakuu@srmist.edu.in

Course Code	UGI24D09J	Course Title	Image Generative Models				Category	D	Discipline Core / Elective Course	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes (PLO)									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Understand the basics of Generative Models																	
CLR-2	Learning the Variational Autoencoders																	
CLR-3	Exploring essentials of Generative Adversarial Networks (GANs)																	
CLR-4	Autoregressive and Flow-based Models																	
CLR-5	Advanced topics and applications																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking			Program Learning Outcomes (PLO)									
						2	8	5	3	1	2	3	4	5	6	7	8	9
CLO-1	Understand and articulate the principles and applications of generative models.	✓	✓	-	-	2	8	5	3	3	-	-	1	-	3	-	2	2
CLO-2	Implement and train various generative models including VAEs, GANs, and autoregressive models.	✓	✓	✓	-	2	8	5	3	3	2	1	2	2	3	-	1	2
CLO-3	Evaluate and compare the performance of different generative models using appropriate metrics.	✓	✓	✓	✓	3	8	5	3	3	1	3	1	3	3	-	1	1
CLO-4	Explore and implement advanced techniques in generative models, keeping up with current research trends.	✓	✓	✓	✓	3	8	5	3	3	3	2	3	3	3	-	2	3
CLO-5	Discuss and address the ethical considerations and societal impacts of generative models.	✓	✓	✓	✓	3	8	5	3	3	3	2	3	3	3	-	3	3

Sessions	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Introduction to Generative Models	Variational Autoencoders (VAEs)	Generative Adversarial Networks (GANs)	Autoregressive and Flow-based Models	Advanced Topics and Applications
	18	18	18	18	18
SLO-1	Understand the fundamentals and significance of generative models.	Describe the architecture of autoencoders and VAEs.	Describe the architecture and components of GANs.	Explain the concepts and applications of autoregressive models.	Introduce and explain the significance of diffusion models.

SLO-2	Differentiate between generative and discriminative models.	Explain the structure and function of VAEs.	Explain the roles and interactions of the generator and discriminator.	Describe the architecture and implementation of PixelRNN and PixelCNN.	Discuss self-supervised learning in the context of image generation.
SLO-3	Identify key applications of generative models.	Discuss the concept and role of latent space in VAEs.	Illustrate the training process and dynamics of GANs.	Discuss the role of masked and causal convolutions.	Apply advanced evaluation metrics like IS and FID
SLO-4-6	Lab 1: Explore various datasets (e.g., MNIST, CIFAR-10) for image generation tasks.	Lab 4: Build the encoder and decoder networks for a VAE.	Lab 7: Implement the GAN training loop.	Lab 10: Install, Import Scikit Learn and Explore Iris Dataset with Pandas for ML Modelling	Lab 13: Build and train a PixelCNN model on a dataset (e.g., CIFAR-10).
SLO-7	Apply basic probability and statistical concepts relevant to generative models	Outline and implement the VAE training process.	Identify and address common challenges in training GANs.	Illustrate the structure and applications of normalizing flows.	Address ethical considerations in generative modeling.
SLO-8	Perform maximum likelihood estimation for generative tasks.	Understand and apply the reparameterization trick.	Apply techniques for stabilizing GAN training.	Explain and implement RealNVP and Glow models.	Explore the societal impacts of generative models.
SLO-9	Explain the concept and importance of latent spaces.	Describe and calculate the VAE loss function.	Implement a basic GAN using a deep learning framework.	Implement and evaluate PixelCNN and normalizing flow models.	Review and discuss current research trends in image generative models.
SLO-10-12	Lab 2: Implement a simple probability distribution and visualize it.	Lab 5: Train the VAE on a dataset (e.g., MNIST) and visualize the generated images.	Lab 8 Train the GAN on a dataset (e.g., CIFAR-10) and visualize the generated images.	Lab 11: Explore all the Data Visualization Graphs and Find the outliers using plot.	Lab 14: Implement and train a RealNVP model.
SLO-13	Recognize common challenges in training generative models.	Implement a VAE using a deep learning framework.	Evaluate the quality of images generated by GANs.	Evaluate the performance of autoregressive models.	Implement advanced generative models from recent literature.
SLO-14	Summarize historical developments in generative models.	Evaluate the performance of a VAE.	Explore and implement variants of GANs.	Compare autoregressive and flow-based models with GANs and VAEs.	Evaluate the impact of generative models on various industries.
SLO-15	Utilize basic evaluation metrics for generative models.	Compare and contrast VAEs with traditional autoencoders.	Review case studies and practical applications of GANs.	Explore practical applications of autoregressive and flow-based models.	Conduct a detailed case study analysis of a real-world application.
SLO-16-18	Lab 3: Perform maximum likelihood estimation on a given dataset.	Lab 6: Evaluate the performance of the VAE using appropriate metrics.	Lab 9: Explore techniques to stabilize GAN training (e.g., label smoothing, gradient clipping).	Lab 12: Find the data distributions using box and Scatter plot.	Lab 15 : Compare the performance of PixelCNN and RealNVP using evaluation metrics and Visualize the generated images and latent spaces.

Resources											
1	"Deep Learning" by Ian Goodfellow, Yoshua Bengio, and Aaron Courville (2016)								4	"Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play" by David Foster (2019)	
2	"Probabilistic Machine Learning: An Introduction" by Kevin P. Murphy (2022)								5	"Hands-On Generative Adversarial Networks with Keras: Build image generation and semi-supervised learning applications with GANs and deep learning" by Rafael Valle (2019)	
3	"Introduction to Deep Learning" by Eugene Charniak (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
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.Jothi Periyasamy, Founder/Chief Data Scientist, Deepsphere, AI 2 Venture Drive, #13-26, Vission Exchange, Singapore, 608626	1 Dr.S.Gopinath, Professor, Dept. of Computer Science, University of Madras, Chennai	1 S. Suriya, Assistant Professor, SRM IST , Ramapuram campus, suriyas@srmist.edu.in
			2 Dr. R. Agusthiyar, Professor, SRM IST, Ramapuram Campus, agusthir@srmist.edu.in
			3 Dr. N. Vijayalakshmi, Assistant Professor, SRM IST, Ramapuram Campus, vijayaln@srmist.edu.in

Course Code	UGI24D010J	Course Title	Advanced Web Application Development	Category	D	Discipline Core / Elective Course	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes									
CLR-1	Explain the significance and basic concepts of generative models.	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Learning Implementation of web applications using HTML5, CSS3, and JavaScript																	
CLR-3	Develop Backend applications																	
CLR-4	Explore about security and performance																	
CLR-5	Development and Maintenance																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Expected Proficiency (%)			Program Learning Outcomes									
CLO-1	Understanding core web development principles and best practices, aligned with CLRs that address foundational knowledge and tools.	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Focuses on front-end technologies and design, aligned with CLRs on frameworks, state management, and UI/UX principles.	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Emphasizes back-end development, including APIs and databases, aligned with CLRs on server-side frameworks and security techniques.	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Deals with security and performance, aligned with CLRs on vulnerability mitigation, optimization, and testing	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Pertains to deployment and maintenance, aligned with CLRs on CI/CD, cloud deployment, and monitoring.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Fundamentals of Web Development	Front-end Development	Back-end Development	Security and Performance	Deployment and Maintenance
	18	18	18	18	18

SLO-1	Evolution of Web Applications	Advanced HTML5 Features	Node.js and Express.js	Web Security Principles	Continuous Integration and Continuous Deployment (CI/CD)
SLO-2	Web Architecture and Components	CSS3 and Preprocessors (Sass, LESS)	RESTful API Development	Common Vulnerabilities (XSS, CSRF, SQL Injection)	Automated Testing (Unit, Integration, End-to-end)
SLO-3	MVC Design Pattern	JavaScript ES6+ Features	Database Integration (SQL/NoSQL)	Security Best Practices (CORS, Content Security Policy)	Docker and Containerization
SLO4-6	Lab 1: Learn basic Git commands and version control	Lab 4: Implement responsive web design using CSS.	Lab 7: Building RESTful APIs with Node.js and Express	Lab 10 Implement security best practices in web applications.	Lab 13: Set up a CI/CD pipeline.
SLO-7	Version Control with Git	Front-end Frameworks (React, Angular, Vue.js)	ORM Tools (Sequelize, Mongoose)	Performance Optimization Techniques	Cloud Deployment (AWS, Azure, GCP)
SLO-8	Development Environments and Tools	State Management (Redux, Vuex)	Authentication and Authorization (JWT, OAuth)	Caching Strategies (CDN, Browser Caching)	Serverless Architecture
SLO-9	Client-Server Model	Responsive Design and Media Queries	Middleware and Routing	Lazy Loading and Code Splitting	Application Monitoring (New Relic, Prometheus)
SLO10-12	Lab 2: Setting Up a Development Environment	Lab 5: Build a single-page application using React.	Lab 8 Database Integration with MongoDB	Lab 11 Conduct load testing and benchmarking.	Lab 14: Containerize a web application using Docker.
SLO-13	HTTP/HTTPS Protocols	Web Components and Shadow DOM	Error Handling and Logging	Load Balancing and Scaling	Logging and Alerting (ELK Stack)
SLO-14	API Design Principles	Cross-browser Compatibility	WebSockets for Real-time Communication	Monitoring and Logging	Maintenance and Troubleshooting
SLO-15	Web Development Best Practices	UI/UX Design Principles	Microservices Architecture	Stress Testing and Benchmarking	Post-deployment Best Practices
SLO-16-18	Lab 3: Building a Simple Web Application	Lab 6: Implement state management in a React application using Redux.	Lab 9: Implement user authentication using JSON Web Tokens (JWT).	Lab 12: Optimize web application performance.	Lab 15 : Deploy a web application to the cloud.

Resources					
1	"Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node" by Vasan Subramanian (2019)			4	"Fullstack Vue: The Complete Guide to Vue.js" by Hassan Djirdeh, Nate Murray, and Ari Lerner (2018)
2	"Node.js Design Patterns" by Mario Casciaro and Luciano Mammino (2019)			5	"Learning React: Functional Web Development with React and Redux" by Alex Banks and Eve Porcello (2020)
3	"Web Development with Node and Express: Leveraging the JavaScript Stack" by Ethan Brown (2019)				

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*				Simulations		Clarification/Pauses		✓	Good Health & Well Being	✓
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools		✓	Group Discussion	✓	Quality Education	✓
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System		✓	Hands-on Practice	✓	Gender Equality	✓
1	Remember	15	15	15	15	10	10	10	10	15	15			Debate	✓			
2	Understand	15	15	15	15	10	10	10	10	15	15			Interactive Lecture	✓			
3	Apply	20	25	25	20	25	25	25	25	25	25			Brainstorming	✓			
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							

* 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 Periyasamy, Founder/Chief Data Scientist, Deepsphere, AI 2 Venture Drive, #13-26, Vission Exchange, Singapore, 608626	1	Dr.S.Gopinath, Professor, Dept. of Computer Science, University of Madras, Chennai	Dr. N. Vijayalakshmi, Assistant Professor, SRM IST, Ramapuram Campus, vijayaln@srmist.edu.in
				2 S. Suriya, Assistant Professor, SRM IST , Ramapuram campus, suriyas@srmist.edu.in
				3 S. Sindhu, Assistant Professor, SRM IST , Ramapuram campus, sindhus1@srmist.edu.in

Course Code	UGI24P03L	Course Title	Project Work				Category	P	Project Work / Internship				L	T	P	C
													0	0	4	2

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme 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																	
CLR-3	Enhance the skills in the system aspects																	
CLR-4	Understanding the professional connections with knowledge learnt.																	
CLR-5	Applying the skills in problem solving																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking			Programme Learning Outcomes									
CLO-1	To get an insight of an industry and organization/company	✓	✓	✓	✓	2	85	75	3	2	2	1	3	2	1	2	1	2
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	✓	2	85	75	3	3	3	2	3	2	2	1	1	2
CLO-3	To make professional connections and enhance networking.	✓	✓	✓	✓	3	85	75	3	3	3	2	2	3	2	1	2	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	2	2	2	2	2	3
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	3	85	75	3	2	2	3	3	2	1	2	2	3

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

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

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

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

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

Course Code	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	Help the students to understand need of value education, appreciate the essential complementarily between 'values' and 'skills' and to ensure sustained happiness and prosperity which are the core aspirations of all human beings,	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Help students initiate a process of dialog within themselves to know what they really want to be' in their life and profession.	Conceive	Design	Implement	Operate	Bloom's 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
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:	✓	✓	✓	✓	3	85	75	-	1	1	2	-	3	2	-	-	-
CLO-1	Evaluate the significance of value inputs in formal education and start applying them in their life and profession																	
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.																	
CLO-3	Analyze the value of harmonious relationship based on trust and respect in their life and profession																	
CLO-4	Examine the role of a human being in ensuring harmony in society and nature.																	
CLO-5	Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.	✓	✓	✓	✓	3	85	75	-	-	1	2	-	3	2	-	-	-

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	6	6	6	6	6
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
SLO-2	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
SLO-3	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
SLO 4	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
SLO-5	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
SLO-6	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

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

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 (%)	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	Prof. Rajiv Kumar, Member Secretary, NCC-IP as member at AICTE	1	Mrs. V Sumathi, Associate Professor, Sri Sairam Engineering College, Chennai, Tamil Nadu	1	Dr. Supraja P, UHV University Coordinator, SRMIST
				2	Dr. Deepalakshmi S, HoD, Department of Career Guidance Cell, FSH, SRMIST
				3	Dr. Sweety Bakyarani E, Department of Computer Science, FSH, SRMIST

SEMESTER VII

Course Code	UGI24D11T	Course Title	Research Methodology in Generative AI	Category	D	Discipline Core / Elective Course	L	T	P	C
							4	0	0	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	Understand Research principles while developing software	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Gain extensive knowledge about the Research concepts, methods and the process models	Conceive	Design	Implement	Operate	Bloom's 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
CLR-3	Obtain adequate knowledge about Research process models and software																	
CLR-4	Identify the research methods involved in various area																	
CLR-5	Gain insight on the Analytical Statistics performed in Research																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	To understand the Research and Evaluation techniques	✓	✓	-	-	2	85	75	3	2	-	1	1	-	-	2	1	2
CLO-2	To plan and manage hypothesis value at each stage of the Research	✓	✓	✓	-	2	85	75	3	-	-	2	2	-	-	1	1	3
CLO-3	To learn about the Research Type and find the correct methods	✓	✓	✓	✓	3	85	75	3	1	3	1	2	-	-	1	1	2
CLO-4	To develop Research skill	✓	✓	✓	✓	3	85	75	3	2	-	3	3	-	-	2	1	3
CLO-5	To perform various analytical techniques in research	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	2	1	3

Sessions	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	FOUNDATIONS OF RESEARCH	DATA PREPARATION	RESEARCH DESIGN	DATA SAMPLING	DATA ANALYSIS & ETHICS IN RESEARCH
	12	12	12	12	12
SLO-1	Introduction to Research Methods	Introduction to literature review	Introduction to research design	Introduction to Design of Sample Survey	Data Preparation
SLO-2	Definition of Research	Methods to collect the meaningful data	Identify the research problem	Introduction to Census	Univariate analysis
SLO-3	Role of Research	Data Cleaning	Select a research problem	Introduction to Sample enumerations	Bivariate Analysis
SLO-4	Objectives of Research	Reviewing the data	Defining a research problem	Difference between Census V/s Sample enumerations	Cross tabulation
SLO-5	Applications of research	Process the data	Introduction to need of research problem design	Introduction to objectives in Research sampling	Chi- Square Test
SLO-6	Research in Computer Science & Applications	Analysis the Data	Apply the research design with the simple data set	Introduction to principles of sampling	Correlation – Pearson's Correlation, Rank Correlation
SLO-7	Steps involved in research	Conceptualization of a research problem	Introduction to good design	Introduction to Types of Sampling in Research methods	Regression Analysis
SLO-8	Aim and Scope of research in Computer field	Formulation of a research problem	Feature of good research design	Sampling Errors	Ethical Issues, Copy right, Patent Law
SLO-9	Types of Research	Identifying the variables	Introductions to different research design	Non-sampling errors	Intellectual Property rights
SLO-10	Research Process in the Computer Field	Assigning the initial value to the variables	Different research designs - Exploratory	Determination of the sample size	Reproduction of published materials
SLO-11	Introduce the basic software to develop a Research	Constructing hypothesis	Different research designs - Descriptive	Designing Questionnaires	Plagiarism , citations and acknowledgment
SLO-12	Research Process	Types of hypotheses	Different research designs - Experimental	Design the interview	Reproducibility and accountability

Resources					
1	Krishna Swamy K.N., Siva Kumar A.I., Mathirajan M., “Management Research Methodology (2006), Pearson Education, New Delhi.			2	Kothari C.R., “Research Methodology, Methods and Techniques, Second edition, (2008), New Age International Publication.

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 (%)
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.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. V.Raja SRM IST, Vadapalani
					2 Dr.Harshini Manoharan,SRMIST, Ramapuram

Course Code	UDS24D12T	Course Title	Data Analytics for Project Management				Category	D	Discipline Core / Elective Course	L	T	P	C
										4	0	0	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	Create an understanding why do we use data analytics in project management	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Give exposure to know the risk in data analytics	Conceive	Design	Implement	Operate	Bloom's 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,	Digital Technology Skills	Value Incubation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-3	Teach the analytical challenges of modern PMO																	
CLR-4	Create a knowledge about portfolio management																	
CLR-5	Impart the knowledge on Big data issues in Project Management																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Understand the role of data analytics in project management	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	-	2
CLO-2	Apply the Exploratory vs Confirmatory vs Predictive analytics	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	-	-
2CLO-3	Understand and apply the concepts of modern PMO challenges	✓	✓	✓	✓	3	85	75	3	-	3	1	3	3	-	1	-	2
CLO-4	Recognize data analytics and Project Portfolio performance	✓	✓	✓	✓	3	85	75	3	3	-	3	3	3	-	2	3	3
CLO-5	Gain Knowledge in the concepts of Big data issues in Project Management	✓	✓	✓	✓	3	85	75	3	3	-	3	3	-	-	3	3	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Data Analytics in Project Management	Data Analytics Risk	Analytical Challenges of Modern PMO	Project Portfolio management	Big data issues in project environment
	12	12	12	12	12
SLO-1	Introduction to Data Analytics in Project Management	The Risk management process	Toward an analytically matured PMO	Main role in data analytics	Determining where to start
SLO-2	Overview of Data Analytics and its Role in Project Management	Establishing Tolerance	Method and tools	data analytics and Project Portfolio performance	Pairing data with an analytical method
SLO-3	The Evolution of Project Management	Risk and data analytics language	Human Resources	Introduction to Earned value method	Big data technologies

SLO-4	Why data analytics in Project management	Data collection risk	Project Environment	EVM methods	Driving organizational Maturity and process Discipline
SLO-5	Taking Root	Risk collection	Project Knowledge Management	Earned value graphs	Gaining Stack-holder Buy-in
SLO-6	The View from 10,000	Exploratory vs Confirmatory vs Predictive	The PMO as the multilevel data analysis center	Interrupting earned value results	Communicating the value statement
SLO-7	Data Warehousing	Exploratory risk in data analytics	Project, portfolio and organization	Setting up for EVM	Assigning responsibility
SLO-8	Project Manager	Predictive risk in data analytics	Operation tactics and strategy	Units Completed, Incremental milestones, start/Finish methods	Overcoming data related challenges
SLO-9	Project Office	Predictive analysis and consequences	Introduction to Project Portfolio management	Supervisor/Resource Estimate, Cast ration, Weight or equivalent units	IT Solutions of Data Analytics as applied to Project Management, Setting the Stage
SLO-10	Chief Operating Officer, Executive Committee	Risk in communicating results	Project Portfolio management and Data analytics	EV Pitfalls	Early Warnings of Project Failure, Data Driven Governance
SLO-11	Descriptive, Predictive data analytics	Solving and resolving our data analytics risks	PPM and Decision Making	Preparing for data deluge	Analytical Tool solutions
SLO-12	Data analytics 3.0	Success	Project Portfolio management as a Rational Decision making Process, Practice and Context	Big data challenges at the project level	Project Risk mitigation through data analytics

Resources

- 1 | Data Analytics in Project Management edited by Seweryn Spalek, CRC Press(Taylor and Francis group)

Assessment						
Bloom's Level of Thinking	Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50% Weightage)	Theory (%)
	CLA – 1	CLA – 2	CLA – 3	CLA – 4 *		
	(10%)	(10%)	(20%)	(10%)		
	Theory (%)	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			
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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 N Aswini , SRMIST, Ramapuram

Course Code	UGI24D013J	Course Title	Human Machine Interaction					Category	D	Discipline Core / Elective Course	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
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Outcome									
CLR-1	To understand the importance of HCI design process in software development	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	To learn fundamental aspects of designing and implementing user interfaces																	
CLR-3	To study HCI with technical, cognitive and functional perspectives																	
CLR-4	To acquire knowledge about variety of effective human-computer-interactions																	
CLR-5	To co-evaluate the technology with respect to adapting changing user requirements in interacting with computer																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's 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 Incultation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Design effective Human-Computer-Interfaces for all kinds of users	✓	✓	-	-	2	85	75	2	2	1	3	1	-	-	2	2	1
CLO-2	Apply and analyze the user-interface with respect to golden rules of interface	✓	✓	✓	-	2	85	75	2	2	1	2	2	-	-	1	2	1
CLO-3	Analyze and evaluate the effectiveness of a user-interface design	✓	✓	✓	✓	3	85	75	3	2	3	2	2	-	-	1	1	2
CLO-4	Implement the interactive designs for feasible data search and retrieval	✓	✓	✓	✓	3	85	75	2	2	2	3	3	-	-	2	3	3
CLO-5	Analyze and identify user models, user support, and stakeholder requirements of HCI system	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	2	3	3

Sessions	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Introduction to HCI	DESIGN PROCES	HCI in Software Process	Evaluation framework:	HCI for Mobile and Handheld devices
	18	18	18	18	18
SLO-1	Foundation: Human Memory. Thinking: Reasoning and Problem Solving	Know your user/client: Understanding how people interact with computers,	Design, Process of Interaction Design.	User interface design process: Designing for People: Seven commandments,	Designing for Mobile and other devices: Anatomy of a Mobile app, Mobile form factors,
SLO-2	Emotion, Individual Difference, Psychology and design of Interactive systems,	Important human characteristics in Design, Human considerations in design of Business systems	Interaction styles: Command line, Menu Selection, Form fill-in, Direct Manipulation.	Usability Assessment in the Design process, Common Usability problems	Handheld format apps, Tablet format apps, Mini-tablet format apps,

SLO-3	The Computer-Text Entry Device, Positioning, Pointing, Display devices	Human Interaction speeds, Performance versus Preference, Methods of gaining an understanding of users, s Law.	Graphical User Interface: Popularity of Graphics, Concept of direct manipulation,	Practical and Objective measures of Usability, Formative and Summative evaluation	Mobile Navigation, Content, and control idioms-
SLO 4-6	Practice: How to open the software and the steps and tutorial about the software	Practice: Design an user interface to find given string is palindrome or not	Practice: Design an user interface for preparing EB bill	Practice: Redesign existing Graphical User Interface with screen complexity	Practice: Implementation of dialog box
SLO-7	Devices for virtual reality and 3D Interaction,	Design Guidelines: Navigating the interface, Organizing the display, Getting user's attention, Facilitating data entry.	Advantages, Disadvantages and characteristics of Graphical user interface	Usability specifications for evaluation, Analytic methods	browse controls, Navigation and toolbars,
SLO-8	The Interactions-Models of Interaction, Frameworks and HCI, Ergonomics,	Principles: identify the tasks, Choose an interaction style,	Web User Interface: Popularity and Characteristics,	Model based analysis, GOMS model, Empirical methods,	Drawers, Tap-to-reveal and direct manipulation, Searching, Sorting and Filtering
SLO-9	Interaction styles, Ergonomics, Elements of WIMP Interface,	Natural Language, Eight Golden rules of Interface design, Prevent errors,	Merging of Graphical business systems and the Web- Characteristics of Intranet versus Internet,	Field studies, Usability testing in Laboratory, Controlled experiments,	Welcome and help screens, Multi-touch gestures
SLO 10-12	Practice: Design an user interface for assigning a grade to students mark	Practice: Design an user interface for calculator	Practice: Design an user interface for maintaining stock	Practice: Design Web User Interface based on Gestalt Theory	Practice: Implementation of Different Kinds of Windows
SLO-13	Interactivity, Measurable Human Factors, The context of Interaction	Ensuring Human control while increasing automation.	Web page versus application design, Principles for user interface design	Heuristic Evaluation, Cognitive Walkthrough.	Inter-app integration, Android Accessibility Guidelines
SLO-14	Importance of User Interface: Defining user Interface,	Theories: Design-by-level, Stages of action, Consistency,	Software life cycle, Usability Engineering,	Evaluation framework: Paradigms and techniques, DECIDE: a framework to guide evaluation,	Other devices: Designing for kiosks, Designing for 10-foot interfaces
SLO-15	Brief History of Human Computer Interface, Good and Poor Design, Importance of good design.	Contextual Theories, Dynamic theories.	Iterative design and prototyping, Design Rationale.	Universal design principles, Multi-modal interaction, Designing for diversity	Designing for automotive interfaces,
SLO 16-18	Practice: Design an user interface for calculating employee payslip	Practice: Design an user interface for displaying and changing of picture on the Form	Practice: Understand the principles of good screen design	Practice: Implementation of Different Kinds of Menus	Practice: Design a system with proper guidelines for icons

Resources		
1	Alan J, Dix, Janet Finalay, Russell Beale, “ Human Computer Interaction”, Pearson Education, 3 rd Edition, 2004, ISBN 81-297-0409-9	3 Jenny Preece, Rogers sharp, “Interaction Design-beyond Human Computer Interaction” , Wiley-India, ISBN 81-265-0393-9
2	Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steve Jacobs, “Designing the User Interface: Strategies for Effective Human-Computer Interaction” 6 th Edition, Pearson Education Limited	

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*				Simulations	Clarification/Pauses	✓	Good Health & Well Being		
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools	✓	Group Discussion	✓	Quality Education	
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	
1	Remember	15	15	15	15	10	10	10	10	15	15		Debate	✓			
2	Understand	15	15	15	15	10	10	10	10	15	15		Interactive Lecture	✓			
3	Apply	20	25	25	20	25	25	25	25	25	25		Brainstorming	✓			
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						

* 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 <i>Dr.V.Nisha,, KTR Campus</i>

Course Code	UGI24D014J	Course Title	Working with Industrial Internet of Things				Category	D	Discipline Core / Elective Course	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
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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	To Understand the fundamentals of IIOT and its significance in Industrial Applications																	
CLR-2	To Apply the theoretical knowledge through Digital Knowledge																	
CLR-3	To Explore the Architecture and Protocols of IIOT System																	
CLR-4	To Understand the Importance of security in IIOT																	
CLR-5	To Gain insights into IIOT data analytics, Machine Learning and Web Logs																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking			Program Learning Outcomes									
						Expected Proficiency (%)	Expected Attainment (%)		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	Have a firm understanding and control over the fundamental concepts of Industrial IoT, Industrial IoT protocols, business drivers of an industrial IoT based solution etc	✓	✓	-	-	2	85	75	3	-	-	1	2	1	-	-	-	1
CLO-2	Have strong hands-on knowledge, skill and expertise on how AI and Big Data together merge with IIoT, and develop new processes within organisations and supply chains, which bring about huge digital transformations.	✓	✓	✓	-	2	85	75	2	-	1	-	2	2	-	1	-	1
CLO-3	A Firm control of IIoT architecture and protocols in the communications layer, that the systems use to exchange actionable information	✓	✓	✓	✓	3	85	75	2	3	2	-	2	1	-	1	-	2
CLO-4	Have the ability of developing capability of IIoT to extract value from data, diminish costs, improve tasks and present new plans of action	✓	✓	✓	✓	3	85	75	3	-	2	-	2	2	-	2	-	-
CLO-5	Have the ability to understand all the privacy risks surrounding an IIoT implementation and how these risks can be mitigated for an efficient process.	✓	✓	✓	✓	3	85	75	2	2	-	-	2	-	-	-	-	-

Sessions	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Understanding IIOT	How IIOT is Transforming Digital World	IIOT Architecture and Protocols	IIOT Implementation Framework, Security and Opportunities	Working with Sensor, Machine Data and Web Logs
	18	18	18	18	18
SLO-1	Definition and Scope of IIOT	Agile Decision Making and Rapid Prototyping	IIOT Architecture overview	IIOT Implementation Framework Overview	Industrial Control Systems of Sensor Data
SLO-2	History and Evolution of IIOT, Benefits and Challenges of IIOT	Data Driven Design	Perception Layer	Categories of IIOT Implementation Framework	Industrial Applications of Sensor

					Data
SLO-3	Difference between IOT and IIOT	Data as a Service, Real-Time Visibility	Network Layer and Processing Layer	Category of Implementation and Knowledge Category of IIOT	Reading Data from Sensors
SLO-4 - 6	Setting up a Basic IIOT Environment	Implement with Agile and various Prototype	Building a simple IIOT Architecture with sensor and gateway	Implement a real world IIOT	Collecting and Processing Data from IIOT devices
SLO-7	Overview of the IIOT technology components	Predicative Maintenance	Application Layer	Knowledge Category of IIOT	Industrial Control Systems of Machine Data
SLO-8	Common Cloud Protocols	Inventory Planning	List of IIOT Protocols	Security Considerations Using IIOT Overview	Industrial Applications of Machine Data
SLO-9	IIOT business models	Industrial IIOT Enablement	MQTT, AMPQ and COAP	Securing IIOT Local Area Networks (LAN)	Reading Data from Machines
SLO-10 - 12	Deploying IIOT in Cloud Platform	Collect Data and Secure	Implementing MQTT with IIOT device	Implementing basic security measures in IIOT setup	Implementing a simple machine learning model for IIOT data
SLO-13	IIOT System Architecture	Configure, Monitor and Control	Platforms for IIOT overview	Secure Network Ports	Industrial Control Systems of Web Logs
SLO-14	Edge, Fog and Cloud Computing	Secure Telemetry	Types of IIOT platforms	Secure User Endpoints	Industrial Applications of Web Logs
SLO-15	Components of IIOT and Gateway of IIOT	Software Updates and maintenance	Words of Caution with Industrial IoT Platform Vendors	Self-driving tractors, Air as a service, Connected Robotics, Intelligent Robotics, Smart Automotive Manufacturing Automotive manufacturing	Reading Data from Web Logs
SLO-16 - 18	Building a simple IIOT with gateway	Implement basic Security measures in IIOT setup	Integrating Sensor with Hardware Platforms	Implement Smart Automotive Manufacturing	Implementing a simple Web Log model for IIOT

Resources	
1 Sudip Misra, Chandana Roy, Anandarup Mukherjee, (2021), "Introduction to Industrial Internet of Things and Industry 4.0", CRC Press, Taylor & Francis Group 3. Giacomo Veneri, Antonio Capasso, (2018), "Hands-On Industrial Internet of Things - Create a powerful Industrial IoT infrastructure using Industry 4.0", Packt publishing	2.Sravani Bhattacharjee, (2018), "Practical Industrial Internet of Things Security – A Practitioner's guide to securing connected industries", Packt publishing 4. Alena Traukina, Jayant Thomas, Prashant Tyagi, Kishore Reddipalli, (2018), "Industrial Internet Application Development – Simplify IIoT development using the elasticity of Public cloud and Native Cloud Services", Packt publishing

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*				Simulations		Clarification/Pauses		✓	Good Health & Well Being		✓	
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools		✓	Group Discussion		✓	Quality Education		✓
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System		✓	Hands-on Practice		✓	Gender Equality		✓
		1	Remember	15	15	15	15	10	10	10	10	15	15			Debate		✓		
2	Understand	15	15	15	15	10	10	10	10	15	15			Interactive Lecture		✓				
3	Apply	20	25	25	20	25	25	25	25	25	25			Brainstorming		✓				
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									

* 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

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Course Code	UGI24D015J	Course Title	Artificial Intelligence and Machine Learning for Robotics	Category	D	Discipline Core / Elective Course	L 3	T 0	P 3	C 4
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Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Outcome									
CLR-1	To introduce the fundamental concepts of Problem Solving and Planning	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	To introduce the basic concepts of Uncertain Knowledge and Reasoning	Conceive	Design	Implement	Operate	Bloom's 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
CLR-3	To enumerate about decision tree and statistical learning																	
CLR-4	To work with temporal model and Q learning																	
CLR-5	To implement AI and ML in Robotics																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Apply the fundamental concepts of Problem Solving and Planning	✓	✓	-	-	2	85	75	3	1	1	1	1	-	-	2	-	-
CLO-2	Identify the basic concepts of Uncertain Knowledge and Reasoning	✓	✓	✓	-	2	85	75	3	1	1	2	2	-	-	1	2	1
CLO-3	Use decision tree and statistical learning	✓	✓	✓	✓	3	85	75	3	-	3	-	2	-	-	1	-	-
CLO-4	Ability to apply temporal model and Q learning	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	2	3	3
CLO-5	Implement AI and ML in Robotics	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	2	3	3

Sessions	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Problem Solving and Planning	Uncertain Knowledge and Reasoning	Decision tree and Statistical learning	Temporal Model and Q Learning	Implementation of AI and ML in Robotics
	18	18	18	18	18
SLO-1	The Foundations of Artificial Intelligence, History of AI	Quantifying Uncertainty: Basic Probability Notation, Bayes Rule and its use.	Introduction, What is Machine Learning, Varieties of Machine Learning	Temporal-Difference (TD) Learning: Temporal Patterns and Prediction Problem	Robotics: Robot Hardware,
SLO-2	Agents: Agents and Environment, Nature and Structure of Environment	Probabilistic Reasoning: Representing knowledge in an uncertain domain, The semantics of Bayesian network	Learning Input-Output Functions, Sample Applications.	Incremental Computation, An Experiment with TD Method	Robotic Perception

SLO-3	Problem solving Agents, Examples, Searching for solutions, Uniformed and Informed Search Strategies	Probabilistic Reasoning over time: Time and uncertainty, Inference in temporal models	Boolean Functions: Representation, Classes of Boolean Functions	Intra-Sequence Weight Updating, An Example Application	Planning to Move
SLO 4-6	Lab 1: Implement Basic Search Strategies 8-Puzzle Problem	Lab 4: Implement Naïve Bayes Models	Lab 7: Import and Export data using Pandas library functions, Handling Missing Values	Lab 10: Implement Dimensionality reduction	Lab 13: Case Study : AI and ML Requirements to build Robots
SLO-7	Adversarial Search: Games, Alpha-Beta Pruning, Stochastic games, State of Art Game Program	Hidden Markov Models and case study	Decision Trees: Supervised Learning of Univariate Decision Trees, Overfitting and Evaluation	Delayed-Reinforcement Learning	Planning Uncertain Movements.
SLO-8	Constraint Satisfaction Problems: Defining problems, Constraint Propagation, Backtracking Search, Local Search, Structure of Problems	Kalman Filters and case study	Unsupervised Learning: What is Unsupervised Learning? Clustering Methods	The General Problem, An Example	Robotic Software Architectures
SLO-9	Logical Agents: Knowledge Based Agents, Propositional Logic	Making simple decisions: The basics of utility theory, Utility functions,	Hierarchical Clustering Methods: A Method Based on Euclidean Distance	Temporal Discounting and Optimal Policies	Application Domains, AI: The Present and Future
SLO 10-12	Lab 2: Implement basic search strategies – 8-Queens Problem	Lab 5: Implement Forward Chaining Algorithm	Lab 8: Implementation of Linear Regression	Lab 11: Implement Unsupervised Learning	Lab 14: Basic Case study for building Robots
SLO-13	First-Order Logic, Inference in First order Logic	Multiattribute utility functions, Decision networks,	Hierarchical Clustering Methods: A Method Based on Probabilities	Q-Learning	The Ethics and Risks of Developing Artificial Intelligence
SLO-14	Classical Planning: Definition, Algorithms, Planning Graphs,	Making complex decisions: Sequential decision problems, Value iteration, Policy iteration	Statistical Learning: Gaussian (or Normal) Distributions	Discussion, Limitations, and Extensions of Q-Learning,	Basic knowledge of robotics concepts using machine learning
SLO-15	Planning and Acting in Real World: Hierarchical Planning, Multiagent Planning	Decisions with multiple agents: Game theory	Statistical Learning: Nearest-Neighbor Method	Explanation-Based Learning: Deductive Learning, An Example, Applications.	Challenges for implementing in Machine learning
SLO 16-18	Lab 3: Implement Mini-Max algorithm for game playing (Alpha-Beta pruning)	Lab 6: Implement backward Chaining Algorithm	Lab 9: Implementation of K-nearest Neighbor	Lab 12: Build Artificial Neural Network model with back propagation	Lab 14: Detailed Case study for building Robots

Resources					
1	Stuart J. Russell and Peter Norvig, Artificial Intelligence, A Modern Approach, Third Edition, Pearson, 2010	2	Nils J. Nilsson, Introduction to Machine ,Stanford University Stanford, 1998		

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*				Simulations	Clarification/Pauses	✓	Good Health & Well Being	✓	
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		1	Remember	15	15	15	15	10	10	10	10	15	15		Debate	✓	
2	Understand	15	15	15	15	10	10	10	10	15	15		Interactive Lecture	✓			
3	Apply	20	25	25	20	25	25	25	25	25	25		Brainstorming	✓			
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						

* 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 Periyasamy, Founder/Chief Data Scientist, Deepsphere,AI 2 Venture Drive, #13-26 Vision Exchange,Singapore,608526	1 Dr. S. Gopinathan, Professor, Department of Computer Science, University of Madras, Chennai	1 Dr.S.Belina V J Sara, SRMIST, Kattankulathur.

Course Code	UGI24D016J	Course Title	Web Intelligence and Mining	Category	C	Discipline Core Course	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
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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	To understand the basic concepts of web mining	Conceive Design Implement Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Communication Skills, Independent Thinking, Analytical Skills, Leadership Qualities, Digital Technology Skills, Value Incultation, Multicultural Environmental Action, Entrepreneurial Risk Taking	PSO-1	PSO-2										
CLR-2	To analyze the data with different web mining tools																	
CLR-3	To develop customer-centric approach in dealing with data																	
CLR-4	To know the principles, tools, and methods of web intelligence																	
CLR-5	To apply analytics for business situations.																	
CLO	At the end of this course, learners will be able to:	✓	✓	-	-	2	85	75	3	-	-	-	-	-	-	-	-	-
CLO-1	Know the concepts and terminologies related to web mining																	
CLO-2	Explore various parameters used for web analytics and their impact																	
CLO-3	Explore the use of tools and techniques of web analytics																	
CLO-4	Get experience on websites, web data insights and conversions																	
CLO-5	Develop efficient web analytical support systems for business.	✓	✓	✓	✓	3	85	75	3	3	-	-	3	-	-	3	3	3

Sessions	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Web Mining	Information Retrieval and Web Search	Web Analytics and Search Analytics	User Experience through Web Analytics	Google Analytics
	18	18	18	18	18

SLO-1	Introduction to Web Mining	Information Retrieval Models	Introduction to Web Analytics	Learning about User Experience	Google Analytics Account Creation and Structure
SLO-2	Types of Web Mining: Web Content Mining, Web Structure Mining, Web Usage Mining	Crawling the Web, Basic Web Crawler Algorithms, Universal Crawlers	Web Analytics Metrics and Dimensions	Visitor Analysis	Google Tag Manager Concepts
SLO-3	Applications and Challenges of Web Mining	Indexing, Inverted Index, Index Construction and Index Compression	Web Analytics Reports, Templates	Traffic Analysis	Deploying Google Analytics through Google Tag Manager
SLO-4-6	Lab 1: Website Evaluation using Opinion Mining	Lab 4: Implementing Inverted Index	Lab 7: Working with Web Analytics Tools	Lab 10: Creation of Websites and Blogs	Lab 13: Building Google Analytics Dashboard
SLO-7	Comparison between Data Mining and Web Mining	Latent Semantic Indexing	Basics of search, Internal search	Organic Search, Paid Search	Event Tracking
SLO-8	Web log structure and issues regarding web logs	Document representation, Relevance Ranking, Relevance feedback	Google Analytics, Google Ads	Search Query Analysis	Virtual Pageviews
SLO-9	Web Mining for Social Network Analysis	Vector space model (TF, IDF, TFIDF), Euclidian distance, cosine similarity	Search Engine Optimization (SEO) and Pay Per Click (PPC)	Referral Traffic, Direct Traffic	Tracking Google Analytics Events, Tracking Social Interactions
SLO-10-12	Lab 2: Working with HTML and Javascript Tags	Lab 5: Web Information Retrieval System	Lab 8: Working with Search Analytics Tools	Lab 11: Audience Analysis Tools	Lab 14: Working with Google Analytics Tools
SLO-13	Web Mining with Sensor Networks	Keyword search, Advanced text search, Using the HTML structure in keyword search	Measuring Email and Multichannel Marketing	Analyzing People usage of content	Filters, Segments
SLO-14	Web Search Engines	Evaluating search quality	Competitive Intelligence and Web 2.0 Analytics	Click-Path Analysis	Ecommerce Tracking, Multi-Channel Funnel Reports
SLO-15	Semantic Web	Pattern Matching, Similarity Search	Connectable Reports	Measuring the Effects of Changes	Dashboards, Custom Reports, Intelligence Alerts
SLO-16-18	Lab 3: Working with Web Mining Tools	Lab 6: Working with Web Crawler Algorithms	Lab 9: Working with Web Analytics Reports	Lab 12: Implementation of Web Traffic Analysis Tools for Performance Tracking	Lab 15: Building Google Analytics Reports

Resources											
1	Bing Liu, “Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data”, Springer, Second Edition, 2011.								3	Avinash Kaushik, “Web Analytics 2.0: The Art of Online Accountability and Science of Customer Centricity “, 1st edition, Sybex, 2009.	
2	Michael Beasley, “Practical Web Analytics for User Experience: How Analytics can help you Understand your Users”, Morgan Kaufmann, 2013.								4	Eric Fettman, Shiraz Asif, Feras Alhlou, “Google Analytics Breakthrough”, John Wiley & sons, 2016.	

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.Jothi Periyasamy, Founder, Chief Data Scientist, Deepsphere.	1	Dr.S.Gopinathan Professor, Dept. of Computer Science, University of Madras.
		1	Dr. Ananthi Claral Mary.T, Assistant Professor, Department of Computer Applications, FSH, SRMIST, KTR.

SEMESTER VIII

Course Code	UGI24D017J	Course Title	Security, Ethics and Bias in Generative AI				Category	D	Discipline Core / Elective Course	L	T	P	C
										3	0	2	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Comprehensive understanding of the ethical considerations surrounding Generative AI (GenAI), including fairness, inclusivity, and social responsibility																	
CLR-2	To Understand the Privacy risks associated with Generative AI																	
CLR-3	To understand the Bias Detection and Mitigation in Generative Models																	
CLR-4	To understand Ethical developments of AI developers																	
CLR-5	To Analysis the real-world case studies involving ethical challenges in Generative AI																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking			Program Outcomes									
						Expected Proficiency (%)		Expected Attainment (%)										
CLO-1	Implement GAN models with Generative AI frameworks	✓	✓	-	-	2	85	75	3	-	2	1	-	-	-	3	2	3
CLO-2	Apply and create the Ethical Implications in deepfake AI models	✓	✓	✓	-	2	85	75	3	2	1	1	2	-	-	2	2	2
CLO-3	Detect and measure the bias in generative models	✓	✓	✓	✓	3	85	75	2	1	1	1	2	1	-	2	1	2
CLO-4	Create and Assign Accountability in Generative AI Model	✓	✓	✓	✓	3	85	75	2	2	2	2	2	1	-	3	3	3
CLO-5	Implement the Generative AI models to improve the security and privacy of the data	✓	✓	✓	✓	3	85	75	3	3	2	2	2	1	-	3	3	3

Sessions	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Introduction to Generative AI and Ethical Frameworks	Privacy and Data Security	Bias Detection and Mitigation	Accountability and Responsibility	Case Studies and Ethical Dilemmas
	15	15	15	15	15
SLO-1	Define Generative AI Ethics	Deepfake technology and its indications for society	Importance of explainability	Assess the strengths and Weakness of bias and fairness	Identify and develop organizational ethical AI pipelines
SLO-2	AI- How can it be Fair	Ethical creation and dissemination of deepfake content	Challenges of transparency in generative models	Articulate compliance metrics for responsible data governance	Guidelines

SLO-3	Reliability, Stability & Accountability of GenAI	Strategies for detecting and combating deepfakes and misinformation	How of achieve transparency in GenAI models	Identify ethical AI auditing mechanisms	Ethical frameworks for GenAI
SLO-4-5	Practice: Implement a basic generative adversarial network (GAN) using TensorFlow or PyTorch	Practice: Create a case study of deepfake usage and discuss the ethical implications	Practice: Analyze a dataset used for training a generative AI model and identify Possible sources of bias.	Practice: Implement mitigation strategies to improve fairness in GenAI models	Practice: Implement GAN AI Model to improve the Security and Privacy of the data
SLO-6	Define GenAI fairness problem statements and priorities	Privacy risks associated with Generative AI	Bias in AI algorithms	Ethical responsibilities of AI developers,	Exploration of emerging ethical challenges posed by advances in generative AI technologies
SLO-7	Inclusive and Socially responsible AI	Challenges in training and deploying generative models	Detecting and measuring bias in generative models	Researchers	Addressing future ethical concerns in AI development
SLO-8	Identify harms in GenAI solutions	Regulatory frameworks for protecting privacy in AI applications	Mitigating bias in training model	practitioners	Analysis of real-world case studies involving ethical challenges in Generative AI
SLO-9-10	Practice: Generate synthetic images using a pre-trained GAN model and analyze the results	Practice: Create the Model to identify the risks associated with a specific generative AI application (face generation)	Practice:Apply metrics for measuring AI bias and fairness	Practice: Develop a generative AI technologies with considering principles such as transparency and fairness	Practice: Implement VAE Model to improve the Security and Privacy of the data
SLO-11	Introduction to ethical considerations in GenAI development	Techniques for developing privacy-preserving generative models	Social implications of Generative AI technologies	Frameworks for assigning accountability in AI-related models	Discussion of ethical dilemmas faced by AI stakeholders
SLO-12	Ethical frameworks for AI	Differential privacy and its application in Generative AI	Impact of Generative AI on various industries and communities	Strategies for promoting accountability in GenAI models	Performance Metrics for improve the security

SLO-13	Frameworks: utilitarianism, deontology, and virtue ethics	Case studies of privacy-preserving generative models in practice	Identify bias and fairness with AI lifecycle phases and negative feedback loops	Strategies for Responsible AI development	Ethical decision-making frameworks for complex AI-related scenarios
SLO-14-15	Practice: Implementation of Ethical Frameworks	Practice: Implement a private GAN using libraries or frameworks.	Practice: Implement bias detection algorithms (Fairness Indicators)	Practice: Implement the AI model to Promote the Accountability	Practice:Analyze the Performance metrics of GenAI Model to improve the Security and Privacy of the data

Resources					
1	Muller, Vincent C. (forthcoming Spring 2020), ‘Ethics of artificial intelligence and robotics’, in Edward N. Zalta (ed.), Stanford Encyclopedia of Philosophy (Palo Alto: CSLI, Stanford University). http://plato.stanford.edu	4	Ramos Salazar, L., Peeples, S. F., & Brooks, M. E. (2024). Generative AI ethical considerations and discriminatory biases on diverse students within the classroom. In S. Elmoudden& J. Wrench (Eds.), The role of generative AI in the communication classroom (pp. 191-213). IGI Global. https://doi.org/10.4018/979-8-3693-0831-8.ch010		
2	“BEYOND THE ALGORITHM - AI, SECURITY, PRIVACY, AND ETHICS”, Omar Santos, PetarRadanliev.	5	“The ethics of artificial intelligence: Issues and initiatives”, Eleanor Bird, European Parliamentary Research Service Scientific Foresight Unit (STOA) PE 634.452 – March 2020		
3	“Mitigating Bias in Artificial Intelligence”, Berkeley Haas, July 2020				

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*				Simulations		Clarification/Pauses		✓	Good Health & Well Being	✓	
		(10 %)		(10 %)		(20 %)		(10%)				Presentation Tools		✓	Group Discussion		✓	Quality Education	
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Learning Management System		✓	Hands-on Practice		✓	Gender Equality	
1	Remember	15	15	15	15	10	10	10	10	15	15			Debate		✓			
2	Understand	15	15	15	15	10	10	10	10	15	15			Interactive Lecture		✓			
3	Apply	20	25	25	20	25	25	25	25	25	25			Brainstorming		✓			
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								

* 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 Periyasamy, Founder/Chief Data Scientist, Deepsphere, AI 2 Venture Drive, #13-26, Vission Exchange, Singapore, 608626	1 Dr.S.Gopinath, Professor, Dept. of Computer Science, University of Madras, Chennai	1 Dr.A.Thilaka SRMIST FSH, Kaattankulathur

Course Code	UDS24D18J	Course Title	Social Media and Text Analytics				Category	D	Discipline Core / Elective Course	L	T	P	C
										3	0	2	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	To leverage the power of the R eco-system to extract, process, analyze, visualize and model social media data	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Visualize and analyze data from social media platforms to understand and model complex relationships using various concepts and techniques	Conceive	Design	Implement	Operate	Bloom's 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
CLR-3	Understand the fundamentals of text mining																	
CLR-4	Utilize text for prediction techniques																	
CLR-5	Understand the relevance between information retrieval and text mining																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Understand the basics of social media analytics and R language	✓	✓	-	-	2	85	75	3	1	1	1	1	-	-	2	2	2
CLO-2	Analyze data from major social media channels such as Twitter & Flickr	✓	✓	✓	-	2	85	75	3	1	1	2	2	-	-	1	2	2
CLO-3	Acquire knowledge on fundamentals of text mining	✓	✓	✓	✓	3	85	75	3	1	3	1	2	-	-	1	3	3
CLO-4	Perform prediction from text and evaluate it	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	2	3	3
CLO-5	Perform document matching	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	2	3	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Social Media Analytics	Sentiment analysis	Text Mining	Document Classification	Mining social media
	15	15	15	15	15
SLO-1	Getting Started with R and Social Media Analytics, Understanding social media	Visualizing data, Managing packages	Overview of Text Mining, What's Special About Text Mining?	Using Text for Prediction, Recognizing that Documents Fit a Pattern	Finding Structure in a Document Collection

SLO-2	Advantages and Significance of social Media, Disadvantages and Pitfalls of social media	Data analytics - Analytics workflow, Machine learning techniques	Structured or Unstructured Data, Is Text Different from Numbers?	How Many Documents Are Enough?, Document Classification	Clustering Documents by Similarity, Similarity of Composite Documents
SLO-3	Social media analytics, A typical social media analytics workflow	Supervised learning, Unsupervised Learning, Text analytics	What Types of Problems Can Be Solved?, Document Classification	Learning to Predict from Text, Similarity and Nearest-Neighbor Methods	k-Means Clustering
SLO 4-5	Lab 1: Simple Text Analytics	Lab 4: Text Analytics	Lab 7: Working with Classification	Lab 10: Working with Document Classification	Lab 13: implementing clustering algorithm
SLO-6	Opportunities and Challenges,	Registering an application,	Clustering and Organizing Documents	Decision Rules,	The EM Algorithm
SLO-7	Data Science vs. Artificial Intelligence, Types of Analysis	Connecting to Twitter using R, Extracting sample Tweets	Information Extraction, Prediction and Evaluation	Decision Trees, Scoring by Probabilities	The EM Algorithm
SLO-8	Similarities Between Data Science and Business Intelligence, Data Science alignment With Business Intelligence	Trend analysis	From Textual Information to Numerical Vectors, Collecting Documents	Linear Scoring Methods, Evaluation of Performance - Estimating Current and Future Performance	What Do a Cluster's Labels Mean?, Applications, Evaluation of Performance
SLO 9-10	Lab 2: Working with Data structures	Lab 5: Working with Twitter data	Lab 8: Information Extraction	Lab 11: Decision Trees	Lab 14: EM Algorithm
SLO-11	Data Science Reinforcement with Business Intelligence, Data Science and Business Intelligence Together: Future	Sentiment analysis, Key concepts of sentiment analysis – Subjectivity, Sentiment polarity	Document Standardization, Tokenization	Getting the Most from a Learning Method, Errors and Pitfalls in Big Data Evaluation	Case Study: Market Intelligence from the Web
SLO-12	Three Features for Data Science and Business Intelligence, Getting Started with Data Science, Business Intelligence and AI Journey	Opinion summarization, Features	Lemmatization-Inflectional Stemming, Stemming to a Root	Information Retrieval and Text Mining, Is Information Retrieval a Form of Text Mining?	Case Study: Lightweight Document Matching for Digital Libraries
SLO-13	Functions - Built-in functions User-defined functions, Controlling code flow - Looping constructs, Conditional constructs	Sentiment analysis in R, Follower graph analysis, Flickr Data Analysis	Vector Generation for Prediction Multiword Features, Labels for the Right Answers, Feature Selection by Attribute Ranking, Sentence Boundary Determination	Key Word Search Nearest-Neighbor Methods, Measuring Similarity -Shared Word Count, Word Count and Bonus, Cosine Similarity	Mining social media, E-mail Filtering
SLO 14-15	Lab 3: Working with Looping and functions	Lab 6: Working with Flickr Data Analysis	Lab 9: Phrase Recognition	Lab 12: Nearest-Neighbor Methods	Lab 15: Developing social media Listening Program

Resources											
1	Raghav Bali, Dipanjan Sarkar, Tushar Sharma, (2017),” Learning Social Media Analytics with R”, Packt Publishing.						2	Sholom M. Weiss, Nitin Indurkha, Tong Zhang, (2015), “Fundamentals of Predictive Text Mining”, Second Edition, Springer London			
3	Matthew A.Russell, “Mining the social web”, 2nd edition- O'Reilly Media, 2013						4	Mining the Social Web_ Analyzing Data from Facebook, Twitter, LinkedIn, and Other Social Media Sites, Matthew A Russell, O'Reilly, Media.,2013			
5	Seven Layers of Social Media Analytics_ Mining Business Insights from Social Media Text, Actions, Networks, Hyperlinks, Apps, Search Engine, and Location Data, Gohar F. Khan,(ISBN-10: 1507823207)						6	Charu Aggarwal (ed.), Social Network Data Analytics, Springer, 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.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 Mrs. K. Kanmani, SRMIST, KTR

Course Code	UGI24D019T	Course Title	Reinforcement Learning				Category	D	Discipline Core / Elective Course	L	T	P	C
										4	0	0	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes									
CLR-1	To introduce the fundamental principles of reinforcement learning.	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, 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	To provide an understanding of the mathematical and computational aspects of reinforcement learning.																	
CLR-3	To enable students to design, implement, and evaluate reinforcement learning models for various applications using Policy Gradient Methods.																	
CLR-4	To enable students to design, implement, and evaluate Reinforcement Learning in Continuous Spaces.																	
CLR-5	To explore advanced topics and current research trends in reinforcement learning.																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Understand the core concepts of reinforcement learning, including the exploration- exploitation tradeoff.	✓	✓	-	-	2	85	75	3	-	-	-	-	-	-			
CLO-2	Implement basic and advanced reinforcement learning algorithms.	✓	✓	✓	-	2	85	75	3	-	-	-	-	-	-			
CLO-3	Apply reinforcement learning techniques to real-world problems.	✓	✓	✓	✓	3	85	75	3	-	-	-	3	-	-			
CLO-4	Analyze and optimize the performance of reinforcement learning models.	✓	✓	✓	✓	3	85	75	3	3	-	-	-	-	3			
CLO-5	Understand the advanced topics in the field of reinforcement learning.	✓	✓	✓	✓	3	85	75	3	3	-	-	3	-	3			

Sessions	CLO – 1	CLO – 2	CLO – 3	CLO – 4	CLO - 5
	Introduction to Reinforcement Learning	Dynamic Programming for RL	Policy Gradient Methods	Policy Learning	Exploration Strategies
	12	12	12	12	12
SLO-1	Introduction to Reinforcement Learning (RL)	Polices, Value Functions	Policy-based Reinforcement Learning	On-Policy Learning	Exploration Strategies
SLO-2	Comparison with supervised and unsupervised learning	Value based RL, Policy based RL	Policy Gradients	Off-Policy Learning	Epsilon-greedy
SLO-3	Applications of Reinforcement Learning	Bellman Equations	Policy Evaluation (Prediction), Policy Improvement	Temporal Difference Prediction, Full RL	Softmax Exploration
SLO-4	Limitations and Scope of Reinforcement Learning	Exploration vs Exploitation	Policy Iteration	Reinforcement Learning in Continuous Spaces	Bayesian Optimization and Bayesian Optimization
SLO-5	Components of Reinforcement Learning	Q Learning	Value Iteration	State–action–reward–state–action (SARSA)	Upper Confidence Bound (UCB) algorithms
SLO-6	Sequential Decision Making	Deep Q Networks (DQN),	REINFORCE Algorithm,	Incremental Implementation	Thompson Sampling:
SLO-7	Modelling the World	Double DQN, Dueling DQN (DDQN)	Stochastic policy search	Policy optimization methods	Transfer learning in RL
SLO-8	Taxonomy of reinforcement learning agents	Experience Replay,	Actor-critic Methods(A2C, A3C),	Trust Region Policy Optimization (TRPO)	Imitation learning
SLO-9	Fully vs partially observed environment	Bandit Algorithms,	Hierarchical Reinforcement Learning	Proximal Policy Optimization (PPO)	Inverse reinforcement learning
SLO-10	Markov Processes, Markov property, Markov chains	Optimality Proofs,	Generalized Policy Iteration, Hierarchical RL: MAXQ, Monte Carlo	Meta-learning	Model Based RL
SLO-11	Markov Decision Processes (MDP)	Contextual Bandits,	Policy Gradients, Generalized Advantage Estimation (GAE),	Multi-Agent Reinforcement Learning	Importance of models in RL

SLO-12	Markov Reward Process (MRP).	Dynamic Programming, Asynchronous Dynamic Programming.	Monte Carlo Prediction, Monte Carlo Estimation of Action Values, Monte Carlo Control.	Partially Observable Markov Decision Processes (POMDPs)	Comparison with model-free RL approaches
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Resources					
1	Richard S. Sutton and Andrew G. Barto, Reinforcement Learning: An Introduction (2 nd ed.), MIT Press, 2018. ISBN 978-0262039246.			3	Mohit Sewak, Deep Reinforcement learning: Frontiers of Artificial Intelligence (1st ed.), Springer, 2019. ISBN 978-9811382840.
2	Csaba Szepesvári; Morgan, Algorithms for Reinforcement Learning Claypool Publishers; First Edition.			4	Sean Saito, Rajalingappaa Shanmugamani, and Yang Wenzhuo; Python Reinforcement Learning Projects - Packt Publishing; First Edition.

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*		Simulations		Clarification/Pauses	✓	Good Health & Well Being	
		(10 %)	(10 %)	(20 %)	(10%)		Presentation Tools	✓	Group Discussion	✓	Quality Education	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)	Learning Management System	✓	Hands-on Practice	✓	Gender Equality	
1	Remember	15	15	10	10	15			Debate	✓		
2	Understand	15	15	10	10	15			Interactive Lecture	✓		
3	Apply	20	25	25	25	25			Brainstorming	✓		
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						

* 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 Periyasamy, Founder/Chief Data Scientist, Deepsphere, AI 2 Venture Drive, #13-26, Vission Exchange, Singapore, 608626	1 Dr.S.Gopinath, Professor, Dept. of Computer Science, University of Madras, Chennai	1 Dr.J.Anita Smiles

Course Code	UDS24D20T	Course Title	Applications of Edge IoT and Machine Learning				Category	D	Discipline Core / Elective Course	L	T	P	C
										4	0	0	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	The purpose of taking this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	Understand the basic concepts of IoT and its possible application areas	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Understand the various IoT architectures along with compute and management stack across layers																	
CLR-3	Understand the architecture dissected at physical, Communication and Access levels																	
CLR-4	Be able to understand and manage the knowledge of models and principles and key techniques for IOT data analytics.																	
CLR-5	Understand the various enabling technologies for IOT including Big data analytics, Machine learning, Cloud and Streaming analytics																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's 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	Appreciate the omnipotent presence of IOT in all fields across globe	✓	✓	-	-	2	85	75	2	1	1	1	1	-	-	2	1	2
CLO-2	Compare and contrast various architectures and be able to justify the right choice for adoption	✓	✓	✓	-	2	85	75	2	1	1	2	2	-	-	1	1	2
CLO-3	Choose appropriate protocols for various levels/layers based on the requirement in hand	✓	✓	✓	✓	3	85	75	2	1	2	1	2	-	-	1	1	3
CLO-4	Implement using the available resources and demonstrate quick to deployment skills wherever applicable	✓	✓	✓	✓	3	85	75	2	2	2	3	3	-	-	2	1	3
CLO-5	Be able to identify and implement practical IOT applications with data analytics techniques	✓	✓	✓	✓	3	85	75	2	2	2	3	3	-	-	2	1	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Introduction to IoT	IoT Network Architecture and Design	Smart Objects	Microsoft Azure	Machine Learning
	12	12	12	12	12
SLO-1	Introduction to IoT, Genesis of IoT	IoT Network Architecture and Design, Drivers Behind New Network Architectures	Smart Objects: The “Things” in IoT, Sensors, Actuators, Micro-Electro-Mechanical Systems	Introducing IoT Analytics, IoT Analytics for the Cloud	Apache Spark for data processing, Spark and big data analytics
SLO-2	IoT and Digitization, IoT Impact	Scale, Security	Smart Objects: A Definition, Trends in Smart Objects	Building elastic analytics, Designing for scale	Using Spark for IoT data Processing, Lambda architectures
SLO-3	Convergence of IT and IoT, IoT Challenges	Constrained Devices and Networks	Sensor Networks, Connecting Smart Objects	Cloud security and analytics Public/private keys, Public versus private subnets, Access restrictions, Securing customer data	Getting to Know Your Data - Exploring IoT Data, Exploring and visualizing data, The Tableau overview
SLO 4	Introduction, IoT Data and Big Data, IoT Conceptual Framework	Comparing IoT Architectures, The oneM2M IoT Standardized Architecture	Communications Criteria, IoT Access Technologies – Introduction	The AWS overview: AWS key concepts, AWS key core services, AWS key services for IoT analytics	Techniques to understand data Quality, Data completeness
SLO-5	Data Flow of IoT, IoT Architectural View	The IoT World Forum (IoTWF) Standardized Architecture, Layer 1: Physical Devices and Controllers Layer	IoT Access Technologies- Definitions, IP as the IoT Network Layer	Microsoft Azure overview: Azure Data Lake Store, Azure Analysis Services, The ThingWorx overview	Data validity, Basic time series analysis
SLO-6	Technology Behind IoT, Sources of IoT	Layer 2: Connectivity Layer, Layer 3: Edge Computing Layer	The Business Case for IP, The Need for Optimization	Creating an AWS Cloud Analytics Environment: The AWS Virtual Private Cloud (VPC) setup walk-through	Machine Learning, Machine Learning Overview
SLO-7	M2M Communication, Examples of IoT	Upper Layers: Layers 4-7, A Simplified IoT Architecture	Optimizing IP for IoT, Profiles and Compliances	Creating a key pair for the NAT and bastion instances, Creating an S3 bucket to store data	Supervised Learning, Unsupervised Learning
SLO- 8	Design Principles for Connected Device, IoT/M2M Systems, Layers and Designs Standardization	The Core IoT Functional Stack, Layer 1: Things: Sensors and Actuators Layer	Internet Protocol for Smart Objects (IPSO) Alliance, Wi-SUN Alliance	Creating a VPC for IoT Analytics, How to terminate and clean up the environment	Machine Learning and Getting Intelligence from Big Data, Predictive Analytics
SLO-9	Modified OSI Model for the IoT/M2M Systems, ITU-T Reference Model	Layer 2: Communications Network Layer, Layer 3: Applications and Analytics Layer	IPv6 Ready Logo, IoT Application transport methods- Definitions	ThingSpeak an Overview, Setup and Configuring ThingSpeak	Edge Streaming Analytics, Comparing Big Data and Edge Analytics

SLO-10	ETSI M2M Domains and High-level Capabilities, Communication Technologies	Analytics Versus Control Applications, Data Analytics Versus Business Benefits	Application Layer Protocol Not Present SCADA, A Little Background on SCADA	Collecting All That Data - Strategies and Techniques: Designing data processing for analytics	Edge Analytics Core Functions, Distributed Analytics Systems
SLO-11	Wired Communication Technology, Communication Technologies—A Comparison	IoT Data Management and Compute Stack, Fog Computing	Adapting SCADA for IP, SCADA Protocol Translation	Applying big data technology to storage: Hadoop, Hadoop cluster architectures	Network Analytics, Flexible NetFlow Architecture
SLO -12	Data enrichment, data Consolidation and device Management at gateway, Device-management Gateway	Edge Computing, The Hierarchy of Edge, Fog, and Cloud	IoT Application Layer Protocols, Message Queuing Telemetry Transport (MQTT)	Hadoop Distributed File System, Parquet, Avro, Hive, SerDe, YARN	FNF Components, Flexible NetFlow in Multiservice IoT Networks

Resources	
1	Internet of Things: Architecture and Design Principles, Raj Kamal, McGraw Hill Education (India) Private Limited, ISBN-13: 978-93-5260-522-4
2	IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things by Rob Barton, Gonzalo Salgueiro, David Hanes, Publisher: Cisco Press, Release Date: June 2017, ISBN: 9780134307091 (https://www.oreilly.com/library/view/iot-fundamentals-networking/9780134307091/)

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 (%)
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.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. L. Selvam, SRMIST, KTR

Course Code	UGI24P04L	Course Title	Research Project and Dissertation	Category	P	Project Work / Internship	L	T	P	C
							0	0	24	12

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	<i>The purpose of taking this course is to:</i>	Depth				Attainment			Programme 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	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Incultation, Multicultural Inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2	
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	<i>At the end of this course, learners will be able to:</i>	✓	✓	-	-	2	85	75	3	2	2	1	2	1	1	2	2	
CLO-1	To get an inside view of an industry and organization/company	✓	✓	✓	-	2	85	75	3	3	2	2	2	2	1	1	2	
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	✓	3	85	75	3	3	3	1	3	2	2	1	3	
CLO-3	To make professional connections and enhance networking	✓	✓	✓	✓	3	85	75	3	3	3	3	3	1	2	2	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	2	2	2	3	
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	3	85	75	3	2	3	3	3	2	2	2	3	

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

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

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

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

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

Course Code	UGI24P05L		Professional Internship				Category	P	Project Work / Internship	L	T	P	C
										0	0	24	12

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil
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CLR	<i>The purpose of taking this course is to:</i>	Depth				Attainment			Programme 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	Bloom's 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 Incultation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
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	<i>At the end of this course, learners will be able to:</i>	✓	✓	-	-	2	85	75	3	2	2	3	3	2	2	2	2	2
CLO-1	To get an insight of an industry and organization/company	✓	✓	✓	-	2	85	75	3	2	3	3	3	2	2	1	2	2
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	✓	3	85	75	3	2	3	3	3	3	2	1	3	3
CLO-3	To make professional connections and enhance networking	✓	✓	✓	✓	3	85	75	3	2	2	3	3	2	2	2	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	2	2	2	3	3
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	3	85	75	3	3	3	3	3	2	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. 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.

Assessment Component	Expected outcome	Type	Evaluators	Criteria or basis	Marks
Review-1	Internship letter Submission Internship title to be described.	Internal	Supervisor / Guide & Internship Coordinator	Feasibility Study of the Internship	20
Review-2	A short presentation about the internship work	Internal	Supervisor / Guide & Project Coordinator	Clarity of the idea, Preliminary work done.	30
Internship Report	Evaluation of internship Report	External	Examiner(s)/ Reviewer(s)	Presentation, Handling Q&A	30
Viva-Voce	Final Presentation				20

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

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