ACADEMIC CURRICULA

UNDERGRADUATE DEGREE PROGRAMMES

Bachelor of Science

(B.Sc. Computer Science)

Three Years

Learning Outcome Based Curriculum Framework

(LOCF)

Academic Year

2020 - 2021

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur- 603203, Chengalpattu District, Tamil Nadu, India

Bachelor of Science - Computer Science

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

2.Department Mission Statement	
Stmt - 1	To provide a great platform to learn and practice technologies to meet the growing demands in the industries
Stmt - 2	To be distinguished as an renowned department for learning, experimenting and continuing research
Stmt - 3	Encouraging the students to understand the best of practices and standards of software and apply the same while developing applications that benefits the society
Stmt - 4	To make the learners recognize the need for engaging themselves in continuing professional development
Stmt - 5	Promoting students to integrate technical ability and IT-based solutions into appropriate user environments

3.Program Education Objectives (PEO)	
PEO - 1	Proficiency: Understanding the principles of computing, mathematics, and basic sciences and apply the same to the development of applications across various disciplines of study and utility
PEO - 2	Analytical Ability: Developing skillfulness to identify and analyze user needs and take them into account in the selection, creation, evaluation, and administration of computer-based systems
PEO - 3	Continuous learning:Helps and supports to use current techniques, skills, and tools necessary for computing practices and imbibe the art of adaptive learning towards the technologies to come
PEO - 4	Demonstration Skill: An ability to communicate effectively with a range of audiences
PEO - 5	Social Connect: An understanding of professional, ethical, legal, security and social issues, responsibilities

4.Program Specific Outcomes (PSO)	
PSO - 1	The learners will expand their skill sets and develop professional proficiency to establish themselves as prominent resource to fit in IT,ITES and research environments
PSO - 2	The learners will find an optimal positions in their career ladders by engaging them in continuous learning process
PSO - 3	The learners will be proficient in technical skills, evaluate and create themselves as a demandable resource, socially responsible

5. Consistency of PEO's with Mission of the Department

	Mission Stmt. - 1	Mission Stmt. - 2	Mission Stmt. - 3	Mission Stmt. - 4	Mission Stmt. - 5
PEO - 1	H	M	H	H	H
PEO - 2	H	H	H	M	M
PEO - 3	H	M	H	H	H
PEO - 4	L	L	M	M	H
PEO - 5	H	H	H	H	M

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

6. Consistency of PEO's with Program Learning Outcomes (PLO)

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

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

7.Programme Structure

1. Professional Core Courses (C)
(13 Courses)

Course Code	Course Title	L	T	P	C
USA20101J	Programming for Problem Solving	4	0	4	6
USA20102J	Digital Logic Fundamentals	4	0	2	5
USA20201J	Object Oriented Programming	4	0	4	6
USA20202J	Data Structures and Algorithms	4	0	2	5
USA20301J	Programming in Java	4	0	4	6
USA20302J	Operating Systems	4	0	4	6
UCS20401J	Advanced Java Programming	4	0	4	6
USA20401J	Database Systems	4	0	4	6
UMS20402T	Resource Management Techniques	4	0	0	4
USA20501J	Web Programming	4	0	4	6
USA20502J	Computer Networks	4	0	2	5
USA20503J	Software Engineering and Testing	4	0	2	5
USA20601J	Python Programming	4	0	4	6
	Total Learning Credits				**72**

2. Discipline Specific Elective Courses (E)
(4 Courses)

Course Code	Course Title	L	T	P	C
UCS20D01J	Web development using NodeJS and Mongo	4	0	4	6
UCS20D02J	Web development using ReactJS and Mongo				
UCS20D03J	Web development using AngularJSand Mongo				
UCS20D04J	Multimedia and Animation	4	0	4	6
UCS20D05J	Computer Organization and Architecture				
UCS20D06J	Artificial Intelligence				
UCS20D07J	Machine Learning	4	0	4	6
UCS20D08J	Cloud Computing				
UCS20D09J	Internet of Things				
UCS20D10L	Project Work	0	0	12	6
Total Learning Credits					**24**

3. Generic Elective Courses (G)
(9 Courses)

Course Code	Course Title	L	T	P	C
ULT20G01J	Tamil – I	2	0	2	3
ULH20G01J	Hindi - I				
ULF20G01J	French - I				
ULT20G02J	Tamil – II	2	0	2	3
ULH20G02J	Hindi – II				
ULF20G02J	French -II				
UMS20G01T	Discrete Mathematical Structures	3	1	0	4
UMS20G02T	Mathematical Foundation	3	1	0	4
UMS20G03T	Statistical Methods	3	1	0	4
Total Learning Credits					**18**

4. Ability Enhancement Courses (AE)
(3 Courses)

Course Code	Course Title	L	T	P	C
ULE20AE1T	English	4	0	0	4
UES20AE1T	Environmental Studies	3	0	0	3
Total Learning Credits					**7**

5. Skill Enhancement Courses (S) (6 Courses & My India Project)					
Course	Course	Hours/ Week			
Code	Title	L	T	P	C
UCS20S01J	Advanced Excel	1	0	1	2
UCS20S02J	Content Management Software	1	0	1	2
UCS20S03L	Android Basics	0	0	2	1
UCS20S04L	Visualization Tool	0	0	2	1
UMI20S01L	My India Project	0	0	0	1
UCD20S01L	Soft Skills	0	0	2	1
UCD20S02L	Quantitative Aptitude and Reasoning	0	0	2	1
Total Learning Credits					9

6. Extension Activity (NS/NC/NO/YG) (Any 1 Course)					
Course	Course	Hours/ Week			
Code	Title	L	T	P	C
UNS20201L	NSS	0	0	0	0
UNC20201L	NCC				
UNO20201L	NSO				
UYG20201L	YOGA				
Total Learning Credits					0

7. Life Skill Courses (JeevanKaushal – JK) (4 Courses)					
Course	Course	Hours/ Week			
Code	Title	L	T	P	C
UJK20201L	Communication Skills	0	0	4	2
UJK20301T	Universal Human Values	2	0	0	2
UJK20401T	Professional Skills	2	0	0	2
UJK20501T	Leadership and Management Skills	2	0	0	2
Total Learning Credits					8

Total Learning Credits : 138

AS SRMIST STRONGLY ENCOURAGES THE USE OF SWAYAM (Study Web of Active Learning by Young and Aspiring Minds) PLATFORM, THE STUDENTS ARE ENCOURAGED TO CHOOSE ATLEAST ONE CORE/ ELECTIVE COURSE FROM SWAYAM ON THE RECOMMENDATION OF THE FACULTY ADVISOR AND THE CREDITS WILL BE TRANSFERRED

8.Implementation Plan

Semester - I

Code	Course Title	L	T	P	C
ULT20G01J	Tamil-I				
ULH20G01J	Hindi-I	2	0	2	3
ULF20G01J	French-I				
ULE20AE1T	English	4	0	0	4
USA20101J	Programming for Problem Solving	4	0	4	6
USA20102J	Digital Logic fundamentals	4	0	2	5
UMS20G01T	Discrete Mathematical Structures	3	1	0	4
UCS20S01J	Advanced Excel	1	0	1	2
UCD20S01L	Soft Skills	0	0	2	1
Total Hours Per Week		18	1	11	30
Total Learning Credits					25

Semester – II

Code	Course Title	L	T	P	C
ULT20G02J	Tamil-II				
ULH20G02J	Hindi-II	2	0	2	3
ULF20G02J	French-II				
USA20201J	Object Oriented Programming	4	0	4	6
USA20202J	Data Structures and Algorithms	4	0	2	5
UMS20G02T	Mathematical Foundation	3	1	0	4
UCS20S02J	Content Management Software	1	0	1	2
UCD20S02L	Quantitative Aptitude and Reasoning	0	0	2	1
UJK20201L	Communication Skills	0	0	4	2
UNS20201L	NSS				
UNC20201L	NCC	0	0	0	0
UNO20201L	NSO				
UYG20201L	YOGA				
Total Hours Per Week		14	1	15	30
Total Learning Credits					23

Semester - III

Code	Course Title	L	T	P	C
USA20301J	Programming in Java	4	0	4	6
USA20302J	Operating Systems	4	0	4	6
UCS20D01J	Web development using Node JS and Mongo				
UCS20D02J	Web development using React JS and Mongo	4	0	4	6
UCS20D03J	Web development using Angular JS and Mongo				
UMS20G03T	Statistical Methods	3	1	0	4
UMI20S01L	My India Project	0	0	0	1
UJK20301T	Universal Human Values	2	0	0	2
Total Hours Per Week		17	1	12	30
Total Learning Credits					25

Semester - IV

Code	Course Title	L	T	P	C
UCS20401J	Advanced Java Programming	4	0	4	6
USA20401J	Database Systems	4	0	4	6
UMS20402T	Resource Management Techniques	4	0	0	4
UCS20D04J	Multimedia and Animation				
UCS20D05J	Computer Organization and Architecture	4	0	4	6
UCS20D06J	Artificial Intelligence				
UJK20401T	Professional Skills	2	0	0	2
Total Hours Per Week		18	0	12	30
Total learning credits					24

Semester - V					
Code	Course Title	Hours/ Week			C
		L	T	P	
USA20501J	Web Programming	4	0	4	6
USA20502J	Computer Networks	4	0	2	5
USA20503J	Software Engineering and Testing	4	0	2	5
UCS20S03L	Android basics	0	0	2	1
UCS20S04L	Visualization Tool	0	0	2	1
UES20AE1T	Environmental Studies	3	0	0	3
UJK20501T	Leadership and Management skills	2	0	0	2
Total Hours Per Week		17	0	13	30
Total Learning Credits					23

Semester - VI					
Code	Course Title	Hours/ Week			C
		L	T	P	
USA20601J	Python Programming	4	0	4	6
UCS20D07J	Machine Learning				
UCS20D08J	Cloud Computing	4	0	4	6
UCS20D09J	Internet of Things				
UCS20D10L	Project work	0	0	12	6
Total Hours Per Week		8	0	20	28
Total Learning Credits					18

1.Programme Articulation Matrix															
		Programme Learning Outcomes													
Course Code	Course Name	Fundamental	Application of	Link with Related	Procedural Skills in	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
USA20101J	Programming for Problem Solving	H	H	M	M	L	L	L	L	L	L	H	M	M	M
USA20102J	Digital Logic Fundamentals	H	H	M	M	M	L	L	L	L	L	H	M	M	M
USA20201J	Object Oriented Programming	H	H	M	M	M	L	M	M	L	M	H	M	M	L
USA20202J	Data Structures and Algorithms	H	M	M	M	M	L	M	L	M	M	H	H	H	H
USA20301J	Programming in Java	H	M	M	M	M	L	M	L	M	M	H	H	H	H
USA20302J	Operating Systems	H	H	M	M	M	L	L	L	M	M	M	M	M	M
UCS20401J	Advanced Java Programming	H	H	H	H	M	L	L	L	M	L	M	H	L	H	L
USA20401J	Database Systems	H	H	M	M	M	L	M	M	L	L	H	M	L	M
UMS20402T	Resource Management Techniques	H	H	H	H	M	L	L	L	M	M	M	L	L	L
USA20501J	Web Programming	H	H	H	H	M	L	L	L	H	L	M	H	H	L
USA20502J	Computer Networks	H	H	M	H	M	L	M	M	L	L	M	H	M	L	M
USA20503J	Software Engineering and Testing	H	H	M	M	M	L	L	L	M	M	M	M	M	M
USA20601J	Python Programming	H	H	M	M	M	L	L	L	M	M	M	M	M	H
UCS20D01J	Web Development using NodeJS and Mongo	H	H	M	H	M	L	L	L	M	M	H	M	M	H
UCS20D02J	Web Development using ReactJS and Mongo	H	H	M	H	M	L	L	L	M	M	H	M	M	H
UCS20D03J	Web Development using AngularJS and Mongo	H	H	M	M	H	H	H	M	M	M	L	H	H	M	M
UCS20D04J	Multimedia and Animation	H	H	M	M	M	L	L	L	M	M	M	M	M	M
UCS20D05J	Computer Organization and Architecture	H	H	M	M	M	L	L	L	M	H	M	M	M	M
UCS20D06J	Artificial Intelligence	H	H	M	M	M	L	L	L	M	M	H	M	M	M
UCS20D07J	Machine Learning	H	H	M	H	M	L	L	L	M	M	H	M	M	M
UCS20D08J	Cloud Computing	H	H	M	H	M	L	L	L	M	M	H	M	M	M
UCS20D09J	Internet of Things	H	H	M	M	H	H	H	M	M	M	L	H	H	M	M
UCS20D10L	Project Work	H	H	M	M	L	L	L	L	L	L	L	H	M	M	M
ULT20G01J	Tamil-I	H	H	M	M	M	L	L	L	L	L	L	H	M	M	M
ULH20G01J	Hindi-I	H	H	M	M	M	L	M	M	L	M	L	H	M	M	L
ULF20G01J	French-I	H	M	M	M	M	L	M	L	M	M	L	H	H	H	H
ULT20G02J	Tamil-II	H	M	M	M	M	L	M	L	M	M	M	H	H	H	H
ULH20G02J	Hindi-II	H	H	M	M	M	L	L	L	M	M	M	M	M	M
ULF20G02J	French	H	H	H	H	M	L	L	L	M	L	M	L	H	L
UMS20G01T	Discrete Mathematical Structures	H	H	M	H	M	L	M	M	L	L	M	H	M	L	M
UMS20G02T	Mathematical Foundation	H	H	M	H	M	L	L	L	M	M	H	M	M	M
UMS20G03T	Statistical Methods	H	H	M	M	H	H	H	M	M	M	L	H	H	M	M
ULE20AE1T	English	H	H	M	M	L	L	L	L	L	L	L	H	M	M	M
UES20AE1T	Environmental Studies	H	H	M	M	L	L	L	L	L	L	L	H	M	M	M
UCS20S01J	Advanced Excel	H	H	M	M	M	L	M	M	L	M	L	H	M	M	L
UCS20S02J	Content Management Software	H	M	M	M	M	L	M	L	M	M	L	H	H	H	H
UCS20S03L	Android Basics	H	M	M	M	M	L	M	L	M	M	H	H	H	H
UCS20S04L	Visualization Tool	H	H	M	M	M	L	L	L	M	M	M	M	M	M
UMI20S01L	My India Project	H	H	M	M	M	L	L	L	M	M	M	M	M	M
UCD20S01T	Soft Skills	H	H	M	H	M	L	L	L	M	M	M	H	M	M	M
UCD20S02T	*Quantitative Aptitude and Reasoning*	H	H	M	M	H	H	H	M	M	M	L	H	H	M	M
UNS20201L	NSS	H	H	M	M	L	L	L	L	L	L	L	H	M	M	M
UNC20201L	NCC	H	H	M	M	M	L	L	L	L	L	L	H	M	M	M
UNO20201L	NSO	H	M	M	M	M	L	M	L	M	M	M	H	H	H	H
UYG20201L	YOGA	H	H	M	M	M	L	L	L	M	M	M	M	M	M
UJK20201L	Communication Skills	H	H	H	H	M	L	L	L	M	L	M	H	L	H	L
UJK20301T	Universal Human Values	H	H	M	H	M	L	M	M	L	L	M	H	M	L	M
UJK20401T	Professional Skills	H	H	H	H	M	L	L	L	M	M	M	M	L	L	L
UJK20501T	Leadership and Management Skills	H	H	H	H	M	L	L	L	H	L	M	H	H	H	L
	Programme Average	H	H	M	H	M	L	L	L	M	M	M	H	M	M	M

Structure of UG Courses in Computer Science

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

Semester	Compulsory Core Courses (CC)	Discipline Specific Elective (DSE)	Ability Enhancement Compulsory Courses (AECC)	Skill Enhancement Course (SEC) / Life Skill Course (JeevanKaushal) (JK)	Generic Elective (GEC)	Total Credits
Semester I	CC-1 CC-2 (11)	-	AECC-1 (4)	SEC-1 (2) SEC-2 (0)	GE-1 (Language-I) (3) GE-2 (Discrete Mathematical Structure) (4)	24
Semester II	CC-3 CC-4 (11)	-	AECC-2 (0)	SEC-3 (2) JK-1 (2)	GE-3 (Language-II) (3) GE-4 (Mathematical Foundation) (4)	22
Semester III	CC-5 CC-6 (12)	DSE-1 (6)	-	SEC-4 (2) JK-2 (2)	GE-5 (Statistical Methods) (4)	26
Semester IV	CC-7 CC-8 CC-9 (16)	DSE-2 (6)	-	JK-3 (2)	-	24
Semester V	CC-10 CC-11 CC-12 (16)	-	AECC-3 (4)	SEC-5 (1) SEC-6 (1) JK-4 (2)	-	24
Semester VI	CC-13 (6)	DSE -3 (6) DSE-4 (6)	-	-	-	18
Total Credits	72	24	8	16	18	138

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SEMESTER I

Course Code	ULT20G01J	Course Name	Tamil-I	Course Category	G	Generic Elective Course	L	T	P	C
							2	0	2	3

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

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

		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	To enable them to learn the nuances of modern poetry in Tamil																		
CLR-2 :	To explore New historicism through the works of art written in Tamil to enlighten the students to understand the changes in the modern society																		
CLR-3 :	Inculcate Ways of life, moralities and ethical factors as an essential part of learning Tamil literature																		
CLR-4 :	Develop strategies of comprehension of texts of different origin																		
CLR-5 :	Strengthen the language of the students both in oral and written																		
CLR-6 :	Express their sentiments, emotions and opinions, reacting to information, situations																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	PSO -1	PSO -2	PSO-3
CLO-1 :	Extend and expand their savoir-faire through the acquisition of skills to cater the needs of the modern era.	2	75	60	H	H	H	-	H	H	M	H	H	-	H	H	H	H	H
CLO-2 :	Enable the students to appreciate their mother tongue and to Enhance their thinking capacity	2	80	70	H	H	-	H	-	-	H	-	-	H	H	-	H	H	H
CLO-3 :	Make them learn the basic rules of Language and make them communicate better	2	70	65	H	H	H	M	-	-	H	-	-	H	H	-	H	H	H
CLO-4 :	Develop strategies of comprehension of texts based on different culture and life styles	2	70	70	H	-	H	H	H	-	M	-	-	H	H	-	H	H	H
CLO-5 :	Strengthen spoken and written skills of the student	2	80	70	-	H	-	M	-	H	H	-	-	H	H	-	H	H	H
CLO-6 :	Will be able to clear government examinations	2	75	70	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H

Duration (hour)		12	12	12	12	12
S-1	SLO-1	தமிழ் இலக்கியப் போக்குகள்	நவீன கவிதை தோற்றம்	தமிழரின் வீரமரபு	சிற்றிலக்கியத் தோற்றம்	மொழி வரலாறு
	SLO-2	இலக்கிய நுட்பங்கள்	நவீன கவிதை வரலாறு	போர் விழுமியங்கள்	சிற்றிலக்கிய வகைமை	மொழிப் பயிற்சி
S-2	SLO-1	தமிழ்க் கவிதை மரபு	நவீன கவிதை செல்நெறிகள்	பரணி அறிமுகம்	சிற்றிலக்கியங்கள்	தமிழும் அகராதியியலும்
	SLO-2	காலந்தோறும் கவிதை உள்ளடக்கம்	செல்நெறிகளில் கோட்பாடுகள்	பரணி இலக்கியங்கள்	முதன்மைச் சிற்றிலக்கியங்கள்	அகரவரிசைப்படுத்தல்
S-3	SLO-1	காலந்தோறும் கவிதை வடிவம் –	கவிதை மொழி	கலிங்கத்துப்பரணி (484)	புதுக்கவிதையும் இதழ்களும்	கலைச்சொல் அறிமுகம்
	SLO-2	தற்கால இலக்கியம்	நவீன கவி மொழியின் நுட்பங்கள்	தலைவனின் வீரம்	மணிக்கொடி இதழ்	கலைச்சொல் உருவாக்க நுட்பங்கள்
S-4	SLO-1	புதுக்கவிதை உருவாக்கம்	நவீன கவி ஆளுமைகள்	தமிழ் இலக்கிய மரபில் தூது	எழுத்து இதழ்	தமிழில் கலைச்சொற்கள்
	SLO-2	புதுக்கவிதை செல்நெறிகள்	நவீன கவி ஆளுமைகளின் கவித்துவம்	தூது இலக்கியங்கள்	வானம்பாடி இதழ்	நிலைபெற்ற கலைச்சொற்கள்
S-5	SLO-1	பாரதியார் – காலத்தின் அடையாளம்	விளிம்புநிலை மனிதர்கள்	அழகர் கிள்ளைவிடு தூது (கண்ணிகள்)	சிறுகதை தோற்றம்	மரபுத்தொடர்
	SLO-2	பாரதியார் -பன்முக ஆளுமை	விளிம்புநிலை இலக்கியம்	தூது மரபில் கிளியும் பாராட்டும்	சிறுகதை வளர்ச்சி	தமிழில் மரபுத்தொடர்கள்
S-6	SLO-1	பாரதியார் - கண்ணன் என் சேவகன்	ராஜா சந்திரசேகரரின் கைவிடப்பட்ட குழந்தை	செய்யுள் மரபில் கலம்பகம்	சிறுகதை – வரலாறு	நாட்டார் வழக்காறுகள்
	SLO-2	கண்ணன் என் சேவகன் கவிதை சொல்லும் வாழ்வியல்	புறக்கணிப்பும் வாழ்வியலும்	கலம்பக இலக்கியங்கள்	சிறுகதை ஆசிரியர்கள்	பழமொழி அறிமுகம்
S-7	SLO-1	20 ஆம் நூற்றாண்டுக் கவிதை மரபில் பாரதிதாசன்	புலம்பெயர்தல்	நந்திக் கலம்பகம் (77)	புதினம் தோற்றம்	தமிழில் பழமொழிகள்
	SLO-2	பாரதிதாசனும் தமிழும்	புலம்பெயர் வாழ்வியல்	மகள் மறுத்தலில் வீரம்	புதினம் வளர்ச்சி	பழமொழியும் பயன்பாடும்
S-8	SLO-1	பாரதிதாசன் – தமிழினி இனிமை,	அனார் - மேலும் சில இரத்தக் குறிப்புகள்	குறவஞ்சி அறிமுகம்	புதினத்தின் வகைமை	தமிழ் இலக்கண நுட்பங்கள்
	SLO-2	தமிழின் பெருமையும் வளமையும்	உள்நாட்டுப் போர்ச்சூழலும் பெண் உளவியலும்	குறவஞ்சி இலக்கியங்கள்	புதின ஆசிரியர்கள்	இலக்கணமும் பயன்பாடும்

S-9	SLO-1	வானம்பாடியில் அப்துல்ரகுமான்	காலந்தோறும் பெண்	குற்றாலக் குறவஞ்சி (9)	அச்சு ஊடக வரலாறு	தமிழில் சொல் வகைகள்
	SLO-2	அப்துல்ரகுமான் கவிதையின் தனித்தன்மைகள்	பெண் இலக்கியம்	மலையும் வாழ்வும்	அச்சு ஊடகமும் தமிழும்	சொல்லும் பயன்பாடும்
S-10	SLO-1	அப்துல்ரகுமான் - அவதாரம்	சுகிர்தராணியின் அம்மா	காப்பிய இலக்கணம்	அச்சு ஊடகமும் உரைநடை வளர்ச்சியும்	பெயர்ச்சொற்கள்
	SLO-2	அவதாரம் - நம்பிக்கையும் வெற்றியின் பாதைகளும்	பெண்மையும் தாய்மையும்	காப்பிய வகைமைகள்	தமிழில் உரைநடை	பெயர்ச்சொற்கள் அறிதல்
S-11	SLO-1	சுற்றுச்சூழலியல்	சமத்துவம்	தமிழில் பௌத்த இலக்கியங்கள்	சுவடிகள்	வினைச்சொற்கள்
	SLO-2	தமிழ்க் கவிதையில் சுற்றுச்சூழலியல்	பாலியல் சமத்துவம்	மணிமேகலை	சிவதருமோத்திரச் சுவடி பெற்ற வரலாறு	வினைச்சொற்கள் அறிதல்
S-12	SLO-1	நரசிம்மன் – மகனே என்னை மன்னித்து விடு	நா. முத்துக்குமாரின் தூர் கவிதை	பெண் சாபமும் காயசண்டிகையும்	புழங்குபொருள் பண்பாடும் தமிழர் வாழ்வியலும்	தமிழில் பெயரடை, வினையடை
	SLO-2	நவீன வாழ்வும் சுற்றுச்சூழலியல் அறிதலும்	தூர் கவிதை முன்வைக்கும் பெண் சமத்துவம்	பெண் வரலாற்றில் சாபங்களின் கதைகள்	கூஜாவின் கோபம்	பெயரடை, வினையடை அறிதல்

Learning Resources	1.குறிஞ்சித்தேன், தொகுப்பும் பதிப்பும் - தமிழ்த்துறை ஆசிரியர்கள், எஸ்.ஆர்.எம். அறிவியல் மற்றும் தொழில்நுட்பக் கல்விநிறுவனம், காட்டாங்குளத்தூர், 603203, 2020 2.வல்லிக்கண்ணன், புதுக்கவிதை தோற்றமும் வளர்ச்சியும், ஆழி பதிப்பகம், சென்னை, 2018 3.கா. சிவத்தம்பி, தமிழில் சிறுகதை தோற்றமும் வளர்ச்சியும், என்.சி.பி.எச்., சென்னை, 2013 4.தமிழ் இணையக் கல்விக்கழகம் - http://www.tamilvu.org/ 5.மதுரை தமிழ் இலக்கிய மின் தொகுப்புத் திட்டம் - https://www.projectmadurai.org/

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

Level 2	Apply	40%	40%	50%	50%	50%	50%	50%	50%	50%	-
	Analyze										
Level 3	Evaluate	30%	30%	20%	20%	20%	20%	20%	20%	20%	-
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

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

Course Designers		
Experts from Industry	**Expert from Higher Technical Institutions**	**Internal Experts**
	Dr. R..Srinivasan Associate Professor, Department of Tamil, Presidency College, Chennai,	1. B.Jaiganesh, Assistant Professor & Head, FSH, SRMIST 2. T.R.Hebzibah Beulah Suganthi, Assistant Professor, FSH, SRMIST 3.S.Saraswathy, Assistant Professor, FSH, SRMIST

Course Code	**ULH20G01J**	Course Name	**HINDI-I**	Course Category	**G**	**Generic Elective Course**	L	T	P	C
							2	0	2	3

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

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

		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	*To be able to converse well in the Hindi Language*																		
CLR-2 :	*To read and write and clarity*																		
CLR-3 :	*To be willing listeners and translators –where need be*																		
CLR-4 :	*To acquire the values/thought contents of the writers and practice in it in life.*																		
CLR-5 :	*To find motivation through the various forms of literature and learn to overcome any challenges of life.*																		
CLR-6 :	*To discover the importance of the language in making education as a means of growth in life and not mere literacy.*																		

Column headers (Learning): Level of Thinking (Bloom), Expected Proficiency (%), Expected Attainment (%)

Column headers (PLO): Fundamental Knowledge, Application of Concepts, Link with Related Disciplines, Procedural Knowledge, Skills in Specialization, Ability to Utilize Knowledge, Skills in Modeling, Analyze, Interpret Data, Investigative Skills, Problem Solving Skills, Communication Skills, Analytical Skills, PSO -1, PSO -2, PSO -3

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																	
CLO-1 :	To appreciate the Hindi language in its various forms.	2	75	60	H	H	H	-	-	-	-	-	-	-	-	-	-	-
CLO-2 :	To understand the philosophy of life and living through stories.	2	80	70	-	H	-	H	-	-	-	-	-	-	-	-	-	-
CLO-3 :	To help the students learn and develop the fundamentals of life, through One-Act plays.	2	70	65	H	-	-	H	-	-	-	-	-	-	-	-	-	-
CLO-4 :	To share the richness of thought and content presented in the Hindi language, into other languages so that the readers would stand to gain.	2	70	70	H	-	H	H	H	-	-	-	-	-	H	-	-	-
CLO-5 :	To guide the students in the learning of the technical aspect of the Hindi language, this would help them in the field of administration.	2	80	70	-	H	-	H	-	-	-	-	-	-	-	-	-	-
CLO-6 :	To encourage the students to communicate with the public, on a large scale with the medium of Main stream and Documentary films.	2	75	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Kahani kya Hai	Ekanki aur Natak kya hai	Patrkarita ka arambh	Film Samiksha	Takniki Shabdavali
	SLO-2	Jivan ka anubhav	Vidhyarthiyon dono ke antar ko smajhkar apne dwara use prastut kar sakta hai	Vidhyarthiyon ka apne samaj ke prti jagrukta	Film ka prabhav ko smajhna	Vaignik tarike se bhashaon ka avishkaar karna
S-2	SLO-1	Kahani ke Tatva	EKANKI KA ARTH	Aazdi aur Patrkarita ka daiytava	SAMIKSHA KYA HAI	ARTH
	SLO-2	Vishleshan karne ki Kshmta	Vidhyarthi ke bhitar vishkleshan ki kshamta jagrit	Vidhyarthiyon ko patrkarita ka itihas smajkar samaj nirman ke liye sahyog dena	Tarkik vishleshan kshmta paida karta hai	Vidhyarthi uske arth dwara hi uske mahtav smjhenge
S-3	SLO-1	Vo Tera Ghar Ye Mera Ghar Parivar me Buzargon ke Mahtav ko Samjhana	PARIBHASHA	PATRKARITA KA MAHTAVA	SAMIKSHA KE PRAKAR	PARIBHASHA
	SLO-2	Bhartiya Sanskriti Se Vidhyarthiyon ko Jodna	Vidvano ke mat se parichay	Patrkarita se bhut se sawal ka smadhan ho jata hai	Vidhyarthiyon ka un prkaro ka adhyaan karna jisse vidhyarthi us samiksha ko tayaar kar payenge	Vibhinn vidwano dwara di gai paribhasha se us baat ko smjhenge vidhyathi
S-4	SLO-1	Mithaiwala Pyar Bantne se dukh kam hota hai	SWAROOP	PTRAKARITA KA ARTH	SAMIKSHA KA UDDESHYA	SHABDAVALI KI AVSHYAKTA
	SLO-2	Manavata ka Path	Vidhyarthiyon me iski samajh se lekhan kshmata badegi	Vibhinn vidhvono ko padhne se vidhyarthiyon ki tarkik kshmta badhti hai ,	Vidhyarthi ke andar smaj ke prati Kartavya bodh paida hoga	Vaignikon ka awiskar kitna mahtavpurn

S-5	SLO-1	Bechadri Pal Chatro me Utsah Vardhan Karna	PATHYA VACHAN	PTRAKARITA KI PARIBHASHA	FILM KA SAMAJIK MAHTAVA	BHASHA VAIGYANIK
	SLO-2	Beta-beti ek saman ke mahtav ko smjhana.	Vidhyarthiyon ka path kaushal bdhega	K vidhvaono ki ukti ek smadhan bhi hota hai	Samajik uttar daiytav ko smjhana	Bhasha vaignikon ki jankari
S-6	SLO-1	Nadi aur Jeevan Paryavaran ke mahtav se awagat karana.	PRASTUTI	PRAMUKH SAMACHAR PATR	FILM KA VISHLESHAN	KARYALYIN SHABD
	SLO-2	Manav Jeevan me nadi ki upyogita aur Mahtav.	Natak khelne par bahut si takniki bate samajhenge	Vidhyarthiyon ki jankari badhegi	Vidhyarthi tarkik vishleshan sikhega	Shabd kaise tayar kiye jate hain vidhyorthiyon ko jankari
S-7	SLO-1	Pachees chauka Ded Sau Jamindari Pratha se awagat karana	MAHTVA	TV.PATRKARITA	DRISTIKON NIRMAN	ANGREZI SE HINDI ANUVAD
	SLO-2	Asprishya Vicharao ke Prati Sakaratamak Bnana.	Natak ka mahtav ko majhkr samaj ke hito ke sath judna.	TV patrkar ke daiytav ko smajkar vidhyarthi ise apne rozgar se jod sakta hai	Vidhyarthi ka drishtikon nirmit hoga	Hindi adhikarai aur anuvadak ke pad ke liye tayaar karna
S-8	SLO-1	Kahani ka Uddeshya	PRASHAN-ABHYAS	PHOTO PATRKARITA	DOCUMENTRY FILM	HINDI SE ANGREZI ANUVAD
	SLO-2	Vidhyarthiyon ko Samaj se Jode rakhna	Vidhyarthiyon ka lekhan kshmata Badhna	Vidhyarthiyon me photo patrkarita ke mahtav ka smajh paida hona	Vidhyarthi samajik dharatal ki kathinai ko smajhkar desh se judega	Hindi adhikari aur anuvadak ke pad ke liye tayaar karna.
S-9	SLO-1	Kahani Lekhan	UDDESHYA	PRASTUTIKARAN	MAIN STREAM FILM	EK DIN EK SHABD
	SLO-2	Vidhyarthi Ko likhne ki aur Prerit karna	Vidhyarthi ko smaj upyog hito ki jankari dena	Vifhyarthi apni baat rakhne ki kshmta vikstit karta hai	Vidhyarthion ko jivan ke anchue pahluon se bhi sakshaktkar	Vidhyarthiyon ko rozgaar se jodna
S-10	SLO-1	Seminar	PARICHARCHA	BHASHA-SHAILI	FILM KE DARSHAK	ATI MAHTVAPURN SHABD
	SLO-2	Vidhyarthiyon dwara Prastuti karan	Vidhyarthi me vak-kaushal bdhana	Vidhyarthi ko apni report me bhasha-shaili ko sikh kar ek badhiya reporter ban sakta hai	Vidhyarthiyon ka samajik gyan	Shabdon ke mahtav ko smajhkar use yaad karna
S-11	SLO-1	Prashan Abhyas	BHASHA SHAILI	PATRKARITA KE NIYAM	FILM AUR BAZAAR	SAMANYA SHABD AUR PARIBHASHIK SHABDAVALI ME ANTAR
	SLO-2	Vidhyarthiyon me Lekhn Kaushal ki kshmata Viksit karna.	Vidhyarthiyon ko bhasha ka mahtav smjhna	Vidhyarthi ise sikh kar ek nyay priya patrkar ban sakta hai	Vidhyarthiyon ko rozgaar se jodna	Vidhyarthiyon ko vaighniko dwara tayaar ki gai bhasha ki samaj
S-12	SLO-1	Path-Punravarti	EKANKI AUR RANGMANCH	PATRKAR KA DAIYTVA	FILM DARSHAK KA MAHTAVA	PARIBHASHIK SHABDAVALI KA MAHTAV

| | SLO-2 | Pariksha ke liye Saksham | Vidhyarthi isse rangmanch ke mahtav ko smajhenge | Vidhyarthiyon ko patrkar ka daityva sikhkar smaj ke uttar daityva ko nibhana hai | Vidhyarthiyon ko darshak ki ruchiyon se awagat karvana | Rozgaar se vidhyarthiyon ko jodnaw |

| Learning Resources | *The Prescribe Text Book Compiled and Edited by Department of Hindi*
 www.gadyakosh.com
 www.shabdkosh.com |

Learning Assessment

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

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

Course Designers		
Experts from Industry	**Expert from Higher Technical Institutions**	**Internal Experts**
	1. Prof.(Dr.) S.Narayan Raju, Head, Department of Hindi,CUTN, Tamilnadu	*1. Dr.S Preeti. Associate Professor & Head, SRMIST*
		2. Dr. Md.S. Islam Assistant Professor, SRMIST
		3 Dr. S. Razia Begum, Assistant Professor, SRM IST

Course Code	**ULF20G01J**	Course Name	**French-I**	Course Category	*G*	**Generic Elective Course**	L	T	P	C
							2	0	2	3

Pre-requisite	*Nil*	Co-requisite	*Nil*	Progressive	*Nil*

Courses		Courses		Courses	
Course Offering Department	*French*	**Data Book / Codes/Standards**		*Nil*	

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

		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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																			
CLR-6 :	Express their sentiments, emotions and opinions, reacting to information, situations																			

Course Learning Outcomes (CLO):	*At the end of this course, learners will be able to:*	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	PSO -1	PSO -2	PSO -3
CLO-1 :	*To acquire knowledge about French language*	2	75	60		H	H	H	-	-	-	-	-	-	-	-	-	-	-	-
CLO-2 :	*To strengthen the knowledge on concept, culture, civilization and translation of French*	2	80	70		-	H	-	H	-	H	-	-	-	-	M	-	-	-	-
CLO-3 :	*To develop content using the features in French language*	2	85	75		H	-	-	H	-	H	-	-	-	-	M	-	-	-	-
CLO-4 :	*To interpret the French language into other language*	2	70	80		H	-	H	H	H	-	-	-	-	-	H	-	-	-	-
CLO-5 :	*To improve the communication, intercultural elements in French language*	2	80	70		-	H	-	H	-	-	-	-	-	-	H	-	-	-	-
CLO-6 :						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Duration (hour)		12	12	12	12	12
S-1	**SLO-1**	**Bonjour, ça va ?**	**Salut ! Je m'appelle Agnès**	**Qui est –ce ?**	**Dans mon sac, j'ai…**	**Il est comment ?**
	SLO-2	**Salut**	**Paul, Valérie, Manish**	**Les exemples**	**Da ns ton sac**	**Les objectifs**
S-2	**SLO-1**	Les pays	Les pronoms personnels sujets	Les professions	La formation du féminin (3)	L'aspect physique
	SLO-2	Les nationalités	Je, Tu, Il/Elle Nous, vous, Ils/Elles	Les exemples	Les féminins	Le corps
S-3	**SLO-1**	Les animaux domestiques	Les verbes être et avoir	Quelques objets	La phrase interrogative	Le caractère
	SLO-2	Les animaux	Les verbes auxiliaires	Objets	Les interrogatives	Les exemples
S-4	**SLO-1**	Les jours de la semaine	Les articles définis et indéfinis	La fiche d'identité	*qu'est – ce que.. ?*	Les prépositions de lieu (1)
	SLO-2	Les mois de l'année	Les exemples	La carte d'identité	*Les exemples*	Dans, sur, sous etc..,

S-5	SLO-1	Les nombres de 0 à 69	La formation du féminine (1)	La liaison	*Qu'est – ce que C'est*	Les nombre à partir de 70
	SLO-2	Les nombres	Les féminins	Les activités	*Les objets*	Les exemples
S-6	SLO-1	La famille (1)	La formation du pluriel (1)	L'élision	*Qui est – ce ?*	**Allo ?**
	SLO-2	Ses parents	Les exemples	Les activités	*Les personnes*	**Portable**
S-7	SLO-1	L'accent	Les adjectifs possessifs	Intonation descendre	*la phrase négative*	La formation du féminin(3)
	SLO-2	L'accent tonique	Les exemples	Les descendre	*La négation*	Les exemples
S-8	SLO-1	Les articles définis	Entrer en contact : salut	Intonation montante	*C'est*	Les articles contractés
	SLO-2	Les articles indéfinis	Entrer en contact : demander	Les montantes	*Il est*	Les articles partitifs
S-9	SLO-1	Bonjour, - Salut !	Dire comment ça va	Dans mon sac	*Les verbes du premier group*	Les pronoms personnels toniques
	SLO-2	Ca va	Comment allez-vous ?	Des objets	*Les exemples*	Les pronoms
S-10	SLO-1	Je m'appelle Agnès	Se présenter	Les Mots	Les verbes *aller*	Les adverbes interrogatifs
	SLO-2	Quel est votre nom	Présenter quelqu'un	Les expressions	Le verbe venir	Les interrogatifs
S-11	SLO-1	Les Mots	*Demander*	Demander poliment	Demander et répondre poliment	Les verbes du deuxième group
	SLO-2	Les Expressions	*Demander le temps*	Répondre poliment	Les exemples	Les exemples
S-12	SLO-1	Entrer en contact	Demander la date	Demander des informations personnelles	Demander des informations personnelles	Décrire l'aspect physique
	SLO-2	Se présenter.	Dire la date	Les exemples	Les activités	Décrire le caractère

Learning Resources	Theory: 1. **''Génération-AI''** Méthode de français, Marie-Noëlle COCTON, P.DAUDA, L.GIACHINO, C.BARACCO, Les éditions Didier, Paris, 2018. 2. *Cahier d'activités avec deux discs compacts.*

Learning Assessment

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

	Total	100 %	100 %	100 %	100 %	100 %

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

Course Designers		
Experts from Industry	**Expert from Higher Technical Institutions**	**Internal Experts**
	1. Dr. C.Thirumurugan Associate Professor, Department of French, Pondicherry University	1. Kumaravel K. Assistant Professor & Head, SRMIST
		2. Ponrajadurai M Assistant Professor, SRMIST

Course Code	ULE20AE1T	Course Name	English	Course Category	AE	Ability Enhancement Course	L	T	P	C
							4	0	0	4

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Extend and expand the integrity in an individual which shall never allow him/her to compromise upon a noble way of living																		
CLR-2 :	Enable the students to overcome the fear of speaking a foreign language and enable them to think through a foreign language.																		
CLR-3 :	Make them communicate an unbiassed way of thinking in a better manner																		
CLR-4 :	Develop strategies of comprehension of texts based on different culture and life styles																		
CLR-5 :	Strengthen spoken and written skills of the student in English																		
CLR-6 :	Help them express their sentiments, emotions and opinions, and reactions to information and situations in a civilized, cultured and humane manner.																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	PSO -1	PSO - 2	PSO - 3
CLO-1 :	To acquire knowledge of becoming better beings through the tools of Language and Literature	2	75	60	H	H	H	-	-	H	-	H	-	H	H	H	-	-	-
CLO-2 :	To acquire a strong knowledge on concept, culture, civilization through English Literature	2	80	70	-	H	-	H	-	H	-	H	-	-	H	H	-	-	-
CLO-3 :	To develop own content and to be able to translate using the features in English Language	2	70	65	H	-	-	H	-	H	-	H	-	-	H	H	-	-	-

CLO-4 :	To interpret the contents in the texts presented in English Language	2	70	70	H	-	H	H	H	H	-	H	-	-	H	-	-	-	-
CLO-5 :	To present an improved and healthier communication and intercultural elements acquired through English Literature	2	80	70	-	H	-	H	-	H	-	H	-	-	H	-	-	-	-
CLO-6 :	To participate in any level of conversation and discussion presented in English with both proficiency in the language and positive caliber in the content of speech	2	75	70	H	H	-	H	M	H	M	H	H	H	H	H	H	H

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Introduction to the art of poetry writing will be done	Post-colonial impacts in India as observed in their language and culture will be discussed.	Story through images is explained to the students	The definition and purpose of monologue is explained	Homophones and Homonyms are to be explained in the class along with examples of usage.
	SLO-2	The rationale behind this unit will be discussed.	The students will be encouraged to impart their views	The students are asked to create their own stories from those images	the sample monologues are to be provided to the learners	How where and when these as vocabulary can be used is to be explained
S-2	SLO-1	Feminism through Kamaladas' poem' In Kindergarten' is explained	Mathraboothan and the mother tongue influence in English – a discussion	Every day the students are made to bring their own cartoons to tell stories related to social issues and political issues.	The learners are made to create their own monologue contents.	Cross word puzzles are to be given to the students to make them understand the differences and usage of homophones and homonyms
	SLO-2	feminist critique's stand through poets like Meena Kandasamy is discussed	Students from different regions are asked to talk. The peculiarity in their pronunciation is to be identified by them	How to identify irony and sarcasm is taught	The contents are assessed and the lacuna is informed	The students are evaluated by making them use homophones and homonyms on their own
S-3	SLO-1	The writer Meena Kandasamy is invited to read her poems on women.	Enjoywithinlimits, says Mr Mathruboothamistaught and discussed	International Political memes to be created in the class	Discuss the contents created by the students and reiterate the idea that a monologue should mimic a story and has to have a proper beginning middle and an end.	How exactly to decide a proper word at a given situation is to be practically explained in the class.
	SLO-2	Questions on her perspectives are to be posed by the students	Everymistakefound in the textisanalysed	Memes on popular issues to be created in the class	The created monologues are to be assessed by the students themselves	Mundane situations are to be given to the students to check their ability to use those words

S-4	**SLO-1**	*Gender inequality is discussed through A K Ramanujam and his poetry*	*The structure of sentence in English and the distorsion of the sentence isverified*	*Autobiography and biography differences are explained*	*To ask the students to bringnewspaper to class and makethem select a column and readitloudly.*	*To give all the parts of speech not according to the grammar book order but according to a method which would easily make one understand correlation of one with the other. For instance – Noun, Pronoun, Adjective, Verb, Adverb… will have to be the order*
	SLO-2	*Different legal situations where both the genders suffer is explained in the class*	*Diffèrent sentences are given and tested*	*Certain Classic autobiographies and biographies are presented*	*No meaningis to beexplained. Just the flow is to bechecked.*	*The students are made to use as many adjectives as possible for describing their friends*
S-5	**SLO-1**	*Kalki the poetisinvited to conduct a guets lecture on herownpoem.*	*Nobel? What Nobel, asks MrMathrubootham is discussed*	*How to give voice to an inanimate object.*	*Another reading loud session of the same passages are to be conducted along with dictionary checking for meanings are to be done.*	*The parts of speech must beused in different sentences*
	SLO-2	*Questions on her perspectives are to be posed by the students*	*The attitudes of people in a ludicrous manner is discussed*	*Different objects are given to the students and they are asked to give autobiographical notes to them*	*The new meanings that the students get must be compared with the given word and the distance between the meanings are to be explained*	*the teacherought to use the board to draw a situation to make one understandeachpart's usage.*
S-6	**SLO-1**	*Seminar to generate discussion to enhance gender sensitivity is conducted*	*The Text is analyzed in detail*	*Practically test the students in class by giving them different concrete objects.*	*To make them compare and realize how they had overcome their fear for English*	*Along with parts of speech particularly when Verb is being taught Tenses ought to be taught with same methodology mentioned above.*
	SLO-2	*Case studies are to be incorporated by the students in their seminar*	*More insights into Indian English is given*	*Ask the students to evaluate each other's autobiography on concrete objects*	*The comprehensive techniques are taught*	*The students are asked to create a lighter vein situation and asked to use all the tenses*

S-7	**SLO-1**	Human interest columns in news papers - tragedies on women men and transgender documented is read aloud and discussed in the class room.	Neutral accent is taught along with right pronunciation	Caption writing is taught	To develop the ability to pick up a conversation istaugh	The rules of Tenses are taught with live examples in the classes.
	SLO-2	. how much are the students able to relate with or able to feel emotionally for those situations is to be checked and analysed	Test is to be conducted to check how far a student is able to understand neutral accent	The purpose of the caption writing is to be instilled	to engage in conversations and be able to interupt and end conversation appropriatelywilllbetaught	Ability to use all the rules in tenses is taught.
S-8	**SLO-1**	Case studies to be given to the students to document their reactions	Mr Mathruboothamisfullysupporting all new technologies – discussion	Different examples for captions are given	Different situations to be given to the students to engage in a conversation.	The basic way to pick an error is by already knowing the rules of grammar thoroughly.
	SLO-2	Find out if there is any student finding it hard to emote or is insensitive toward the moment	Humor and sarcasmisskimmedfrom the text	The studenst are asked to create captions similar to the ones shown in the class	The students are asked to find errors in each others' monologue	Hence all the rules are to be brushed up
S-9	**SLO-1**	Students are to made to createtheirownenactable content on the prevailinggenderinequalities	How to write a statement and question is to be taught with reference to the text.	The students are made to give captions different news articles, products and situations	To test how much one is able to use ironyhumor and sarcasm in one's conversation	Excercises on all sorts of possible errors are given to the students and asked to rectify.
	SLO-2	The students are asked to improvise on dialogue on theirown	The way sentences are constructed according to the regional impact is discussed	The best is appreciated for its qualities of being best	Natural usage of punisexplained	Mathrabootham's passages are given to the studentsagain to check the errors.
S-10	**SLO-1**	Feminism vs Gender inequality a test for the students to chart out the existing gulf	Pizza maavu : Welcome to Mr Mathruboothamfoodrecipiewebsiteisdiscussed	Public Speakingexamplessince Julius Caesar to Martin Luther isgiven	To teachdifferentkinds of reading. -skimming scanning and intensive reading extensive reading is taught	Definesynonym and antonym. Ask the sudents to identifysynonyms and antonyms in text.
	SLO-2	False allegations and Legal situations sometimes created by women to corner men only degrades the freedom struggle of women – discuss	The students are made to explain the textthemselves	The techniques used by different leaders sinceagesisdiscussed	Teh students are practicallyasked to use thosemethodology to understand a text	Demonstartetheriunderstanding of synonyms and antonyms in active learning. Introduce thesaurus reference.

S-11	**SLO-1**	*A detailed discussion on the 4 poets is done in the class through comparative method*	*Identify the errors and make students to rewrite first two texts*	*The Ted X talks are played in the class, different political leader's canvasing is presented*	*The students are made to read the passages loudly*	*Demeonstrateunderstanding of words by relatingthem to their opposites (antonyms)*
	SLO-2	*While comparison the students are able to get a deeper analytical way of thinking and are able to present an all encompassed points*	*Check if they are able to retain the humor in the text after correcting the sentences*	*What makes a talk impressive is identified and discussed*	*The students are asked questions from the passages to check their retention capacity*	*Demonstrateunderstanding of wordswithsimilar but not identicalmeanings (synonyms)*
S-12	**SLO-1**	*The comprehension and retention and application of all the acquired knowledge of the student is checked by initiating an informal discussion in the class.*	*Identify the errors and make the students to rewrite the last two texts*	*The students are givendifferent topics to give impromptu*	*The learner is made to select phrases and words from the given passages and is asked to use it in own sentences*	*With the studentsbrainstormshortlist of commonlyusedwords*
	SLO-2	*The overall development in the student's EQ pertaining to gender oriented issues will be sensible and objective.*	*Check if they are able to retain the humor in the text after correcting the sentences. Explain the result to them*	*The best talk isrecorded and made available for other'srefferences*	*The ability to converse with humor sarcasm or deep thoughts and with the capacity to emote the desired emotion in the other is checked*	*Askthem to rapidlygivesynonyms and antonyms to thosewords*

Learning Resources	*Theory:* 1.Horizon- English Text Book – Compiled and Edited by the Faculty of English Department, FSH, SRMIST, 2020 2.English Gramar in Use by Raymond Murphy

Learning Assessment

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

Level 3	Analyze										
	Evaluate	40%	-	40%	-	40%	-	40%	-	40%	-
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
	1. Prof. Daniel David, Prof & Head, Department of English, MCC, Chennai	*1. Dr. Shanthichitra, Associate Professor, & Head, Department of English, FSH,SRMIST*
		2. Dr K B Geetha, Assistant Professor, Department of English, FSH, SRMIST

Course Code	USA20101J	Course Name	**PROGRAMMING FOR PROBLEM SOLVING**	Course Category	**C**	**Professional core**	L	T	P	C
							4	0	4	6

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

		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Think and evolve logically																			
CLR-2 :	Write application code for specific purpose																			
CLR-3 :	Understand the effectiveness of programming																			
CLR-4 :	Customizing functions and procedures to encourage reusability																			
CLR-5 :	Establish interaction between stored files and the application code																			
CLR-6 :	Solve mathematical, scientific and engineering problems with reduced complexity																			
Course Learning Outcomes (CLO):	**At the end of this course, learners will be able to:**	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO – 3
CLO-1 :	Apply the features of programming language	2	85	80		L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-2 :	Choose operators, control structures to solve the problem optimally	3	85	80		L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-3 :	Analyze the problem thoroughly and choose the prebuilt functions/ customize functions to solve the problem	3	85	80		L	H	H	H	H	-	-	M	M	L	-	H	-	-	-

			3	85	80															
CLO-4 :	Able to use dynamic memory allocation concepts for problems that demand		3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-5 :	Defend the need for files storage and the access privilege modes		3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-6 :	Talk on the data flow		3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Evolution of Programming Languages	Relational and logical Operators	Understanding contiguous memory allocation	Formal and Actual Parameters	File Types: text and binary
	SLO-2	Problem solving through programming	Character and Numbers: Manipulation	Array : Advantages and Limitations	Functions: Returning values	File operations:basics
S-2	SLO-1	Writing algorithms/pseudo codes	Expressions with pre / post increment operator	String Basics	Advantages of using Functions	File permissions and access privileges
	SLO-2	Drawing flowcharts	Expression with conditional and assignment operators	String Declaration and Initialization	Passing Array to Function	Changing permissions
S-3	SLO-1	Evolution of C language	Ternary operator	Understanding String Functions: gets(), puts(), getchar(), putchar(), printf()	Call by Value	Writing contents to file
	SLO-2	Program structure	L value and Rvalue in expression	String Functions: atoi, strlen, strcat, strcmp	Call by Reference (An introduction on pointers shall be effective)	Reading file contents
S-4	SLO-1	Need for file header files	Operator precedence	String Functions: sprint, sscanf, strrev, strcpy, strstr, strtok	Nested functions	Appending an existing file
	SLO-2	Need for linkers and loaders	Type conversion	Need for tokenization	Functions: advantages and limitations	Difference: Append and write
S 5-8	SLO-1	Laboratory 1: Algorithm, Flow Chart, Pseudo code	Laboratory 4: Operators and Expressions	Laboratory 7: Arrays : Multi dimensional	Laboratory 10: Functions	Laboratory 13: File: reading and writing
	SLO-2					
S-9	SLO-1	Input and output statements: scanf, printf	Control Statements : sequential, branching, looping and jump	Need for user-defined data types	Pointers and address operator	fscanf(),fprintf()
	SLO-2	Variables and identifiers	If, if ..else, else if ladder	Stuctures	sizeof Pointer Variable and Pointer Operator	fseek(),ftell()
S-10	SLO-1	Expressions	nested if, switch case	Unions	Pointer Declaration and dereferencing pointers	fputc(),fgetc()
	SLO-2	Single line and multiline comments	for loop	Accessing members of the structure	void Pointers and sizeof void Pointers	fputs(),fgets()
S-11	SLO-1	Constants, Keywords	while loop	Structure and arrays	Function and call by reference	fputw(),fgetw()

	SLO-2	Literals	do while	Accessing members of the structure	Functions and Returning array(use of pointers)	End_of_file in file handling
S-12	SLO-1	Scope and lifetime of variables	goto, break, continue, exit: Jump statements	Structure and arrays	Structures and pointers :dynamic creation of data structures(list)	feof(), remove()
	SLO-2	Storage clauses	Understanding jump statements with branch and iterative statements	Nested structures	Incrementing Pointers	ferror()
S 13-16	SLO-1	Laboratory 2: Input and Output Statements	Laboratory 5: Control Statements	Laboratory 8: Strings, structures and union	Laboratory 11: Pointers	Laboratory 14: File Handling fputw(),fgetw(),remove();
	SLO-2					
S-17	SLO-1	Data types classification:Basic,derived,user-defined	Array Basic	Functions declaration and definition	Constant Pointers	Processor Directives
	SLO-2	Numeric Data types: int, float, long, double	Array Declaration, Initialization	Prebuilt and user defined functions	Pointers and strings	include
S-18	SLO-1	Non-Numeric Data types: char and string	Types	Function prototypes	Function Pointers	Predefined macros and macros
	SLO-2	Arithmetic operators	Manipulating one dimensional arrays with indices	Defining and calling functions	Array of Function Pointers	
S-19	SLO-1	Increment and decrement operator	Methods: sort, append, reverse, traverse	Multiple functions	Null Pointers	conditional compilation
	SLO-2	Bitwise and sizeof operator	Manipulating two dimensional arrays with indices	Recursion , recursive Functions	Using sizeof(),malloc,calloc()	#pragma
S-20	SLO-1	Using Boolean	Problems: matrix manipulations	Scope of variables across functions	File Handling	Creating include and macros
	SLO-2	Comma, Arrow and Assignmentoperator	Manipulating more than two dimensions in arrays	Sharing Global variables	Open(),close()	
S 21-24	SLO-1	Laboratory 3: Data Types	Laboratory 6: Arrays – One Dimensional	Laboratory 9: Functions	Laboratory 12: Pointers	Laboratory 15: Creating Macros
	SLO-2					

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

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

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

.,**Course Designers**		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1.Mrs. S. Usha, SRMIST
		2.Dr. P.J.Arul Leena Rose
		3. Dr.J.Padmavathi

Courrse Code	USA20102J	Course Name	**DIGITAL LOGIC FUNDAMENTALS**	Course Category	**C**	**Professional Core**	L	T	P	C
							4	0	2	5

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
CLR-1 :	To learn the concepts of basics of Digital Logics	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To impart in-depth knowledge of Logic Gates																		
CLR-3 :	Understand the principles of Boolean algebra																		
CLR-4 :	Basic knowledge of Combinational circuits and it applications																		
CLR-5 :	Basic knowledge of sequential circuits and it applications																		
CLR-6 :	Design principles of counters																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO – 1	PSO – 2	PSO – 3
CLO-1 :	Have a thorough Understanding of Fundamentals of Digital Logic and IT Fundamentals	3	80	70	H	H	M	-	-	-	-	-	H	H	-	-	M	H	H
CLO-2 :	Understand the concepts of logic gates and its uses	3	85	75	H	H	H	H	H	-	M	-	H	H	-	-	M	H	H
CLO-3 :	Real time applications of Boolean algebra	3	75	70	H	H	M	H	H	-	M	-	H	H	-	-	M	H	H
CLO-4 :	Design and implementation knowledge of Combinational circuits	3	85	80	H	H	H	-	-	-	-	-	H	M	-	-	M	H	H
CLO-5 :	Design and implementation knowledge of sequential circuits	3	85	75	H	M	M	M	M	M	M	-	H	H	-	M	M	H	H
CLO-6 :	Real time application of Counters	3	80	70	H	H	M	-	-	-	-	-	H	H	-	-	M	H	H

Duration (Hour)		18	18	18	18	18
S-1	SLO-1	Number System and its types	Minterms and Maxterms	Combinational Logic - Introduction	Sequential Circuit - Introduction	Counters - Introduction
	SLO-2	Base conversions	Sum of Products	Designing of a Logic Circuit Diagram	Latches	A Basic Design Counter
S-2	SLO-1	Binary codes and its types	Product of Sums methods	Adders : Quarter, Half and Full Adders	Flip Flops - Introduction	Classification of Counters
	SLO-2	Code conversions	Conversions of SOP to POS	Subtractors:Half, Full Subtractors	RS Flip Flop	Asynchronous Counters
S-3	SLO-1	Basics of Logic Gates and Derived Gates	Simplifying Boolean Expressions using theorems	Design of Adder Circuits	JK Flip Flop	Synchronous Counters
	SLO-2					
S-4	SLO-1	Truth Tables	Derivation of a Boolean Functions	Design of Subtractor Circuits	D Flip Flop	SynVsAsyn Counters
	SLO-2					
S 5-6	SLO-1	Laboratory1 : Verification of Basic Gates and Derived	Laboratory 4: Verifications of Distributive Law	Laboratory 7: Half Adder and Full Adder	Laboratory 10: Implementation of DeMultiplexer	Laboratory 13: Ring Counters
	SLO-2					

S-7	SLO-1	Gates				
S-7	SLO-1	Universality of NAND Gate	Karnaugh Map - Introduction and its uses	Multiplexer	T - Flip Flop	Ripple Counters
	SLO-2	Universality of NOR Gate	Types of K-Map	Implementation of a Boolean expression using a Multiplexer	Edge Triggered	MOD Counters
S-8	SLO-1	Duality of Logic Gate Representation	Rules for constructing K-Map	De Multiplexer	Master Slave Flip Flop	UP DOWN Counters
	SLO-2					
S-9	SLO-1	Boolean Algebra - Introduction	Two and Three Variable K-Map	Encoder	Registers Architecture	Ring Counter
	SLO-2					
S-10	SLO-1	Logical Operations AND OR NOT	Four Variable K-Map	Decoder	Shift Registers	Shift Counters
	SLO-2					
S 11-12	SLO-1	Laboratory2:NAND as Universal Gate NOR as Universal Gate	Laboratory 5-Simplifying Boolean Expressions using theorems	Laboratory 8:Half Subtractor and Full Subtractor	Laboratory 11: Implementation of Shift Registers and Serial Transfer	Laboratory 14: Implementation of DOWN Counter
	SLO-2					
S-13	SLO-1	Evaluating Logic Circuits	Don't Care conditions	Parity Generator	Four-bit Serial in Serial Out Shift register	Memory - Introduction
	SLO-2	Implementing Circuits from Boolean Expressions	Determination Prime Implicant Method	Parity Checker	Shift Registers Operations	Basic terms and ideas
S-14	SLO-1	Boolean Functions	Boolean Arithmetic - Introduction	Checksum	Serial-to-Parallel Shift Register	Magnetic Memories
	SLO-2	Duality Principle, Complements	Binary Addition	Code Conversions	Design of Serial to Parallel	Memory Addressing
S-15	SLO-1	Laws and Theorems	Binary Subtractions	Programmable Array Logic	Parallel-to-Serial Shift Register	Types of ROM
	SLO-2					
S-16	SLO-1	Laws of Intersection, Union, Absorption, Involution, Demargan's Theorems	Various Representation of Binary Numbers	Programmable Logic Array	Design of Parallel to serial	Types of RAM
	SLO-2					
S 17-18	SLO-1	Laboratory 3:Laws of Boolean Expressions	Laboratory 6: Implementation fo Binary Addition and Subtraction	Laboratory 9: Implementation of Multiplexer	Laboratory 12: Four Bit Binary Shift Counters	Laboratory 15: Implementation of DOWN Counter
	SLO-2					

Learning Resources	1.AnanthiSheshasaayee, J.G. Sheshasaayee,(2005),"Digital Logic Fundamentals", Margham Publications 2.Vijayendran. V, (2003), "Digital Fundamentals", S.V. Publishers	3.Leach.D.P and Malvino.A.P, (2002), "Digital Principles and Applications", 5th Edition, TM. 4.MorisMano.M,(2001),"Digital Logic and Computer Design", 4th Edition

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1. Mr.M.Ramesh
		2.Mrs.P.Yogalakshmi
		3.Mr.V.Raja

Course Code	UMS20G01T	Course Name	DISCRETE MATHEMATICAL STRUCTURES	Course Category	G	Generic Elective Course	L	T	P	C
							3	1	0	4

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

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

		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	To provide a strong foundations in discrete mathematics																		
CLR-2 :	To apply mathematical techniques for solving real life problems																		
CLR-3 :	Apply Boolean algebra, truth table, logic gates, in computer science and communication.																		
CLR-4 :	To enable the use of logical, graphical and algebraic techniques wherever relevant.																		
CLR-5 :	Understanding of computer science through the applications of Discrete Mathematics																		
CLR-6 :	To provide a strong foundations in discrete mathematics																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO – 1	PSO - 2	PSO – 3
CLO-1 :	Problem solving in sets and relations. Gaining knowledge, solving the simple problems using elementary concepts.	3	85	80	M	M	L	M	L	-	-	-	L	M	H	M	-	-	-
CLO-2 :	Understand the concepts of Graphs terminology Sub graphs, Acyclic, Euler path, Hamiltonian Path	3	80	75	M	M	M	M	M	-	-	-	M	M	H	M	-	-	-
CLO-3 :	Logical knowledge through the Statements, connectives, arguments, validity of arguments and Normal forms using truth tables	3	85	80	H	H	M	H	M	-	-	-	M	M	H	H	-	-	-
CLO-4 :	Gain the knowledge about Trees , Labeled Trees, Binary trees ,Rooted Trees , Spanning Trees Minimal Spanning Trees	3	85	80	M	H	M	H	M	-	-	-	M	M	H	H	-	-	-
CLO-5 :	Apply the concepts of Boolean Algebra in real world problems related to Computer Science	3	85	80	M	M	M	M	M	-	-	-	M	M	H	M	-	-	-
CLO-6 :	Gaining knowledge in Boolean arithmetic to solve problems using logic gates	3	75	80	M	M	M	M	M	-	-	-	M	M	H	M	-	-	-

Duration (hour)		Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
		12	12	12	12	12
S-1	SLO-1	Introduction to Sets – simple examples.	Logic	Graphs and Their Representation-	Trees	Sets concepts
	SLO-2	Properties of sets Types of sets	Basic explanation	Basic Graph terminology	Basic Definitions	Partition of a set
S-2	SLO-1	Venn diagram.	Statements- simple compound	Simple Problems	Basic properties of Trees	Relation concepts
	SLO-2	Problems using Venn diagrams	Symbolic representation	Drawings of Graphs	properties of Trees	matrix representation of relation
S-3	SLO-1	Relation definitions	Connectives explanation .	Special Families of Graphs	Labeled Trees	Simple problems
	SLO-2	Problems on Relations	conjunction, disjunction, negation	Simple Problems	Labeled Trees	Hasse diagrams for partial
S 4	SLO-1	Types of relation	Simple problems	Incidence graphs	Problems based on the concepts	More problems using Hasse diagrams
	SLO-2	Problems on relations	Problems using Truth Tables	Simple Problems	Undirected Trees	Lattices as posets
S-5	SLO-1	Equivalence relation-basic explanation	Tautology, contradiction	Adjacency Matrices	Simple Problems	Lattices as posets
	SLO-2	Simple problems	Problems using Truth tables	Problems using Adjacency Matrices	Binary trees	Definition of Lattices-
S 6	SLO-1	Reflexive basic explanation	logical equivalence,	vertex Degrees matrices	Rooted Trees and Branches	Properties of Lattices
	SLO-2	Simple problems	Simple truth table problems	Isomorphism of Graphs	Rooted Trees and Branches	Introduction to Boolean Algebra- basic definitions.
S-7	SLO-1	Symmetric, Transitive basic explanation	Tautological implications	Simple Problems	Spanning Trees	Axiomatic definition of boolean Algebra, logic gates.
	SLO-2	Simple problems	Simple problems	Sub graphs	Simple problems	Postulates of Boolean algebra.
S -8	SLO-1	Function	Arguments- validity of arguments	Acyclic Graphs	Spanning Trees	Postulates of Boolean algebra.
	SLO-2	Comparison of Relation and functions	Simple problems	Simple Problems	Simple problems	Problems using the postulates of Boolean Algebra
S -9	SLO-1	Types of functions	Normal forms	Digraphs	Minimal Spanning Trees	Problems using the basic concepts

	SLO-2	Simple problems	Minterms and maxterms	Problems using Digraphs	Simple Problems	Properties of Boolean algebra
S-10	SLO-1	One- one, injective, surjective, one to many, many to one functions with example	Maxterms with examples	Euler path and circuits	Problems based on Minimal Spanning Trees	Simple Boolean algebra problems
	SLO-2	Simple problems	Problems using Truth tables	Eulerian cycles	Kruskal's Algorithm	Expression of a Boolean function By Truth table method.
S-11	SLO-1	composite of two functions	Principal disjunctive normal form	Euler path and Circuits	Rooted Tree	Boolean function in canonical form by Truth table method.
	SLO-2	Simple problems	Problems using Truth tables	Hamiltonian Path and Circuits.	binary Tree and Simple Problems	DNF by Truth table method
S-12	SLO-1	composite of three functions	Principal conjunctive normal form	Problems using Hamiltonian Path	Expression of Trees	CNF by Truth table method
	SLO-2	Simple problems	Problems using Truth tables	Simple Problems	Simple Problems	Simple problems

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

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

Level 3	Evaluate	30%		30%		30%		30%		30%	
	Create										
	Total	100 %		100 %		100 %		100 %		100%	

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

Course Designers		
Experts from Academic		**Internal Experts**
1.Dr.M.A.Baskar, Professor & Head, Dept. Of Mathematics, Loyola college, Chennai		1. L.Sivakami, SRMIST
2. Dr.P.Dhanavanthan, Professor & Head, Dept. Of statistics, Pondicherry University		2. S.Suruthi, SRMIST

Course Code	**UCS20S01J**	Course Name	**ADVANCED EXCEL**	Course Category	**S**	**Skill Enhancement**	L	T	P	C
							1	0	1	2

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

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

		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Categorize data in an easy-to-navigate manner																		
CLR-2 :	Do basic and complex mathematical functions																		
CLR-3 :	Turn lots of data into helpful graphics and charts.																		
CLR-4 :	Analyze data and make forecasting predictions																		
CLR-5 :	Create, build, and edit pixilated images																		
CLR-6 :	easily create dashboards, reports, interfaces, charts and formatted data																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO – 1	PSO – 2	PSO – 3
CLO-1 :	Construct formulas, including the use of built-in functions, and relative and absolute references.	2	85	80	H	M	M	M	-	-	-	-	M	-	-	-	H	H	H

CLO-2 :	Enter and edit data.				3	85	80		H	M	M	M	-	-	-	-	M	-	-	-	H	H	H
CLO-3 :	Indicate the names and functions of the Excel interface components.				3	85	80		H	H	H	H	-	-	-	-	M	-	-	-	H	H	H
CLO-4 :	Create and modify charts				3	85	80		H	H	H	H	-	-	-	-	M	-	-	-	H	H	H
CLO-5 :	Preview and print worksheets.				3	85	80		H	M	M	M	-	-	-	-	M	-	-	-	H	H	H
CLO-6 :	Use the Excel online Help feature.				3	85	80		H	M	M	M	-	-	-	-	M	-	-	-	H	H	H

Duration (Hour)		6	6	6	6	6
S-1	SLO-1	Laboratory 1: Working with formulas and functions	Laboratory 2 :IF function Nested IF, IF with AND OR NOT	Laboratory 3:Look Up Functions V-Lookup	Laboratory 4:Data Validation Methods of data validation	Laboratory 5:Protecting a worksheet by Password
	SLO-2				Setting data validation rules	Protecting part of a worksheet
S-2	SLO-1	Laboratory 6: Sorting a database	Laboratory7:Filtering a database Auto Filter	Laboratory 8:Subtotals: Display Subtotal at a single level	Laboratory 9:Pivot table: Format a Pivot table Report	Laboratory10:Create a graph using Pivot data
	SLO-2	Simple Sort Multilevel sort	Number, Text or Date Filter	Displaying nested subtotals	Top/Bottom Report	Slicer
S-3	SLO-1	Laboratory 11:Conditional formatting Using Cells	Laboratory 12:What if Analysis tools:	Laboratory 13: Links between different Worksheets	Laboratory 14:Creating Hyperlinks	Laboratory 15:Working with charts: Creating charts using chart tools
	SLO-2					
S-4	SLO-1	Laboratory 16 :Merging Workgroups	Laboratory 17 :Tracking changes	Laboratory 18:Formatting charts	Laboratory 19 :Charts for My data	Laboratory 20:Chart Templates
	SLO-2					
S-5	SLO-1	Laboratory 21::Adding titles and values in charts	Laboratory 22::Spark lines	Laboratory 23: Customize Spark lines	Laboratory24 :Change the style of Spark lines	Laboratory 25:Creating a Macro
	SLO-2					
S-6	SLO-1	Laboratory 26:Recording a macro	Laboratory27:Running a macro using menu command	Laboratory 28:Writing a macro	Laboratory 29: Assigning a macro to a button	Laboratory 30:Functions Description
	SLO-2					

Learning Resources	1.Ritu Arora, (2018), "Advance Excel" Training Guide, BPB Publications

Learning Assessment

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1.Mrs.S.Parimala
		2.Dr.S.P. Angelin Claret
		3.Dr.A.Meenakshi

Course Code	*UCD20S01L*	Course Name	Soft Skills	Course Category	*S*	*Skill Enhancement Course*	L	T	P	C
							0	0	2	1

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
CLR-1 :	Expose students to right attitudinal and behavioral aspects and to build the same through activities	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Develop and nurture interpersonal skills of the students through individual and group activities.																		
CLR-3 :	Increase efficiency and leadership skills and to improve team results.																		
CLR-4 :	Acquire time management skills and develop creative skills																		
CLR-5 :	Understand intercultural communication and etiquettes required in a professional environment																		
CLR-6 :	Instill confidence in students and develop skills necessary to face the challenges of competitive exams and placements																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	Re-engineer their attitude and understand its influence on behavior	3	80	70	M	M	M	-	M	H	M	-	-	H	H	H	M	H	H
CLO-2 :	Acquire inter personal skills and be an effective goal oriented team player	3	80	70	M	M	M	-	M	H	M	-	-	H	H	H	M	H	H
CLO-3 :	Understand the importance of time management and creativity	3	85	75	M	M	M	-	M	H	M	-	-	H	H	H	M	H	H
CLO-4 :	Build confidence during any presentation	3	85	75	M	M	M	-	M	H	M	-	-	H	H	H	M	H	H
CLO-5 :	Develop interpretation skills and intercultural communication	3	85	75	M	M	M	-	M	H	M	-	-	H	H	H	M	H	H
CLO-6 :	Help the students succeed in competitive exams and placements	3	80	70	M	M	M	-	M	H	M	-	-	H	H	H	M	H	H

Duration (hour)		6	6	6	6	6
S-1	SLO-1	IKIGAI	Interpersonal Skills	Creating brands – activity (posters, flyers, business cards)	Value of Time	Intercultural communication – beliefs, customs and attitude of people in different countries (US, UK, Japan, West Asia, China, Russia)
	SLO-2	IKIGAI	Emotional Intelligence	Creating brands – activity (posters, flyers, business cards)	Diagnosing Time Management	Social and cultural etiquettes
S-2	SLO-1	Attitude	Importance of Team Work	Causes of Stress and Its Impact	Weekly Planner, To do list, Prioritizing work	Communication etiquettes
	SLO-2	Factors influencing Attitude	Team Building Activity	How to Manage Stress and Distress?	Time management activity	Telephone etiquettes
S-3	SLO-1	SWOT Analysis	Leadership skills	Understanding the Circle of Control	Creativity – think out of the box	Dinning etiquettes

	SLO-2	*Individual SWOT Analysis - activity*	*Leadership skills based Activity*	*Stress Busters*	*Creativity Activity*	*Grooming etiquettes*
S-4	SLO-1	*Extempore Practice Session*	*Networking skills*	*Conflicts in Human Relations – reasons*	*Creativity Assessment Activity*	*Ice breaking*
	SLO-2	*Extempore Practice Session*	*Networking skills based Activity*	*Approaches to conflict resolution*	*Creativity Assessment Activity*	*Designing ice breaker games*
S-5	SLO-1	*Extempore Practice Session*	*Negotiation skills*	*Conflict resolution – case studies*	*Brainstorming, use of groups and individual brainstorming techniques to promote idea generation*	*Ice breaker activity*
	SLO-2	*Extempore Practice Session*	*Negotiation skills based Activity*	*Conflict resolution – case studies*	*Brainstorming session activities*	*Ice breaker activity*
S-6	SLO-1	*Extempore Practice Session*	*Entrepreneurial Skills*	*Importance and necessity of Decision Making*	*Brainstorming session*	*Introduction to resume building*
	SLO-2	*Extempore Practice Session*	*Entrepreneurial knowledge, Focus, Investment, Risk tolerance, Resilience, Negotiation, Ethics, Networking*	*Process of Decision Making, Practical Way of Decision Making, Weighing Positives and Negatives*	*Brainstorming session*	*Introduction to resume building*

Learning Resources	*1.Jeff Butterfield, Soft Skills for Everyone, CENGAGE, India, 2015* *2.Dr. K. Alex, Soft Skills, S.Chand Publishing & Company, India, 2014* *3.Covey Sean, Seven habits of highly effective teens, Simon & Schuster, New York, 2014*	*4. Carnegie Dale, How to win friends and influence people, Simon and Schuster, New York, 2016* *5. Thomas A Harris, I am ok, you are ok, Arrow, London, 2012* *6. Daniel Coleman , Emotional Intelligence , Bloomsbury, India, 2016*

Learning Assessment

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

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
1. Ajay Zener, Director, Career Launcher	-	1. Mr Priyanand, Assistant Professor, CDC, E&T, SRMIST
		2. Ms Sindhu Thomas, Head in charge, CDC, FSH, SRMIST
		3. Ms Mahalakshmi, Assistant Professor, CDC, FSH, SRMIST

Course Code	ULT20G02J	Course Name	Tamil-II		Course Category	G	Generic Elective Course	L	T	P	C
								2	0	2	3

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

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

		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	To generate in students a sensitivity to gender marginalization and Eco sensitivity.																			
CLR-2 :	An evolved consciousness in the minds to accommodate all is developed																			
CLR-3 :	The ability to accept all and to co- exist is initiated																			
CLR-4 :	To create community connectivity and interdependence is initiated					Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	PSO -1	PSO -2	PSO-3
CLR-5 :	To instill language skills																			
CLR-6 :	To give them all the historical insights																			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																			
CLO-1 :	To acquire knowledge about Tamil Language	2	75	60		H	H	H	-	-	H	H	H	H	H	H	H	H	H	H
CLO-2 :	To strengthen the knowledge on concept, culture, civilization and translation of Tamil	2	80	70		-	H	-	H	H	H	H	-	-	H	H	H	H	H	H
CLO-3 :	To develop content using the features in Tamil language	2	70	65		H	-	-	H	-	H	H	H	-	H	H	H	H	H	H
CLO-4 :	To use Tamil Language and Literature to enhance their creativity	2	70	70		H	-	H	M	H	-	-	-	H	H	H	H	H	H	H
CLO-5 :	To improve communication and creative expression in Tamil language	2	80	70		-	H	-	H	-	H	H	-	-	H	H	H	H	H	H
CLO-6 :	To enable the students to speak and write in chaste Tamil	2	75	70		H	H	H	H-	H	H	H	H	H	H	H	H	H	H	H

Duration (hour)		12	12	12	12	12
S-1	SLO-1	தமிழில் காலந்தோறும் அகமரபு	களப்பிரர் காலம்	பல்லவர் காலம்	சங்ககால வரலாறு	தமிழ்ச் சிறுகதைப் போக்குகள்
	SLO-2	அக இலக்கியப் போக்குகள்	அறமும் வாழ்வியலும்	பல்லவர் கால இலக்கியம்	சங்ககால மக்களின் வாழ்வியல்	தமிழ்ச் சிறுகதையும் தமிழ்ச் சமூக வாழ்வியலும்
S-2	SLO-1	எட்டுத்தொகை	திருக்குறள்	-பக்தியும் தமிழும்	முச்சங்கம் – அறிமுகம்	புதுமைப்பித்தன் -

S	SLO					
		நூல்களும் பெயர்களும்	உலகப்பொதுமறை			அகல்யை
	SLO-2	எட்டுத்தொகையில் அக நூல்கள்	திருக்குறள் கட்டமைப்பு	பக்தி இலக்கியங்கள்	முச்சங்க வரலாறு	தொன்மம் – கட்டுடைப்பு
S-3	SLO-1	ஐங்குறுநூறு (203)	தமிழில் வினை	சைவ சமய இலக்கியங்கள்	செம்மொழி இலக்கியங்கள்	அகிலன் - ஒருவேளைச் சோறு
	SLO-2	தலைவனின் நாட்டுப் பெருமை	திருக்குறள் வினைத்திட்பம் (67)	தேவார மூவர்	பாட்டும் தொகையும்	தொழிற்புரட்சியும் விவசாயமும்
S-4	SLO-1	குறுந்தொகை (130)	உழவும் தமிழர் வாழ்வும்	தேவாரம் – திருஞான சம்பந்தர் பாடல்	எட்டுத்தொகை உருவாக்கப் பின்புலம்	ஆண்டாள் பிரியதர்ஷினி – மாத்திரை
	SLO-2	அகவாழ்வில் நம்பிக்கை வேர்கள்	திருக்குறள் - உழவு (104)	தேவாரம் – திருநாவுக்கரசர் பாடல்	எட்டுத்தொகையும் தமிழர் வாழ்வியலும்	குடும்பம் – கட்டமைப்பு
S-5	SLO-1	பண்டைத் தமிழரின் வாழ்வியல்	சமண சமய இலக்கியங்கள்	திருவாசகம் அறிமுகம்	பத்துப்பாட்டு உருவாக்கப் பின்புலம்	பாரததேவி - மாப்பிள்ளை விருந்து
	SLO-2	பண்டைத் தமிழர் உணர்வியல்	நாலடியார்	மாணிக்கவாசகர் பாடல்	பத்துப்பாட்டும் தமிழர் வாழ்வியலும்	எளிய மனிதர்களின் கதை
S-6	SLO-1	அகநானூறு (44)	இலக்கியங்களில் நட்பு	வைணவ சமய வளர்ச்சிப் போக்கு	பதினென் கீழ்க்கணக்கு நூல்கள்	சிங்கார வடிவேலு – தவிப்பு
	SLO-2	புறவாழ்வோடு கூடிய அகம்	நட்பில் பிழை பொறுத்தல் (221)	வைணவ சமய இலக்கியங்கள்	பதினென் கீழ்க்கணக்கும் தமிழர் அற மரபும்	புறக்கணிப்பின் வலி
S-7	SLO-1	கற்றறிந்தார் ஏத்தும் கலி	தமிழர் மருத்துவம்	நாலாயிரத் திவ்யப் பிரபந்தம்	நீதி இலக்கியங்கள்	செய்தி அறிக்கை அறிமுகம்
	SLO-2	கலித்தொகை கட்டமைப்பு	நீதி இலக்கியத்தில் மருத்துவ நூல்கள்	பெரியாழ்வார் பாடல்	நீதி இலக்கியங்களின் பன்முகத் தன்மைகள்	செய்தி அறிக்கை தயாரித்தல்
S-8	SLO-1	கலித்தொகை (149)	திரிகடுகம்	ஆண்டாள் பாடல்	காப்பிய இலக்கணம்	விமர்சனம்
	SLO-2	வாழ்வியல் அறமும் அகமும்	செங்கோல் அரசு	தொண்டரடிப்பொடி ஆழ்வார் பாடல்	காப்பியப் போக்குகள்	இலக்கியம், கலை விமர்சனம்
S-9	SLO-1	தமிழர் புறமரபு	இனியவை நாற்பது அறிமுகம்	தமிழில் இஸ்லாமிய இலக்கியங்கள்	ஐம்பெருங்காப்பியங்கள்	நேர்காணல் அறிமுகம்
	SLO-2	புற இலக்கியங்கள்	இனியவை நாற்பதின் தனித்தன்மைகள்	இஸ்லாமிய இலக்கியங்களின் கொடை	ஐம்பெருங்காப்பியங்களின் சிறப்புகள்	நேர்காணல் – நுட்பங்கள்
S-10	SLO-1	புறநானூறு (235)	இனியவை நாற்பது (14)	சீறாப்புராணம்	தமிழ்ச் சமூகமும் சமயத் தத்துவங்களும்	நேர்காணல் கேள்வி தயாரிப்பு
	SLO-2	கையறுநிலை	இனிமையும் அழகும்	மானுக்குப் பிணைநின்ற படலம் (5 பாடல்கள்)	சமயத் தத்துவங்களும் வாழ்வியல் விழுமியங்களும்	நேர்காணல் பதிவும் எழுது முறையும்
S-11	SLO-1	ஆற்றுப்படை அறிமுகம்	பண்டைக்காலப் போரும் வாழ்வும்	கிறித்தவ சமய இலக்கியங்கள்	பன்னிரு திருமுறை அறிமுகம்	பேச்சுக்கலை அறிமுகம்
	SLO-2	ஆற்றுப்படை மரபுகள்	போர் இலக்கியங்கள்	கிறித்தவ	பன்னிரு திருமுறை	தமிழரின் பேச்சுக்கலை

					இலக்கியங்களின் கொடை	வரலாறு	
S-12	SLO-1	சிறுபாணாற்றுப்படை	களவழி நாற்பது (14)	ஆதிநந்தாவனப் பிரளயம்	நாலாயிரத் திவ்யப் பிரபந்தம் – அறிமுகம்	பேச்சுக்கலையின் வகைகள்
	SLO-2	நல்லியக்கோடனும்பாணர் வாழ்வியலும்	தமிழர் வீரம்	ஏதேன் தோட்ட வருணனை	பன்னிரு ஆழ்வார்கள் வரலாறு	பேச்சுப் பயிற்சி

Learning Resources	1.மௌவல், தொகுப்பும் பதிப்பும் - தமிழ்த்துறை ஆசிரியர்கள், தமிழ்த்துறை, எஸ்.ஆர்.எம். அறிவியல் மற்றும் தொழில்நுட்பக் கல்விநிறுவனம், காட்டாங்குளத்தூர், **603203, 2020.** 2.தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை, 2017 3.மு. அருணாசலம், தமிழ் இலக்கிய வரலாறு, நூற்றாண்டு முறை (9ஆம் நூ. முதல் 16 வரை), தி பார்க்கர், சென்னை, 2005 **4.**தமிழ் இணையக் கல்விக்கழகம் - **http://www.tamilvu.org/** 5.மதுரை தமிழ் இலக்கிய மின் தொகுப்புத் திட்டம் - **https://www.projectmadurai.org/**

Learning Assessment

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

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

Course Designers

Experts from Industry	Expert from Higher Technical Institutions	Internal Experts
	. Dr. R..Srinivasan, Associate Professor, Department of Tamil, Presidency College, Chennai.	1. B.Jaiganesh, Assistant Professor & Head, FSH, SRMIST
		2. T.R.Hebzibah Beulah Suganthi, Assistant Professor, FSH, SRMIST
		3.S.Saraswathy, Assistant Professor, FSH, SRMIST

Course Code	ULH20G02J	Course Name	HINDI-II			Course Category	G	Generic Elective Course	L	T	P	C
									2	0	2	3

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

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

		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	To be able to converse well in the Hindi Language																		
CLR-2 :	To read and write and clarity																		
CLR-3 :	To be willing listeners and translators –where need be																		
CLR-4 :	To acquire the values/thought contents of the writers and practice in it in life.																		
CLR-5 :	To find motivation through the various forms of literature and learn to overcome any challenges of life.																		
CLR-6 :	To discover the importance of the language in making education as a means of growth in life and not mere literacy.																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	PSO -1	PSO -2	PSO -3
CLO-1 :	To acquire knowledge about Medieval and Modern Poetry.	2	75	60	H	H	H	-	-	-	-	-	-	-	-	-	-	-	-
CLO-2 :	To consider the relevance of the present trends in Hindi and their contemporary relevance.	2	80	70	-	H	-	H	-	-	-	-	-	-	-	-	-	-	-
CLO-3 :	To help develop better understanding of the Hindi language by studying the stories with reference to current reality.	2	70	65	H	-	-	H	-	-	-	-	-	-	-	-	-	-	-
CLO-4 :	To understand the usage of the present Advertising trends and its creative angles with the varied skills of Hindi Language.	2	70	70	H	-	H	H	H	-	-	-	-	-	-	H	-	-	-
CLO-5 :	To make translation of good literature and any relevant document from the Hindi Language to English and Vice-versa.	2	80	70	-	H	-	H	-	-	-	-	-	-	-	-	-	-	-
CLO-6 :	To help the learner to tackle Administrative terminologies, help them use Idioms and Phrases in their daily life, with ease.	2	75	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Kavye ke guno se awagat karana - Jaysi	Kahani Idkiyan	VIGYAPAN	ANUVAD	Takniki Shabdavali

	SLO-2	Ishk hakiki evam moksh bhava se awagat karana	Nari Shakti ki sarthakata	Srijnatamak kshmata jagrit karna	Vidhyarthiyon ko sikhaya jayega anuvad kitna upyogi hai	Vaignik tarike se bhashaon ka avishkaar karna
S-2	**SLO-1**	Surdas – Vatsalya ras se awagat karana	Kahani gunda Prem ki prakashtha se awagat karvana	VIGYAPAN KYA HAI	ARTH	ARTH
	SLO-2	Bhakti Bhavna se vidhyarthiyon ko jodna	Prtantr bharat ki samajik vyavstha se awagat karvana	Shabdavali evam chitratamakta se awagat karvana	Vidhyarthiyon dwara arth smajkar samaj ke liye mahtavpurn karya kar payenge	Vidhyarthi uske arth dwara hi uske mahtav smjhenge
S-3	**SLO-1**	Tulsidas-Manav mulyon ki prabal bhavna jagrit karna	KAHANI KE TATVA	VIGYAPAN KI BHASHA	PARIBHASHA	PARIBHASHA
	SLO-2	Dharmik Parvarti se awagat karana	Kahani ke tatva ki mahatta se awagat karvana	Bhasha ki abhivyakti ke pryog ko smjhana	Vibhinn vidwano dwara di gai paribhasha se us baat ko smjhenge vidhyathi	Vibhinn vidwano dwara di gai paribhasha se us baat ko smjhenge vidhyathi
S-4	**SLO-1**	Tiruvaluvaar – naitik mulyon ko jagrit karna	KAHANI KE AAYAM	VIGYAPAN KA PRBHAV	MAHATVA	SHABDAVALI KI AVSHYAKTA
	SLO-2	Vidhyarthiyon ko nitivaan bnana	Vidhyarthiyon ko kahani ke vidhinn ayam se awagat karvana	Shravaya-drishya samgri ke prbhav ki upyogita	Samijik jan-jeevan ke liye anuvad ke mahtav ko smjhana.	Vaignikon ka awiskar kitna mahtavpurn
S-5	**SLO-1**	Desh prem ki bhavna bharna	LEKHAK PARICHAY	VIGYAPAN AUR BAZAR	UDDESHYA	BHASHA VAIGYANIK
	SLO-2	Krantikari vicharon se Awagat karana	Lekhako ke jivan se awagat karvana	Vidhyarthioyon ko vigyapan se bazar me kaise sthapit kiya ja skata hai batana	Vidhyarthi anuvad ke uddeshya ko smajhkar samaj upyogi karya krne me apni sarthak bhumika nibhayenge	Bhasha vaignikon ki jankari
S-6	**SLO-1**	Badal Raag- Desh prem ki bhavna bhrna	KAHANI PATH	VIGYAPAN AUR ROZGAR	HINDI-ENGLISH	KARYALYIN SHABD
	SLO-2	Krantikari vicharo se awagat karana	Vidhyarthiyon ko kahani path ke dwara unka vak kausal majbut karna	Vidhyarthi savam ka ad-ajency bhi bna paye	Hindi adhikarai aur anuvadak ke pad ke liye tayaar karna	Shabd kaise tayar kiye jate hain vidhyorthiyon ko jankari
S-7	**SLO-1**	Pret ka Byaan -Bhukhmari evam akaal se awagat karana	KAHANI KA SARANSH	VIGYAPAN KI NIYAM	ENGLISH-HINDI	ANGREZI SE HINDI ANUVAD
	SLO-2	Samajik samanta banaye rkhne ki pravarti jagana	Lekhan kshmata ka vikas hona	Vigyapan ka ek hi niyam bhasha ka kashav jo vidhyarthiyon me viksit kiya jayega	Hindi adhikarai aur anuvadak ke pad ke liye tayaar karna	Hindi adhikarai aur anuvadak ke pad ke liye tayaar karna
S-8	**SLO-1**	Lahro se dark a nauka paar nhi hoti –chatro ko sahashi bnana	KAHANI KA UDDESHYA	VIGYAPAN KA MAHTVA	ANUVAD KI UPYOGITA	HINDI SE ANGREZI ANUVAD
	SLO-2	Karmaththa purn bhavna ko	Kahani ke uddeshy unke jiwan	Vartman me uski prasangikta	Vidhyarthiyon ko vibhin	Hindi adhikari aur anuvadak ke

		jagrit karna	ke mahtav ko smjhne me sahayk banna	vidhyarthiyon ko smjhana	karyalayon me hindi adhikari pad ki jankari prapt	pad ke liye tayaar karna.
S-9	SLO-1	Javani –rashtr prem ki bhavna jagrit karna	KAHANI KA VISHELESHAN	PRINT VIGYAPAN	ANUVADk KI BHUMIKA	EK DIN EK SHABD
	SLO-2	Vir ras evam virta ki pravati se awagat karana	Vishleshan kshmata viksit hota	Vidhyarthi iski bhasha sikhenge	Vidhyarthiyon ko anuvadak ki bhumika ka mahtav smajh aayega jiske adhar par vo kaam karenge	Vidhyarthiyon ko rozgaar se jodna
S-10	SLO-1	Dhool- saman vyavhar ki pravarti jagana	KAHANI PARICHARCHA	RADIO, TV.VIGYAPAN	SAHITYIK ANUVAD	PRYOJANMULAK SHABD KA MAHTAVA
	SLO-2	Satah se jude rahne ke prerna dena.	Vaad-vivad se vidhyarthiyon me apni baat ko rkhne ki yogyata banna	Vidhyarthiyon ko abhyas karvaya jayega	Vibhinn bhashaon ke sahitya ka anuvad kaise kiya jane ki chunouti ko samjajh payenge	Vidhyarthiyon ko vaighniko dwara tayaar ki gai bhasha ki samaj
S-11	SLO-1	KAVYA BIBM	KAHANI ANDOLAN	Ad agency	ANUVAD KE NIYAM	VIBHINN KSHETRO ME PRYOJANMULAK SHABDO KA MAHATAV
	SLO-2	Vidhyarthiyon ko naye-naye bibm ki jankari prapt hona	Vibhinn kahani andolan se bhi awagat karana	Ad agency aur swarozgaar se jodna	Anuvad ke niyamo ko vidhyarthi smajh payenge	Hindi adhikari pad par karyarat
S-12	SLO-1	SAMUHIK PARICHARCHA	KAHANI KA BADLTA SWAROOP	VIGYAPAN KA SWARUP	SHABDO KA MAHATAV	VAIGYANIK SHABDAVALI KI AVSHYAKATA
	SLO-2	Vidhyarthiyon ki bolne ki kaushal kshamta ko bdhana	Smay ke sath unke swarup ke bdlav ka bhi vidyarthi me samajh paida hona	Vidhyarthiyon ko vigyapan lekha ki barikayon ki samajh utpann hona	Shabda anuvad ke mahtva ko vidhyarthi smajhenge	Vidhyarthiyon ko shabdo ki vaignikta se jodna

Learning Resources	*The Prescribe Text Book Compiled and Edited by Department of Hindi* 1. *www.kavitakosh.org* 2. *www.shabdkosh.com*

Learning Assessment

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

| Level 3 | Evaluate Create | 30% | 30% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | - |
| | Total | 100 % | | 100 % | | 100 % | | 100 % | | 100 % | |

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

Course Designers		
Experts from Industry	**Expert from Higher Technical Institutions**	**Internal Experts**
	Prof.(Dr.) S.Narayan Raju, Head, Department of Hindi,CUTN, Tamilnadu	*1. Dr.S Preeti. Associate Professor & Head, SRMIST* *2. Dr. Md.S. Islam Assistant Professor, SRMIST* *3 Dr. S. Razia Begum, Assistant Professor, SRM IST*

Course Code	ULF20G02J	Course Name	French-II	Course Category	G	Generic Elective Course	L	T	P	C
							2	0	2	3

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

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

		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Strengthen the language of the students both in oral and written																		
CLR-2 :	Express their sentiments, emotions and opinions, reacting to information, situations																		
CLR-3 :	Make them learn the basic rules of French Grammar.																		
CLR-4 :	Develop strategies of comprehension of texts of different origin																		
CLR-5 :	Enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French																		
CLR-6 :	*Extend and expand their savoir-faire through the acquisition of current scenario*																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	PSO -1	PSO -2	PSO -3
CLO-1 :	*To acquire knowledge about French language*	2	75	60	H	H	H	-	-	-	-	-	-	-	-	-	-	-	-
CLO-2 :	*To strengthen the knowledge on concept, culture, civilization and translation of French*	2	80	70	-	H	-	H	-	-	-	-	-	-	M	-	-	-	-
CLO-3 :	*To develop content using the features in French language*	2	70	65	H	-	-	H	-	-	-	-	-	-	H	-	-	-	-
CLO-4 :	*To interpret the French language into other language*	2	70	70	H	-	H	H	H	-	-	-	-	-	H	-	-	-	-

CLO-5 :	To improve the communication, intercultural elements in French language	2	80	70		-	H	-	H	-	-	-	-	-	-	H	-	-	-	-
CLO-6 :	To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French	2	75	70		H	-	M-	H	H	-	-	-	-	-	-	-	-	-	-

Duration (hour)		12	12	12	12	12
S-1	SLO-1	**Les loisirs**	**La routine**	**Où faire ses courses ?**	**Découvrez et dégustez**	**Tout le monde s'amuse**
	SLO-2	**Les activités**	**Les exemples**	**Les courses**	**Dégustez**	**Le monde**
S-2	SLO-1	Les activités quotidiennes	Les adjectifs interrogatifs	Les aliments	Les articles partitifs	Les sorties
	SLO-2	Les quotidiennes	Les trois formes	Les exemples	Du, De la, De l', Des	Les exemples
S-3	SLO-1	Les matières	Les nombres ordinaux	Les quantités	Le pronom en (la quantité)	Situer dans le temps
	SLO-2	Les exemples	Les nombres	Les exemples	Le bon quantité	Les activités
S-4	SLO-1	Le temps	L'heure	Les commerces	Très ?	Les vêtements
	SLO-2	L'heure	Quelle heure est-il ?	Les activités	Beaucoup ?	Les accessoires
S-5	SLO-1	Les fréquences	Le pronom personnel COD	Les commerçants	La phrase négative (2)	**Les ados au quotidien**
	SLO-2	Les activités	Les exemples	Les exemples	Les négations	**La vie quotidienne**
S-6	SLO-1	Les sons [u]	Les pronominaux	Demander le prix	C'est /Il est	Les adjectifs démonstratifs
	SLO-2	Les sons [y]	Se promener, se coucher etc…,	Dire le prix	Les activités	Ce, Cet, Cette, Ces
S-7	SLO-1	Les loisirs	Les verbes du premier groupe	Les services	L'impératif	La formation du féminin
	SLO-2	Les exemples	Parler, Demander, Poser	Les exemples	Les exemples	Les exemples
S-8	SLO-1	La routine	groupe en –e_er,é_er,-eler,-eter	Les moyens de paiement	Les verbes devoir, pouvoir	Le pronom indéfini on
	SLO-2	Les activités	Appeler, Jeter etc..,	La carte de crédits	Les verbes savoir, vouloir	Les activités
S-9	SLO-1	Les Mots	Le verbe prendre	les sons [ã]	Il faut	Le futur proche
	SLO-2	Les expressions	Les exemples	Les sons [an]	Le verbe impersonnel	S+Aller+Infinitif du verbe
S-10	SLO-1	Exprimer ses gouts	Parler de ses gouts	Découvrez !	Au restaurant : Commander et commenter	Le passe composé
	SLO-2	Les exemples	Des gouter	Dégustez !	Les restaurant	Les exemples
S-11	SLO-1	Exprimer ses préférences	Parler de ses préférences	Au restaurant : commander	Inviter à une invitation	Les verbes voir et sortir
	SLO-2	Les activités	Les exemples	Au restaurant : commenter	Répondre à une invitation	Décrire une tenue
S-12	SLO-1	Décrire sa journée	Décrire sa journée	Inviter à une invitation	Les Mots	écrire un message amical

SLO-2	Les exemples	Les activités	Répondre à une invitation	Les expressions	Lire un message

Learning Resources	***Theory:*** 1. **''Génération-AI''** Méthode de français, Marie-Noëlle COCTON, P.DAUDA, L.GIACHINO, C.BARACCO, Les éditions Didier, Paris, 2018. ***2.Cahier d'activités avec deux discs compacts.***

Learning Assesment

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

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

Course Designers		
Experts from Industry	**Expert from Higher Technical Institutions**	**Internal Experts**
	1. Dr. C.Thirumurugan Associate Professor, Department of French, Pondicherry University	*1. Kumaravel K. Assistant Professor & Head, SRMIST* *2. Ponrajadurai M Assistant Professor, SRMIST*

Course Code	USA20201J	Course Name	OBJECT ORIENTED PROGRAMMING	Course Category	C	Professional Core	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:		Learning			Program Learning Outcomes (PLO)														
CLR-1 :	Utilize class and build domain model for real-time programs		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Utilize method overloading and operator overloading for real-time application development programs																			
CLR-3 :	Utilize inline, friend and virtual functions and create application development programs																			
CLR-4 :	Utilize exceptional handling and collections for real-time object oriented programming applications																			
CLR-5 :	Create programs using object oriented approach and design methodologies for real-time application development																			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CLO-1 :	Identify the class and build domain model	3	80	70	H	H	M	-	-	-	-	-	H	H	-	-	M	H	H
CLO-2 :	Construct programs using method overloading and operator overloading	3	85	75	H	H	H	H	H	-	M	-	H	H	-	-	M	H	H
CLO-3 :	Create programs using inline, friend and virtual functions, construct programs using standard templates	3	75	70	H	H	M	H	H	-	M	-	H	H	-	-	M	H	H
CLO-4 :	Construct programs using exceptional handling and collections	3	85	80	H	H	H	-	-	-	-	-	H	M	-	-	M	H	H
CLO-5 :	Construct programs using object oriented concepts	3	85	75	H	M	M	M	M	M	M	-	H	H	-	M	M	H	H
CLO-6 :	Create applications based on real world scenarios	3	80	70	H	H	M	-	-	-	-	-	H	H	-	-	M	H	H

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Comparison of Procedural and Object Oriented Programming	Constructor Types: Default and Parameterized constructor	Inheritance and its types	Introduction to Files	Templates : Introduction
	SLO-2	List of OOPS languages and its features	Example Programs	Inheritance: Single	Classes For File Stream Operations	

S-2	SLO-1	Features: Classes, Objects, Inheritance, Polymorphism, Encapsulation	Constructor Types: Copy and Static, Private.	Inheritance: Multiple	Types of files	Types of templates
	SLO-2	Data Hiding, Message Passing, Reusability	Example Programs	Example program	Opening and Closing a File	
S-3	SLO-1	I/O Operations, Data Types,	Destructor	Inheritance: Multilevel	Example Program	Class Templates
	SLO-2	Variables, Constants and Type Conversion	Static Data members	Example program	Detecting End Of File	Example for class templates
S4	SLO -1	Operators	Static member functions	Inheritance: Multiple	Example program	Function templates
	SLO -2	Special operators	Example program	Visibility of access specifier	Read and write functions-character and string	Example
S 5-8	SLO-1 SLO-2	Laboratory 1: I/O operations and operators	Laboratory 4: Parameterized Constructor and Constructor Overloading	Laboratory 7: Inheritance	Laboratory 10 : Simple file programs	Laboratory13 :Templates
S-9	SLO-1	Control Structures	Overloading Concept in OOP	Inheritance : Hierarchical	File Open Modes	Exceptional Handling: Types of exceptional handling
	SLO-2	Examples of Control Structures	Overloading types	Example program	Example program	Exceptional Handling :Try and Catch
S-10	SLO-1	Functions and types	Function Overloading: Different parameter with same data type	Inheritance : Hybrid	Example Program	Example program
	SLO-2	Function declaration and definition	Example Program	Example program	File Pointer Manipulations	Exceptional Handling : Standard exceptions
S-11	SLO-1	Passing arguments, returning values	Function Overloading: Different parameter with different argument types	Constructors and destructors in inheritance	Example Program	Example program
	SLO-2	default arguments, Constant arguments	Example Program	Example Program	Sequential Input and Output Operations	Exceptional Handling: Multilevel exceptional
S-12	SLO-1	Call by value , Call by reference	Function Overloading: Different parameter with different return values	Constructors and types of inheritance	Functions to handle file pointer	throw and throws
	SLO-2	Return by reference, Inline Functions	Example Program	Example program	Example program	Example program
S	SLO-1	Laboratory 2: Control	Laboratory 5 : Function	Laboratory 8 : Multiple	Laboratory 11 : Working with	Laboratory 14 :Multilevel

13-16	SLO-2	structures and Functions	Overloading	,Multilevel Inheritance	files	exceptional programs
S-17	SLO-1	Class and Objects	Operator Overloading Concept	Friend Function	Reading a class object	Exceptional Handling: finally
	SLO-2	Access specifier	Types of operator overloading	Virtual Base Classes	Example Program	User defined exceptions
S-18	SLO-1	Visibility of access specifier	Operator Overloading: Unary Operators	Example Program	Random Access –Updating a File	Programs for user defined exceptions
	SLO-2	Example program	Example program	Abstract Classes	Example program	Example program
S-19	SLO-1	Constructor	Operator Overloading: binary Operators	Example Program	Error Handling in File Operations	Exception Handling class
	SLO-2	Example program	Example program	Virtual Functions	Example program	Example program
S-20	SLO-1	Destructor	Operator Overloading: Assignment Operator	this pointer	Command Line Arguments	User defined exceptional class
	SLO-2	Example program	Example program	Inline functions	Example Program	Example Programs using CPP
S 21-24	SLO-1 SLO-2	Laboratory 3: Classes and Objects	Laboratory 6 : Operator Overloading	Laboratory 9 : Abstract classes and Virtual Functions	Laboratory 12: Random Access - updating	Laboratory 15:User defined Exceptions and simple CPP application.

Learning Resources	1.E Balagurusamy,(2017), "Object Oriented Programming in C++", 7th Edition, Tata McGraw Hill 2.ReemaThareja, (2015), "Object Oriented Programming with C++", 1st Edition, Oxford University Press 3.R S Salaria,(2016), "Mastering Object Oriented Systems Development Programming in C++", 6th Edition, Khanna Publishing	4.Robert Lafore, (2008), "Object-Oriented Programming in C++", 4th Edition, SAMS Publishing 5.SouravSahay, (2017), "Object Oriented Programming with C++", 2nd Edition, Oxford University Press

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1.Mrs. E. Sweety Bakyarani
		2.Mr. M.R.Vinodh
		3.Dr. J.AnithaRuth

Course Code	USA20202J	Course Name	**DATA STRUCTURES AND ALGORITHMS**		Course Category	**C**	**Professional Core**		L	T	P	C
									4	0	2	5
Pre-requisite Courses	Nil			Co-requisite Courses	Nil			Progressive Courses	Nil			
Course Offering Department		Computer Science		Data Book / Codes/Standards		Nil						

Course Learning Rationale (CLR):	The purpose of learning this course is to:	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Utilize linked list in developing applications																			
CLR-3 :	Utilize stack and queues in processing data for real-time applications																			
CLR-4 :	Utilize tree data storage structure for real-time applications																			
CLR-5 :	Utilize algorithms to find shortest data search in graphs for real-time application development																			
CLR-6 :	Utilize the different types of data structures and its operations for real-time programming applications																			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO – 1	PSO - 2	PSO – 3
CLO-1 :	Identify linear and non-linear data structures. Create algorithms for searching and sorting	2	80	70		L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Create the different types of linked lists and evaluate its operations	2	85	75		M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Construct stack and queue data structures and evaluate its operations	2	75	70		M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Create tree data structures and evaluate its types and operations	2	85	80		M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Create graph data structure, evaluate its operations, implement algorithms to identify shortest path	2	85	75		H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Construct the different data structures and evaluate their types and operations	2	80	70		L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		18	18	18	18	18
S-1	SLO-1	Introduction to theory of data structures	Introduction to stack	Tree Traversals – Inorder, preorder	Introduction to sorting	Graph Terminology
	SLO-2	Data representation	Representation of stack through array	Tree Traversals - Postorder	Efficiency of algorithm	Representation of graph - Arrays
S-2	SLO-1	Abstract Data type	Representation of stack through linked list	Binary Search Tree	Time complexity and space complexity	Representation of graph – Linked list
	SLO-2	Classification of data types	Operations on stack	Threaded Binary Search Tree	Different types of sorting	Graph Traversal – BFS

S-3	SLO-1	Program design and algorithm	Disadvantages of Stack, Polish notations	Binary Search Tree :Construction	Bubble sort	Example
	SLO-2	Problem Solving using algorithm	Applications – Evaluation of expression	Binary Search Tree : Insertion	Example	Graph Traversal – DFS
S-4	SLO-1	Recursion	Infix to Postfix expression	Binary Search Tree : Searchimg	Insertion Sort	Example
	SLO-2	Example	Tower of Hanoi, Recursion	Example	Example	Topological Sorting
S 5-6	SLO-1	Laboratory 1: Recursion	Laboratory 4 : stack and its applications	Laboratory 7 : Tree Traversals	Laboratory 10 : Implementation of Bubble and Insertion sort	Laboratory 13: Implementation of Graph using Array
	SLO-2					
S-7	SLO-1	Asymptotic Notation	Queue	Applications of trees	Selection sort	Shortest Path Algorithm- Introduction
	SLO-2	Algorithm Analysis	Representation of Queue using Arrays and Linked list	Applications of BST	Example	Shortest Path Algorithm: Dijkstra
S-8	SLO-1	Introduction to Data structures	Operations on Queue	Expression trees	Comparison of sorts	Minimum spanning tree – Prims
	SLO-2	Data Structures and its uses	Circular Queue	Example	Quick sort	Example
S-9	SLO-1	Linear and Non Linear Data Structures	Double ended Queue	AVL Tree	Example	Minimum Spanning Tree - Kruskals
	SLO-2	Operations on data structure	Priority Queue	AVL Tree Rotations	Merge sort	Example
S-10	SLO-1	Arrays and Pointers	Reversing a Queue using another queue	Example	Example	Network flow problem
	SLO-2	Structure and Pointers	Applications of Queue	Applications of AVL tree	Radix sort	Applications of Graph
S 11-12	SLO-1	Laboratory 2: Arrays, structure using pointers	Laboratory 5: Queue implementation using array and pointers	Laboratory 8: Implementation of BST	Laboratory 11 : Implementation of Qucik sort and merge sort	Laboratory 14 : Implementation of shortest path algorithm
	SLO-2					
S-13	SLO-1	Array types	Introduction to non linear data structures	Heap Data Structure	Shell sort	Define Hashing
	SLO-2	Array operations	Tree ADT and Terminologies	Minimum Heap Construction	Example	Hashing: Hash functions
S-14	SLO-1	Dynamic memory allocation	Tree Terminologies	Minimum Heap Deletion Construction	Heap Sort	Hashing : Collision avoidance
	SLO-2	Introduction to lists	Tree Representation	Example	Example	Hashing : Separate chaining

S-15	SLO-1	Linked list operations	Tree Types and Operations	Maximum Heap Construction	Linear search	Example
	SLO-2	Types of Linked Lists	Binary Tree Representation	Maximum Heap Deletion Construction	Binary search	Open addressing
S-16	SLO-1	Linked list vs. Arrays	Properties of binary tree	Example	Comparison of different search	Example
	SLO-2	Application of linked list		Applications of Heaps and AVL trees	Example	Advantages of Hashing
S 17-18	SLO-1 SLO-2	Laboratory 3 : Linked List	Laboratory 6: Implementation of binary tree using Arrays	Laboratory 9 :Heap Implementation	Laboratory 12: Linear search and Binary search	Laboratory 15 : Implementation of minimum spanning tree

Learning Resources	1.Seymour Lipschutz, (2014), "Data Structures with C", McGraw Hill Education, Special Indian Edition 2.ISRD Group, (2013), "Data structures using C",McGraw Hill, 2nd Edition, 3.R.F.Gilberg, B.A.Forouzan, (2005), "Data Structures", Thomson Indi, Second Edition 4.A.V.Aho, J.E Hopcroft , J.D.Ullman, (2003), "Data structures and Algorithms", 1st Edition, Pearson Education	5.Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2ndEdition, Pearson Education 6.ReemaThareja, (2011), "Data Structures Using C", 1st Edition, Oxford Higher Education

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mrs.P.Yogalakshmi
		Dr..S.Sabeen
		Dr.L.V.Raja

Course Code	UMS20G02T	Course Name	**MATHEMATICAL FOUNDATION**	Course Category	*G*	*Generic Elective Course*	L	T	P	C
							3	1	0	4

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

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

		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	*To apply the basic concepts and theorems of matrices*																			
CLR-2 :	*To learn the concepts of polynomial equations, reciprocal equations and approximation of roots.*																			
CLR-3 :	*To learn the basic concepts of differentiation, successive differentiation and partial differentiation*	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Scientific Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO – 1	PSO – 2	PSO – 3
CLR-4 :	*To learn the basic concepts of integration and to apply Bernoulli's formula and reduction formula.*																			
CLR-5 :	*To understand how a function is transformed by Laplace and inverse Laplace methods and how they are related.*																			

Course Learning Outcomes (CLO):	*At the end of this course, learners will be able to:*																			
CLO-1 :	*Gaining knowledge in basic concepts of matrix method.*	3	85	80		L	L	L	M	L	-	-	-	L	M	H	M	-	-	-
CLO-2 :	*Gaining knowledge in the concepts of polynomial equations and reciprocal equations and applying Horner's and Newton's methods for finding roots*	3	80	75		M	M	M	M	M	-	-	-	M	M	H	M	-	-	-
CLO-3 :	*Understanding the concepts of differentiation and to solve the problems of Radius of*	3	85	80		H	H	M	H	M	-	-	-	M	M	H	H	-	-	-

	curvature and Euler's theorem																	
CLO-4 :	*Understanding the concepts of integration and to evaluate reduction formula.*	3	85	80	M	H	M	H	M	-	-	-	M	M	H	H	-	-	-
CLO-5 :	*Getting the knowledge of Laplace and Inverse Laplace transformation and their application.*	3	85	80	H	H	M	H	H	-	-	-	M	M	H	M	-	-	-

		Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
Duration (hour)		12	12	12	12	12
S-1	SLO-1	Definition and types of matrix	Introduction to algebraic equations	Introduction to Differentiation	Introduction to integration	Introduction to Laplace Transforms
	SLO-2	Examples of types of matrix.	Types of algebraic equations	Solving basic problems	Basic problems on integration	Basic properties
S-2	SLO-1	Symmetric matrix	Relation between roots and coefficients of equation	More examples	Integration of polynomial functions	Problems on Laplace Transforms
	SLO-2	Skew symmetric matrix	Simple problems	More examples	Integration of polynomial functions	Problems on Laplace Transforms
S-3	SLO-1	Hermitian matrix	Problems on irrational roots	Minima of functions of single variable	Integration of irrational functions	Solving problems of type $L\left[e^{at}f(t)\right]$
	SLO-2	Skew Hermitian matrix	Problems on complex roots	Maxima of functions of single variable	Integration of irrational functions	Solving problems of type $L\left[e^{at}f(t)\right]$
S 4	SLO-1	Orthogonal matrix	Reciprocal equations-Definition	Minima and maxima of functions of single variable	Integration of irrational functions	Solving problems of type $L\left[tf(t)\right]$
	SLO-2	Unitary matrix	Solving Reciprocal equation of degree four with like and unlike signs for its coefficients-Type I	Minima and maxima of functions of single variable	Integration of irrational functions	Solving problems of type $L\left[tf(t)\right]$
S-5	SLO-1	Eigen values of a matrix	Solving reciprocal equation of odd degree with like signs for its coefficients-Type II	More examples on maxima and minima	Integration by the method of partial fractions	Solving problems of type $L\left[tf(t)\right]$
	SLO-2	Eigen values of a matrix	Solving reciprocal equation of odd degree with like signs for its coefficients-Type II	More examples on maxima and minima	Integration by the method of partial fractions	Solving problems of type $L\left[tf(t)\right]$
S-6	SLO-1	Eigen vectors of a matrix	Solving reciprocal equation of odd degree with unlike signs for its coefficients-Type III	Introduction to curvature	Integration by the method of partial fractions	Solving problems of type $L\left[e^{at}tf(t)\right]$
	SLO-2	Eigen vectors of a matrix	Solving reciprocal equation of odd degree with unlike signs for its coefficients-Type III	Radius of curvature	Integration by the method of partial fractions	Solving problems of type $L\left[e^{at}tf(t)\right]$

S -7	SLO-1	Eigen values and eigen vectors of a matrix	Solving reciprocal equation of even degree with unlike signs for its coefficients and the middle term is absent-Type IV	Problems based on radius of curvature	Integration by the method of partial fractions	Solving problems of type $L\left[e^{at}tf(t)\right]$
	SLO-2	Eigen values and eigen vectors of a matrix	Solving reciprocal equation of even degree with unlike signs for its coefficients and the middle term is absent-Type IV	Problems based on radius of curvature	Integration by the method of partial fractions	Solving problems of type $L\left[e^{at}tf(t)\right]$
S -8	SLO-1	Eigen values and eigen vectors of a matrix	Problems based on Type I and II	Problems based on radius of curvature	Bernoulli's formula	Solving problems of type $L\left[\dfrac{f(t)}{t}\right]$
	SLO-2	Eigen values and eigen vectors of a matrix	Problems based on Type III and IV	Problems based on radius of curvature	Simple problems	Solving problems of type $L\left[\dfrac{f(t)}{t}\right]$
S-9	SLO-1	Cayley Hamilton theorem	Newton-Raphson method.	Partial differentiation-Introduction	Reduction formula for $\int \sin^n xdx$	Introduction of Inverse Laplace transforms
	SLO-2	Problems based on Cayley Hamilton theorem	Problems on Newton-Raphson method.	Simple problems	Reduction formula for $\int \sin^n xdx$	Simple problems
S-10	SLO-1	Problems based on Cayley Hamilton theorem	Problems on Newton-Raphson method.	Euler's theorem	Reduction formula for $\int \cos^n xdx$	Basic problems on Inverse Laplace Transforms
	SLO-2	Problems based on Cayley Hamilton theorem	Problems on Newton-Raphson method.	Problems on Euler's theorem	Reduction formula for $\int \cos^n xdx$	Basic problems on Inverse Laplace Transforms
S-11	SLO-1	Cramer's rule	Horner's method	Problems on Euler's theorem	Reduction formula for $\int_{0}^{\frac{\pi}{2}} \sin^n xdx$	Finding inverse Laplace transforms by the method of partial fractions
	SLO-2	Problems based on Cramer's rule.	Problems on Horner's method	Problems on Euler's theorem	Reduction formula for $\int_{0}^{\frac{\pi}{2}} \sin^n xdx$	Finding inverse Laplace transforms by the method of partial fractions

					Reduction formula for $\int_{0}^{\frac{\pi}{2}} \cos^n x\,dx$	Finding inverse Laplace transforms by the method of partial fractions
S-12	SLO-1	*Problems based on Cramer's rule.*	*Problems on Horner's method*	*Problems on Euler's theorem*	*Reduction formula for* $\int_{0}^{\frac{\pi}{2}} \cos^n x\,dx$	*Finding inverse Laplace transforms by the method of partial fractions*
	SLO-2	*Problems based on Cramer's rule.*	*Problems on Horner's method*	*Problems on Euler's theorem*	*Reduction formula for* $\int_{0}^{\frac{\pi}{2}} \cos^n x\,dx$	*Finding inverse Laplace transforms by the method of partial fractions*

Learning Resources	*Theory:* *1.Dr.A.Singaravelu, Allied Mathematics, 7th edition, A.R.S.Publicatiions, 2015* *2., P.R.Vittal, <edition>, Margham Publications, <year of publication>*

Learning Assesment

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

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

Course Designers	
Experts from Academic	**Internal Experts**
Dr.M.A.Baskar, Professor & Head, Dept. Of Mathematics, Loyola college, Chennai	L. Ananthi, Asst.Prof.,VDP,SRMIST
Dr.P.Dhanavanthan, Professor & Head, Dept. Of statistics, Pondicherry University	

Course Code	UCS20S02J	Course Name	CONTENT MANAGEMENT SOFTWARE	Course Category	S	Skill Enhancement	L	T	P	C
							1	0	1	2

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:			Learning			Program Learning Outcomes (PLO)															
CLR-1 :	Joomla Overview			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	How to install Joomla, Architecture of Joomla																				
CLR-3 :	Utilizing Control panel of Joomla																				
CLR-4 :	Utilizing Toolbar, Menus, Content Menu of Joomla																				
CLR-5 :	Utilizing Components Menu, Extensions Menu of Joomla. Utilizing Menus, Modules of Joomla																				
CLR-6 :	Utilizing Templates, Banners.																				

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO – 1	PSO – 2	PSO – 3
CLO-1 :	Install Joomla, Overview of Joomla Architecture	3	80	70	H	H	M	-	-	-	-	-	H	H	-	-	M	H	H
CLO-2 :	Working with Control Panel to access the functions of Joomla through clickable icons.	3	85	75	H	H	H	H	H	-	M	-	H	H	-	-	M	H	H
CLO-3 :	To know about the various toolbar options in Joomla. Create custom menus for your website.	3	75	70	H	H	M	H	H	-	M	-	H	H	-	-	M	H	H
CLO-4 :	Studying the menus present under Joomla content, Component Menu, Banners. To know about Extension Manager, Module Manager, Plugin Manager, Template Manager.	3	85	80	H	H	H	-	-	-	-	-	H	M	-	-	M	H	H
CLO-5 :	Creating Menus, adding menu items, Modifying menu items, Creating submenus. Creating Modules in Joomla.	3	85	75	H	M	M	M	M	M	M	-	H	H	-	M	M	H	H
CLO-6 :	Create Templates, Banners. Add Forums, Web links, Creating Real world Examples.	3	80	70	H	H	M	-	-	-	-	-	H	H	-	-	M	H	H

Duration (Hour)	6	6	6	6	6
S-1	SLO-1	Overview of Joomla	Manage media files	Working with extension manager	Working with Breadcrumb module in Joomla	Add template in Joomla

	SLO-2	Real world examples of Joomla	Manage menus	Display the location and function of modules	Working with Random Image Module	Create template in Joomla
S-2	SLO-1	Laboratory 1: System Requirements for Joomla	Laboratory 4: Creating Menus for website	Laboratory 7 : Working with modules, Implementation of Templates	Laboratory 10: Joomla Global Settings, Media settings	Laboratory 13 : Template Manager
	SLO-2					
S-3	SLO-1	Create store Database	Working with details tab	Set default language for your website.	Working with debug settings	Create contact details of the company
	SLO-2	Joomla Admin Panel	Working with Page display, metadata.	Joomla Translations	Working with media manager	Use Newsfeed in Joomla Real World Applications.
S-4	SLO-1	Laboratory 2 : Using Toolbar options , Creating Store Database	Laboratory 5 : Content Menu in Joomla	Laboratory 8: Working with plugin Manager	Laboratory 11 : Configure Joomla site with personal settings	Laboratory14: Adding forums, web Links.
	SLO-2					
S-5	SLO-1	How to create article page	Add New Article using Article manager	Create Menus in Joomlausing Menu Manager	Working with Joomla media settings	Create corporate intranets and extranets
	SLO-2	Create standard pages	Create categories for the article using category manager	Add New Menu Items	Working with Joomla Language Manager	Create on-line magazines
S6	SLO-1	Laboratory 3 : Create a Template	Laboratory 6 : Component menu in Jhoomla	Laboratory 9 :Modules in Joomla	Laboratory 12: Joomla Language Manager	Laboratory 15: Creation of Web sites and Personal home pages
	SLO-2					

Learning Resources	1. Stephen Burge, "Joomla 3 Explained: Your step-by-step Guide to Joomla3", Independently published 2. Eric Tiggeler, "Joomla! 3 Beginner's Guide", 2nd Edition, Packt Publishers 3. Tim Plummer," Learning Joomla3 Extension Development", 3rd Edition, Packt Publishers	URL: https://www.tutorialspoint.com/joomla/joomla_overview.htm

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

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

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

Course Code	UCD20S02L	Course Name	Quantitative Aptitude and Reasoning	Course Category	S	Skill Enhancement Course	L	T	P	C
							0	0	2	1

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
CLR-1 :	Demonstrate various principles involved in solving mathematical concepts	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Develop interest and awareness in students regarding profit/ loss, interest calculations and average																		
CLR-3 :	Critically evaluate basic mathematical concepts related to mixtures and alligations, permutation and combination, time and work																		
CLR-4 :	Provide students with skills necessary to generate and interpret data and concepts related to time, speed and distance and blood relation.																		
CLR-5 :	Enable students to understand reasoning skills																		
CLR-6 :	Create awareness in students regarding the various concepts in quantitative aptitude and reasoning skills and also its importance in various competitive exams																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	Understand, analyze and solve questions based on numbers, logarithms.	3	80	70	H	H	M	H	L	M	-	H	-	H	-	H	M	-	H
CLO-2 :	Create, solve, interpret and apply basic mathematical models which are applicable in our day to day life	3	80	75	M	H	M	H	-	M	-	H	-	H	-	H	M	-	H
CLO-3 :	Understand the concepts of mixtures and alligations, permutation and combinations, probability, time and work and to approach questions in a simpler and innovative method	3	85	70	M	H	M	H	-	M	-	H	-	H	-	H	M	-	H
CLO-4 :	Understand the concept in time ,speed and distance	3	85	80	M	H	M	H	-	M	-	H	-	H	-	H	M	-	H
CLO-5 :	Ability to solve the problems on reasoning	3	85	75	M	H	M	H	-	M	-	H	-	H	-	H	M	-	H
CLO-6 :	Able to face different competitive exams	3	80	70	M	H	M	H	-	M	-	H	-	M	-	H	M	-	H

Duration (hour)	6	6	6	6	6
S-1 SLO-1	Classification of numbers	Profit and Loss-Introduction	Mixtures and Alligations-Introduction	Time, Speed and Distance-Problems on Trains	Direction Sense-Introduction
S-1 SLO-2	Test of divisibility	Profit and Loss- Basic Problems	Mixtures and Alligations-Problems	Time, Speed and Distance-Boats & Streams	Direction Sense-Problems
S-2 SLO-1	Unit digit	Statistics-Introduction	Permutation –Introduction& Basics	Data Interpretation – Bar chart	Number Series
S-2 SLO-2	Tailed zeroes	Statistics-Mean, Median, Mode	Combination-Introduction& Basics	Data Interpretation – Pie chart	Word Series
S-3 SLO-1	HCF, LCM	Simple Interest-Introduction,Formulas &Problems	Probability-Introduction &Basics	Data Interpretation – Table	Seating Arrangements - Linear
S-3 SLO-2	HCF, LCM - Solving problems	Compound Interest-Introduction ,Formulas &Problems	Probability-Problems	Data Interpretation – Line graph	Seating Arrangements - Circular
S-4 SLO-1	Logarithm –Introduction of log rules	Word problems on Line equations-Introduction	Time and work-Introduction	Data sufficiency-Introduction and Basics	Puzzles-Concepts
S-4 SLO-2	Logarithm –Applications of log rules	Word problems on Line equations- Basic problems	Time and work-Men and Work	Data sufficiency-Problems	Puzzles-Problems
S-5 SLO-1	Percentage -Introduction	Averages-Introduction & Basics	Time and work-Pipes &Cisterns(Introduction)	Blood relation-Introduction	Clocks-Concepts Discussion
S-5 SLO-2	Percentage- Basic problems	Averages-Tricky Problems	Time and work-Pipes &Cisterns(Problems)	Blood relation-Problems	Clocks-Problems
S-6 SLO-1	Percentage-Increasing & Decreasing functions	Ratio and Proportions-Introduction	Time, Speed and Distance-Introduction	Coding – Decoding-Introduction	Calendars-Introduction of basic concept
S-6 SLO-2	Percentage- Miscellaneous problems	Ratio and Proportions-Basics & problems	Time, Speed and Distance-Basic problems	Coding – Decoding-Different types	Calendars-Problems

Learning Resources	1. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata McGraw Hill, 5th Edition 2. Dr. Agarwal.R.S, Quantitative Aptitude for Competitive Examinations, S. Chand and Company Limited, 2018 Edition 3. Archana Ram, PlaceMentor: Tests of Aptitude for Placement Readiness, Oxford University Press, Oxford, 2018	4. Edgar Thrope, Test Of Reasoning for Competitive Examinations, Tata McGraw Hill, 6th Edition 5. Dinesh Khattar, The Pearson Guide to Quantitative Aptitude for competitive examinations, Pearson, 3rd Edition 6. P A Anand, Quantitative Aptitude for competitive examinations, Wiley publications, e book, 2019

Learning Assessment

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

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

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

Course Designers

Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
1. Ajay Zener, Director, Career Launcher	-	*1. Dr. P Madhusoodhanan, HoD, CDC, E&T, SRMIST*
		2. Dr. M Snehalatha, Assistant. Professor, CDC, E&T, SRMIST

Course Code	UJK20201L	Course Name	Communication Skills		Course Category	JK	Life Skill Course	L	T	P	C
								0	0	4	2

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

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

		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	To make the students learn the native speakers' accent.	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	PSO -1	PSO -2	PSO -3
CLR-2 :	To educate them about word stress of English																		
CLR-3 :	The enable them to participate in group discussion and debates																		
CLR-4 :	To improve their participation and participation skills																		
CLR-5 :	To improve the listening and speaking abilities in English																		
CLR-6 :	LSRW skills all together is developed in every student																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLO-1 :	Understand the native speakers' exact pronunciation	2	75	60	H	H	H	H	-	-	-	H	H	H	H	H	-	-	-
CLO-2 :	Master the sound systems of English	2	80	70	H	H	H	-	-	-	-	H	H	H	H	H	-	-	-
CLO-3 :	Have a better Word stress, Rhythm and Intonation	2	70	65	H	H	H	-	H	H	-	-	H	H	H	H	-	-	-
CLO-4 :	Develop Neutral Accent	2	70	70	H	H	H	-	H	-	-	-	-	-	H	H	-	-	-
CLO-5 :	Participate in any conversation with any native speaker	2	80	70	H	H	-	H	-	H	-	H	H	H	H	H	-	-	-
CLO-6 :	Clear any standardized tests conducted to measure the English language ability like IELTS and TOEFL	2	75	70	H	H	H	H	H	H	H	H	H	H	H	H	H	H	-

Duration (hour)	12	12	12	12	12
S-1	SLO-1	Introduction to Digital language lab - helps in the listening skills by providing an interactive environment to the	Learners are enabled to record their speech and listen to it in order to correct their lacuna	Reading software is used to facilitate reading exercises for the students	To enable the students to familiarize with word processor blogging	Students are enabled to learn and pronounce stressed and unstressed words

		students			
	SLO- 2	The students will be able to converse fluently	*One will know himself where he/ she has gone wrong*	*Flow in reading will be improved*	*online publishing. Will be learnt by the students*	The practice will lead them to acquire neutral accent and understand foreign accent
S-2	SLO-1	*Students are exposed to functional language*	*Fluency and Pronunciation to be evaluated*	*The usage of phonetics will be mandated.*	Enable the students in learning situational language	Common topics in IELTS speaking test and TOFEL will be provided to assess the students.
	SLO- 2	*This exposure will help them pick up fluency*	*Their standard will measured*	*reading will be done in the class*	Create imaginary situations and students are allowed to engage in conversations	Assessments will be provided for self scrutiny
S-3 – S-4	SLO-1	*Laboratory 1 In the wall of Pink Floyed to be played for the students*	*Laboratory 4 Students are given a situation, they need to write a respond for it by writing a letter requesting information or explaining the situation*	*Laboratory 7 Introduction to the conversation of a native speaker/ interview of a native speaker*	*Laboratory 10 learners are asked to describe some visual information(table/charts/nature) in their own word*	*Laboratory 13students will listen to a passage and they need to give a suitable title*
	SLO- 2	*The students will be able to understand the isolation of a wall. It helps them to enhance their pronunciation*	*This will lead to understand the English letter conventions*	*Learners will prove the fluency by listening*	*They need to have a well organized thought of it using language accurately in a academic style.*	Assessment on their language competency and vocabulary
S-5	SLO-1	*They get familiarized with pronunciation styles*	*Learners to record and repeat new wordsagain and again*	*New words are to be referred in the reading passages and checked with the help of dictionaries*	*Familiarize the students with e-journals , e-guidance, e-magazines, e-Books, e-Library*	Listening topics in the IELTS listening test and TOFEL will be provided
	SLO- 2	*American and British styles are differentiated*	*Untill right prononciation isaquiredis not allowed to go to the Next session*	*Those new words are to be used in different contexts and sentences*	*Help students to access them as much as possible*	Assessment on their listening capacity is to be provided
S-6	SLO-1	*Listening to news bulletins and songswillbeenabled to help them to understand use of vocabulary*	*Learnerscanspeak English and compare the notes and exchange ideas*	*Comprehensive skills are enhanced and checked the level*	Enable the students to versatile writing	Reading topics in the IELTS reading test and TOFEL will be provided to assess the students.
	SLO- 2	*Will beenabled ti imitae the exact accent and prononciation*	*From the exchangedideascomprehensive questions willbeasked by the otherstudents*	*The levels are informed to the students and lcuna is explained*	Diffrerence in writing and readingisexplained	Assesment on their capacity is explained

S-7 – S-8	SLO-1	*Laboratory 2TedX will be played for the student*	*Laboratory 5 introduction to semi-formal/ neutral discursive essay will be taught.*	*Laboratory 8 television news will be broadcasted to them*	*Laboratory 11learners are given with a set of images where they need to write a story from it*	*Laboratory 14 students will listen to the great monologues of the time*
	SLO- 2	*It will help them to improve their fluency*	*It will teach them to write coherently and cohesively.*	*It will help them to understand the usage of words and the fluency of speaker*	*It helps them to keen on observation as well as to know their creativity.*	They will learn the importance of pronunciation, stress and pause in a speech
S-9	SLO-1	*To enable to listen to authentic sounds of the target language*	Give different topics to debate to enable them talk fluently	*The right pronunciation is checked with an access to articles fiction verses and speeches*	*Focus on writing is done*	writing topics in the IELTS writing test and TOFEL will be provided to assess the students.
	SLO- 2	*To enable them imitate the different sounds and accents and make them repeat it*	*To check the pace of their speech*	*Minute details and differences are marked and rectified*	*Conversational skills are enhanced*	Writing skills are assessed and tested
S-10	SLO-1	To enable to practice different accents focusing on intonation and voice modulation	*Dialogue delivery be checked by asking them to prepare for their own e- learning materials*	*Read and repeat passages*	Help in professionalwriting	Model IELTS and TOFEL test will be conducted for the students
	SLO- 2	The differences between intonation stress and modulations are explained	*Make the students speak and record*	*Check the ability to repeat the exact pronounciation*	Check and asses theirwritings	Assessment will be provided to the learners
S 11 - S 12	SLO-1	*Laboratory 3 After listening to TedX, students need to jot down set of question.*	*Laboratory 6 learners will be taught to write a review for a film after watching*	*Laboratory 9 conversation between two people in every day context will be played for the studetns*	*Laboratory 12 students will listen to the writers note on publishing a novel/ short story*	*Laboratory 15 they will listen to grammar usage in the form of visual image and song*
	SLO- 2	This will help them to identify the key information in listening text.	*Leaner will need to think for the apt word. Through this language competency will be evaluated*	*It Will help them to understand the target language*	It will helps them to enhance their creativity also the language compétence	They will the foreign language easily and it enhances their competency of it

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

Learning Assessment

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

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

Course Designers

Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
	Prof. Daniel David, Prof & Head, Department of English, MCC, Chennai	1. Dr. Shanthichitra, Associate Professor, & Head, Department of English, FSH,SRMIST 2. Dr K B Geetha, Assistant Professor, Department of English, FSH, SRMIST

Course Code	UNS20201L/ UNC20201L/ UN020201L/ UYG20201L	Course Name	NSS/NCC/NSO/YOGA	Course Category	EA	EXTENSION ACTIVITY	L	T	P	C
							0	0	0	0

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

Assessment is Fully Internal

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

Course Code	USA20301J	Course Name	PROGRAMMING IN JAVA	Course Category	C	Professional Core	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-4 :	To achieve parallelism using threading concepts																		
CLR-5 :	To understand the basics of Graphical User Interface Programming																		
CLR-6 :	To design and program stand-alone Java applications																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Read and make elementary modifications to Java programs that solve real-world problems.	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Validate input in a Java program	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Identify and fix defects and common security issues in code.	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	To design reading and writing files in Java.	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	To develop various applications like banking, Inventory, etc	3	80	70	L	H	M	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	The Genesis of Java	Introducing classes	Inheritance Basics	Introduction to Java Thread model	Introduction to Event Handling

	SLO-2	How java changed the internet	Class fundamentals	Understanding Types of Inheritance: Single, Multilevel, Hierarchical Inheritance	Creating a Thread by Extending Thread Class	Understanding ActionEvent&ItemEvent
S-2	SLO-1	Java's magic: Byte Code	Declaring Objects	How does java support multiple inheritance?	Creating a Thread by implementing Runnable Interface.	Understanding KeyEvent&MouseEvent
	SLO-2	Introduction to Java Buzzword	Assigning object Reference variables	using Super keyword	Thread Class	TextEvent,WindowEvent,ComponentEvent
S-3	SLO-1	Understanding Java Buzzwords - Simple, Object Oriented, Robust, Multithreaded, Architecture-Neutral, Interpreted and high performance, Distributed, Dynamic	Introducing method	What is Method Overriding?	Creating multiple threads	Introduction to Event Listener Interfaces
	SLO-2	Evolution of Java	What are Constructors? What are the Characteristics of constructors?	Understanding Dynamic method dispatch	Assigning Thread priorities	Working with ActionListener&, AdjustmentListener
S-4	SLO-1	Introduction to Object Oriented Concepts of Java	Understanding Types of Constructors	Introduction to Abstract keyword	Applying Synchronization	Working with ContainerListener, ItemListener, ComponentListener
	SLO-2	Understanding Encapsulation, Polymorphism, Inheritance	Using this Keyword	Working with Abstract class and Method & Using final with inheritance,	Inter-thread communication	Working with KeyListener&MouseListener
S 5-8	SLO-1	Laboratory1: Learning to work with Java IDE and Writing Simple Conversion Programs	Laboratory 4: Classes and Objects	Laboratory 7: Inheritance, Method Overriding, Abstract classes and methods	Laboratory 10: Multithreading	Laboratory 13: Event Handling
	SLO-2					
S-9	SLO-1	Introduction to Lexical Issues of Java	Introduction to Garbage Collection	Introduction to Package	Introduction to Legacy Classes	Introduction AWT Controls
	SLO-2	Understanding Whitespaces, Identifiers, Literals Comments, Separators, Keywords	Using Finalize() method	Creating a Package	Working with Vector class	Working with Laboratoryel controls
S-10	SLO-1	Introduction to Data types of Java	Overloading methods	Understanding Access Protection	Examples using Vector class	Working with Buttons controls

	SLO-2	Understanding byte,short,int,long, float,double,chars,boolean	Overloading constructors	Importing packages	Understanding Stack class	Working with CheckBoxes
S-11	SLO-1	What is variable?, Declaring a variable, dynamic initialization of variables	Using objects as parameters	Introduction to Interfaces	Examples using Stack class	Working with CheckBoxGroup controls
	SLO-2	Scope and lifetime of variables	Argument Passing	Defining an interface	Introduction to Legacy Interfaces	Working with Choice controls controls
S-12	SLO-1	Introduction to Operators	Returning Objects	Implementing Interfaces	Understanding Enumeration Interface	Working with Lists controls
	SLO-2	Working with Arithmetic, Relational, Logical, Bitwise, Conditional, Assignment operators	Recursion	How Interfaces are extended?	Examples using Enumeration interface	Working with TextField controls
S 13-16	SLO-1	Laboratory2: Operators	Laboratory 4: Overloading Methods and Constructors, finalize() method	Laboratory 8: Packages and Interfaces	Laboratory 11: Legacy Classes and Interfaces	Laboratory 14: AWT Controls
	SLO-2					
S-17	SLO-1	What is Array?, Initialization of Arrays	Introducing Access Control	What is Exception?	Introduction to Utility classes	Introduction to Layout Manager
	SLO-2	Understanding Types of Arrays	Understanding Static variables and methods	Understanding Exception Types	Working with StringTokenizer	Understanding Flow Layout
S-18	SLO-1	Introduction to Control Statements	Understanding Final variables and methods	Introduction to Exception handling	Working with Date class	Understanding Border Layout
	SLO-2	Working with Selection Statements- All forms of if & Switch	Working with Nested Class	Working with try and catch	Working with Calendar	Understanding Grid Layout
S-19	SLO-1	Introduction to Iterative Statements	Understanding Inner Class	Using multiple catch clauses	Working with GregorianCalendar	Introduction to I/O Streams
	SLO-2	Working with while, do-while, for, for each statements	Introduction to String Class	Working with Finally, Throw and throws	Working with Random Class	Byte Streams classes
S-20	SLO-1	Introduction to Jump Statements	Working with String Handling Methods	Understanding Built-in Exceptions	Working with Scanner Class	Character Streams classes
	SLO-2	Working with break,	Command Line arguments	Creating user defined Exceptions	Examples using utility classes	Examples using Byte and Character

| S 21- 24 | SLO-1 | Laboratory 3: Arrays, Control Statements | Laboratory 6: String Class, Command Line Arguments | Laboratory 9: Exception Handling | Laboratory 12: Utility Classes | Laboratory 15: Layout Managers, Byte and Character Streams |
| | SLO-2 | | | | | |

Learning Resources	1.Herbert Schildt, (2007), "Java: The Complete Reference", Seventh Edition, Tata McGrawpublication 2.Arnold and J.Goslin,(2000), "The Java Programming Language", Second Edition, Addision Wesley

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chenna	Mrs.E.Sweety Bakyarani
		Dr.G.Kalpana

Course Code	USA20302J	Course Name	OPERATING SYSTEMS	Course Category	C	Professional Core	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
CLR-1 :	Utilize operating systems based on its features and utility	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Utilize the Process Management functions of an Operating system																		
CLR-3 :	Utilize the features of Memory Management concepts of an Operating system																		
CLR-4 :	Analyze how Device Management part of an Operating system functions																		
CLR-5 :	Utilize the File Management functions of an Operating system																		
CLR-6 :	Analyze the practical operating systems and evaluate their utility																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO – 3
CLO-1 :	Identify functions of an operating system, analyze the process management functions	2	80	70	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M
CLO-2 :	Analyze CPU scheduling and synchronization process of an operating system	3	85	75	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M
CLO-3 :	Analyze the need of Memory management functions of an operating system	3	75	70	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M
CLO-4 :	Identify the significance of device management and file management's role of an operating system	3	85	80	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M
CLO-5 :	Identify the essentials of inter process communication in an operating system, evaluate hypervisors	3	85	75	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M
CLO-6 :	Analyze how operating systems are constructed, analyze the features and aspects of different operating environments	3	80	70	H	H	H	H	H	M	L	M	H	M	-	H	H	H	M

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Introduction Operating Systems (OS): Operating System overview ,Operating system as a	Process concept : Introduction	Process Synchronization - Background	Deadlocks - System model	Memory management: introduction
	SLO-2		Process states : Process creation	The Critical section problem		

		resource management	and process termination			
S-2	SLO-1	Operations, Assembler, Compiler, loader, linker	Process state transition diagram	Two process Solutions	Deadlock characterization - Necessary conditions	Logical Vs physical address space
	SLO-2	Evolution of Operating Systems ,serial processing and batch processing	Operation on process	Multi process Solutions		
S-3	SLO-1	Batch: Simple, Multiprogramming	Symmetric multiprocessing	Synchronization hardware solution	Resource Allocation Graph	swapping
	SLO-2	Multiprocessor, Time Sharing, parallel systems			Methods for handling deadlocks	Organization : physical and logical organization
S-4	SLO-1	Distributed (client-server, peer-to-peer), Real-Time (hard, soft Clustering (symmetric, asymmetric, parallel)) , Network,)	Concurrent process	Semaphores – Usage	Deadlock Prevention - Mutual exclusion, Hold and Wait	Memory allocation method
	SLO-2				No Preemption, Circular Wait	Single partition allocation
S 5-8	SLO-1	Laboratory 1: Comparison between various Operating Systems	Laboratory 4: Simulation of FCFS CPU scheduling algorithm	Laboratory 7: Write a procedure for timer interrupt handler	Laboratory 10: Program to implement Bankers Algorithm	Laboratory 13: multiple partition (dynamic)
	SLO-2					
S-9	SLO-1	Microkernel: Architecture, Kernel mode, user mode, Monolithic, differences	CPU Scheduling: Process Scheduler (long, short, medium term)	Semaphores –Implementation	Deadlock Avoidance - Safe state	Multiple partition memory management : contiguous (fixed, dynamic)
	SLO-2	System Call Types	Scheduling criteria	Binary semaphores	Resource Allocation Graph Algorithm	
S-10	SLO-1	((a) process control: fork(), exit(), wait()b)file manipulation: open(), read(), write(), close() (c)device mgt: ioctl(), read(), write()	CPU utilization, throughput, time: (a) turnaround (b) waiting (c) response Scheduling Types: FCFS, SJF	Classic Problems of Synchronization - The Bounded Buffer problem	Banker's Algorithm - Safety Algorithm	Contiguous Types: memory protection, allocation, fragmentation (c) partitioned
	SLO-2	b)file manipulation: open(), close()	Scheduling Types: FCFS, SJF	The Readers - Writers Problem		Compaction
S-11	SLO-1	read(), write()	Priority Scheduling: Preemptive, non-preemptive	The Dinning philosophers problem	Resource request algorithm	Paged memory management, Paging technique
	SLO-2					
S-12	SLO-1	Operating System services	Other Scheduling Types: Round Robin	Critical Regions: Race condition and process synchronization	Examples	Segmentation
	SLO-2					Segmentation with paging
S 13-16	SLO-1	Laboratory 2: Booting process in GNU/Linux OS	Laboratory 5: Priority CPU scheduling algorithm	Laboratory 8: classical inter process communication problem (Producer consumer)	Laboratory 11: Program to implement memory allocation with pages	Laboratory 14 : Simulation of FIFO page replacement algorithm
	SLO-2					
S-17	SLO-1	System Programs: file management, status info	multilevel queue	Implementation of Critical region	Deadlock Detection - Single instance of each resource type	Demand paging
	SLO-2		multilevel feedback queue	Mutual Exclusion Algorithm: Peterson , Monitors	Several instances of a Resource type	

S-18	SLO-1	File modification, language support Loading and execution, communications,	multiple processor Scheduling	Producer consumer problem	Recovery from deadlock	Page replacement algorithms
	SLO-2	Communications Threads: Single thread, Multi-thread			Process termination	Page Replacement - FIFO Page replacement
S-19	SLO-1	Operating System structure	Real time scheduling	IPC : Inter process communication	Resource preemption	Optimal
	SLO-2	Layered approach Micro kernels				
S-20	SLO-1	Multithreading	Performance comparison	Message passing	Concurrency mechanism	LRU page replacement
	SLO-2	Symmetric multiprocessing		Bounded Buffer Problem	Comparison between deadlock and starvation	Thrashing
S 21-24	SLO-1	Laboratory 3: Multi-thread Programming	Laboratory 6: Simulation of Round Robin CPU scheduling algorithm	Laboratory 9: Write a procedure to make message passing in inter process communication	Laboratory 12: Simulation of FIFO page replacement algorithm	Laboratory 15: Simulation of optimal page replacement algorithm
	SLO-2					

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Dr.P.J,Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1.Mr.D.RajKumar
		2.Dr .P.J. Arul Leena Rose

Course Code	UCS20D01J	Course Name	WEB DEVLEOPMENT USING NODEJS AND MONGO	Course Category	E	Discipline Specific Electives	L	T	P	C
							4	0	4	6

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

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

		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Understand the benefits of combining language and data formats while creating web applications																		
CLR-2 :	Encourage the reusability of programming resources																		
CLR-3 :	Utilize the light weight applications across distributed devices																		
CLR-4 :	Understand multiuser conversations and data serialization																		
CLR-5 :	Understand the request and response model that works for client and server side applications																		
CLR-6 :	Take up the role of a full stack developer																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO – 1	PSO – 2	PSO – 3
CLO-1 :	Write code for client and server	2	85	85	H	L	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-2 :	Create modules and use the same in applications	3	90	90	H	M	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-3 :	Code using callback functions for scaLaboratoryle functions	3	85	85	H	M	M	M	H	-	-	-	-	-	-	-	M	M	H

CLO-4 : Distinguish RDBMS and schema design of MongoDB	4	90	90		H	M	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-5 : Perform query operations using MongoDB	3	85	85		H	M	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-6 : Understand and build logical relationships between documents using MongoDB	4	90	90		H	H	H	H	H	-	-	-	-	-	-	-	M	M	H

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Need of Scripting Language	Array Methods :indexOf, join, lastIndexOf, toString	Add HTTP header	Streams – Reading a Stream	Document with different types of values i)*Document with Scalar Values*
	SLO-2	Difference between client and server side scripting	Array Methods : reduce, reverse, slice, some, sort	Example programs	Stream – Writing to a stream	ii)*Document with Documents as values*
S-2	SLO-1	Script tag in HTML	Function Definition	Read the Query String	Piping the Stream	iii)*Document with Array as values*
	SLO-2	Java Script declaration	Function Parameters	Split the Query String	Chaining the Streams	CRUD operation :Insert Operation i)*insertOne() and ii)insertMany()* with examples
S-3	SLO-1	Output printing – document. Write, innerHTML	Calling a Function	Node.js URL Module	Node.js as a File Server	Perform Query Operation for the following situations i)*Query on nested documents* ii)*Query an array*
	SLO-2	window .alert, console.log	Return Statements	Node.js File Server	Create Files, Reading Files	ii)*Query an array of nested documents* iv)*Geospatial Queries* *Query Operation Examples*
S-4	SLO-1	Java script statements	Nested Functions	Node.js – NPM Package	Delete Files	Update Operation: *updateOne(), updateMany()*
	SLO-2	Comments and Variables	Example Programs	Downloading and Using a Package	Update and rename files	*replaceOne(), findAndModify()* Update operation :Examples
S 5-8	SLO-1	Laboratory 1 – Java Script Input and Output	Laboratory 4 - Functions	Laboratory 7 –Query String	Laboratory 10 – Streams and Files	*Laboratory 13 : Working with CRUD operations* - Insert and Query
	SLO-2					
S-9	SLO-1	Java script Operators -Logical, Bitwise	Web stacks introduction	Callback – Blocking code example	Creating a Upload Form	Delete Operation: deleteMany(), deleteOne()
	SLO-2	Arithmetic and Assignment	LAMP, LEMP, MEAN, MERN	Callback – Non- Blocking code	Parse the uploaded files	iii)findOne() And Delete()

		operators		example		Delete operation Examples
S-10	SLO-1	Java Script Datatypes - numeric	Difference between php and java script	Event Driven Programming	Save the files	Operation on Mongodb Data: projection
	SLO-2	Java Script Datatypes – non numeric	Node introduction and evolution	Working of node Application	Display the uploaded files	Limiting Records Sorting Records
S-11	SLO-1	Conditional statements	Installing node.js and npm in windows	Node Even emitter class	Nodemailer Modules	Indexes in Mongodb, default _id index
	SLO-2	If else statements	Installing node.js and npm in Linux	add Listener(), on(), once()	Sending a email	Creating and Index createIndex method
S-12	SLO-1	Switch statements	Built in modules in node.js – http, https	removeListener(), removeAllListeners()	Multiple Receivers	IndexMethods : Single Field, Compound, Multikey
	SLO-2	Iteration statements	Built in modules in node.js – querystring, readline	setMaxListemers(), listeners()	Sending HTML	text Index, Hashed Index, Geospatial
S 13-16	SLO-1 SLO-2	Laboratory 2 – Java Script Operators and Conditions	Laboratory 5 – Installing Node.js	Laboratory 8 – Event Driver classes	Laboratory 11 – Sending Mail	*Laboratory 14 :Working with CRUD operations* Update and Delete
S-17	SLO-1	Loop Controls – for loop	Include modules	Creating Buffers, writing to buffers	MongodbDatatypes: i)Integer ii)Boolean iii)Double iv)String v)Arrays vi)Object vii)Null viii)Regular expression ix)Timestamp x)Date xi)Object ID	Properties of Index i)Unique Indexes ii)Partial Indexes
	SLO-2	While loop	Writing first sample application	Reading from Buffers	Installing Mongo DB in Windows, Linux and Mac Operating Systems	iii)Sparse Indexes iv)TTL Indexes
S-18	SLO-1	Do whileLoop	Creating own modules	Converting Buffer to JSON	Installing and Working with MongoDB interfaces: i)Mongo Shell, ii)Mongo Compass	Aggregation in MongoDB: i)aggregate() method Aggregate expressions: i) $sum ii) $avg iii) $min iv) $max
	SLO-2	For each loop	Including your own module	Concatenate Buffer	Introduction to entities of MongoDB: i)Databases i)Collections and iii)Documents	v) $push vi) $addToSet vii) $first viii) $last
S-19	SLO-1	Arrays Introduction and declaring	Node.js – REPL Terminal – Read, Eval	Compare, Copy Buffer	Database: i)*createDatabase()*method with example	*MongoDB Backup: Export/Import data backup using shell*

						i)mongodump ii)mongorestore
	SLO-2	Accessing arrays	Node.js – REPL Terminal – Print, Loop	Slice Buffer and Buffer Length	ii)*dropDatabase()* method with example	*MongoDB Backup: Export/Import data backup using Mongo Compass*
S-20	SLO-1	Array Properties : index, input length, prototype	Node.js as built in HTTP module	isEncoding(), isBuffer()	Collections: i)*createCollection()* method with example	Monitoring Deployment using MongoDB: i)*mongostat*, *mongotop*
	SLO-2	Array Methods :concat, every, forEach	Node.js as a Web Server	byteLength	ii)*dropCollection()* method with example	iii)serverStatus, dbStats, collStats
S 21-24	SLO-1 SLO-2	Laboratory 3 - Looping Statements	Laboratory 6 - Running sample application using node.js	Laboratory 9 - Buffers	Laboratory 12 – creating dbs	Laboratory 15: i)Creating different types of indexes ii)Aggregate data using different Aggregate expressions iii) Perform Mongodb data *Export* and *Import* using shell iv)Working with mongo deployment commands

Learning Resources	1.Basarat Syed, (2014), "Practical Node.js: Building Real-World Scale Web Apps", APress	1.URL: https://nodejs.org/dist/latest-v12.x/docs/api/ 2.URL: https://docs.mongodb.com/manual/tutorial/

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

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

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

Course Code	UCS20D02J	Course Name	WEB DEVELOPMENT USING REACTJS AND MONGO	Course Category	E	Discipline Specific Elective	L	T	P	C
							4	0	4	6

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

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

CLR-1 :	To understand the User Interfaces/User interactive components as a DOM tree
CLR-2 :	Understand MVC framework/architecture of web programming
CLR-3 :	Develop single page applications for mobile and web applications
CLR-4 :	Understanding the concurrent model
CLR-5 :	Understand CRUD operations of MongoDB
CLR-6 :	Understanding JSON in DBs, helps building applications for large scale data storage

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO – 1	PSO – 2	PSO – 3
CLO-1 :	Create meaningful User Interfaces for web and mobile applications	3	90	90		H	L	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-2 :	Understand the need for immutable data	3	90	90		H	M	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-3 :	Distinguish class components and functional components	3	85	85		H	M	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-4 :	Distinguish RDBMS and schema design of MongoDB	4	90	90		H	M	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-5 :	Perform query operations using MongoDB	3	90	90		H	M	M	M	H	-	-	-	-	-	-	-	M	M	H
CLO-6 :	Understand and build logical relationships between documents using MongoDB	4	85	85		H	H	H	H	H	-	-	-	-	-	-	-	M	M	H

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Need of Scripting Language	Array Methods :indexOf, join, lasIndexOf, toString	Arrow Functions return value by Default	Adding Events	Document with different types of values i)*Document with Scalar Values*
	SLO-2	Difference between client and server side scripting	Array Methods : reduce, reverse, slice, some, sort	Arrow Functions with Parameters	Event Handler	ii)*Document with Documents as values*
S-2	SLO-1	Script tag in HTML	Function Definition	Arrow Function without Parentheses	React Event Object	iii)*Document with Array as values*
	SLO-2	Java Script declaration	Function Parameters	React Render HTML	Adding Forms in REACT	CRUD operation :Insert Operation i)*insertOne() and ii)insertMany()* with examples
S-3	SLO-1	Output printing – document. Write, innerHTML	Calling a Function	Render Function	Handling Forms	Perform Query Operation for the following situations i)*Query on nested documents* ii)*Query an array*
	SLO-2	window .alert, console.log	Return Statements	HTML and root node	Conditional Rendering	ii)*Query an array of nested documents* iv)*Geospatial Queries* *Query Operation Examples*
S-4	SLO-1	Java script statements	Nested Functions	REACT JSX	Submitting Forms	Update Operation: *updateOne(), updateMany()*
	SLO-2	Comments and Variables	Example Programs	Coding and expressions in JSX	Multiple Input Fields	*replaceOne(), findAndModify()* Update operation :Examples
S 5-8	SLO-1	Laboratory 1 – Java Script Input and Output	Laboratory 4 - Functions	Laboratory 7 – arrow functions	Laboratory 10 - binding function to a component	*Laboratory 13 :Working with CRUD operations* Insert and Query
	SLO-2					
S-9	SLO-1	Java script Operators -Logical, Bitwise	Web stacks introduction	Inserting a Large Block of HTML	Validating Form Input	Delete Operation: deleteMany(), deleteOne()
	SLO-2	Arithmetic and Assignment operators	LAMP and LEMP	Example Programs	Running Validation form	iii)findOneAndDelete() Delete operation Examples
S-10	SLO-1	Java Script Datatypes - numeric	Difference between php and java script	REACT Components	Adding Error messages	Operation on MongodbData:projection
	SLO-2	Java Script Datatypes – non numeric	MEAN, MERN	Creating a Class Component	Textarea, select	Limiting RecordsSorting Records

S-11	SLO-1	Conditional statements	REACT Environment set up - windows	Creating a Function Component	REACT CSS	Indexes in Mongodb, default _id index
	SLO-2	If else statements	Creating a Sample REACT Program	Component Constructor	Inline Styling	Creating and Index createIndex method
S-12	SLO-1	Switch statements	Creating a REACT APP	Components in Components	CSS Style sheet	Single Field, Compound, Multikey
	SLO-2	Iteration statements	Running the REACT Application	Components in Files	CSS Modules	Geospatial, text Index, Hashed Index
S 13-16	SLO-1	Laboratory 2 – Java Script Operators and Conditions	Laboratory 5 – simple React program	Laboratory 8 –class and function component	Laboratory 11 - validating form inputs	*Laboratory 14 :Working with CURD operations* Update and Delete
	SLO-2					
S-17	SLO-1	Loop Controls – for loop	REACT Directly in HTML	REACT Props	MongoDB Datatypes: i)Integer ii)Boolean iii)Double iv)String v)Arrays vi)Object vii)Null viii)Regular expression ix)Timestamp x)Date xi)Object ID	Properties of Index i)Unique Indexes ii)Partial Indexes
	SLO-2	While loop	Running and Modifying REACT Application	Pass Data , Props Constructor	Installing Mongo DB in Windows, Linux and Mac Operating Systems	iii)Sparse Indexes iv)TTL Indexes
S-18	SLO-1	Do whileLoop	ECMA Script 6 – ES6	REACT state object	Installing and Working with MongoDB interfaces: i)Mongo Shell, ii)Mongo Compass	Aggregation in MongoDB: i)aggregate() method Aggregate expressions: i) $sum ii) $avg iii) $min iv) $max
	SLO-2	For each loop	Versions of ECMA	Using the state object	Introduction to entities of MongoDB: i)Databases i)Collections and iii)Documents	v) $push vi) $addToSet vii) $first viii) $last
S-19	SLO-1	Arrays Introduction and declaring	Classes	Changing the state object	Database: i)*createDatabase()*method with example	*MongodDB Backup: Export/Import data backup using shell* i)mongodump ii)mongorestore
	SLO-2	Accessing arrays	Methods in Class	Life cycle components - Mounting	ii)*dropDatabase()* method with example	*MongoDB Backup: Export/Import data backup using Mongo Compass*

S-20	SLO-1	Array Properties : index, input length, prototype	Class Inheritance	Life cycle components - Updating	Collections: i)*createCollection()* method with example	Monitoring Deployment using MongoDB: i)*mongostat, mongotop*
	SLO-2	Array Methods :concat, every, forEach	Arrow Functions	Life cycle components - UnMounting	ii)*dropCollection()* method with example	iii)serverStatus, dbStats, collStats
S 21-24	SLO-1	Laboratory 3 - Looping Statements	Laboratory 6 –using inheritance	Laboratory 9 –props and state object	Laboratory 12 - creating dbs	Laboratory 15 : i)Creating different types of indexes ii)Aggregate data using different Aggregate expressions iii)Perform MongoDB data *Export* and *Import* using shell Working with mongo deployment commands
	SLO-2					

Learning Resources	1.Alex Banks, Eve Porcello (2017), "Learning React: Functional Web Development with Reactand Redux",O'REILLY	1.URL: https://reactjs.org/docs/getting-started.html 2.URL: https://docs.mongodb.com/manual/tutorial/

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	Mr.M.R.Vinodh
		Dr.G.Kalpana

Course Code	UCS20D03J	Course Name	WEB DEVELOPMENT USING ANGULARJS AND MONGO	Course Category	E	Discipline Specific Elective	L	T	P	C
							4	0	4	6

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

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

		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Create single page applications and understand the functional behavior of dynamic web pages																			
CLR-2 :	Understand presentation components that look like HTML elements																			
CLR-3 :	Build corner to corner interactive components in dynamic web pages																			
CLR-4 :	Understand MVC framework/architecture of web programming/client-server architecture																			
CLR-5 :	Build synchronized objects across view and model components																			
CLR-6 :	Understanding JSON in DBs, helps building applications for large scale data storage																			

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

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Need of Scripting Language	Array Methods :indexOf, join, lasIndexOf, toString	Angular JS Arays	Angular JS Scope	Document with different types of values i)*Document with Scalar Values*
	SLO-2	Difference between client and server side scripting	Array Methods : reduce, reverse, slice, some, sort	Angular JS Expressions vs Java Script Expressions	Understanding the scope	ii)*Document with Documents as values*
S-2	SLO-1	Script tag in HTML	Function Definition	Angular JS Modules	Angular JS Filters	iii)*Document with Array as values*
	SLO-2	Java Script declaration	Function Parameters	Creating a Module	Adding Filters to Directives	CRUD operation :Insert Operation i)*insertOne() and ii)insertMany()* with examples
S-3	SLO-1	Output printing – document. Write, innerHTML	Calling a Function	Adding a Controller	The filter Filter	Perform Query Operation for the following situations *i)Query on nested documents* *ii)Query an array*
	SLO-2	window .alert, console.log	Return Statements	Adding a Directive	Filter an Array Based on User Input	*ii)Query an array of nested documents* *iv)Geospatial Queries* *Query Operation Examples*
S-4	SLO-1	Java script statements	Nested Functions	Modules in Files	Sorting an Array based on Userinput	Update Operation: *updateOne(), updateMany()*
	SLO-2	Comments and Variables	Example Programs	Controllers in Files	Custom Filters	*replaceOne(), findAndModify()* Update operation :Examples
S 5-8	SLO-1	Laboratory 1 – Java Script Input and Output	Laboratory 4 - Functions	Laboratory 7 – Using controllers	Laboratory 10 – using filters	*Laboratory 13 :Working with CURD operations* Insert and Query
	SLO-2					
S-9	SLO-1	Java script Operators -Logical, Bitwise	Web stacks introduction	Angular JS Directives	Angular Service $http Service, $timeout Service, $interval service	Delete Operation: deleteMany(), deleteOne()
	SLO-2	Arithmetic and Assignment operators	LAMP and LEMP	Data Binding	Creating own services	iii)findOneAndDelete() Delete operation Examples
S-10	SLO-1	Java Script Datatypes - numeric	Difference between php and java script	Repeating HTML Elements	Angular JS $http and methods	Operation on Mongodb Data: projection
	SLO-2	Java Script Datatypes – non	MEAN, MERN	ng-app directive	Angular JS $http and Properties	Limiting Records Sorting

		numeric				Records
S-11	SLO-1	Conditional statements	Angular Environment set up - windows	ng-init directive	Displaying Data in a Table	Indexes in Mongodb, default _id index
	SLO-2	If else statements	Angular JS Framework	Ng-model directive	Displaying with CSS Style	Creating and Index createIndex method
S-12	SLO-1	Switch statements	Angular JS with HTML	Create new directives	Angular JS Select Box	Single Field, Compound, Multikey
	SLO-2	Iteration statements	Angular ng directives	Restrictions	Data Source as Object	Geospatial,text Index, Hashed Index
S 13-16	SLO-1 SLO-2	Laboratory 2 – Java Script Operators and Conditions	Laboratory 5 – Angular ng directives	Laboratory 8 – data binding	Laboratory 11 – location service and timeout service	*Laboratory 14:Working with CURD operations* Update and Delete
S-17	SLO-1	Loop Controls – for loop	Angular directives	Angular JS ng-model directive	MongoDB Datatypes: i)Integer ii)Boolean iii)Double iv)String v)Arrays vi)Object vii)Null viii)Regular expression ix)Timestamp x)Date xi)Object ID	Properties of Index i)Unique Indexes ii)Partial Indexes
	SLO-2	While loop	Angular JS Expressions	Ng-model directive	Installing MongoDB in Windows, Linux and Mac Operating Systems	iii)Sparse Indexes iv)TTL Indexes
S-18	SLO-1	Do whileLoop	Angular JS Applications	Two-way binding	Installing and Working with MongoDB interfaces: i)Mongo Shell, ii)Mongo Compass	Aggregation in Mongodb: i)aggregate() method Aggregate expressions: i) $sum ii) $avg iii) $min iv) $max
	SLO-2	For each loop	Angular JS Module	Validating user input	Introduction to entities of MongoDB: i)Databases i)Collections and iii)Documents	v) $push vi) $addToSet vii) $first viii) $last
S-19	SLO-1	Arrays Introduction and declaring	Angular JS Controller	AngularJS Data Binding – Data Model	Database: i)*createDatabase()*method with example	*MongoDB Backup: Export/Import data backup using shell* i)mongodump ii)mongorestore
	SLO-2	Accessing arrays	Angular JS Numbers	AngularJS Data Binding – ng Model	ii)*dropDatabase()* method with example	*MongoDB Backup: Export/Import data backup*

						using Mongo Compass
S-20	SLO-1	Array Properties : index, input length, prototype	Angular JS Strings	AngularJS Controller	Collections: i)*createCollection()* method with example	Monitoring Deployment using Mongodb: i)*mongostat, mongotop*
	SLO-2	Array Methods :concat, every, forEach	Angular JS Objects	Controller Methods	ii)*dropCollection()* method with example	iii)serverStatus, dbStats, collStats
S 21-24	SLO-1	Laboratory 3 - Looping Statements	Laboratory 6 –Manipulating strings and numbers	Laboratory 9 - Data binding: controllers and external files	Laboratory 12 - – creating dbs	Laboratory 15: i)Creating different types of indexes ii)Aggregate data using different Aggregate expressions iii) Perform Mongodb data *Export* and *Import* using shell as well as mongo compass. iv)Working with mongo deployment commands
	SLO-2					

Learning Resources	1.Ken Williamson (2015), "Learning AngularJS: A Guide to AngularJS Development", O'REILLY	1.URL: https://docs.AngularJS.org/api 2.URL: https://docs.mongodb.com/manual/tutorial/

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

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

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

Course Code	UMS20G03T	Course Name	STATISTICAL METHODS	Course Category	G	*Generic Elective Course*	L	T	P	C
							3	1	0	4

Pre-requisite Courses	*Nil*	Co-requisite Courses	*Nil*	Progressive Courses	*Nil*
Course Offering Department	*Mathematics and Statistics*	Data Book / Codes/Standards	*Graph sheet needed; t, F and χ^2 table is needed*		

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

		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	To provide foundations in Bio Statistics																		
CLR-2 :	To provide a strong foundations of organizing the data, diagrammatic and graphical presentation.																		
CLR-3 :	To apply Statistical techniques for biological problems.																		
CLR-4 :	To understand the characteristics of biological problems.																		
CLR-5 :	To provide the application of correlation and regression in biological sciences.																		
CLR-6 :	To analyze the sample data in order to estimate or predict characteristics of the larger population from which the sample is drawn.																		

Level of Thinking (Bloom) / Expected Proficiency (%) / Expected Attainment (%)

Scientific Knowledge / Problem Analysis / Design & Development / Analysis, Design, Research / Modern Tool Usage / Society & Culture / Environment & Sustainability / Ethics / Individual & Team Work / Communication / Project Mgt. & Finance / Life Long Learning / PSO - 1 / PSO - 2 / PSO – 3

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

CLO-1 :	To understand the statistical modeling and its limitations, and have skill in description, interpretation and exploratory analysis of data by graphical and other means;	3	85	80	L	L	L	M	L	-	-	-	L	M	H	M	-	-	-
CLO-2 :	To calculate and apply measures of central tendency - grouped and ungrouped data cases.	3	80	75	M	M	M	M	M	-	-	-	M	M	H	M	-	-	-
CLO-3 :	To understand and apply measures of dispersion - grouped and ungrouped data cases.	3	85	80	H	H	M	H	M	-	-	-	M	M	H	H	-	-	-
CLO-4 :	Find the relationship between two or more variables using correlation and regression.	3	85	80	M	H	M	H	M	-	-	-	M	M	H	H	-	-	-
CLO-5 :	Perform Test of Hypothesis for small sample. Learn non-parametric test such as the Chi-Square test for Independence and Goodness of Fit.	3	85	80	H	H	M	H	H	-	-	-	M	M	H	M	-	-	-
CLO-6 :	Perform the Analysis of Variance - One way Classifications.	3	75	80	H	H	M	H	M	-	-	-	M	M	H	M	-	-	-

		Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
Duration (hour)		12	12	12	12	12
S-1	SLO-1	Nature and scope of statistical methods Definition of statistics Numerical Data	Measures of Central tendency i.Definition ii.Functions of average iii.Characteristics of a typical average	Measures of Dispersion,	Correlation Analysis: Correlation - Definition and uses Types of correlation	Testing of Hypotheses -Testing Procedures
	SLO-2	Nature of statistics	Arithmetic mean Individual series	Range –Individual, Discrete series and Continuous series	Methods for Finding Correlation Coefficient, Properties of correlation coefficient	Definition of test statistic t and its uses
S-2	SLO-1	Importance of statistics	Arithmetic mean Discrete series	Quartile Deviation - Individual and Discrete series	Karl Pearson's Correlation Co-efficient	t-test Small Sample tests
	SLO-2	Functions of statistics	Arithmetic mean Continuous series	Quartile Deviation - Individual and Discrete series	Karl Pearson's Correlation Co-efficient	Testing Procedure
S-3	SLO-1	Limitations	Arithmetic mean Continuous series	Quartile Deviation - Continuous series	Spearman's Rank Correlation Coefficient with non-repeated Ranks	t-test - Test for Single Mean

	SLO-2	Distrust of Statistics	Arithmetic mean Cumulative series	Quartile Deviation - Continuous series	Spearman's Rank Correlation Coefficient with non-repeated Ranks	t-test - Test for Single Mean

S 4	SLO-1	Classification i) Meanings
		  ii)Objects
		  iii) Rules of classification
			Arithmetic mean
			   Meritsand Demerits
				Mean Deviation about Mean – Individual Series	Spearman's Rank Correlation Coefficient with repeated Ranks	t-test
						-Test for two Sample Means

	SLO-2	Classification
		  i.Types of classification
		  ii.Characteristics of good classification
			Median
			Individual series
				Mean Deviation about Mean – Discrete series	Spearman's Rank Correlation Coefficient with repeated Ranks	t-test
						-Test for two Sample Means

S-5	SLO-1	Tabulation:
		  i.Parts of Tabulation
		  ii.Rules of Tabulation
			Median
			   Discrete series
				Mean Deviation about Mean – Continuous series	Spearman's Rank Correlation Co-efficient	t-test
						- t Test Statistic, when sample standard deviations are not known, but Population Standard Deviations are known

	SLO-2	Types of tables Objective of Tabulation	Median Continuous series	Mean Deviation about Median – Individual series	Problems on finding the best pair of judgements	t-test - t Test Statistic, when sample standard deviations are not known, but Population Standard Deviations are known
S-6	SLO-1	Components of Good Table Rules of construction of the table.	Median Continuous series	Mean Deviation about Median – Discrete series	Bivariate Distribution	Chi-Square distribution - Definition and its Uses
	SLO-2	Difference between classification and tabulation.	Median Merits and Demerits	Mean Deviation about Median– Continuous series	Bivariate Distribution	Chi-Square test - Testing Procedure
S -7	SLO-1	Diagrammatic representation of various types of statistical data : Bar Diagram	Mode Individual series	Standard Deviation – Individual and Discrete Series	Regression Analysis: Regression - Definition and Uses	Test based on Goodness of fit

	SLO-2	Types of Bar diagram	Mode Discrete series	Standard Deviation – Individual and Discrete Series	Regression Coefficients	Test based on Goodness of fit
S -8	SLO-1	One dimensional Diagrams	Mode Continuous Series	Standard Deviation- Continuous Series	Regression Equations	Testing the Independence of Attributes using Chi-Square
	SLO-2	Two dimensional Diagrams	Mode Continuous Series	Standard Deviation- Continuous Series	Types of Regression Equations	Testing the Independence of Attributes using Chi-Square
S-9	SLO-1	Pie chart	Mode Continuous series	Coefficient of Variation	Regression Equation of X on Y and Regression Equation of Y on X	F-test - Test Statistic of F-test
	SLO-2	Histogram	Mode Meritsand Demerits	Coefficient of Variation	Regression Equation of X on Y and Regression Equation of Y on X	Uses and testing Procedures
S-10	SLO-1	Frequency Polygon	Empirical Relation	Graphical solution of Dispersion Lorenz curve	Regression Equation of X on Y and Regression Equation of Y on X	Testing the equality of variance using F distribution
	SLO-2	Frequency Curve	Empirical Relation	Graphical solution of Dispersion Lorenz curve	Regression Equation of X on Y and Regression Equation of Y on X	Testing the equality of variance using F distribution
S-11	SLO-1	Less than O gives	Graphical solution of Median	Skewness Bowley's coefficient of Skewness	Relationship between Correlation and Regression Coefficients	Analysis of Variance – Definition and Uses
	SLO-2	More than O gives	Graphical solution of Median	Skewness Bowley's coefficient of Skewness	Problems on the Relationship between the Coefficients	Analysis of Variance – testing procedure
S-12	SLO-1	Lorenz Curve	Graphical solution of Mode	Concept of Kurtosis	Finding the corrected Correlation Coefficient values by correcting the wrongly entered inputs	ANOVA - One Way Classification

					Finding the corrected Correlation Coefficient values by correcting the wrongly entered inputs	ANOVA - One Way Classification
	SLO-2	Lorenz Curve	Graphical solution of Mode	Concept of Kurtosis		

Learning Resources	Theory: 1. Pillai, R.S.N, Bagavathi, V. (2009),Statistics,Theory and Practice,7th Edition,S.Chand Ltd,New Delhi. 2. Gupta, S.P. (2012), Statistical Methods, 4th Edition, Sultan Chand & Sons, New Delhi. 3. 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

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

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

Course Designers	
Experts from Academic	**Internal Experts**
Dr.M.A.Baskar, Professor & Head, Dept. Of Mathematics, Loyola college, Chennai	S. Suruthi, Assistant Professor, Dept. Mathematics and Statistics, FSH, SRMIST
Dr.P.Dhanavanthan, Professor & Head, Dept. Of statistics, Pondicherry University	

Course Code	UMI20S01L	Course Name	My India Project	Course Category	S	Skill Enhancement Elective	L	T	P	C
							0	0	0	1

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

My India project - Assessment Method – Fully Internal

Assessment Method – Fully Internal

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

Course Code	UJK20301T	Course Name	Universal Human Values		Course Category	JK	Life Skill Course	L	T	P	C
								2	0	0	2

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

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

		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	To generate in students a sensitivity to current regional and national issues such as gender marginalization Eco sensitivity, vision for the Nation and general humanness																		
CLR-2 :	An expanded consciousness with a mind to accommodate all is developed																		
CLR-3 :	The ability to accept all and to co- exist is initiated																		
CLR-4 :	To create community connectivity and interdependence																		
CLR-5 :	To instill intrinsic link between freedom and responsibility for both individuals and communities																		
CLR-6 :	Make them learn the basic nature of human beings																		

Column headers for Learning: Level of Thinking (Bloom) / Expected Proficiency (%) / Expected Attainment (%)

PLO column headers:
1. Fundamental Knowledge
2. Application of Concepts
3. Link with Related Disciplines
4. Procedural Knowledge
5. Skills in Specialization
6. Ability to Utilize Knowledge
7. Skills in Modeling
8. Analyze, Interpret Data
9. Investigative Skills
10. Problem Solving Skills
11. Communication Skills
12. Analytical Skills
13. PSO -1
14. PSO -2
15. PSO -3

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLO-1 :	Become sensitive toward every living life and be able to respect every religion recognizing the universal values	2	75	60	H	H	H	H	-	-	-	H	H	H	H	H	-	-	-
CLO-2 :	Every way of life and culture will kindle the curiosity in them to know them and will be able appreciate the beauty in it	2	80	70	H	H	H	H	-	-	-	H	H	H	H	H	-	-	-
CLO-3 :	The presumptuous or prejudiced mentality will be overcome by them	2	70	65	H	H	H	H	-	-	-	-	-	-	-	-	-	-	-
CLO-4 :	Critical thinking and accommodative nature will become so natural way of thinking for them	2	70	70	H	H	H	H	H	-	-	-	-	-	H	-	-	-	-
CLO-5 :	They will become aware of the social inequalities and justice	2	80	70	H	H	-	H	-	-	-	-	-	-	-	-	-	-	-
CLO-6 :	Will be able to explore their own emotions, hopes & fear and be able to describe them verbally	2	75	70	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H

Duration (hour)		06	06	06	06	06
S-1	SLO-1	What is love? Forms of love. For self, parents, family, friends, spouse, community, nation, humanity and other beings, both for living and non living	*Love compassion empathy sympathy and non violence*	*Narratives and anecdotes from history, literature including local folklore*	*What will learners lose if they don't practice love and compassion?*	*Sharing learners' individual and/ or group experiences*
	SLO-2	Love and Compassion inter relatedness	*Individuals who are remembered in history for practicing compassion and love*	*Practicing Love and Compassion: what will they gain if they practice compassion?*	*Simulated situations*	Case studies
S-2	SLO-1	*What is Truth ?*	*Universal truth, truth as value, as fact,*	*Veracity, sincerity, honesty among others*	Individuals who are remembered in the history who have practiced these values	Practicing truths
	SLO-2	*: what will they gain if they practice truth*	*What will learners lose if they don't practice truth?*	*Sharing learners' individual and/ or group experiences*	*Simulated situations*	Case studies
S-3	SLO-1	*What is non violence – its need, love compassion,*	empathy sympathy for others as pre- requisites for non- violence	**Ahimsa as non violence and non killing**	*Individuals and their organizations which are known for their commitment for non violence*	Narratives and anecdotes about non violence from history and literature including local folklore
	SLO-2	Practicing non violence	*What will they gain if they practice non violence*	*What will learners lose if they don't practice non violence?*	*Simulated situations*	Case studies
S-4	SLO-1	*What is righteousness ?*	*Righteousness and Dharma*	*Righteousness and priority*	Individuals who are remembered in the history who have practicing righteousness.	Narratives and anecdotes about Righteousness from history and literature including local folklore

	SLO-2	Practicing *Righteousness*	*: Sharing learners' individual and/ or group experiences*	*what will learners lose if they don't practice Righteousness*	*Simulated situations*	Case studies
S-5	SLO-1	*What is peace?*	*Need of peace in Relation with harmony and balance*	Narratives and anecdotes about peace from history and literature including local folklore	Individuals who are remembered in the history who have practicing peace	Practicing peace
	SLO-2	*What will they gain if they practice peace*	*what will learners lose if they don't practice peace*	*Sharing learners' individual and/ or group experiences*	*Simulated situations*	Case studies
S-6	SLO-1	What is service and renunciation	*Forms of service , & renunciation Individuals who have recommended service in history*	*Practicing service and renunciation*	Narratives and anecdotes about Service & renunciation from history and literature including local folklore	Individuals who are remembered in the history who have practicing renunciation
	SLO-2	*Sharing learners' individual and/ or group experiences on renunciation*	*Sharing learners' individual and/ or group experiences on service*	*what will learners lose or gain if they do/don't practice Renunciation and service*	*Simulated situations*	Case studies

Learning Resources	**Theory:**
	1."Universal Human Values: Text Book"– Compiled and Edited by the Faculty of Science and Humanites, SRMIST, 2020.

Learning Assessment

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

Level 3	Evaluate	20%	-	20%	-	20%	-	20%	-
	Create								
	Total	100 %		100 %		100 %		100 %	

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
	Prof. Daniel David, Prof & Head, Department of English, MCC, Chennai	*1. Dr. Shanthichitra, Associate Professor, & Head, Department of English, FSH,SRMIST*
		2. Dr K B Geetha, Assistant Professor, Department of English, FSH, SRMIST

Course Code	UCS20401J	Course Name		ADVANCED JAVA PROGRAMMING	Course Category	C	Professional Core	L	T	P	C
								4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
CLR-1 :	This module aims to introduce the students to some concepts of advanced programming and practice on reusing components.	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	The course covers Graphical User Interface (GUI) networking, and database manipulation																		
CLR-3 :	To work with Web and Application Servers like Apache Tomcat, Glassfish etc and understand the communication over HTTP protocol.																		
CLR-4 :	Enterprise application using JavaBeans l																		
CLR-5 :	Develop web application using Java Servlet and Server Pages technology																		
CLR-6 :																			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	Advanced technology in Java such as Internationalization, and Remote method Invocation	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	To write sophisticated Java applications	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	To use Java language for writing well-organized, complex computer programs with both command-line and GUI	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Develop a JSP code to create a Web site	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Construct Web Application using Servlets	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Web application using Java Server Pages	3	80	70	L	H	M	H	L	-	-	-	L	L	-	H	-	-	-

Duration (hour)		**24**	**24**	**24**	**24**	**24**
S-1	SLO-1	Remote method invocation : Overview of RMI	Servlet – Introduction	JSP Overview	EJB Architecture: Logical Architecture	Understanding the need for MVC
	SLO-2	Introduction to RMI	Background – Servlet	Why to Learn JSP	EJB overview	MVC overview
S-2	SLO-1	Developing an RMI Application	Types : Generic Servlet,	How JSP works	Software Architecture	frameworks
	SLO-2	Setting up RMI	GenericServlet class	JSP Working Principle	EJB Architecture	Architecture
S-3	SLO-1	Architecture of an RMI Application	HttpServlet	Components of a JSP page	EJB Session Beans	implementing MVC with request dispatcher
	SLO-2	RMI Architecture	HttpServlet class	JSP Architecture	EJB Stateless Bean	Struts2 configuration
S-4	SLO-1	RMI over IIOP.Database Access	Servlet Life Cycle	JSP life Cycle	constraints on session beans	Struts2 Actions
	SLO-2	RMI Database	Life Cycle of a Servlet	Life Cycle of JSP	EJB Stateful Bean	Create Actions
S 5-8	SLO-1	LAB 1: Create distributed applications using RMI	Develop Web Applications Using Servlet	Web Applications using JSP	An EJB application that demonstrates Session Bean-Stateless Bean	MVC Architecture(i) Implementing MVC with Request Dispatcher(ii) Data Sharing Approaches
	SLO-2					
S-9	SLO-1	Overview of JDBC	Servlet Classes: Servlet	JSP API	Life Cycle with example	Struts2 Interceptors
	SLO-2	Presentation to JDBC connection	Servlet Classes	API	Life Cycle of EJB	Struts2 framework Interceptors
S-10	SLO-1	JDBC Drivers	ServletRequest	JSP : Scripting Elements	EJB Entity Bean	Struts2 Result type
	SLO-2	JDBC Driver types		JSP Syntax	Entity Bean in EJB	Results and Result type
S-11	SLO-1	Connecting to a Database	ServletResponse	JSP Implicit objects	When to use Entity Bean	Struts2 File upload
	SLO-2	Database connections		Pre- defined variables	Use of Entity Bean	Create View files
S-12	SLO-1	Statement Interfaces	ServletContext,	RequestDispatching: Anatomy of Request Processing	Entity Bean Life Cycle	Create Action Class
	SLO-2	JDBC statements, prepareStatement and CallableStatement		JSP - Directives	Life Cycle of Entity Bean	Configuration File
S 13-16	SLO-1	LAB 2: Create applications which can demonstrate the use of JDBC for Database Connectivity.	Develop Web Applications Using ServletRequest, ServletResponse	Include Directive JSP: include Action	An EJB application that demonstrates Session Bean – Stateful Bean	Build a web application that collects the user's name and displays "Hello World" followed by the user name.
	SLO-2					
S-17	SLO-1	Using MetaData.	ServletConfig	Forwarding Requests	Message Driven Beans:	Struts2 Database Access

	SLO-2	Statement Objects	Methods of Servlet Interface	JSP Client Request	Create Message driven Beans	JPA/Hibernate integration
S-18	SLO-1	ResultSets	Single Thread Model	RequestDispatcher Object	EJB Annotations	Create Action using JSP file
	SLO-2	Result and ResultSets	Thread Model	JSP Server Response	Describe Meta data using Annotations	Action using JSP
S-19	SLO-1	Commit and Rollback	Session Tracking: Cookies	Model1 Vs Model2	EJB – Access Database	Create Main page using JSP file
	SLO-2	Transaction Control	Cookies	JSP Model1 and Model2 Architectures	Database Using JDBC API	Main page creation
S-20	SLO-1	JDBC - Exceptions	URL Rewriting, Hidden Fields, The Session API	JSP Actions.	EJB : exception Handling	Create View
	SLO-2	Exception Handling	Session API	Actions in JSP	Exception Handling in EJB	Create Configuration File
S 21-24	SLO-1	LAB 3: Create student applications using JDBC Database Connectivity	Program that demonstrates the use of session management in Servlet.	Create a JSP based Web application which allows the user to edit his/her database Information.	An EJB application that demonstrates Entity Bean.	creating our view which will be required to browse and upload a selected file.
	SLO-2					

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

Learning Assessment

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

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

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

Course Code	USA20401J	Course Name	DATABASE SYSTEMS	Course Category	C	Professional Core	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR): The purpose of learning this course is to:		Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	100	11	12	13	14	15
CLR-1 :	Understand the fundamentals of Database Management Systems, Architecture and Languages																		
CLR-2 :	Conceive the database design process through ER Model and Relational Model																		
CLR-3 :	Design Logical Database Schema and mapping it to implementation level schema through Database Language Features	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO – 3
CLR-4 :	Familiarize queries using Structure Query Language (SQL) and PL/SQL																		
CLR-5 :	Familiarize the Improvement of the database design using normalization criteria and optimize queries																		
CLR-6 :	Understand the practical problems of concurrency control and gain knowledge about failures and recovery																		
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Acquire the knowledge on DBMS Architecture and Languages	3	80	70	H	M	L	L	-	-	-	-	L	L	L	H	-	-	-
CLO-2 :	Apply the fundamentals of data models to model an application's data requirements using conceptual modeling tools like ER diagrams	3	85	75	H	H	H	H	H	-	-	-	H	H	H	H	-	-	-
CLO-3 :	Apply the method to convert the ER model to a database schemas based on the conceptual	3	75	70	H	H	H	H	H	-	-	-	H	H	H	H	-	-	-

	relational model																	
CLO-4 :	Apply the knowledge to create, store and retrieve data using Structure Query Language (SQL) and PL/SQL	3	85	80		H	H	H	H	H	-	-	-	H	H	H	H	-	-	-
CLO-5 :	Apply the knowledge to improve database design using various normalization criteria and optimize queries	3	85	75		H	H	L	M	L	-	-	-	M	M	M	L	-	-	-
CLO-6 :	Appreciate the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures.	3	85	75		H	L	L	L	L	-	-	-	H	L	L	L			

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	What is Database Management System	Design process	Basics of SQL-DDL,DML,DCL,TCL	Decomposition using FD-dependency preservation,	Serializability, Recoverability, Transaction support in SQL
	SLO-2	Advantage of DBMS over File Processing System		Structure Creation, alternation		
S-2	SLO-1	Introduction and applications of DBMS	Entity Relation Model	Defining Constraints-Primary Key, Foreign Key, Unique, not null, check, IN operator	Codd Rules	Concurrent Executions
	SLO-2	Purpose of database system				Concurrency control
S-3	SLO-1	Views of data	ER diagram	Functions-aggregation functions	Normalization – 1Nf, 2NF, 3NF,	Concurrency Control : Lock based Protocols Two Phase Ccontrol Commit Protocol
	SLO-2		Case study for ER Diagram	Built-in Functions-numeric, date, string functions, string functions, Set operations,	BCNF, 4NF and 5NF	
S-4	SLO-1	SQL : Data Definition Commands	Design Issues in ER Model	SQL : Joins	Pl/SQL Introduction	PL/SQL : Query Precessing and Stored Procedure
	SLO-2		SQL : Aggregate Functions		PL/SQL : variable declaration and icontrol structures	
S 5-8	SLO-1	Laboratory 1: SQL Data Definition Language Commands on sample exercise	Laboratory 4 : Inbuilt functions in SQL on sample Exercise.	Laboratory 7 : Join Queries on sample exercise. * Frame and execute the appropriate DDL,DML,DCL,TCL for the project	Laboratory 10: PL/SQL Conditional and Iterative Statements	Laboratory 13: PL/SQL Query Processing , stored procedure
	SLO-2					
S-9	SLO-1	Database system	Keys , Attributes and Constraints	Sub Queries,	Domain Constraints,	Concurrency Control : Time

	SLO-2	Architecture			Referential Integrity Secondary Storage Devices	Stamp based Validation based
S-10	SLO-1	Overview of SQL	Mapping Cardinality	Correlated sub queries	Buffering of blocks File organization	MultiGranularity, Deadlocking, Deadlock Prevention protocol
	SLO-2					
S-11	SLO-1	SQL : Data Manipulation Commands	Extended ER - Aggregation	Nested Queries, Views and its Types	Indexing Methods – Primary , Secondary , Multilevel Indices	Recovery Concepts, Deferred update technique, Immediate update technique, Shadow paging,
	SLO-2		Generalizaion and Specialization			
S-12	SLO-1	SQL : Set Operations	SQL : Views in SQL	Transaction Control Commands	ISAM, B-trees Introduction	PL/SQL : Exceptional Handling
	SLO-2		SQL Queries in SQL	Commit, Rollback, Save point		PL/SQL: Trigger
S-13-16	SLO-1	Laboratory 2: SQL Data Manipulation Language Commands * Identification of project Modules and functionality	Laboratory 5: Simple Queries in SQL	Laboratory 8: Sub Queries	Laboratory 11: PL/SQL Functions * Frame and execute the appropriate Set Operators & Views for the project	Laboratory 14: PL/SQL Trigger, Exceptional Handling * Frame and execute the appropriate PL/SQL Cursors and Exceptional Handling for the project
	SLO-2					
S-17	SLO-1	Data Independence	ER Diagram Issues	Relational Algebra – Fundamental Operators and syntax, relational algebra queries	Transaction Management Transaction Concept	Database security and Authorization Need forf Database security
	SLO-2					
S-18	SLO-1	The evolution of Data Models	Weak Entity	Pitfalls in Relational database	Transaction States	Mandatory Access control and Multilevel Security
	SLO-2					
S-19	SLO-1	Comparision of Data Models	Conversion of ER to Relational Table	Functional Dependency – definition,	ACID Properties	Database Users and DBA Statistical database security
	SLO-2					
S-20	SLO-1	SQL : Data Control Commads	SQL : Nested Queries	trivial and non-trivial FD	PL/SQL Cursor	
	SLO-2	SQL:Transaction Control Commands			PL/SQL : Functions and statements to handle Cursor,	PL/SQL : Application Programs
S 21-24	SLO-1	Laboratory 3: SQL Data Control Language Commands and Transaction control commands to the sample exercises * Identify the issues	Laboratory 6: Nested Queries on sample exercise * Construction of Relational Table from the ER Diagram	Laboratory 9: Correlated Subqueries	Laboratory 12: PL/SQL Cursors * Frame and execute the appropriate PL/SQL Conditional and Iterative Statements for the project	Laboratory 15 Student Progress report Generation Employee Payslip generation
	SLO-2					

		that can arise in a business perspective for the application				

Learning Resources	1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, (2011),"Database System Concepts", Sixth Edition, Tata McGraw Hill 2. RamezElmasri, Shamkant B. Navathe,(2011), "Fundamentals of Database Systems", Sixth Edition, Pearson Education 3. CJ Date,AKannan,SSwamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education	5. . Martin Gruber, (1990), "Understanding SQL", Sybex SharadMaheshwari, (2016), "Introduction to SQLandPL/SQL", Second Edition, Laxmi Publications 6. RaghuramaKrishnan,JohannesGehrke, (2003), Database Management Systems, Third Edition,McGrawHill Education

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

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

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

Course Code	**UMS20402T**	**Course Name**	**Resource Management Techniques**	**Course Category**	**C**	**Professional Core Course**	**L**	**T**	**P**	**C**
							4	0	0	4

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

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

		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	To provide foundations in Operations Research																			
CLR-2 :	To apply basic concepts of Linear programming problems																			
CLR-3 :	To learn and understand Operations research approach to various applications																			
CLR-4 :	To provide a set of algorithms for solving sequencing problems																			
CLR-5 :	To employ appropriate methods of Game theory																			
CLR-6 :	To have a proper understanding of decision making problems																			
			Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Scientific Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO – 3
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																				
CLO-1 :	To recognize the scope and models of Operations research methods for decision making process.	3	85	80		L	L	L	M	L	-	-	-	L	M	H	M	-	-	-

CLO-2:	To apply Operations research techniques for solving real life problems	3	80	75	M	M	M	M	M	-	-	-	M	M	H	M	-	-	-
CLO-3:	To know optimization through various transportation and assignment problems	3	85	80	H	H	M	H	M	-	-	-	M	M	H	H	-	-	-
CLO-4:	To schedule jobs through machines using the prescribed algorithm	3	85	80	M	H	M	H	M	-	-	-	M	M	H	H	-	-	-
CLO-5:	To calculate saddle point, strategy and value of the game by various methods	3	85	80	H	H	M	H	H	-	-	-	M	M	H	M	-	-	-
CLO-6:	To deal with optimization problems in real life situation	3	75	80	H	H	M	H	M	-	-	-	M	M	H	M	-	-	-

		Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
Duration (hour)		12	12	12	12	12
S-1	SLO-1	Introduction to Operations Research(O.R)	Introduction to Linear Programming Problem (LPP)	Transportation Problems(TP) - Examples, Definitions – decision variables, supply and demand constraints	Sequencing Problems: Introduction	Game theory: Definitions, Examples
	SLO-2	Scope of O.R	Mathematical formulation of LPP	Mathematical formulation of TP	Assumptions made while solving Sequencing problem	Characteristics of Game theory
S-2	SLO-1	Some O.R. Models	Basic assumptions to formulate LPP	Balanced and Unbalanced TP	Total elapsed time, Idle time, No passing Rule	Pure Strategies: Maximin - Minimax Principle
	SLO-2	Iconic Models, Analogue Models	Procédure for forming a LPP model	Methods for finding Initial basic feasible solution	Procedure for sequencing n jobs on 2 machines	Saddle point and value of the game
S-3	SLO-1	Mathematical Models	Formulation of LPP Model	North West Corner Rule	Sequencing n jobs on 2 machines	Mixed Strategies: Games without saddle points
	SLO-2	Static Models ,Dynamic Models	Formulation of LPP Model	North West Corner Rule	Sequencing n jobs on 2 machines	Solving 2x2 games
S 4	SLO-1	Deterministic Models, Stochastic Models	Graphic method of solving LPP	Row Minima Method	Sequencing n jobs on 2 machines	Solving 2x2 games
	SLO-2	Classification of Models	Graphic method Special Cases: Infeasibility	Column Minima Method	Procedure for sequencing n jobs on 3 machines	Matrix oddment method for 3x3 games
S-5	SLO-1	Characteristics of O.R.	Graphic method Special Cases:	Least Cost Method	Sequencing n jobs on 3	Matrix oddment method for nxn

		Unboundedness			machines	games
	SLO-2	Principles of Modelling	Graphic method Special Cases: Redundancy	Least Cost Method	Sequencing n jobs on 3 machines	Matrix oddment method for nxn games
S-6	SLO-1	General methods for solving O.R. Models	Graphic method Special Cases	Vogel's Approximation Method(VAM)	Procedure for sequencing n jobs on m machines	Dominance property
	SLO-2	Main phases of O.R: Formulation of the problems:	Graphic method Special Cases	VAM Computational details	Sequencing n jobs on m machines	Dominance property: Computational details
S-7	SLO-1	Main phases of O.R: Formulation of the problems:	Graphic method Special Cases	VAM Computational details	Sequencing n jobs on m machines	Dominance property: Computational details
	SLO-2	Construction of a mathematical model	Advantages of LPP	VAM Computational details	Sequencing n jobs on m machines	Dominance property: Computational details
S-8	SLO-1	Construction of a mathematical model	Advantages of LPP	VAM Computational details	Sequencing n jobs on m machines	Dominance property: Computational details
	SLO-2	Solving the model constructed	Limitations of LPP	Unbalanced Transportation Problem	Sequencing n jobs on m machines: computational details	Dominance property: Computational details
S 9	SLO-1	Controlling and updating	General Linear Programming Problem	Unbalanced Transportation Problem	Sequencing n jobs on m machines: computational details	Graphical method for 2x3 games
	SLO-2	Testing the model and its solution, Implementation	Types of Solutions	Maximization case in Transportation Problem	Processing of 2 jobs on n machines	Graphical method for 2xn games
S 10	SLO-1	Role of O.R in industry	Canonical form of LPP	Assignment Problem(AP): Examples, Definitions – decision variables, supply and demand constraints	Processing of 2 jobs on n machines: Computational details	Graphical method for 2xn games
	SLO-2	Role of O.R. in Various fields	Standard form of LPP	Mathematical formulation of AP, Balanced and Unbalanced AP	Processing of 2 jobs on n machines: Computational details	Graphical method for 3x2 games
S-11	SLO-1	O.R and decision making	Simplex Algorithm Introduction	Assignment Algorithm: Hungarian Method	Processing of 2 jobs on n machines: Computational details	Graphical method for mx2 games
	SLO-2	Role of computers in O.R.	Simplex method: non-degenerate basic solution, degenerate basic solution	Hungarian Method: Computation details	Processing of 2 jobs on n machines: Computational details	Graphical method for mx2 games

| S-12 | SLO-1 | Role of computers in O.R. | Simplex method: basic feasible solution | Solving Unbalanced AP | Processing of 2 jobs on n machines: Computational details | Graphical method for 2xn and mx2 games |
| | SLO-2 | Limitations of O.R. | Simplex Algorithm: Computational details | Maximization case in AP | Graphical method | Limitations of game theory |

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

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

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

Course Designers	
Experts from Academic	Internal Experts
Dr.M.A.Baskar, Professor & Head, Dept. Of Mathematics, Loyola college, Chennai	J.Madhumitha, SRMIST
Dr.P.Dhanavanthan, Professor & Head, Dept. Of statistics, Pondicherry University	

Course Code	UCS20D04J	Course Name	MULTIMEDIA AND ANIMATION	Course Category	E	Discipline Specific Elective	L	T	P	C
							4	0	4	6

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

Program Learning Outcome(PLO)

Course Learning Rationale (CLR):		The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1	Formulate a working definition of interactive multimedia																			
CLR-2	Demonstrate competence in using the authoring program HyperStudio																			
CLR-3	Demonstrate the use of animation, digitized sound, video control, and scanned images																			
CLR-4	Demonstrate the use of Netscape to access the Course Home Page and Tips and Tricks																			
CLR-5	Use basic instructional design principles in the development																			
CLR-6	Implementation of Design concepts																			

Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Scientific Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO – 1	PSO – 2	PSO – 3
CLO-1	Understand Multimedia works		3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2	Create a multimedia component using various tools and techniques		3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3	Import graphics and textures created on other applications into a multimedia software program		3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-	Create a movie using simple animation		3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5	Create an effective interactive site for use on the internet		3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6	Do simple scripting for a file		3	80	70	L	H	M	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	What Is Multimedia	Photoshop Introduction	Adjustments	Flash – Introduction	Introduction to Action Sciript
	SLO-2	Interactive Multimedia	Importance and Fundamentals	Retouching	Animation	Actions – Button
S-2	SLO-1	Advantages Of Interactive Multimedia	Opening Images	Tonal Adjustment	Interacting	Button Actions
	SLO-2	Where To Use Multimedia	Importing Images	Color Adjustment	Basic Concepts	Frame Action
S-3	SLO-1	Text ,Graphics	Resolution	Retouch by hand	Drawing Lines	Action scene
	SLO-2	Audio, Film, Video	Pixels	Smudge Tool	Shapes	Movie Clip
S-4	SLO-1	Understanding Text	Colour Models	Effects	Strokes	Symbols
	SLO-2	Typeface or Fonts	Colour Spaces	Filters	Fill	Browsers
S 5-8	SLO-1	Laboratory 1:Understanding Photoshop Environment, Learning the usage of tools in tool bar with sample images	Laboratory 4: Testing Laboratory Mode, Multichannel color mode, Edge Mask	Laboratory 7: Using Retouching Tools in a Image , Adjusting color and tone for a Image	Laboratory 10: Drawing spokes on a wheel and allow the wheel to rotate, Motion Tweening, Bouncing Ball	Laboratory 13: Automatic Slide show presentation and presentation with action script
	SLO-2					
S-9	SLO-1	Types of Fonts	Layers: Layer Properties	Blurring	Shapes and Brushes	Networks
	SLO-2	COMPUTER GRAPHICS	Layer Palette Menu	Sharpening	Selection	Beyond the Basic Actions
S-10	SLO-1	2D Computer Graphics	Painting Pixels	Special Effects	Transformation	Flash MX275: Introduction
	SLO-2	3D Computer Graphics	The Painting Tools	Distortion	Reshaping	Home Page
S-11	SLO-1	API	Paint Bucket, Gradient Tool	Merge layer	Importing Art Work	Usage of Tools
	SLO-2	UNDERSTANDING SOUND: Basic Sound Concept	Erasers :Normal	Guide Layer	Manipulating	Interface Elements
S-12	SLO-1	Audio Formats	Background Eraser	Effects	Images : Animation	Panels
	SLO-2	Quality Levels	Magic Eraser	Filters	Frame Animation	Tools
S 13-16	SLO-1	Laboratory 2: Understanding the usage of selection Tools: Marquee Selections and Lasso Selections	Laboratory 5: Clone an Image, Captain Kirk's Myophia Effect	Laboratory 8: Apply readymade effects to image using Filter menu	Laboratory 11: Text and Shape Tweening, Moving a bus from one end to other end of stage	Laboratory 14: Masking Effect and Water Masking
	SLO-2					
S-17	SLO-1	AIF Format	Fills and its Types	Layer Palette	Animating One Frame at a time	Layer Folders
	SLO-2	AU Format	Selection and allied operations	Layer effects	Motion Tweening	Layer Accessibility
S-18	SLO-1	EA Format	Marquee selection	Layer Sequence	Object,Text	Masking Layer
	SLO-2	MIDI Format	Cropping	Masking Effect	Symbols	Video
S-19	SLO-1	Mp3 Format	Lasso selections-Paths	Layer styles	Instances	User Interface Components

	SLO-2	UNDERSTANDING VIDEO	Combining	Background layer	Shape Tweening, Sound	Changing the Appearance of Component
S-20	SLO-1	Digital Video	Transforming	Adding image to background Layer	Bouncing Ball with Star shape	Transforming view
	SLO-2	Analog Video	Selections	Filters	Moving a Truck with wheel	Transition
S 21-24	SLO-1	Laboratory 3: Adjusting Brightness and Contrast, Isolating image from complex image	Laboratory 6: Apply antique framing for photo, Apply various transformations for the selection	Laboratory 9: Designing ID Card and Invitation Card using Layer and Layer effects, Gradients	Laboratory 12: Moving an object and text along a curved path	Laboratory 15: Creating buttons using action script, States of button
	SLO-2					

Learning Resources	1. Vishnu Priya Singh, (2006), "A Text Book of Multimedia", 1st Edition, Computech Publication Ltd, (UNIT I) 2. Nigel Chapman and Jenny Chapman, " Practical Multimedia ", 2nd Edition, Wiley – Dream Tech Pvt. Ltd. (UNITS II, III, IV & V)

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1.Mr. M.D.Bakthavachalam
		2.Mrs.S.Parimala

Course Code	UCS20D05J	Course Name	COMPUTER ORGANIZATION AND ARCHITECTURE	Course Category	E	Discipline Specific Elective	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Utilize the functional units of a computer																		
CLR-2 :	Analyze the functions of arithmetic Units like adders, multipliers , etc																		
CLR-3 :	Understand the concepts of Pipelining and basic processing units																		
CLR-4 :	Study about parallel processing and performance considerations.																		
CLR-5 :	Have a detailed study on Input-Output organization and Memory Systems.																		
CLR-6 :	Simulate simple fundamental units like half adder, full adder, etc																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	Identify the computer hardware and how software interacts with computer hardware	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Apply Boolean algebra as related to designing computer logic, through simple combinational and sequential logic circuits	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Analyze the detailed operation of Basic Processing units and the performance of pipelining	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Analyze the concepts of parallelism and multi-core processors	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Identify the memory technologies, input-output systems and evaluate the performance of memory system	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Identify the computer hardware, software and its interactions	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (hour)		**24**	**24**	**24**	**24**	**24**
S-1	SLO-1	Functional Units of a computer	Addition of Signed numbers	Fundamental concepts of basic processing unit	Parallelism	Memory systems- Basic concepts
	SLO-2	Operational concepts	Subtraction of Signed numbers	Performing ALU operation	Need of Parallelism	Memory hierarchy
S-2	SLO-1	Bus structures	Problem Solving	Execution of complete instruction	Types of Parallelism	Memory hierarchy
	SLO-2	Bus structures	Design of fast adders	Branch instruction	Applications of Parallelism	Memory technologies
S-3	SLO-1	Memory locations and addresses	Ripple carry adder	Multiple bus organization	Parallelism in Software	RAM
	SLO-2	Memory locations and addresses	Carry look ahead adder	Multiple bus organization	Instruction level parallelism	Semiconductor RAM
S-4	SLO-1	Memory operations	Multiplication of positive numbers	Hardwired control	Instruction level parallelism	ROM, Types
	SLO-2	Memory operations	Problem Solving	Generation of control signals	Data level parallelism	Speed, size cost
S 5-8	SLO-1	Laboratory 1: To recognize various components of PC- input Output systems Processing and Memory units	Laboratory 4:Study of TASM Addition and Subtraction of 8-bit number	Laboratory 7:Design of Half Adder Design of Full Adder	Laboratory 10: Study of Array Multiplier Design of Array Multiplier	Laboratory 13: Study of Carry Save Multiplication Program to carry out Carry Save Multiplication
	SLO-2					
S-9	SLO-1	Instructions	Signed operand multiplication	Micro-programmed control	Challenges in parallel processing	Cache memory
	SLO-2	Instruction sequencing	Problem solving	Microinstruction	Architectures of parallel Systems	Cache memory
S-10	SLO-1	Addressing modes	Fast multiplication	Microinstruction	Flynn's Classification	Mapping Functions
	SLO-2	Problem solving	Problem Solving	Micro-program Sequencing	Flynn's Classification	Replacement Algorithms
S-11	SLO-1	Introduction to Microprocessor	Bit pair recoding of Multipliers	Micro instruction with Next address field	SISD	Replacement Algorithms
	SLO-2	Introduction to Assembly language	Problem Solving	Basic concepts of pipelining	SIMD	Problem Solving
S-12	SLO-1	Writing of assembly language programming	Carry Save Addition of summands	Pipeline Performance	MIMD	Virtual Memory
	SLO-2	Writing of assembly language programming	Problem Solving	Pipeline Performance	MISD	Performance considerations of various memories
S 13-16	SLO-1	Laboratory 2: To understand how different components of PC are connected to work properly	Laboratory 5: Addition of 16-bit number Subtraction of 16-bit number	Laboratory 8: Study of Ripple Carry Adder Design of Ripple Carry Adder	Laboratory 11:Study of Booth Algorithm	Laboratory 14:Understanding Processing unit
	SLO-2					

		Assembling of System Components				
S-17	SLO-1	*ARM Processor: The thumb instruction set*	*Integer division*	*Pipeline Hazards*	*Uni-Processor*	*Input Output Organization*
	SLO-2	*Processor and CPU cores*	*Restoring Division*	*Data hazards*	*Multiprocessors*	*Input Output Organization*
S-18	SLO-1	*Processor and CPU cores*	*Solving Problems*	*Methods to overcome Data hazards*	*Multi-core processors*	*Need for input output devices*
	SLO-2	*Instruction Encoding format*	*Non Restoring Division*	*Instruction Hazards*	*Multi-core processors*	*Memory mapped IO*
S-19	SLO-1	*Memory Load and Store in ARM*	*Solving Problems*	*Hazards on conditional and Unconditional Branching*	*Memory in Multiprocessor Systems*	*Program controlled IO*
	SLO-2	*Memory Load and Store in ARM*	*Floating point numbers*	*Control hazards*	*Memory in Multiprocessor Systems*	*Interrupts - Hardware*
S-20	SLO-1	*Basics of IO operations*	*Operations*	*Control hazards*	*Cache Coherency in Multiprocessor Systems*	*Enabling and Disabling interrupts*
	SLO-2	*Basics of IO operations*	*Solving Problems*	*Influence of hazards on instruction sets*	*Cache Coherency in Multiprocessor Systems*	*Handling multiple Devices*
S 21-24	SLO-1	*Laboratory 3: To understand how different components of PC are connected to work properly Disassembling of System Components*	*Laboratory 6: Multiplication of 8-bit number Factorial of a given number*	*Laboratory 9: Study of Carry Look-ahead Adder Design of Carry Look-ahead Adder*	*Laboratory 12: Programs to carry out Booth Algorithm*	*Lab 15:Design of primitive processing unit*
	SLO-2					

Learning Resources	*1. Carl Hamacher, ZvonkpVranesie, SahwatZaky, (2015), " Computer Organisataion", 5thEdition McGraw-Hill* *2. Kai Hwang, Faye A.Briggs, (2016), "Computer Architecture and Parallel Processing", 3rd Edition, McGraw Hill, 2016* *3. Ghost T.K, (2011), "Computer Oraganization and Architecture", 3rd Edition, Tata McGraw-Hill* *4. P.Hayes, (2015), "Computer Architecture and Organization", 3rd Edition, McGraw Hill*	*5. William Stallings, (2015), "Computer Organization and Architecture-Designing for Performance", 10th Edition, Pearson Education* *6. David A. Patterson and John L Hennessy, (2014), "Computer Organization and Design- A Hardware Software Interface", 5thEdition, Morgan Kaufman,*

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

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

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

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

Course Code	UCS20D06J	Course Name	ARTIFICIAL INTELLIGENCE	Course Category	E	Discipline Specific Elective	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Discover problems that are agreeable to solution by AI methods.																		
CLR-2 :	Study the basics of designing intelligent agents that can solve general purpose problems																		
CLR-3 :	Discover appropriate AI methods to solve a given problem	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-4 :	Perform intellectual task as decision making, problem solving, perception, understanding																		
CLR-5 :	Formalize a given problem using different AI methods																		
CLR-6 :	Provides adaptive learning																		
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Demonstrate fundamental understanding of the history of artificial intelligence and its	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

	foundations																			
CLO-2 :	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Identify systems with Artificial Intelligence. evaluation of different algorithms on a problem formalization	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Use classical Artificial Intelligence techniques, such as search algorithms,	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Ability to apply Artificial Intelligence techniques for problem solving.	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Ability to learn the current Artificial Intelligence techniques.	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Introduction to Artificial Intelligence	Logical Reasoning-Introduction	Planning: designing programs to search for data or solutions to problems	Uncertain Knowledge and reasoning	Learning
	SLO-2	History of AI- AI Techniques	Knowledge Representation	Forward search and backward search	Quantifying uncertainty	Learning agents
S-2	SLO-1	Problem Solving with AI- AI models	Logical Agents: Knowledge based Agents	state-space search	Probability Theory: Uncertain Knowledge	Classification of learning
	SLO-2	Data Acquisition and Learning Aspects in AI	The Wumpus World & Logic	Represent the current state and goal state	Axioms of probability	Learning elements
S-3	SLO-1	Problem-Solving Process	Propositional logic	Problems to solve: Water Jug Problem	Bayes Theorem	Inductive Learning methods
	SLO-2	Formulating Problems	Propositional logic: Syntax & Syntax grammar	State representation: Initial, operator, goal state	Bayes' Rules & uses	Learning decision tree
S-4	SLO-1	Problem Types and Characteristics	Inference	Train travel problem	probabilistic Reasoning	Attribute based representation
	SLO-2	Problem Analysis and Representation	Implication by inference Types of reasoning	State representation: Initial, operator, goal state	Uncertainty: Causes of uncertainty:	Choosing an attributes
S 5-8	SLO-1	Laboratory 1:program showing the various possibilities involved in solving a water jug problem.	Laboratory 3:program for Tic Tac Toe game played by Single player against automated Computer player.	Laboratory 7:Program for building a magic square of Odd number of Rows and columns.	Laboratory 10:Program for solving A* shortest path algorithm.	Laboratory 13: Program which demonstrate the precedence properties of operators in C language.
	SLO-2					
S-9	SLO-1	Agents- Examples of Agents	First-Order logic	partial-order planning	Probability	Decision tree learning
	SLO-2	Types of agents	Syntax of First-Order logic	Basic representation Operator representation	Probability of occurrence	Hypothesis Spaces
S-10	SLO-1	General Search algorithm Uniformed Search Methods	Basic elements of First order logic Reducing first-order inference	planning graphs	Conditional probability	Information theory
	SLO-2	Heuristic Search Techniques	Quantifiers in First-order logic	Planning graph of feeding	Probability occurrence for the problem	Information gain

S-11	SLO-1	BFS, Uniform Cost Search	Inference in first order logic and Generalized rules for FOL	Uses of planning graph	Bayesian networks	Explanation based learning
	SLO-2	Depth First search , Depth Limited search (DLS)	FOL inference rules for quantifier	Planning graph example	Types of Bayesian Network	Hypothesis
S-12	SLO-1	Iterative Deepening search algorithm	Forward chaining	Graph plan algorithm	Building model op Bayesian Network	Statistical Learning methods
	SLO-2	Iterative Deepening search for DFS	Properties of forward chaining	Using planning graphs for heuristics	Directed Acyclic Graph	Naïve Bayes
S 13-16	SLO-1	Laboratory 2: Program for solving a water jug problem using Breadth first search and Depth first search (BFS & DFS).	Laboratory 5: Program for Tic Tac Toe game played by two different human players.	Laboratory 8: Program for building a magic square of Even number of Rows and columns.	Laboratory 11: Program which demonstrates Best First Search.	Laboratory 14: Program to calculate factorial of a number
	SLO-2					
S-17	SLO-1	Informed Search-Introduction	Fast conversion of forward chaining	planning and acting in the real world	Conditional probability	Instance base learning
	SLO-2	General tree search: Evaluation function	Properties of forward chaining Examples for forward chaining	Basic Planning	Bayesian Network Graph	Neural Networks
S-18	SLO-1	General graph search: Evaluation function	Backward Chaining	Real world: JOB shop scheduling	Inferences in Bayesian networks	Reinforcement Learning
	SLO-2	Generate and Test BFS	Properties of Backward chaining Examples for Backward chaining	Critical path method	Components of Bayesian Network	Elements of reinforce learning
S-19	SLO-1	Generate and Test A* algorithm	Unification	Forward march	Temporal models	Reinforcement learning problem
	SLO-2	Generate and Test AO* algorithm	Conditions for Unification & Unification algorithm	Backward march	Inference in temporal models	Agent environment interface
S-20	SLO-1	constraint satisfaction	Resolution for inference rule	Limited resources	Hidden Markov models	Steps for Reinforcement learning
	SLO-2	Perform the task for given CSP:	Steps for Resolution	Hierarchical Planning	HMM components	Problem solving methods for RL
S 21-24	SLO-1	Laboratory 3: program to find out route distance between two cities	Laboratory 6:program to implement Tower of Hanoi	Laboratory 9:program to implement five House logic puzzle problem	Laboratory 12:program to solve 8-Queens problem	Laboratory15:program to implement five House logic puzzle problem
	SLO-2					

Learning Resources	1.Russel. SandNorvig.P, (2003), "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education. Unit (I – V) 2.David Poole, Alan Mackworth, Randy Goebel,(2004),"Computational Intelligence : a logical approach", Oxford University Press. 3.Luger.G(2002), "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education. 4.Nilsson.J (1998), "Artificial Intelligence: A new Synthesis", Elsevier Publishers.

Learning Assessment

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1.Dr. S.Kanchana
		2.Mrs.E.Sweety Bakyarani

Course Code	*UJK20401T*	Course Name	**Professional Skills**	Course Category	*JK*	*Life Skill Course*	L	T	P	C
							2	0	0	2

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 : expose students to the requirements of job market																			
CLR-2 : develop resume building practice																			
CLR-3 : increase efficiency in speaking during group discussions																			
CLR-4 : prepare students for job interviews																			
CLR-5 : instill confidence in students and develop skills necessary to face audience																			
CLR-6 : develop speaking and presentation skills in students																			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 : understand the importance of resume preparation and build resume		3	80	70	M	M	L	L	M	H	-	-	-	M	H	L	H	H	H
CLO-2 : acquire group discussion skills		3	85	75	M	M	L	L	M	H	-	-	-	M	H	L	H	H	H
CLO-3 : face interviews confidently		3	85	80	M	M	L	L	M	H	-	-	-	M	H	L	H	H	H
CLO-4 : Ask appropriate questions during an interview		3	85	80	M	M	L	L	M	H	-	-	-	M	H	L	H	H	H
CLO-5 : understand various types of presentation and use presentation skills in projects		3	85	80	M	M	L	L	M	H	-	-	-	M	H	L	H	H	H
CLO-6 : build confidence during any presentation		3	85	80	M	M	L	L	M	H	-	-	-	M	H	L	H	H	H

Duration (hour)		6	6	6	6	6
S-1	SLO-1	Introduction of resume and its importance	Meaning and methods of group discussion	Meaning and types of interview (face to face, telephonic, video)	Types - Informative, Instructional, Arousing, Persuasive, Decision-making	PowerPoint presentation–body language and stage etiquettes
	SLO-2	Difference between a CV, Resume and Bio Data	Procedure of group discussion	Dress code, background research	Structure of a presentation – Introduction of the event, Introducing the speaker, vote of thanks	PowerPoint presentation–body language and stage etiquettes
S-2	SLO-1	Essential components of a good resume, common errors people make while preparing a resume	Group discussion – simulation	STAR Technique (situation, task, approach and response) for facing an interview	Working with audience – ice-breaking, Creating a 'Plan B',	PowerPoint presentation– practice session
	SLO-2	Resume building format	Group discussion – common errors	Interview procedure (opening, listening skills, closure, asking questions)	Getting the audience in the mood, working with emotions,	PowerPoint presentation– practice session

S-3	SLO-1	*Resume building using templates*	*Group discussion – types – Topic based*	*Important questions generally asked in an interview*	*Improvisation and unprepared presentations, man-woman view, feedback – appreciation and critique*	*PowerPoint presentation– practice session*
	SLO-2	*Resume building using templates*	*Group discussion – types – Case study based*	*Important questions generally asked in an interview*	*Improvisation and unprepared presentations, man-woman view, feedback – appreciation and critique*	*PowerPoint presentation– practice session*
S-4	SLO-1	*Resume building activity*	*Group discussion – practice session- Topic based*	*Mock interview – face to face*	*Power point presentation, skit, drama, dance, mime, short films and documentary – Dos and Don'ts*	*PowerPoint presentation– practice session*
	SLO-2	*Resume building activity - Feedback*	*Group discussion - Feedback*	*Mock interview- Feedback*	*Power point presentation, skit, drama, dance, mime, short films and documentary – Dos and Don'ts*	*PowerPoint presentation– practice session*
S-5	SLO-1	*Video resume – Tips and tricks*	*Group discussion – practice session- Topic based*	*Mock interview - face to face*	*PowerPoint presentation – content preparation*	*PowerPoint presentation– practice session*
	SLO-2	*Video resume – Do's and Don'ts*	*Group discussion - Feedback*	*Mock interview - Feedback*	*PowerPoint presentation–logical arrangement of content*	*PowerPoint presentation– practice session*
S-6	SLO-1	*Video resume – Templates*	*Group discussion – practice session- Case study based*	*Mock interview - face to face*	*PowerPoint presentation–using internet source, citations, bibliography*	*PowerPoint presentation– practice session*
	SLO-2	*Video resume – Templates*	*Group discussion - Feedback*	*Mock interview- Feedback*	*PowerPoint presentation–using internet source, citations, bibliography*	*PowerPoint presentation– practice session*

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

Learning Assessment

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

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
1. Ajay Zener, Director, Career Launcher	-	1. Mr Priyanand, Assistant Professor, CDC, E&T, SRMIST
		2. Ms Sindhu Thomas, Head in charge, CDC, FSH, SRMIST
		3. Ms Mahalakshmi, Assistant Professor, CDC, FSH, SRMIST

Course Code	USA20501J	Course Name	WEB PROGRAMMING	Course Category	C	Professional Core	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	To gain knowledge about Open Source Software																		
CLR-2 :	To Learn basic file and directory commands in Linux																		
CLR-3 :	To develop simple PHP programs																		
CLR-4 :	To understand working with arrays and functions																		
CLR-5 :	To learn various MySQL queries																		
CLR-6 :	To create database-driven applications																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	Create files using Vi editor	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Write PHP scripts to handle HTML forms.	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Write regular expressions including modifiers, operators, and metacharacters.	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Create PHP programs that use various PHP library functions, and that manipulate files and directories	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Analyze and solve various database tasks using the PHP language	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Analyze and solve common Web application tasks by writing PHP programs.	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Introduction to Linux	What Does PHP Do?	Introduction to Function	Introduction to Arrays	Introduction to MySQL Database
	SLO-2	Features of Linux	A Brief History of PHP	Calling a Function	Indexed Versus Associative Arrays	Connecting to and disconnecting from the server
S-2	SLO-1	Introduction to Linux Distributions	Language Basics	Defining a Function	Identifying Elements of an Array	Creating and using a database
	SLO-2	Widely used Linux distros	Lexical Structure	Variable scope	Storing Data in Arrays	Selecting a database
S-3	SLO-1	Open Source software	Introduction to Data Types	Passing parameters by value	Multidimensional Arrays	Creating a table
	SLO-2	Benefits of Open Source software	Scalar Types	Passing parameters by reference	Extracting Multiple Values	Loading data into a table
S-4	SLO-1	Linux Files	Compound Types	Default Parameters	Converting Between Arrays and Variables	Retrieving information from a table
	SLO-2	The File Structure	Special Types	Variable Parameters	Traversing Arrays	Selecting all data
S 5-8	SLO-1 SLO-2 SLO-3 SLO-4	Laboratory1: Learning to work with linux server	Laboratory 4: Writing Simple PHP Programs	Laboratory 7: Passing parameters to a function	Laboratory 10: Arrays	Laboratory 13: Creating Database, tables
S-9	SLO-1	Listing files	Defining Variables	Missing Parameters	Sorting	Selecting particular rows
	SLO-2	Working with ls command	Variable Scope	Return Values	Reversing an array	Selecting particular columns
S-10	SLO-1	Displaying Files	Introduction to Expressions and Operators	Variable Functions	Introduction to Object	Sorting rows
	SLO-2	Working with cat, more, less command	Arithmetic operators, Comparison operators, Bitwise operators	Anonymous Functions	Creating an Object	Date Calculation
S-11	SLO-1	Printing Files	Logical operators, Casting operators & Miscellaneous Operators	Introduction to Strings	Accessing Properties and Methods	Working with Null values
	SLO-2	Working with lpr	Operator precedence	Quoting String Constants	Declaring a Class	Pattern Matchin
S-12	SLO-1	Managing Directories	Introduction to Flow-Control Statements	Variable Interpolation	Declaring methods and properties	Counting Rows
	SLO-2	Working with mkdir, rmdir, cd and pwd commands	Working with If & Switch	Printing Strings	Declaring constant	Using more than one table

S 13-16	SLO-1	Laboratory2: Working with files and directory commands	Laboratory 5: Operators & Control Statements	Laboratory 8: Functions & Strings	Laboratory 11: Arrays & Objects	Laboratory 14: Working with various MySQL Queries
	SLO-2					
S-17	SLO-1	Listing directories	Working with While, for, foreach,	Accessing Individual Characters	Inheritance	Introduction to Working with MySQl Database using PHP
	SLO-2	ls command	Using exit, return, goto statements	Cleaning Strings	Interfaces	Connecting to MySQL database
S-18	SLO-1	File and directory operations	Including Code form another module	Encoding and Escaping	Traits	Querying database
	SLO-2	find, cp, mv, rm and ln commands	Working with include and require construct	Comparing Strings	Abstract Methods	Retrieving and displaying the results
S-19	SLO-1	Controlling Access to directories and files	Embedding PHP in Web Pages	Manipulating and Searching Strings	Constructors	Modifying data
	SLO-2	Working with chmod command	Standard (XML) Style, SGML Style	Introduction to Regular expression	Destructors	Deleting data
S-20	SLO-1	Introduction to Vi editor	ASP Style	Pattern matching and substituting new text for matching text	Introduction to Introspection	Designing simple database application
	SLO-2	Working with Vi editor	Script Style	Splitting a string into an array of smaller chunks	Examining an Object	
S 21-24	SLO-1 SLO-2 SLO-3	Laboratory 3: Working with file commands, Creating and modifying files using Vi Editor	Laboratory 6: Embedding PHP script in HTML	Laboratory 9: String Manipulation	Laboratory 12:: Introspection and Serialization	Laboratory 15: Developing Simple Database Applications

Learning Resources	1.Richard Petersen, (2006), "Linux : The Complete Reference" ,Sixth Edition 2.RasmusLerdorf, Kevin Tatroe, Bob Kaehms, RicMcGredy, (2002), "Programming PHP", O'REILLY	3.Lee Babin, Nathan A. Good, Frank M. Kromann, Jon Stephens (2005), "PHP 5 Recipes, A Problem Solution Approach", APrèss 4.VikramVaswani (2008), "PHP: A BEGINNER'S GUIDE", McGraw-Hill.

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

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1.Mr.M.Ramesh
		2.Dr.S.Sabeen

Course Code	USA20502J	Course Name	COMPUTER NETWORKS	Course Category	C	Professional Core	L	T	P	C
							4	0	2	5

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:				Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Understand the evolution of computer networks using the layered network architecture				Thinking	Proficiency	Attainment	al	of	Related Procedural Knowledge	Specializati	Utilize Skills in	Modeling	Interpret	Investigativ e Skills	Solving	Communica tion Skills	Analytical Skills	ICT Skills	Professiona l Behavior	Life Long Learning
CLR-2 :	Understand the addressing concepts and learn networks devices																			
CLR-3 :	Design computer networks using subnetting and routing concepts																			
CLR-4 :	Understand the error types, framing, flow control																			
CLR-5 :	Understand the various Medium Access Control techniques and also the characteristics of																			

	physical layer functionalities																
CLR-6 :	Know the algorithms behind the protocols that helps data transfer																

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																	
CLO-1 :	Acquire the basics of computer network and its architecture	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Acquire the knowledge of various networks devices and addressing methods	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Design the network routing methods	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Find the error type that may happen during data transportation	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Understand the physical layer functions and components	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Speak on the topology chosen for a architecting a network that an organization demands	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		18	18	18	18	18
S-1	SLO-1	Evolution of Computer Networks	Addressing Types	Network layer functionalities	Introduction- Error Types	Physical layer
	SLO-2	The Internet	Physical , Logical addresses	Delivery vs Forwarding	Types of Error	Overview of physical layer
S-2	SLO-1	The Internet today	Port, specific addresses	Unicast routing protocols	Error Control Mechanism	Functionalities
	SLO-2	Data communications	IPV4 addresses	Intra domain routing	Error Detection	Analog and Digital
S-3	SLO-1	Components	Notations	Inter domain routing	Error Correction	Data, signals
	SLO-2	Networks	Classful addressing	Multicast routing protocols	Error Detection vs Error Correction	Transmission impairment
S-4	SLO-1	Physical structures	Categories of Classful addressing	Application of Multicast routing protocols	Parity	Attenuation
	SLO-2	Categories of Networks	Categories	Distance vector routing	Checksum	Distortion, Noise
S 5-8	SLO-1	Laboratory 1: Introduction of packet racer	Laboratory 4:IP addressing and subnetting(VLSM)	Laboratory 7: Implementation of static routing	Laboratory 10: Implementation of EIGRP configuration	Laboratory 13: Implementation of Single-Area OSPF link costs and interface
	SLO-2					
S-9	SLO-1	Network Models	Categories of addressing	Application of Distance vector routing	Hamming code	Performance metrics
	SLO-2	Protocols	Classless addressing	Node instability issues	Application of Hamming code	Bandwidth, Delay
S-10	SLO-1	Standards	Categories of Classless addressing	RIPv1	Correction vs Detection	Throughput, Jitter

	SLO-2	Standards Organizations	Prefix usage	RIPv2	Framing	Wireless 802.11
S-11	SLO-1	Layered Tasks	Network Address Translation (NAT)	Difference of RIPV1 and RIPV2	Flow control	Addressing mechanism
	SLO-2	Hierarchy	Types of NAT	Link state routing	Error control	Transmission Media
S-12	SLO-1	OSI Model	NAT Terminology	Principle of Link state routing	ARQ	Twisted pair
	SLO-2	Layered Approach	Translation table	Dijkstra's Algorithm	ARQ types	Coaxial
S 13-16	SLO-1 SLO-2	Laboratory 2: Implementation of various Topology creation	Laboratory 5: Configuring Interfaces	Laboratory 8: Implementation of Default routing	Laboratory 11:Implementation of EIGRP bandwidth and adjacencies	Laboratory 14:Implementation of Multi-Area OSPF with stub areas and authentication
S-17	SLO-1	Peer-Peer Approach	IPV6 addresses	Applications of Dijkstra's Algorithm	Random access	Fiber Optics
	SLO-2	Layers in the OSI Model	Types, Notation	OSPF	ALOHA	Architecture of IEEE 802
S-18	SLO-1	OSI Reference Model	VLSM	EIGRP	CSMA	IEEE 802.15
	SLO-2	Comparison of Layers	Masking	Path vector routing	CSMA/CD	Architecture
S-19	SLO-1	TCP/IP Protocol Suite	CIDR	Applications of Path vector routing	CSMA/CA	IEEE 802.15.4
	SLO-2	TCP/IP Reference Model	Address Aggregation	Stabilized routing table creation for AS	Collision Detection VS Collision Avoidance	Architecture
S-20	SLO-1	Comparison with OSI Model	Networking devices	BGP	Controlled access	IEEE 802.16
	SLO-2	Comparison of the OSI and TCP/IP Reference Models	Router,Switch,Hub,Bridges	BGP sessions	Channelization	Architecture
S 21-24	SLO-1 SLO-2	Laboratory 3: Implement the categories of network(LAN,MAN,WAN)	Laboratory 6: Basic router configuration, creating passwords	Laboratory 9: Implementation of RIPv1,v2	Laboratory 12: Implementation of EIGRP authentication and timers	Laboratory 15: Redistribution Between EIGRP and OSPF

Learning Resources	1.BehrouzA.Forouzan,(2010), "Data Communications and Networking", 5th Edition 2.ToddLammle,(2011), "CCNA Study Guide", Seventh Edition 3.WilliamStallings,(2010), "Data and Computer Communications", Ninth Edition

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

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

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

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

Course Code	*USA20503J*	Course Name	SOFTWARE ENGINEERING AND TESTING	Course Category	C	*Professional Core Course*	L	T	P	C
							4	0	2	5

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

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

		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	*Familiarize the software life cycle models and software development process*																			
CLR-2 :	*Understand the various techniques for requirements, planning and Testing*																			
CLR-3 :	*Examine the basic methodologies for software design, development, testing*																			
CLR-4 :	*Manage user expectations and software development team*																			
CLR-5 :	*Acquire the latest industry knowledge like agile for development*																			
CLR-6 :	*Usage of tools and comply the global standards for testing*																			

Column headers (learning): Thinking, Expected Proficiency (%), Expected Attainment (%)

PLO headers: Engineering Knowledge, Problem Analysis, Design & Development, Design, Modern Tool Usage, Society & Culture, Environment & Sustainability, Ethics, Individual & Team Work, Communication, Project Mgt. & Finance, Life Long Learning, PSO – 1, PSO – 2, PSO – 3

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																	
CLO-1 :	Identify the process of project life cycle model and process	2	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-2 :	Analyze and specify software requirements through a productive working Relationship Customers.	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-3 :	Design the system based on Functional Oriented and Object Oriented Approach for Software Design.	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-4 :	Develop the correct and robust code for the software products	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-5 :	Perform by applying the test plan and various testing techniques	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-6 :	Analyze the key issues of Software maintenance	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-

Duration (hour)		24	24	24	24	24
S-1	SLO-1	The Evolving Role of Software	Computer-Based Systems	Principles of Testing	Integration testing	Performance Testing
	SLO-2	Software Engineering Definition	The System Engineering Hierarchy – System Modeling	Introduction-Testing Definition	Top down Integration testing	Factors of Governing
S-2	SLO-1	Software Characteristics	System Simulation	Phases of software	Bottom up Integration testing	Regression testing
	SLO-2	Software Applications and A Crisis	Comparison of various software Development	Error, Fault, Bug-Failure of the system –Comparison of the terms	Bi-Directional Integration	Types of regression testing
S-3	SLO-1	Software Myths	Business Process Engineering: An Overview	Types of testing-	System Integration	Software testing strategy
	SLO-2	Types Of Myths	Requirements Engineering process	Quality assurance	System Acceptance Testing	Best practice in regression testing
S-4	SLO-1	Software Engineering : Layered Technology	Software requirements specification	Quality Control	Functional testing	Methodology for Performance Testing
S 5-6	SLO-1	Laboratory 1 :Problem Statement Preparation	Laboratory 4 : Software Requirement Specification Document Preparation	Laboratory 7 : Preparation of DFD of any Project	Laboratory 10: Test Case Design	Laboratory 13 : Testing – Usage of Text
	SLO-2					
S-7	SLO-1	Software Process	Characteristics of Good Requirements	Testing verification and validation	Non Functional testing	Tools for Performance Testing

	SLO-2	*Software Process Models*	*Types of Requirements*	*White Box Testing*	*Functional Vs Non Functional Testing*	*Challenges for Performance Testing*
S-8	SLO-1	*Linear Sequential Model*	*Requirements Elicitation*	*Techniques of White Box Testing*	*System Testing*	*Performing Initial Test, Understanding the Criteria*
	SLO-2	*Advantages And Disadvantages*	*Requirements Analysis and Negotiation*	*Black box testing*	*Design and Architectural Verification*	*Classifying Test Cases.*
S-9	SLO-1	*Prototyping Model*	*Requirement Documentation*	*Techniques of Black box testing*	*Deployment Testing*	*Resetting the Test Cases*
	SLO-2	*Advantages And Disadvantages*	*Requirement Specification and Analysis*	*Static Testing*	*Beta Testing*	
S-10	SLO-1	*Rapid Application Development Model*	*Requirement Review, Validation*	*DYNAMIC Testing*	*Certification, Standards*	*Concluding the Results of Regression Testing*
	SLO-2		*Software Requirement Specification and System Requirement Specifications*			
S 11-12	SLO-1	*Laboratory 2 :Problem Statement Preparation*	*Laboratory 5: Drawing E-R Diagram for any project*	*Laboratory 8 : Preparation of Use case diagram of any Project*	*Laboratory 11 : l Testing – Calculator*	*Laboratory 14 : Testing Sorting*
	SLO-2					
S-13	SLO-1	Evolutionary Process Models	Characteristics of Good SRS Document	Challenges in white box testing	Testing for Compliance	Configuration testing
	SLO-2	Incremental Model	Requirement Management	Black Box Testing	Scalability Testing	compatibility testing
S-14	SLO-1	Advantages and Disadvantages	Software Prototyping	Techniques of Black Box Testing	Reliability testing	Test plan with debugging
	SLO-2	Spiral Model, WIN WIN Model	Selecting the prototyping approach	Structural testing	Stress testing	Levels of testing
S-15	SLO-1	Concurrent Development Model	Specification Principles, Representation	Static testing	Acceptance Testing	Testing tools
	SLO-2	Component Based Development	Specification Review	Verification & Validation Techniques	Acceptance Criteria	Key Issues in Software maintenance
S-16	SLO-1	Comparison of Process models	Characteristics of Good E-R Diagrams	Cyclomatic complexity	Selecting Test Cases	Examples University Previous Question Papers Discussion
	SLO-2	Advantages and Disadvantages	SRS Document	Control flow graph	Executing Tests	
S 17-18	SLO-1	*Laboratory 3 : Software Requirement Specification Document Preparation*	*Laboratory 6: Drawing E-R Diagram for any project*	*Laboratory 9: Test Case Design*	*Laboratory 12 : Testing – Mark sheet*	*Laboratory 15 : Testing – Login Form*
	SLO-2					

Learning Resources	*1.Roger S. Pressman, (2001), "Software Engineering ", Fifth edition, McGraw-Hill Higher Education - A Division of The McGraw-Hill Companies.*	*3. William E. Perry (2006), "Effective Methods of Software Testing", 3rd Ed, Wiley India.*

	2.*Srinivasan Desikan and Gopalasamy Ramesh, "Software Testing for Principles and Practices", Pearson Education.*	4.*Renu Rajani, Pradeep Oak (2007), "Software Testing", TMH*

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1.*Mrs.A.Pavithra*
		2.*Mrs. S.Parimala*

Course Code	UCS20S03L	Course Name	ANDROID BASICS	Course Category	S	Skill Enhancement Elective	L	T	P	C
							0	0	2	1

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Develop mobile applications																		
CLR-2 :	Design UI for activities of mobile applications																		
CLR-3 :	Get familiarized with broadcast receivers and Internet services																		
CLR-4 :	Work with SQLite Database and content providers																		
CLR-5 :	Work on interactive activities that comprises an application																		
CLR-6 :	tested application (using emulator) and export the application to a mobile phone																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	develop android activities that include date, time, toast,	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	develop activities involving interactive components (UI)	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	create activities that makes use of images, sound files	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	able to create a contact list that simulates a kind of the one in mobile phones (SQlite)	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	make use of spinners, progress bar to simulate loading files with respect to size of file , time and speed of network	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	export the activities to the mobile phone and cheer up the work of his own	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		6	6	6	6	6
S-1	SLO-1	Mobile Application development	Layouts - introduction	Picker view – time picker	Displaying Menus – Options menu	Data persistence
	SLO-2	Mobile Application trends	Linear, Scrollview	Date picker	Program Explanation	Types of Data persistence
S-2	SLO-1	Android overview	Absolute,Table,	Listviews – list view	Context menu	Shared User preferences
	SLO-2	Android versions	Relative,Frame	Spinner view	Program Explanation	Program Explanation
S-3	SLO-1	Android open stack	Resize and reposition	Web view	Helper methods for menus	Managing data using SQLite
	SLO-2	features	Screen orientation	Displaying pictures with views	Program Explanation	Program Explanation

S-4	SLO-1	Setting up Android environment (Eclipse, SDK, AVD)	Views: Textview, EditText, Button, ImageButton	Gallery	SMS Messaging	User defined content providers
	SLO-2	Simple Android application development	Checkbox	ImageView	Broadcasting and service	Program Explanation
S-5	SLO-1	Anatomy of Android applications	ToggleButton, RadioButton	ImageSwitcher	Sending SMS	Location based services: Display map
	SLO-2	Activity and Life cycle	RadioGroup	Simple program for image switcher	Program Explanation	Program Explanation
S-6	SLO-1	Implicit Intent	ProgressBar	Gridview	Receiving SMS	zoom control
	SLO-2	Explicit Intents	AutocompleteText	Simple program for grid view	Program Explanation	Program Explanation

Learning Resources	1.WeiMeng Lee (2012), "Beginning Android Application Development", Wrox Publications 2.EdBurnette (2010), "Hello Android: Introducing Google's Mobile Development Platform", The Pragmatic Publishers, Third Edition	3.Reto Meier, (2012), "Professional Android 4 Application Development", Wrox Publications 4.ZigurdMednieks, Laird Dornin, Blake Meike G, Masumi Nakamura, (2011), "Programming Android: Java Programming for the New Generation of Mobile Devices", OReilly

Learning Assessment

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1. Dr.S.Umarani
		2. Mr.U.Udayakumar

Course Code	UCS20S04L	Course Name	VISUALIZATION TOOL	Course Category	S	*Skill Enhancement Elective*	L	T	P	C
							0	0	2	1

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

Course Learning Rationale (CLR):	*The purpose of learning this course is to:*	Learning			Program Learning Outcomes (PLO)														
CLR-1 :	Analyze and visualize data	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Navigate to data sources. Download data in proper format																		
CLR-3 :	Create visualizations that accurately represent the source dataset																		
CLR-4 :	Use Tableau to perform various types of analysis on data sets																		
CLR-5 :	Data visualizations that demonstrates an understanding of data																		
CLR-6 :	*Use various methods for data visualization*	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning

Course Learning Outcomes (CLO):	*At the end of this course, learners will be able to:*																		
CLO-1 :	Design effective data visualizations in order to provide new insights	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Find and select appropriate data visualization in order to create a better understanding of the data	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Create Heat map, word cloud and different type of charts as visualization	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Cite data from other sources in visualizations and documentation	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Properly document and organize data and visualizations	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	*Create dashboard for data visualization*	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (hour)		06	06	06	06	06
S-1	SLO-1	Introduction to Tableau What is Tableau	Data Connection Details – Connecting to various data source	Top 10 Chart Types – Bar chart	Tableau maps –Geocoded Fields – Geographic Hierarchies and Ambiguity	Creating Dashboards- Creating a simple Dashboards – Tiled Placement
	SLO-2	Tableau User Interface –The data window	Adding multiple tables from the same database	Line / Area chart – Tableau forecasting	Custom Geocoding	Floating Placement, Associated Dashboard elements
S-2	SLO-1	Shelves & Cards	Joining multiple tables from the same database	Pie chart, text table / cross tab	Background Maps and Layers : Maps options	Advanced Dashboard elements – Layout Container, Blank
	SLO-2	Basic Tableau Design Flow	Customizing your view of the data	Scatter plot , Bubble Chart	Web map Services	Text , Image , Webpage
S-3	SLO-1	Basic Visualization Design using show me	Modifying Tableaus default field	Bullet Group, Box Plot	Mapping and Mark types	Setting Dashboards and Element size
	SLO-2	Choosing Mark Types	Assignments	Tree map	Custom Background Images	Dashboards Actions
S-4	SLO-1	Color,Size,Shapes and Label options – Choosing color options	Hiding, Renaming and Combining fields	Word cloud	Calculating fields, Table Calculations and Statistics – Creating Calculate fields	Distributing and Sharing your Visualization – Exporting worksheets and Dashboards- Printing to PDF format
	SLO-2	Setting Mark Size Text tables Mark Labels	Changing default field appearance	Interacting with the viewer - Filtering data, Basics of filtering, Interactive filtering	Numeric calculations, String Manipulations, Date calculations	Exporting Worksheet Data
S-5	SLO-1	Choosing shapes	Using Hierarchies , Groups and Sets	Quick filtering , Parameters – Creating parameters	Logic Constructs, Creating Binned fields	Exporting Worksheet Image
	SLO-2		Saving and Sharing Metadata	Displaying a parameters – Using a parameter in a worksheet	Table Calculations	Exporting Dashboards Images
S-6	SLO-1	Formatting Options	Extracting data, Data Blending	Worksheet Actions – Filter Actions	Reference Lines, Bands & Distributions	Using Tableau Reader
	SLO-2		Moving from text to production databases	Highlight Actions , URL Actions	Trend Lines	Publishing to the Web

Learning Resources	1.George Peck," Tableau 8 : The Official Guide ",First edition, McGraw Hill Professional, 2013.,	1.Website: www.tableaureferenceguide.com

Learning Assessment

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

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

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

Course Code	*UES20AE1T*	Course Name	ENVIRONMENTAL STUDIES	Course Category	AE	Ability Enhancement Courses	L	T	P	C
							3	0	0	3

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:		Learning			Program Learning Outcomes (PLO)														
CLR-1 :	To teach the importance of environment		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To impart the knowledge about ecosystem																			
CLR-3 :	To teach about Biodiversity																			
CLR-4 :	To create awareness about environmental pollution																			
CLR-5 :	To understand about Environment Protection																			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	PSO -1	PSO -2	PSO-3
CLO-1 :	To gain knowledge on the importance of natural resources and energy	2	75	60	H	H	H	-	-	-	-	-	-	-	-	-	-	-	-
CLO-2 :	To understand the structure and function of an ecosystem	2	80	70	-	H	-	H	-	-	-	-	-	-	-	-	-	-	-
CLO-3 :	To imbibe an aesthetic value with respect to biodiversity, understand the threats and its conservation and appreciate the concept of interdependence	2	70	65	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CLO-4 :	To understand the causes of types of pollution and disaster management	2	70	70	H	-	H	H	H	-	-	-	-	-	-	-	-	-	-
CLO-5 :	To observe and discover the surrounding environment through field work	2	80	70	-	H	-	H	-	-	-	-	-	-	-	-	-	-	-

Duration (hour)		9	9	9	9	9
S-1	SLO-1	Environmental Studies- Concept	Concept of an ecosystem	Biodiversity at Global, National And Local Levels	Causes, Effects and Control Measures of Nuclear hazards	Need for equitable utilization
	SLO-2	Scope and Importance of Environmental Studies	Ecosystem degradation and Resource utilization	India as a Mega Diversity Nation		Equity – Disparity
S-2	SLO-1	Need for public awareness.	Structure and Functions of an ecosystem	Threats to biodiversity: habitat loss, poaching of wildlife	Solid Waste Management Causes, Effects and Control Measures of Urban and Industrial Waste	Urban – rural equity issues
	SLO-2	Institutions in Environment	Producers, consumers and decomposers	man-wildlife conflicts		The need for Gender Equity
S-3	SLO-1	People in Environment	Energy flow in the ecosystem	Endangered species of India	Role of Individuals In Pollution Prevention	Preserving resources for future generations
	SLO-2	Awareness about Environmental Studies	The water cycle , The Carbon cycle , The Oxygen cycle , The Nitrogen cycle , The energy cycle and, Integration of cycles	Endemic species of India		The rights of animals

				in nature		
S-4	**SLO-1**	*Introduction to natural resources- Associated Problems*	*Ecological succession*	*Environmental Pollution- Definition*	*Disaster management- Nature Floods, Earthquakes*	*The ethical basis of environment education and awareness*
	SLO-2	*Renewable and Nonrenewable resources*	*Food chains, Food webs and Ecological pyramids*			
S-5	**SLO-1**	*Forest resources*	*Ecosystem, Introduction, Types, Characteristic features, Structure and functions*	*Causes, Effects and Control Measures of Air Pollution*	*Cyclones Landslides*	*The conservation ethic and traditional value systems of India*
	SLO-2	*Water Resources*	*Forest ecosystem*			
S-6	**SLO-1**	*Mineral Resources*	*Grassland ecosystem*	*Causes, Effects and Control Measures of Water Pollution*	*Social Issues and the Environment From Unsustainable to Sustainable Development*	*Wasteland Reclamation*
	SLO-2	*Food Resources*	*Desert ecosystem*			
S-7	**SLO-1**	*Energy Resources*	*Aquatic ecosystems (ponds, lakes, streams)*	*Causes, Effects and Control Measures of Soil Pollution*	*Water Conservation*	*Climate change & Global warming*
	SLO-2	*Land Resources*	*Aquatic ecosystems (rivers, estuaries, oceans)*			
S-8	**SLO-1**	*Renewable and non-renewable resources- Wind*	*Value Of Biodiversity*	*Causes, Effects and Control Measures of Marine pollution*	*Rain Water Harvesting Watershed*	*Acid rain & Ozone layer depletion*
	SLO-2	*Renewable and non-renewable resources- geothermal*	*Consumptive Value And Productive Value*			
S-9	**SLO-1**	*Renewable and non-renewable resources- Solar*	*Social Value and Ethical Value*	*Causes, Effects and Control Measures of Noise Pollution*	*Environmental Ethics: Issues and Possible Solutions*	*Nuclear Accidents and Nuclear Holocaust*
	SLO-2	*Renewable and non-renewable resources- Biomass*	*Aesthetic Value and Option Value*	*Causes, Effects and Control Measures of Thermal Pollution*	*Resource consumption patterns*	

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

Learning Assessment

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

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

Course Designers		
Experts from Industry	**Experts from Academic**	**Internal Experts**
1. Mr. Suresh S, Program Head, Hello FM	1. Dr. G Balasubramania Raja, Prof & Head, Manonmaniam Sundranar University Mail- gbs_raja@yahoo.com	1. Dr. Rajesh R, Head, SRM IST 2.Dr.S.Albert Antony Raj, Associate Professor and Head, SRMIST

Course Code	UJK20501T	Course Name	Leadership and Management Skills	Course Category	JK	Life Skill Courses	L	T	P	C
							2	0	0	2

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	help students to develop essential skills to influence and motivate others																		
CLR-2 :	Inculcate emotional and social intelligence and integrative thinking for effective leadership	Thinking	Proficiency	Attainment	ntal Knowledge	on of Related	Discipline	al Knowledge	Specializa	Utilize	Knowledge Skills in	Modeling	Interpret	Investigat ive Skills	Solving	cation	Analytical Skills	ICT Skills	nal	Life Long Learning
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*																	
CLR-6 :	*manage competency-mix at all levels for achieving excellence with ethics*																	

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*	3	80	75	L	M	H	-	M	M	-	-	-	M	H	L	-	H	H
CLO-2 :	*learn and demonstrate a set of practical skills such as time management, self-management, handling conflicts, team leadership, etc*	3	80	75	L	M	H	-	M	M	-	-	-	M	H	L	-	H	H
CLO-3 :	*understand the basics of entrepreneurship and develop business plan*	3	75	70	L	M	H	-	M	M	-	-	-	M	H	L	-	H	H
CLO-4 :	*apply the design thinking approach for leadership*	3	75	70	L	M	H	-	M	M	-	-	-	M	H	L	-	H	H
CLO-5 :	*appreciate the importance of ethics and moral values for making of a balanced personality*	3	75	70	L	H	H	-	M	M	-	-	-	M	H	L	-	H	H
CLO-6 :	*be an integral human being*	3	75	70	L	H	H	-	M	M	-	-	-	M	H	L	-	H	H

Duration (hour)		**6**	**6**	**6**	**6**	**6**
S-1	SLO-1	Leadership - definition	Team building	Management – definition	*Women in management*	*Entrepreneurship*
	SLO-2	Leadership – qualities	Team dynamics	Manager – traits	*Global gender perspective in business. Do women make good managers? - discussion*	*Entrepreneurship*
S-2	SLO-1	Leadership – styles	Work delegation	Scheduling work	*Confronting problems faced by women managers – case study*	*Successful Indian entrepreneurs – case study*
	SLO-2	Leadership – styles	Work delegation – activity	Scheduling work – activity	*Confronting problems faced by women managers – case study*	*Successful Indian entrepreneurs – case study*
S-3	SLO-1	*Difference between leader and boss*	Decision making	*Strategic planning*	*Successful women managers – documentary screening*	*Successful women entrepreneurs – case study*
	SLO-2	*Case study (based on leadership styles)*	Decision making - activity	*Strategic planning*	*Successful women managers – documentary screening*	*Successful women entrepreneurs – case study*
S-4	SLO-1	*Case study (based on leadership styles)*	Motivation	Change management	*Women labour force in work place*	*Ethics – definition*
	SLO-2	*Case study (based on leadership styles)*	Motivating for results	Change management – activity	*Problems faced by women labour force in work place - case study*	*Corporate ethics*
S-5	SLO-1	Leadership in diverse	Argumentation, Persuasion	*Energy management*	Sexual harassment of women	*Essential elements of business ethics*

		organizational structures, cultures and communications			at workplace (prevention, prohibition, and redressal) Act, 2013	
	SLO-2	Leadership in diverse organizational structures, cultures and communications	Negotiation , Networking	*Novel ways to manage energy in work place – activity*	Documentary screening - Sexual harassment of women at workplace	*Activity (students formulate ethical code of their business organization)*
S-6	SLO-1	Leading the organisation through stability and turbulence	Budget planning	*Work force management*	Transgender persons protection of rights act, 2019	*Ethical dilemma*
	SLO-2	Case study	Taking risk	*Grievance redressal policy in organisations*	Documentary screening – based on inclusiveness of the third gender in workplace	*Ethical dilemma - case study*

Learning Resources	*1. Craig E Johnson, Meeting the ethical challenges of leadership, Sage publications, 2018* *2. Allan R Cohen, David L Bradford, Influence without authority, Wiley, 2018* *3. T V Rao, Managers who make a difference: Sharpening your management skill, Random house India, 2016*	*4. Alexander Osterwalder, Business Model Generation,Wiley, 2013* *5. Deborah Tannen, Talking from nine to five: Women and men in the workplace, Harper Collins publishers, 2010* *6. Amish Tandon, Law of sexual harassment at workplace: Practice and procedure,Niyogi books, 2017* *7. Rashmi Bansal, Connect the dots, Westland books, 2012*

Learning Assessment

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

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
1. Ajay Zener, Director, Career Launcher	-	*1. Ms Sindhu Thomas B, Assistant Professor & Head in Charge, CDC, FSH, SRMIST*
		2. Mr Rajsekar, Assistant Professor, CDC, FOM, SRMIST

Course Code	USA20601J	Course Name	PYTHON PROGRAMMING		Course Category	C	Professional Core		L	T	P	C
									4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:		Learning				Program Learning Outcomes (PLO)														
		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Describe the core syntax and semantics of Python programming language.																			
CLR-2 :	Discover the need for working with the strings and functions.																			
CLR-3 :	Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.																			
CLR-4 :	Indicate the use of regular expressions and built-in functions to navigate the file system.																			
CLR-5 :	Infer the Object-oriented Programming concepts in Python.																			
CLR-6 :	Understand Event Driven Programming																			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	Develop, document, and debug modular python programs to solve computational problems	3	80	70		L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Select a suitable programming construct and data structure for a situation.	3	85	75		M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Use built-in strings, lists, sets, tuples and dictionary in applications.	3	75	70		M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Define classes and use them in applications	3	85	80		M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Use files for I/O operations.	3	85	75		H	H	M	H	L	-	-	-	M	L	-	H	-	-	-

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	An introduction to python programming	The Structure of Strings	Introduction to Lists	Introduction to function	Introduction to classes
	SLO-2	Structure of a Python program	The Subscript Operator	List literals	Functions as Abstraction Mechanisms	Design with Classes
S-2	SLO-1	understanding Python interpreter	Program using subscript operator	Basic list operators	Functions Eliminate Redundancy	Objects and Classes
	SLO-2	understanding Python Shell	Slicing for Substrings	Replacing an Element in a List	Functions Hide Complexity	An example for class
S-3	SLO-1	Datatypes	Program for slicing substrings	Replacing an Element in a List	Functions Support General Methods with Systematic Variations	Docstrings
	SLO-2	Example program using all data types	Testing for a Substring with the in Operator	Example program to Replace an Element in a List	Functions Support the Division of Laboratoryor	Method Definitions
S-4	SLO-1	String literals	Program using substring	List Methods for Inserting Elements	Defining a Recursive Function	The init Method
	SLO-2	Escape Sequences	The Positional System for Representing Numbers	Program to List Methods for Inserting Elements	Tracing a Recursive Function	Instance Variables
S 5-8	SLO-1	Laboratory 1: Write a Python code to display system information using pywhois	Laboratory 4:Make a simple calculator	Laboratory 7: Program to Transpose a Matrix Program to List Methods for Inserting Elements	Laboratory 10: Program using recursive function	Laboratory 13: Program using classes and methods
	SLO-2					
S-9	SLO-1	String Concatenation	Converting binary to decimal	List Methods for Removing Elements	Using Recursive Definitions to Construct Recursive Functions	The str Method
	SLO-2	Variables and the assignment statement	Program to convert binary to decimal	Searching a List	Recursion in Sentence Structure	Accessors
S-10	SLO-1	Example program using variables	Converting decimal to binary	Sorting a List	Infinite Recursion	Mutators
	SLO-2	Program Comments and Doc Strings	Program to convert decimal to binary	Mutator Methods	The Costs and Benefits of Recursion	The Lifetime of Objects
S-11	SLO-1	Numerical Datatypes	String Methods	Aliasing	Managing a Program's Namespace	Rules for Defining a Simple Class
	SLO-2	Character sets	Program using string method	Aliasing side effects	Module Variables, Parameters, and Temporary Variables	Rational Number Arithmetic and Operator Overloading
S-12	SLO-1	Arithmetic expressions	Octal and Hexadecimal Numbers	Equality: Object Identity	Scope	Comparison Methods
	SLO-2	Understanding error messages	Text Files and Their Format	Structural Equivalence	Lifetime	Equality and the eq Method
S 13-16	SLO-1	Laboratory 2: The Magic 8 Ball is a toy used for fortune-telling or seeking advice.	Laboratory 5: Find the Factorial of a Number Python Program to Convert Decimal to Binary, Octal and Hexadecimal	Laboratory 8: Using a List to Find the Median of a Set of Numbers Program using sorting and searching	Laboratory 11: Write the code for a mapping that generates a list of the absolute values of the numbers in a list named numbers.	Laboratory 14: Python Program for Operator overloading
	SLO-2					
S-17	SLO-1	Logical operators	Writing Text to a File	Tuples	Default (Keyword) Arguments	Using pickle for Permanent

						Storage of Objects
	SLO-2	Definite iteration : For loop	Writing Numbers to a File	Creation of several tuples	Functions as First-Class Data Objects	Input of Objects and the try-except Statement
S-18	SLO-1	Example program using for loop	Reading Text from a File	Dictionaries	Mapping	Inheritance Hierarchies and Modeling
	SLO-2	Formatting text for output	Reading Numbers from a File	Dictionary Literals	Filtering	Polymorphic Methods
S-19	SLO-1	Selection : if and if else statement	Example program to read and write text and numbers	Adding Keys and Replacing Values	Reducing	Abstract Classes
	SLO-2	Example program using if and if else	Accessing Files and Directories on Disk	Accessing Values	Using lambda to Create Anonymous Functions	The Costs and Benefits of Object-Oriented Programming
S-20	SLO-1	Conditional iteration :while loop	Manipulating Files and Directories on Disk	Removing Keys	Creating Jump Tables	Event-Driven Programming
	SLO-2	Example program using while loop	Example program to access and manipulate files	Traversing a Dictionary	Example program using functions	Example for Event-Driven Programming
S 21-24	SLO-1	Laboratory 3: Check whether a number is prime or not, Python Program to Generate a Random Number	Laboratory 6: Program to read and write text and numbers	Laboratory 9: When the user enters a statement, the program responds in one of two ways: 1 With a randomly chosen hedge, such as "Please tell me more." 2 By changing some key words in the user's input string and appending this string to a randomly chosen qualifier. Thus, to "My teacher always plays favorites," the program might reply, "Why do you say that your teacher always plays favorites?"	Laboratory 12: Write the code for a filtering that generates a list of the positive numbers in a list named numbers. You should use a lambda to create the auxiliary function.	Laboratory 15: Program using polymorphism, abstract classes
	SLO-2					

Learning Resources	Kenneth A. Lambert, (2011), "The Fundamentals of Python: First Programs", Cengage Learning

Learning Assessment

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

	Create					
	Total	100 %	100 %	100 %	100 %	100%

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

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

Course Code	UCS20D07J	Course Name	MACHINE LEARNING	Course Category	E	Discipline Specific Elective	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	To provide basic concepts of machine learning																		
CLR-2 :	To provide deeper understanding of various tools and techniques for Machine learning Algorithms and outputs																		
CLR-3 :	Understand and Implement the major classification techniques																		
CLR-4 :	Understand and Implement the various Clustering Methods																		
CLR-5 :	Learn and Understand the Tree based machine Learning Algorithms																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO – 1	PSO – 2	PSO – 3
CLO-1 :	Understand the concepts of machine learning	2	80	85	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CLO-2 :	Learn and understand machine tools and libraries of machine learning	2	75	80	H	H	H	-	H	-	-	-	-	-	-	-	-	-	-
CLO-3 :	Learn and understand the linear learning models and classification in machine learning	2	85	80	H	H	-	-	H	-	-	-	-	-	-	-	-	-	-
CLO-4 :	Understand the clustering techniques and their utilization in machine learning	2	80	75	H	H	-	-	H	-	-	-	-	-	-	-	-	-	-
CLO-5 :	Study the tree based machine learning techniques and to appreciate their capability	2	75	85	H	H	-	H	H	-	-	-	-	-	-	-	-	-	-

Duration (hour)		24	24	24	24	24
S-1	SLO-1	Machine Learning: What and Why?	Principal Component Analysis(PCA)	Linear Regression with multiple variables	Multi class classification	Decision tree representation
	SLO-2					
S-2	SLO-1	Types of Machine Learning	Regularization	Logistic Regression	Unsupervised Vs. Supervised Machine learning	Basic decision tree learning algorithm
	SLO-2	Supervised Learning				
S-3	SLO-1	Unsupervised Learning	Kernel smoothing methods	spam filtering with logistic regression		Decision tree construction
	SLO-2	Reinforcement learning				
S-4	SLO-1	Platform for machine learning	Machine learning python libraries	Evaluation Matrix	Case study on Multi class classification problem	Classification and regression trees (CART)
	SLO-2	The Curse of dimensionality	training data – testing data – validation data			
S-6 to S-8	SLO-1	Laboratory 1 : Practice elementary mathematical operations and control statements	Laboratory 4 : Creating Various types of plots /charts from various data source	Laboratory 7 : Implementation of Linear regression with multiple regression	Laboratory 10: Implementation of classifier problem	Laboratory 13 : Implementation of decision tree
	SLO-2					
S-9	SLO-1	Over fitting and under fitting	Ensemble learning:-Bagging, Boosting	Data Preprocessing methods – tokenization, Regular expressions	Introduction to clustering	Example for CART
	SLO-2		Maximum likeliwood estimation (least squares			
S-10	SLO-1	Bias and Variance tradeoff	Kernel density estimation	Data Preprocessing methods - stemming Lemmatization	K nearest neighbor	Issues in decision tree
	SLO-2	Plotting of Data, Vectorization	cross validation Features			
S-11	SLO-1	Matrices and Vectors	k-fold cross validation	Feature scaling , Feature Selection,	K nearest neighbor classification	Random Forest
	SLO-2	Linear Algebra for machine learning	Statistical methods for machine learning			Random Forest with scikit-learn
S-12	SLO-1	Linear Algebra for machine learning	Probability for machine learning	Correlation matrix	Case Study on K nearest neighbor Classification	Multivariate adaptive regression trees (MART
	SLO-2			Introduction to classifiers		
S-13 to S-16	SLO-1	Laboratory 2 : Operations on Matrices and Vectors	Laboratory 5 : Create subplots and color plots	Laboratory 8 : Implementation of Data preprocessing methods , Correlation matrix	Laboratory 11 : Implementation of K-Mean Clustering	Example 14 : Implementation of Random Forest
	SLO-2					
S-17	SLO-1	Gradient Descent - Batch	Performance metrics	Naïve Baiyes Method	Introduction to Clustering Bi-clustering	Introduction to Artificial Neural Networks
S-18	SLO-2	Resampling methods	MSE, accuracy	Baiysean Classifier	Multi-view clustering	Perceptron learning
S-19	SLO-1	Boot Strapping	confusion matrix	Support Vector Machine	K-Means clustering	Gradient Descent Vs Perceptron

	SLO-2	Linear Discrimant Analysis	Precision, Recall	Classifier using support vector machine		Learning
S-20	SLO-1	Parametric vs. non-parametric models	Linear regression with one variable	Spam and Not spam classification	Case study for K-Mean Clustering	Backpropogation Algorithm
	SLO-2					
S-21 to S-24	SLO-1	Laboratory 3 : Vectorized operation on simple matrix operations	Laboratory 6 : Implement Linear regression problem	Laboratory 9 : Implementation of spam and non-spam classification problem.	Laboratory 12 : Implementation of K-Mean Clustering	Laboratory 15 : Implementation of CART
	SLO-2					

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

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

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

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

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

Course Code	UCS20D08J	Course Name	CLOUD COMPUTING	Course Category	E	Discipline Specific Elective	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	understand the evolution of parallel and distributed computing																		
CLR-2 :	understand the architecture of cloud																		
CLR-3 :	understand the need for virtualization																		
CLR-4 :	the concepts behind scheduling and load balancing that is happening across heterogeneous resources in the environment																		
CLR-5 :	justify the need for improved hardware and software infrastructures (servers, protocols, security algorithms)																		
CLR-6 :	know the commercial functioning of cloud computing																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	defend the need for cloud computing to run an online business	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

CLO-2 :	understand and figure out the necessities of middleware technologies	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	practically create a virtual environment (lab purpose using VMware)	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	implement cryto algorithms that may be used in the computing environment	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	use few libraries from the cloud sim to create Cloudlets, CloudletList, scheduling modules	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Implement the methods for real time cloud environment	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Evolution and History of cloud computing	Cloud Infrastructure	Platform as a Service	Data in Cloud	Cloud Computing – Simulation
	SLO-2	Introduction to Cloud Computing	Architectural Design of computer and storage Clouds	Evolution of PaaS	Data as a Service	Cloud Computing : Simulation Tools
S-2	SLO-1	Cloud Types	Layered Cloud Architectural Development	Introduction to Paas	DaaS : Architecture	Simulation Tools : CloudSim,CloudAnalyst
	SLO-2	Basics types of Models	Cloud enabling technologies	Paas Service Provider	DaaS : Advantages	Simulation Tools :Green Cloud,EMUSIM
S-3	SLO-1	Layers and types of Cloud	Data center technologies	Platform as a Service: Acquia Cloud	DaaS :Disadvantage	Simulation Tools :GroundSim, MR-CloudSim
	SLO-2	Features of Cloud Computing	Web technologies	Platform as a Service: Amazon AWS	Database as a service	Cloud based Web Applications & Service Testing Tools
S-4	SLO-1	Cloud Computing Stack	Multitenant technologies	Platform as a Service : APP42PaaS	Cloud Based data storage	Cloud based Web Applications & Service Testing Tools
	SLO-2	Advantages of Cloud computing	Service technologies	Platform as a Service: Google App Engine	Advantage and limitations	Cloud Based Mobile & Multimedia Application Testing Tools
S 5-8	SLO-1 SLO-2	Laboratory 1: Create a virtual machine	Laboratory 4:Create a drop box using Google AP	Laboratory 7:Encryption and Decryption of Text	Laboratory 10: Laboratory 8: Simple Experiments in CloudSim	Laboratory 13: Create a Warehouse Application in Sales force.Com
S-9	SLO-1	Components of Cloud computing	Hardware and Infrastructure	PaaS Application Framework	Cloud Storage Interoperability	Cloud Applications and New Opportunity
	SLO-2	Limitations of Cloud computing	Client network	PaaS Operator Verbs	Cloud Security	Design approach with case studies
S-10	SLO-1	Cloud Computing service providers	Security Networks	Paas Developer Verbs	Introduction	Design methodology for IaaS service model
	SLO-2	Types of service provider	Services	Advantages and challenges of PaaS	Security Risks and Best Practice	Google API
S-11	SLO-1	Virtualization	Accessing the cloud	Software as a Services	Security Cloud	AWS EC2 instance

	SLO-2	History of virtualization	Platforms	Evolution of SaaS	Security risk and Best Practices	Migration
S-12	SLO-1	Introduction to virtualization	Web Applications	Basis of SaaS	Security Cloud : CIA Concept	Specific Cloud Services Models
	SLO-2	Types of Virtual Machines	Web APIs	Advantages of SaaS	Types of Security Attacks	Introduction
S 13-16	SLO-1	Laboratory 2: Installation of Platforms	Laboratory 5: Transfer Data using Google APPs	Laboratory 8: Simple Experiments in Cloud Sim	Laboratory 11: Laboratory 8: Simple Experiments in Cloud Sim	Laboratory 14: Create a Warehouse Application in Sales force.Com using Apex prog Lang
	SLO-2					
S-17	SLO-1	Advantages of virtualization	Web browsers	Brief Introductory part of software as a service	Security Policy Implementation	Resource allocation in cloud computing
	SLO-2	Components of virtualization	Cloud storage	Saas : Unification Technologies	Security Policy Implementation : Policy Types	Introduction
S-18	SLO-1	Virtualization system	Overview	Saas :Integrated Products	Techniques to Secure Data	Importance of Cloud Computing
	SLO-2	Types of virtualizations	Cloud Storage Provider	Saas product selection criteria	Cloud Encryption	Strategies for Resource Allocation
S-19	SLO-1	From virtual computing to clouds	Standards	Saas Integration services	Symmetric Encryption	Resource Allocation Policies and Algorithms
	SLO-2	Key points on cloud	Applications	Infrastructure as a Service	Cloud Security Alliance	Performance-based RAS
S-20	SLO-1	Load balancing and virtualization	Client services	IaaS Architecture	Cloud Security Strategy	Cost Based RAS
	SLO-2	Virtualization security Management	Infrastructure services	IaaS Provider	Cloud Computing Security Architecture	Performance and cost based RAS
S 21-24	SLO-1	Laboratory 3: Deploying existing Apps	Laboratory 6: upload and download using Google APPs	Laboratory 9: Simple Experiments in CloudSim	Laboratory 12:Simple Experiments in CloudSim	Laboratory 15:Implimentation of SOAP Web Services
	SLO-2					

Learning Resources	1.Dr.AnandNayyar, (2019), "Handbook of Cloud Computing", BPB

Learning Assessment

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

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

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

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1.Dr.S.P. Angelin Claret
		2 .Mr.M.D.Bakthavachalam

Course Code	UCS20D09J	Course Name	INTERNET OF THINGS	Course Category	E	Discipline Special Elective	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-1 :	Demonstrate the design, communication model and enabling technologies for IoT.	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-2 :	Explore the system management and domain for various applications of IoT																		
CLR-3 :	Categorize the various protocols that are used for developing IoT applications.																		
CLR-4 :	Deploy an IoT application and connect to the cloud.																		
CLR-5 :	Develop IoT application for real time scenario																		
CLR-6 :	Implemetation of IoT application for real world problems																		
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Apply the knowledge/understanding of mathematics, science, to the solution of complex problems applicable to the discipline	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

CLO-2 :	Design, implement, and evaluate a computer-based system, process, component, or program to meet desired solutions that meet the specified needs with suitable concern for the public health and safety, and the cultural, societal, and environmental considerations.	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Create, select, and apply applicable techniques, resources, and modern engineering and IT tools to complex engineering activities with an understanding of the limitations.	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Function successfully as an individual, and as a member or leader in assorted teams, and in multidisciplinary settings.	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Prove knowledge and understanding of the engineering and management principles and apply the same to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Apprehend the importance of technology with the current scenario	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Introduction	Introduction	Introduction about Iot protocols	IoT Platforms Design Methodology	Introduction about RESTful API
	SLO-2	Definition& Characteristics of IoT	Application of IoT	Infrastructure	Purpose & Requirements, process model specification, domain model specification	Designing a RESTful Web API
S-2	SLO-1	Physical design of IoT	Home Automation	6LowPAN	Information model specifications, service specifications, Iot level specifications	Amazon Web Services
	SLO-2	Things in IoT	Discuss Home automation problems	Architecture of 6LowPAN	Functional view specifications, operational view specifications.	Amazon Web Services for IoT
S-3	SLO-1	IoT protocols	Cities	Ipv6	Device & component Integration, Application development	Creating a ID in Amazon
	SLO-2	IoT protocols	Discuss cities problem	Architecture of Ipv6	IoT System for Weather Monitoring	EC2
S-4	SLO-1	Logical Design of IoT	Industry	Comms / Transport	Purpose & Requirements, process model specification, domain model specification	Implementation of EC2
	SLO-2	IoT Functional Blocks	Discuss Industry problem	Wifi	Information model specifications, service specifications, Iot level specifications	Autoscaling
S 5-8	SLO-1 SLO-2	Laboratory 1: Define and Explain Eclipse IoT Project.	Laboratory 4:Demonstrate a smart object API gateway service reference	Laboratory 7: Explain the application framework and embedded software agents for	Laboratory 10: Give overview of Zetta.	Laboratory 13: Smart Irrigation System

			implementation in IoT toolkit	IoT toolkit.		
S-9	SLO-1	IoT Communication Model	Health & Lifestyle	Bluetooth	Functional view specifications, operational view specifications.	Implementation of Autoscaling
	SLO-2	and IoT Communication APIs	Discuss Health & Lifestyle problem	Discovery	Device & component Integration, Application development	S3
S-10	SLO-1	IoT Enabling Technologies	M2M	Physical Web	IoT System for Agriculture	Implementation of S3
	SLO-2	Wireless Sensor Networks	Architecture of M2M	mDNS	Purpose & Requirements, process model specification, domain model specification	RDS
S-11	SLO-1	Cloud Computing	SDN	DNS-SD	Information model specifications, service specifications, Iot level specifications	Implementation of RDS
	SLO-2	Big Data Analytics	Architecture of SDN	Data Protocols	Functional view specifications, operational view specifications.	DynamoDB
S-12	SLO-1	Communication Protocols	NFV for IOT	MQTT	Device & component Integration, Application development	Implementation of DynamoDB
	SLO-2	Embedded Systems	Architecture of NFV	Examples of MQTT	Introduction to Cloud Storage Models	Kinesis
S 13-16	SLO-1	Laboratory 2: List and summarize few Eclipse IoT Projects.	Laboratory 5: Write and explain working of an HTTP- to-CoAP semantic mapping proxy in IoT toolkit.	Laboratory 8: Explain working of Raspberry Pi.	Laboratory 11: Home Automation – Level 0	Laboratory 14: Weather Reporting Systems
	SLO-2					
S-17	SLO-1	IoT Levels and Deployment Templates	IoT System Management	Difference between MQTT and HTTP	Introduction to Cloud StorageCommunication APIs	Implementation of Kinesis
	SLO-2	Level 0	Advantages of IoT system management	CoAP	Python Web Application Framework	Case studies - Environment
S-18	SLO-1	Level 1	Need for IoT Systems Management	Types of CoAP	Django Architecture	IoT systems for weather Reporting Bot
	SLO-2	Level 2	Disadvantages of IoT system management	Request and Response methods	Design of Weather Monitoring using Django	Air Pollution Monitoring System
S-19	SLO-1	Level 3	Simple Network Management Protocol	Pros and Cons of CoAP	Starting Development with Django Toolkit	Forest Fire Detection
	SLO-2	Level 4	Limitations of SNMP	AMQP	arduino	Case studies - IoT system for Energy
S-20	SLO-1	Level 5	Network Operator	Semantic	rasberry pi	Smart grid
	SLO-2	IOT Applications	Requirements	JSON- LD	Explanation of raspberry pi pin diagram	Renewable Energy Systems
S 21-24	SLO-1	Laboratory 3: Sketch the architecture of IoT Toolkit and explain each entity in brief	Laboratory 6: Describe gateway as a service deployment in Iot toolkit	Laboratory 9: Connect Rasberry Pi with your existing system components	Laboratory 12: Home Automation – Level 4	Laboratory 15: Air Pollution Monitoring System
	SLO-2					

| Learning Resources | 1. ArshdeepBahga and Vijay Madisetti, (2015), "Internet of Things - A Hands-on Approach", Universities Press
2. Dieter Uckelmann et.al, (2011), "Architecting the Internet of Things", Springer
3. CunoPfister, (2011), "Getting Started with the Internet of Things", O'Reilly, 2011. | 4. Adrian McEwen, Hakim Cassimally, (2014), "Designing the Internet of Things", Wiley
5. HonboZhou, (2012), "The Internet of Things in the Cloud: A Middleware Perspective ", CRC Press
6. Olivier Hersent, David Boswarthick, Omar Elloumi, (2012), "The Internet of Things – Key applications and Protocols", Wiley |

Learning Assessment

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

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Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	*1. Dr.S.Umarani* *2. Ms.G.S.Gayathri* *3. Mrs.Aarthi.E*

Course Code	UCS20D10L	Course Name	PROJECT WORK	Course Category	E	Discipline Specific Elective	L	T	P	C
							0	0	12	6

Pre-requisiteCourses	Nil	Co-requisiteCourses	Nil		ProgressiveCourses	Nil
Course Offering	DepartmentComputer Science		Data Book / Codes/Standards	As required for the project work		

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)															
CLR-1 :	CLR-1 : To prepare the student to gain major design and or research experience as applicable to the profession	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Apply knowledge and skills acquired through earlier course work in the chosen project																		
CLR-3 :	Make conversant with the codes, standards , application software and equipment																		
CLR-4 :	Carry out the projects within multiple design constraints																		
CLR-5 :	Incorporate multidisciplinary components																		
CLR-6 :	Acquire the skills of comprehensive report writing																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	Design a system	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Process or gain research insight into a defined problem	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Solution to the problem as would be encountered in professional manner	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Problem solving - its impacton global, economic, environmental and social context.	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Practice software project phases	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :		3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

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

Course	Continuous Learning Assessment (50% weightage)		Final Evaluation(50% weightage)	
	Review – 1	Review – 2	Project Report	Viva-Voce*
Project Work / Internship	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 Final Evaluation and shall be with final grade as 'Ab'