A.V.V.M. Sri Pushpam College (Autonomous), Poondi – 613 503
PG & Research Department of Computer Science
B.Sc. Programme in Computer Science
OUTCOME BASED EDUCATION - CHOICE BASED CREDIT SYSTEM
SCHEME OF PROGRAMME AND SYLLABUS
(For the candidates admitted from 2023-2024 onwards)

Vision and Mission of the college

Vision

To provide quality academic programmes and value oriented higher education to the rural community, equip them to encounter current regional, national and global demands upholding moral standards and intellectual competency.

Mission

- To provide conducive environment for quality teaching-learning process and innovative research.
- To bestow substantial educational experience that is intellectually, socially, and personally transformative.
- To strive to bring out the latent potentiality and core competency of the learners
- To foster the culture of research-based learning, independent academic inquiry by encouraging the students to involve in research activities ranging from hands on training, student projects, publications etc.,
- To nurture essential skills, competent minds and compassionate hearts.
- To impart a practical, demanding and overall development of the personality generated by love, consideration and care for the society.
- To serve the society by extending needful outreach programmes to the rural populace.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- Make the learners realise the transformative power of education.
- Acquire profound disciplinary, applied, integrative knowledge and intellectual competency and domain specific and generic skills.
- Pursue lifelong learning and generate innovative solutions for the problems at individual and social level.
- Create a collaborative and inclusive environment, and serve the betterment of the society with moral integrity.

- Motivate to become a committed professional with necessary ethics as a leader as well as a team player.

PROGRAMME OUTCOMES for B.Sc. Computer Science Programmes
On the completion of the programme, the learners will be able to,

PO1: Well equipped with analytical and logical skills which will accomplish with a sound knowledge of the core and the allied papers.

PO2: Communicate effectively from professional life to personal life and interpret information more accurately and quickly.

PO3: Attain knowledge to figure out scientific data critically and systematically and ability to draw objective conclusions thereof.

PO4: Develop scientific temper, which beneficial for the society, as the scientific developments can grow a nation or a society at a rapid pace through research.

PO5: Enrich skill to understand social, ethical, global and environmental responsibility for the benefit of the society.

PO6: Function effectively as a member or a leader of a team engaged in activities relevant to the program's discipline.

PO7: Enroll in self-sufficient and lifelong learning in the extensive context of socio technological changes.

PROGRAMME SPECIFIC OUTCOMES for B.Sc. Computer Science Programme

PSO1: Apply fundamental principles of Mathematics, Physics and methods of computer science to your wide range of applications in solving the real world problems.

PSO2: Ability to analyze the local and global impact of computing on individuals, organizations and Society to function effectively on teams to accomplish a common goal.

PSO3: Understanding of best practices and standards to develop design, implement and evaluate computer based effective system to desired needs.

PSO4: To make them employable according to current demand of IT industry and responsible citizen.

PSO5: To analyse the local and global impact of understanding of professional,ethical,legal,security,social issues and responsibilities.

PSO6: Explore the technical comprehension in various areas as an individual and as a member (or) leader in diverse teams and in multidisciplinary settings.

PSO7: Understand the impact of the professional solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

Mapping of Programme Outcomes and Programme Specific Outcomes

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
PO1	**3**	**3**	**2**	**2**	**3**	**3**	**3**
PO2	**2**	**3**	**1**	**3**	**3**	**3**	**3**
PO3	**3**	**2**	**3**	**3**	**2**	**2**	**2**
PO4	**3**	**2**	**2**	**3**	**3**	**3**	**3**
PO5	**2**	**2**	**3**	**3**	**3**	**3**	**3**
PO6	**3**	**3**	**2**	**2**	**3**	**3**	**1**
PO7	**1**	**2**	**2**	**3**	**3**	**3**	**3**

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Curriculum structure for UG Programmes (OBE-CBCS) – 2023

	Nature of Course	Total No. of Courses	Total marks	Total credits	Total credits for the Programme
Part – I	Language (Tamil / Hindi)	04	400	12	123 (CGPA)
Part – II	English	04	400	12	
Part – III	Core Courses	14	1400	65	
	Core Industry Module (CIM)	01	100	04	
	Elective Courses(Generic) - Allied	06	600	18	
	Elective Courses (Discipline Centric)	04	400	12	
Part – IV	Skill Enhancement Course - Non Major Elective (NME)	01	100	02	17 (Non CGPA)
	Skill Enhancement Course – Discipline Specific(SEC)	02	200	04	
	Professional Competency Skill Enhancement Course(PCSE)	01	100	02	
	Gender Studies(GS)	01	100	02	
	Environmental Studies (EVS)	01	100	02	
	Value Education (VE)	01	100	02	
	Internship / Industrial Activity	--	--	02	
Part – V	Extension Activity (EA)	--	--	01	
	Total	**40**	**4000**	**140**	**140**
Value Added Course (VAC)		01	100	--	--
Extra Credit Course – MOOC / Field visit / Hands on Training		--	--	Max: 4	--

***Part I, II, and Part III components will be separately taken into account for CGPA calculation and classification for the under graduate programme and the other components. IV, V has to be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree**

Course Structure: B.Sc., Computer Science (2023)

S. No.	Semester	Category	Course Code	Title of the Course	Maximum Marks			Minimum Marks			Hours/ Week	Credits
					CIA	EE	Total	CIA	EE	Total		
1.	I	Language	23U1CST1/H1	Tamil – I / Hindi – I	25	75	100	10	30	40	6	3
2.		Language	23U1CSE1	English – I	25	75	100	10	30	40	6	3
3.		Core	23U1CSC1	C and Data Structures	25	75	100	10	30	40	5	5
4.		Core	23U1CSCP1	Practical: C Programming with Data Structures	25	75	100	10	30	40	5	5
5.		Allied	23U1CSMAA1	Allied Mathematics I	25	75	100	10	30	40	5	3
		Allied	23U2CSMAA2	Discrete Mathematics (Non-Semester)	-	-	-	-	-	-	3	-
6.		ES	23U1CSES	Environmental Studies -Non-Major Elective (Non-Semester)	-	100	100	-	-	40	SS	2
7.	II	Language	23UCST2/H2	Tamil – II / Hindi – II	25	75	100	10	30	40	6	3
8.		Language	23U2CSE2	English – II	25	75	100	10	30	40	6	3
9.		Core	23U2CSC2	Python Programming	25	75	100	10	30	40	5	4
10.		Core	23U2CSCP2	Practical: Python Programming with Bioinformatics	25	75	100	10	30	40	5	4
11.		Allied	23U2CSMAA2	Discrete Mathematics (Non-Semester)	25	75	100	10	30	40	3	3
12.		Allied	23U2CSMAA3	Allied Mathematics II	25	75	100	10	30	40	5	3
13.		VE	23U2CSVE	Value Education	25	75	100	10	30	40	SS	2
		Extra Credit	MOOC(Massive open online course)		-	-	-	-	-	-		
14.	III	Language	23U3CST3/H3	Tamil – III / Hindi – III	25	75	100	10	30	40	6	3
15.		Language	23U3CSE3	English – III	25	75	100	10	30	40	6	3
16.		Core	23U3CSC3	Microprocessor and Microcontroller	25	75	100	10	30	40	5	5
17.		Core	23U3CSCP3	Practical: Simulation and Modeling	25	75	100	10	30	40	5	4
18.		Allied	23U3CSPHA1	Allied Physics I	25	75	100	10	30	40	5	3
		Allied	23U4CSPHAPL	Allied Physics Lab (Non-Semester)	-	-	-	-	-	-	3	-
		Extra Credit	MOOC / Field visit / Hands on Training		-	-	-	-	-	-		

S. No.	Semester	Category	Course Code	Title of the Course	Maximum Marks			Minimum Marks			Hours/ Week	Credits
					CIA	EE	Total	CIA	EE	Total		
19.	IV	Language	23U4CST4/H4	Tamil – IV / Hindi – IV	25	75	100	10	30	40	6	3
20.		Language	23U4CSE4	English – IV	25	75	100	10	30	40	6	3
21.		Core - CIM	23U4CSCIM	Industry Module: Java Programming	25	75	100	10	30	40	5	4
22.		Core	23U4CSCP4	Practical: Java Programming	25	75	100	10	30	40	5	4
23.		Allied	23U4CSPHA2	Allied Physics II	25	75	100	10	30	40	3	3
24.		Allied	23U4CSPHAPL	Allied Physics Lab (N-S)	25	75	100	10	30	40	3	3
25.		SEC	23U4CSSEC1	Digital Literacy in Latex and Advanced Excel	25	75	100	10	30	40	2	2
26.		GS	23U4CSGS	Gender Studies	-	-	100	-	-	40	SS	2
		Extra Credit	Field visit / Hands on Training		-	-	-	-	-	-	-	-
27.	V	Core	23U5CSC4	Computer Networks	25	75	100	10	30	40	5	5
28.		Core	23U5CSC5	Database Management System	25	75	100	10	30	40	5	5
29.		Core	23U5CSCP5	Practical: Database Management System	25	75	100	10	30	40	5	5
30.		Major Elective	23U5CSEL1A/ 23U5CSEL1B	Mobile Application Development/ Cyber security	25	75	100	10	30	40	4	3
31.		Major Elective	23U5CSEL2A/ 23U5CSEL2B	Natural Language Processing/ Data Mining with R Programming	25	75	100	10	30	40	4	3
32.		NME	23U5CSNME	Non Major Elective (Content Writer)	25	75	100	10	30	40	2	2
33.		Core	23U5CSC6PR	Project with Viva Voce	25	75	100	10	30	40	5	4
		Internship / Industrial Training (Carried out in II Year summer vacation – 30 hours)									-	2
34.	VI	Core	23U6CSC7	Software Engineering	25	75	100	10	30	40	6	5
35.		Core	23U6CSC8	DOT NET Programming	25	75	100	10	30	40	5	5
36.		Core	23U6CSCP6	Practical: DOT NET Programming	25	75	100	10	30	40	5	5
37.		Major Elective	23U6CSEL3A/ 23U6CSEL3B	Data Science / Virtual and Augmented Reality	25	75	100	10	30	40	5	3
38.		Major Elective	23U6CSEL4A/ 23U6CSEL4B	Information Security/ Operating Systems	25	75	100	10	30	40	5	3
39.		SEC	23U6CSSEC2	Agile Project Management	25	75	100	10	30	40	2	2
40.		PCSE	23U6CSPCSE	Comprehensive Knowledge	-	100	100	-	40	40	2	2
		Extension Activities		Extension Activities (Outside College hours)	-	-	-	-	-	-	-	1
				Total			**4000**					**140**
		Valued Added Source		Multimedia using ICT tools -Certificate Course	-	100	100	-	40	40	SS	-

Internship/ Industrial Activity:

Students must complete in-plant training in any industry or organization where a programme-related procedure is being used, and this training must be done during the summer vacation at the end of II Year. A minimum of 30 hours should be spent on training. Students must submit a report on their training together with a certificate from the relevant industry or organization authority.

MOOC:

Massive Open Online Course (MOOC) is offered in the II and III Semester as an Extra Credit Course. Students can avail any one or more of the courses available in MOOC to equip their skill and knowledge themselves. To receive the extra credit, students must provide their MOOC course completion certificate at the end of the second year.

Field visit / Hands on Training:

In order to achieve experiential learning, these programmes with a minimum of 15 hours of contact time are offered as Extra Credit Courses in the III & IV Semester.

Evaluation of visit report will be held at the end of IV Semester.

Components of Evaluation:

Internal Marks : 25

External Marks : 75

Total : 100

Skill Enhancement course (SEC) offered by the Computer Science Department

1. Digital Literacy in Latex and Advanced Excel
2. Agile Project Management

Non – Major Elective (NME) Course offered by the Computer Science Department

Content Writer

Value Added Course offered by the Computer Science Department

"**Multimedia using ICT tools"** will be conducted for III UG students as a certificate Course.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
I	**23U1CST1**	**பொதுத் தமிழ் – 1**	**6**	**3**

Nature of the Course

1.Employablity Oriented வேலை வாய்ப்புச் சார்ந்தது	✓	7. Addresses Professional Ethics தொழில் நெறிமுறைகளை நிறைவு செய்தல்	
2. Entrepreneurship Oriented தொழில் முனைவு சார்ந்தது		8.Relevent To Local Need உள்ளூர் தேவைகளோடு தொடர்புடையது	✓
3. Skill Development Oriented திறன்மேம்பாடு சார்ந்தது	✓	9. Relevent To Regional Need மண்டல அளவிலான தேவைகளோடு தொடர்புடையது	
4. Addresses Gender Sensitization பாலின உணர்திறன் பூர்த்தி செய்தல்		10. Relevent To National Need தேசிய அளவிலான தேவைகளோடு தொடர்புடையது	
5. Addresses Environment and Sustainablity சுற்றுச் சூழல் மற்றும் நிலைத் தன்மை நிறைவு செய்தல்		11. Relevent To Global Development Need உலக அளவிலான தேவைகளோடு தொடர்புடையது	
6. Addresses Human Values மனித மதிப்புகளை நிறைவு செய்தல்	✓		

Course Objectives

1. முதலாமாண்டுப் பட்ட வகுப்பு மாணவர்களுக்குத் தமிழ் மொழி இலக்கியங்களை அறிமுகம் செய்தல்
2. தற்கால இலக்கியப் போக்குகளையும் இலக்கணங்களையும் மாணவர் அறியுமாறு செய்தல்.
3. மாணவர்களுக்குத் தமிழ் படைப்பாற்றலைத் தூண்டுதல்.
4. தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

Unit	Details	Hours
Unit-I	***மரபுக் கவிதை*** *1. பெ. சுந்தரனார் - தமிழ்த் தெய்வ வணக்கம்* *2. பாரதிதாசன் - சிறுத்தையே வெளியில் வா* *3. கவிமணி - புத்தரும் சிறுவனும்* *4. முடியரசன் - மொழி உணர்ச்சி* *5. கண்ணதாசன் - ஆட்டனத்தி ஆதிமந்தி — ஆதிமந்தி புலம்பல்* *6. சுரதா - துறைமுகம் தொகுப்பிலிருந்து ஏதேனும் ஒரு கவிதை* *7. தமிழ் ஒளி - கடல்*	18 Hrs

Unit-II	***புதுக்கவிதை*** *1. அப்துல் ரகுமான் - வீட்டுக்கொரு மரம் வளர்ப்போம்* *2. ஈரோடு தமிழன்பன் - சென்ரியூ கவிதைகள் (ஏதேனும் ஐந்து கவிதைகள்)* *3. வைரமுத்து - பிற்சேர்க்கை* *4. மு.மேத்தா- வாழைமரம்* *5. அறிவுமதி -வள்ளுவம் பத்து* *6. நா முத்துக்குமார் - ஆனந்த யாழை மீட்டுகிறாய்* *7. சுகிர்தராணி - சபிக்கப்பட்ட முத்தம்* *8. இளம்பிறை -நீ எழுத மறுக்கும் எனது அழகு*	18 Hrs
Unit-III	***சிறுகதைகள்*** *1. வாய்ச் சொற்கள் - ஜெயகாந்தன் (மாலை மயக்கம் தொகுப்பு)* *2. கடிதம் - புதுமைப்பித்தன்* *3. முள்முடி - தி ஜானகிராமன்* *4. சிதறல்கள் - விழி.பா.இதயவேந்தன்* *5. காகித உறவு - சு.சமுத்திரம்* *6. வீட்டின் மூலையில் சமையல் அறை - அம்பை* *7. (மொழிபெயர்ப்புக் கதை) ஆண்டன் செக்காவ் - நாய்க்காரச் சீமாட்டி, சந்தியா*	18 Hrs
Unit-IV	*1. பாடம் சார்ந்த இலக்கிய வரலாறு* *2. இராகபாவம் — கேட்டிவி*	18 Hrs
Unit-V	***மொழித்திறன் போட்டி தேர்வு*** *1.பொருள் பொதிந்த சொற்றொடர் அமைத்தல்* *2. ஓர் எழுத்து ஒரு மொழி* *3. வேற்றுமை உருபுகள்* *4. திணை, பால், எண், இடம்* *5. கலைச்சொல்லாக்கம், மொழிபெயர்ப்பு.* *(குறிப்பு: அலகு 4, 5 ஆகியன போட்டித் தேர்வு நோக்கில் நடத்தப்பட வேண்டும்).*	18 Hrs

CO Number	CO Statement	Cognitive Level
CO1	*பாரதியார் காலந்தொட்டு தற்காலப் புதுக்கவிதைகள் வரை கவிதை இலக்கியம் அறிமுகப்படுத்தப்படுவதால் படைப்பாற்றல் திறன் பெறுதல்.*	**K2**
CO2	*புதுக்கவிதை வரலாற்றினை அறிந்து கொள்வர்.*	**K3**
CO3	*இக்கால இலக்கிய வகையினைக் கற்பதன் மூலம் படைப்பாக்கத் திறனைப் பெறுவர்.*	**K4**
CO4	*மொழியறிவோடு சிந்தனைத்திறன் அதிகரித்தல்.*	**K3**
CO5	*தமிழ்மொழியைப் பிழையின்றி எழுதவும், புதிய கலைச் சொற்களை உருவாக்கவும் அறிந்து கொள்ளுதல்.*	**K5**

Text Books

1. *தமிழ் இலக்கிய வரலாறு -செம்பதிப்பு- பெ.சுபாஷ் சந்திரபோஸ்*

பார்வை நூல்கள்.

1. *தமிழ் இலக்கிய வரலாறு - சிற்பி.பாலசுப்பிரமணியன்*

2. புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு - தமிழண்ணல்
3. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு - எஃப்.பாக்கியமேரி

Web Resource

Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc.)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org> Tamil virtual University Library-
2. www.tamilvu.org/ library
3. http://www.virtualvu.org/library Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamale books downloads. blogspot.com
7. Tamil Books on line- books. tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

பொதுத்தமிழ் —1												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	3	2	2	2
CLO3	3	2	3	3	2	2	2	3	2	3	3	2
CLO4	2	3	3	2	2	2	3	2	3	2	3	3
CLO5	3	3	2	2	2	3	3	2	2	2	3	3

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I	**23U1CSE1**	**PART - II GENERAL ENGLISH**	**6**	**3**

Learning Objectives		
LO1	To enable earners to acquire self awareness and positive thinking required in Various life situations.	
LO2	To help the macquire the attribute of empathy	
LO3	To assist them in acquiring creative and critical thinking abilities	
LO4	To enable them to learn the basic grammar	
LO5	To assist the min developing LSRW skills	
Unit No.	**Unit Title &Text**	**No.of Periods for the Unit**
I	**SELF-AWARENESS (WHO) & POSITIVE THINKING (UNICEF)** **Life Story** Chapter 1 from Malala Yousafzai, I am Malala An Autobiography or The Story of My Experiments with Truth (Chapters 1, 2 & 3) M.K.Gandhi **Poem** Where the Mind is Without Fear–Gitanjali 35– Rabindranath Tagore Love Cycle– Chinua Achebe	**20**
II	**EMPATHY** **Poem** Nine Gold Medals– David Roth Alice Fellor poverty–William Words worth **Short Story** The School for Sympathy– E.V. Lucas Barn Burning – William Faulkner	**20**
III	**CRITICAL & CREATIVE THINKING** **Poem** The Things That Haven't Been Done Before– Edgar Guest Stopping by the Woods on a Snowy Evening– Robert Frost **Readers Theatre** The Magic Brocade – A Tale of China Stories on Stage–Aaron Shepard (Three Sideway Stories from Wayside School" by Louis Sachar)	**20**
IV	**Reflective Thinking** The Running Rivulets of man The Lady in the Silver Coat Mr.Applebaum at Play The Feigning Brawl of an Imposter Thy Life is my Lesson	**15**
V	**Communication Skill Part of Speech** Articles Noun Pronoun Verb Adverb Adjective Preposition	**15**

Course Outcomes		
Course Outcomes	On completion of this course, students will:	
CO1	Acquire self awareness and positive thinking required in various life situations	PO1,PO7
CO2	Acquire the attribute of empathy.	PO1,PO2,PO10
CO3	Acquire creative and critical thinking abilities.	PO4,PO6,PO9
CO4	Learn basic grammar	PO4,PO5,PO6
CO5	Development and integrate the use of four language skills i.e., listening, speaking, reading and writing.	PO3,PO8

	Textbooks (Latest Editions)
1.	Malala Yousafzai. Iam Malala, Little, Brown and Company, 2013.
2.	M.K.Gandhi. An Autobiography or The Story of My Experiments with Truth (Chapter – I), Rupa Publications, 2011.
3.	Rabindranath Tagore. "Gitanjali 35" from Gitanjali (Song Offerings): A CollectionofProseTranslationsMadebytheAuthorfromtheOriginalBengali. MacMillan, 1913.
4.	N.Krishnasamy. Modern English: A Book of Grammar, Usage and Composition Macmillan, 1975.
5.	Aaron Shepard. Storieson Stage, Shepard Publications, 2017.
6.	J.C.Nesfield. English Grammar Composition and Usage, Macmillan, 2019.
7.	Sri.KTV. Melodious Harmony, New Century Book House. 2022

Web Resources	
1	MalalaYousafzai.Iam Malala(Chapter1)https://archive.org/details/i-am-malala
2	M.KGandhi.An Auto biographyor The Story of My Experiments with Truth(Chapter-1)-RupaPublication,2011https://www.indiastudychannel.com/resources/146521-Book-Review-An-Autobiography-or-The-story-of-my-experiments-with-Truth.aspx
3	Rabindranath Tagore. "Gitanjali 35" from Gitanjali (Song Offerings)https://www.poetryfoundation.org/poems/45668/gitanjali-35
4	AaronShepard.StoriesonStage,ShepardPublications,2017 https://amzn.eu/d/9rVzlNv
5	JCNesfield. Manual of English Grammar and Composition. https://archive.org/details/in.ernet.dli.2015.44179

Mapping with Programme Outcomes:-

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

Mapping with Programme Specific Outcomes:-

CO /PO	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weight age	15	15	15	15
Weighted percentage of Course Contribution to POS	3.0	3.0	3.0	3.0

3– Strong, 2 –Medium, 1-Low

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I	**23U1CSC1**	**C and Data Structures**	**5**	**5**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- To learn the features of C.
- To learn the linear and non-linear data structures.
- To explore the applications of linear and non-linear data structures.
- To learn to represent data using graph data structure
- To learn the basic sorting and searching algorithms

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**C Programming Basics:** Structure of a C program — compilation and linking processes — Constants, Variables — Data Types — Expressions using operators in C — Managing Input and Output operations — **Decision Making and Branching** — Looping statements. **Arrays** — Initialization — Declaration — One dimensional and Two-dimensional arrays. **Strings**- String operations — String Arrays. Simple programs- sorting- searching — **(self-study) matrix operations**.	**15**
II	**Functions, Pointers, Structures And Unions: Functions** — Pass by value — Pass by reference — Recursion — **Pointers** — Definition — Initialization — Pointers arithmetic. **Structures and Unions** — definition — Structure within a structure — Union — Programs using structures and Unions — **(Self-Study)- Storage classes, Pre-processor directives.**	**15**
III	**Linear Data Structures:** Arrays and its representations — **Stacks and Queues** — Linked lists — Linked list-based implementation of Stacks and Queues — Evaluation of Expressions — Linked list based polynomial addition.	**15**

IV	**Non-Linear Data Structures: Trees** — Binary Trees — Binary tree representation and traversals –Binary Search Trees — Applications of trees. Set representations — **Self Study:** Union-Find operations. Graph and its representations — Graph Traversals.	**15**
V	**Searching And Sorting Algorithms: Searching**-Linear Search — Binary Search. **Sorting** -Bubble Sort, Insertion sort — Merge sort — Quick sort — Hash tables — Overflow handling.	**15**

Textbook:

1. Data Structures using C,-E.Balagurusamy, McGraw Hill Education, New Delhi, 2013.
2. Computer Fundamentals and Programming in C-Anita Goel,Ajay Mittal,Pearson,2016
3. Pradip Dey and Manas Ghosh, ―Programming in C, Second Edition, Oxford University Press, 2011.
4. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, ―Fundamentals of Data Structures in C, Second Edition, University Press, 2008.

Unit	Chapter	Sections
I	Chapter – 2,3,4&5	Section 2.3, 2.4,3.1,3.3,4.1,5.1 (Pages: 25-29)
II	Chapter– 6,7,8&9	Section 6.1,6.3,8.1,8.3,9.1,9.3(Pages:6.12-6.30,8.1-9.16)
III	Chapter–6,7	Section6.3,6.4,7.2,7.3,7.4,7.6 (Pages:147-200)
IV	Chapter–8	Section8.3,8.4,8.5,8.6,8.7 (Pages:208-232)
V	Chapter – 10	Section10.1,10.2,10.3 (Pages:261-296)

References:

❖ Mark Allen Weiss, ―Data Structures and Algorithm Analysis in C, Second Edition, Pearson Education, 1996
❖ Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, ―Data Structures and Algorithms, Pearson Education, 1983.
❖ Robert Kruse, C.L.Tondo, Bruce Leung, Shashi Mogalla , ― Data Structures and Program Design in C, Second Edition, Pearson Education, 2007
❖ Jean-Paul Tremblay and Paul G. Sorenson, ―An Introduction to Data Structures with Applications, Second Edition, Tata McGraw-Hill, 1991.

Web Resources-

1. https:// csit.ust.edu.sd/files/2019/10/Data-structure-using-C-1.pdf
2. https:// www.codechef.com
3. http://www.cs.cmu.edu
4. https://www.geeksforgeeks.org
5. https://www. viterbi-web.usc.edu
6. https:// cse.iitkgp.ac.in/~pds/semester/2017s/DSM/

Pedagogy: Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Define and classify various data structures, storage structures and common operations on them.	**K1, K2, K3, K4**
CO2	Be able to check the correctness of algorithms using inductive proofs and loop invariants	**K2, K3, K4,K5**
CO3	Solve the given a problem using an appropriate data structure to achieve optimal performance and compare its performance with other possible data structures	**K1,K3, K4, K6**
CO4	Implement linear and non-linear data structure operations using C for a given data set .Modify or suggest new data structure for an application	**K2,K5,K6**
CO5	Appropriately choose the sorting algorithm for an application.	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;**K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	3	3	3	3	2	2
CO2	3	3	3	3	3	3	3
CO3	2	3	3	3	2	3	3
CO4	2	2	3	3	3	2	3
CO5	3	3	2	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I	**23U1CSCP1**	**Practical: C Programming and Data Structures**	**5**	**5**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- To learn the various concepts of C programming language.
- To learn the linear and non-linear data structures.
- To explore the Searching and Sorting Algorithms.
- To learn to represent data using graph and trees data structure
- To provides an understanding of data structures such as stacks and queues.

SYLLABUS		
Sl.No	**Content**	**No. of Hours**
1.	Array implementation of stacks.	5
2.	Array implementation of Queues.	5
3.	Linked list implementation of stacks.	5
4.	Linked list implementation of Queues.	5
5.	Binary Tree Traversals (Inorder, Preorder, Postorder).	5
6.	Implementation of Linear search and binary search.	5
7.	Implementation Insertion sort, Quick sort and Merge Sort.	5
8.	Implementation of Depth-First Search & Breadth- First Search of Graphs.	5
9.	Finding all pairs of Shortest Path of a Graph.	5
10.	Finding single source shortest path of a Graph.	5
11.	Write a Program in C to Implement Binary-Tree Algorithm for Operations with INSERT, DELETE, and DISPLAY.	5
12.	Write a Program in C to find the Size of Data Types	5
13.	Implementation of Hashing – any two collision techniques	5
14.	Implement C programs using Files	5
15.	Development of real time C applications	5

Textbook:

5. Data Structures using C,-E.Balagurusamy, McGraw Hill Education, New Delhi, 2013.
6. Computer Fundamentals and Programming in C-Anita Goel,Ajay Mittal,Pearson,2016
7. Pradip Dey and Manas Ghosh, ―Programming in C, Second Edition, Oxford University Press, 2011.
8. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, ―Fundamentals of Data Structures in C, Second Edition, University Press, 2008.

Web Resources-

1. https:// www.codechef.com
2. http://www.cs.cmu.edu
3. https://www.geeksforgeeks.org

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Solve the given a problem using an appropriate data structure to achieve optimal performance and compare its performance with other possible data structures	**K1, K2, K3, K4**
CO2	Understand basic data structures such as arrays, strings, and linked lists using linear and non-linear data structure operations using C	**K2, K3, K4,K5**
CO3	Understand the concept of memory management.	**K1,K3, K4, K6**
CO4	Study tree and graphs along with their basic operations.	**K2,K5,K6**
CO5	Study different techniques for solving problems the sorting and searching algorithm for an application.	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	2	2	2
CO2	3	3	3	3	2	3	3
CO3	2	2	3	3	2	3	1
CO4	2	2	3	3	2	2	2
CO5	3	3	2	3	2	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated;
0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I	23U1CSMAA1	Allied Mathematics – I	5	3

Nature of the course

Employability Oriented	√	Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	

Course Objectives

The main objectives of this course are:

1.To introduce the concept of binomial, exponential and logarithmic series.
2.To teach the relation between circular and hyperbolic function
3. To impart the knowledge of the methods to find radius of curvature and centre of curvature

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Algebra:**Binomial series - Application of Binomial theorem to the summation of series - Exponential series - summation of series using exponential series.	15
II	**Theory of Equations:**Nature of roots – Relation between the coefficients and the roots of an algebraic equation – Transformation of equations – Reciprocal Equations.	15
III	**Matrices:**Eigen values and eigen vectors – Diagonalisation – similar matrices – Cayley-Hamilton theorem. ***Self-study: Eigen values for symmetric matrices***	15
IV	**Trigonometry:** Expansion of cosnθ, sinnθ and tannθ – Powers of Sines and Cosines of θ in terms of multiples of θ – expansion of sinθ and cosθ in a series of ascending powers of θ.	15
V	**Differential Calculus:** Curvature – circle, radius and centre of curvature – Cartesian formula for radius of curvature – coordinates of centre of curvature - parametric form.	15

Note:** Questions may be asked from the ***Self-study content for only CIA test (Mid and End semesters) and **NOT** for the external (Semester Examinations)

Textbook:

Ancillary Mathematics, Volume-I, *S. Narayanan, R. HanumanthaRao, T.K.ManikavachagamPillay, S. Viswanathan Printers Pvt. Ltd., 2013.*

Unit	Chapter	Sections
I	Chapter 1	Pages : 7 to 17, 28 to 37 Sec: 1.2, 1. Sec: 1.2, 1.3
II	Chapter 2	Pages:59 to 83 Sec : 2.1 to 2.4
III	Chapter 3	Pages: 151 to 160, Sec : 3.4 to 3.5
IV	Chapter 5	Pages : 220 to 239, Sec : 5.1 to 5.3
V	Chapter 6	Pages: 296 to 309, Sec. 6.4

References:

1. ***Allied Mathematics, Paper-I, First Semester***, P.Kandasamy and K.Thilagavathy, S.Chand & Company Pvt. Ltd., New Delhi, 2014.
2. ***Algebra Volume I***,T.K.M. Pillay, T. Natarajan and K.S.Ganapathy
3. ***Calculus Volume I***,S. Narayanan and T.K. Manikavachagam

Web Resources:

1. https://archive.nptel.ac.in/courses/111/106/111106148/
2. https://www.youtube.com/watch?v=prsgofH2EoU
3. https://www.cuemath.com/radius-of-curvature-formula/

Pedagogy: Teaching / Learning methods:

Chalk and Board, Virtual Class room, LCD projector, Video Conference, Guest Lectures, Tutorial, Assignment, Seminar. Library, Net Surfing, NPTEL Course Materials, Use of Mathematical software.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Know the different types of series and its applications	**K2,K4**
CO2	Classify the relation between the coefficients and the roots of the algebraic equations	**K3,K4**
CO3	Solve the problems using Eigen values and Eigen vectors	**K1,K3**
CO4	Evaluate the problems of power series expansions	**K2,K5**
CO5	Classify the method of finding envelopes, curvature and Cartesian formula for radius of curvature	**K3,K4**

Cognitive Level: **K1 -** Remember; **K2 -** Understanding; **K3 -** Apply; **K4 –**Analyze, **K5 –**Evaluate,**K6-**Create

Mapping of Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	2	3	3	3
CO2	2	3	2	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	2	3	3	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	2	3	3	3	3	3	3
CO2	2	3	2	3	3	3	3	3	3
CO3	3	2	2	3	2	3	3	2	2
CO4	3	2	3	3	3	3	1	2	2
CO5	1	3	2	1	3	2	3	1	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I & II	**23U2CSMAA2**	**Allied-II DISCRETE MATHEMATICS (NS)**	**3+3**	**4**

Nature of the course

Employability Oriented	√	Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	

Course Objectives

The main objectives of this course are to:

1. Throughout the course, students will be expected to demonstrate their understand of Discrete mathematics.
2. To impart the basic knowledge use mathematics correct terminology and notation. Construct correct direct and indirect proofs.
3. 3. To provide a use division into cases in a Proof. Use counter examples. Apply logical reasoning to solve a variety of problems

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Mathematical Logic:** statements and notation – connectives – negation conjunction - disjunction – Statement formulas and truth tables - conditional and bi - conditional – well-formed formulae - Tautologies – equivalence of formulae – duality law – disjunctive normal forms – conjunctive Normal forms	**18**
II	**Set Theory:** Basic concepts – Notation – Inclusion and equality – Power set – some operations on sets – Venn diagrams – Some basic set identities – principle of specification – ordered pairs and n-tuples – Cartesian products.	**18**
III	**Relations and ordering**: relations – properties of binary relations – relation matrix – partition and covering of a set – equivalence relations – compatibility relations composition of binary relations – partial ordering – partially ordered set . ***Self-Study :Functions: Definition and introduction - composition – inverse function - binary and n-array operation.***	**18**
IV	**Graph:** Graph - Sub-graphs – Walks, paths and Circuits – Connected graphs –Euler graphs – operations on graphs – Hamiltonian paths and circuits – Traveling salesman problem.	**18**

V	**Trees**: Trees – properties of trees – pendant vertices – distance and centers in a Tree- Rooted and Binary Trees – on counting trees – Spanning Trees –Fundamental circuits – Spanning Trees in a weighted graph – Shortest spanning tree: kruskal algorithm.	**18**

Note:** Questions may be asked from the ***Self-study content for only CIA test (Mid and End semesters) and **NOT** for the external (Semester Examinations)

Text Book:

1. *J.P.Tremblay, R.Manohar, **"Discrete Mathematical structures with Applications to Computer Science"** Tata McGraw Hill International, 2004.*
2. *NarsingDeo**"Graph Theory with Applications to Engineering and Computer Science".**PHI. Private Ltd., 2014.*

Unit	Text Book	Chapter	Section	Page
I	1	**1**	**Sec(1.1-1.2.10)& Sec(1.3.1-1.3.2)**	Page:2-32,50-53
II	1	2	**Sec(2.1.1-2.1.9)**	Page:105-125
III	1	2	**Sec(2.3&2.4.1-2.4.4)**	Page:148-192
IV	2	1,2	**Sec(1.1-1.6)&Sec(2.1-2.10)**	Page:1-38
V	2	3	**Sec(3.1-3.10)**	Page:39-65

References:

1. Bernard Kolman& Robert C.Busby "Discrete Mathematical Structure for Computer Science" (Revised) PHI.
2. Hamary "Graph Theory" Addison Wesley Publishing Company

Web resources:

1. https://explorecourses.stanford.edu/search?q=CS157[Stanford]
2. https://www.cst.cam.ac.uk/teaching/2021/DiscMath[University of Cambridge]

Pedagogy: Teaching / Learning methods:

Chalk and Board, Virtual Class room, LCD projector, Video Conference, Guest Lectures, Tutorial, Assignment, Seminar.Library, Net Surfing, NPTEL Course Materials, Use of Mathematical software.

CourseOutcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	apply mathematical logic to solve problems.understand sets, relations, functions and discrete structures.	**K5**
CO2	use logical notations to define and reas.son about fundamental mathematical concept such as set relations and function.	**K3, K5**
CO3	formulate truth table for expressions involving the logical connectives :negation, conjunction, disconjunction, conditional and biconditional.	**K4, K5**
CO4	model and solve real world problems using graphs and trees.	**K3, K5**
CO5	extend their knowledge to pursue research using this field	**K4**

Cognitive Level :K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomeswith Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	3	2	2	3
CO2	3	3	3	3	3	3
CO3	2	3	3	2	2	3
CO4	3	1	3	2	3	3
CO5	1	3	3	3	1	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Mapping of Course Outcomeswith Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	2	3	3	3	3	3	3
CO2	2	3	2	3	3	3	3	3	3
CO3	3	2	2	3	2	3	3	2	2
CO4	2	2	3	3	2	1	2	2	1
CO5	2	1	1	2	3	2	3	1	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
II	**23U2CST2**	**பொதுத் தமிழ் – 2**	**6**	**3**

Nature of the Course

1.Employablity Oriented *வேலை வாய்ப்புச் சார்ந்தது*	✓	7. Addresses Professional Ethics *தொழில் நெறிமுறைகளை நிறைவு செய்தல்*	
2. Entrepreneurship Oriented *தொழில் முனைவு சார்ந்தது*		8.Relevent To Local Need *உள்ளூர் தேவைகளோடு தொடர்புடையது*	✓
3. Skill Development Oriented *திறன்மேம்பாடு சார்ந்தது*	✓	9. Relevent To Regional Need *மண்டல அளவிலான தேவைகளோடு தொடர்புடையது*	
4. Addresses Gender Sensitization *பாலின உணர்திறன் பூர்த்தி செய்தல்*		10. Relevent To National Need *தேசிய அளவிலான தேவைகளோடு தொடர்புடையது*	
5. Addresses Environment and Sustainablity *சுற்றுச் சூழல் மற்றும் நிலைத் தன்மை நிறைவு செய்தல்*		11. Relevent To Global Development Need *உலக அளவிலான தேவைகளோடு தொடர்புடையது*	
6. Addresses Human Values *மனித மதிப்புகளை நிறைவு செய்தல்*	✓		

Course Objectives

1. சமய இலக்கியங்களையும் சிற்றிலக்கியங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்.
2. மாணவர்களுக்கு மொழித்திறனை வளர்க்கப் பயிற்சி அளித்தல்.
3. மாணவர்களுக்குச் சிறுகதை இலக்கிய வடிவத்தை உணர்த்துதல்.

Unit	Details	Hours
Unit-I	*1.திருநாவுக்கரசர் தேவாரம் - நாமார்க்கும் குடியல்லோம் எனத் தொடங்கும் பதிகம் (10 பாடல்கள்)* *2.ஆண்டாள் - திருப்பாவை (முதல் 10 பாசுரம்)*	18 Hrs
Unit-II	*1.வள்ளலார் -அருள் விளக்க மாலை (முதல் 10 பாடல்)* *2.எச்.ஏ.கிருட்டிணப்பிள்ளை - இரட்சணிய மனோகரம் - பால்ய பிரார்த்தனை* *3.குணங்குடி மஸ்தான் சாகிபு - பராபரக்கண்ணி (முதல் 10 கண்ணி)*	18 Hrs
Unit-III	*சிற்றிலக்கியங்கள்* *1.தமிழ்விடு தூது (முதல் 20 கண்ணி)* *2.திருக்குற்றாலக் குறவஞ்சி - குறத்தி மலைவளம் கூறுதல்* *3.முக்கூடல் பள்ளு - நாட்டு வளம்*	18 Hrs
Unit-IV	*1.பாடம் தழுவிய இலக்கிய வரலாறு* *2.மனோரஞ்சிதம் -கேட்டிவி*	18 Hrs
Unit-V	*மொழித்திறன்/போட்டித் தேர்வுத் திறன்* *1. தொடர் வகைகள்* *2. மரபுத்தொடர், பழமொழிகள்* *3. பிறமொழிச் சொற்களைக் களைதல்* *4. வழுச்சொற்கள் நீக்குதல்* *5. இலக்கணக் குறிப்பு அறிதல்*	18 Hrs

CO Number	CO Statement	Cognitive Level
CO1	பக்தி இலக்கியங்களைக் கற்பதன் மூலம் பக்தி நெறியினையும், சமய நல்லிணக்கத்தையும் தெரிந்து பின்பற்றுவர்.	**K1, K2**
CO2	சிற்றிலக்கியங்களின்வழி இலக்கியச் சுவையினையும் பண்பாட்டு அறிவினையும் பெறுவர்.	**K2**
CO3	பட்டப் படிப்பினைப் படிக்கும் போதே பெரும்பான்மையான தமிழ் இலக்கியங்கள் குறித்த அறிவினைப் பெறுவர்.	**K4**
CO4	தமிழ்ச் சமூகப் பண்பாட்டு வரலாற்றினை இலக்கியங்கள் வாயிலாக அறிவர்.	**K3**
CO5	போட்டித் தேர்வுகளில் வெற்றி பெறுவதற்குத் தமிழ்ப் பாடத்தினைப் பயன்கொள்ளும் வகையில் ஏற்ற பயிற்சி பெறுவர்.	**K4**

Text Books

1. தமிழ் இலக்கிய வரலாறு -செம்பதிப்பு- பெ.சுபாஷ் சந்திரபோஸ்

பார்வை நூல்கள்

1. தமிழ் இலக்கிய வரலாறு - சிற்பி.பாலசுப்பிரமணியன்
2. புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு - தமிழண்ணல்
3. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு - எஃப்.பாக்கியமேரி

Web Resource:-

Related Online Contents (MOOC,SWAYAM,NPTEL,Websites etc.)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org> Tamil virtual University Library-
2. www.tamilvu.org/ library
3. http://www.virtualvu.org/library Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

பொதுத்தமிழ் —2												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	3	2	2	2
CLO3	3	2	3	3	2	2	2	3	2	3	3	2
CLO4	2	3	3	2	2	2	3	2	3	2	3	3
CLO5	3	3	2	2	2	3	3	2	2	2	3	3

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
II	**23U2CSE2**	**PART - II GENERAL ENGLISH**	**6**	**3**

Learning Objectives	
LO1	To make students realize the importance of resilience
LO2	To enable them to become good decision makers
LO3	To enable them to imbibe problem-solving skills
LO4	To enable them to usetenses appropriately
LO5	To help the muse English effectively at the work place.

Unit No.	Unit Title &Text	No.of Periods for the Unit
I	**RESILIENCE** **Poem** Don't Quit – Edgar A. Guest Still Here–Langston Hughes **Short Story** Engine Trouble – R.K.Narayan RipVan Winkle– Washington Irving	**20**
II	**DECISION MAKING** **Short Story** The Scribe– Kristin Hunter The Lady or the Tiger- Frank Stockton **Poem** The Road not Taken–Robert Frost Snake – D. H Lawrence	**20**
III	**PROBLEM SOLVING** **Prose life Story** How I taught My Grandmother to Read– Sudha Murthy **Autobiography** How frog Went to Heaven–ATale of Angolo Wings of Fire(Chapters1, 2, 3) by A.P.J Abdul Kalam	**20**
IV	**Moral Values** The Stoic Penalty Nobility in Reasoning Malu, the Frivolous Freak Honesty is the Cream of Chastity A Boy in Boy's Town	15
V	**Tenses** Present Past Future Concord	15

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Realize the importance of resilience	PO1,PO7
CO2	Become good decision-makers	PO1,PO2,PO10

CO3	Imbibe problem-solving skills	PO4,PO6,PO9
CO4	Use tenses appropriately	PO4, PO5,PO6
CO5	Use English effectively at the work place.	PO3,PO8

Text Books (Latest Editions)	
	References Books
1	Martin Hewings. Advanced English Grammar. Cambridge University Press, 2000
2	SP Bakshi, Richa Sharma. Descriptive English. Arihant Publications (India) Ltd., 2019.
3.	Sheena Cameron, Louise Dempsey. The Reading Book: A Complete Guide to Teaching Reading. S & L. Publishing, 2019.
4	Barbara Sherman. Skimming and Scanning Techniques, Liberty University Press, 2014.
5.	Phil Chambers. Brilliant Speed Reading: What every ouneed to read, however. Pearson, 2013.
6.	Communication Skills: Practical Approach Ed.Shaikh Moula Ramendra Kumar. Stories of Resilience, Blue Rose Publications, 2020.
7.	Sri.KTV.Melodious Harmony, New Century Book House. 2022

Web Sources

1	LangstonHughes.StillHere https://poetryace.com/im-still-here
2	R.K. Narayan.Engine Trouble http://www.sbioaschooltrichy.org/work/Work/images/new/8e.pdf
3	Washington Irving. Rip Van Winkle https://www.gutenberg.org/files/60976/60976-h/60976-h.htm
4	FrankStockton. TheLadyor the Tigerhttps://www.gutenberg.org/ebooks/396

Mapping with Programme Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3–Strong,2–Medium,1-Low Mapping with Programme Specific Outcomes:

CO /PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weight age	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0

3– Strong, 2 –Medium, 1-Low

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
II	**23U2CSC2**	**Programming in Python**	**5**	**4**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented	√	Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

1. To learn the features of Python.
2. To understand why Python is a useful scripting language for developers.
3. To learn how to design and program Python applications.
4. To learn how to use lists, tuples, and dictionaries in Python programs.
5. Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Introduction to Python** - Why Python - Installing in various Operating Systems - Executing Python Programs - **Basic Programming concepts** - Variables, expressions and statements - Input/ Output – Operators.	15
II	**Conditions** - Functions - Arguments - Return values – Decision statements- Iteration - Loops - Strings -**Data Structures** - Lists - Dictionaries - Tuples - Sequences - Exception Handling.	15
III	**File Handling** - **Modules** - Regular Expressions - Text handling - O**bject Oriented Programming** - Classes - Objects - Inheritance - Overloading - Polymorphism Interacting with Databases - Introduction to **MySQL** - interacting with MySQL - Building an address book with add/edit/delete/search features.	15
IV	Introduction to **Graphics programming** - Introduction to GTK - PyGTK - Developing GUI applications using pyGTK - Scientific Programming using NumPy / SciPy - Image Processing - Processing multimedia files -Network Programming, Web services using SOAP, **Self Study:** Introduction to Graphics programming – PyGame	15
V	**DJANGO:** working of MVT, Environment setting and installation, creating a Project, Apps Life Cycle, Admin Interface, Views, URL Mapping. **Self Study: Template System:** DTL and JINJA. Models, Page Redirection, Form Processing, project with signup and login.	15

Textbook:

1. Core Python Programming, 2nd Edition – Dr.R.Nageswara Rao – Dreamtech Press – 2018.
2. Beginning Django (Rubio Daniel) Apress
3. Beginning Python From Novice to Professional, Second Edition, Magnus Lie Hetland
4. MySQL for Python, Albert Lukaszewski, © 2010 Packt Publishing

Unit	Chapter	Sections
I	Chapter –1 2,3,4,5	Section 1.4,1.5,1.6,2.3, 2.4,3.1,3.3,4.1,5.1 (Pages:5-18, 25-29)
II	Chapter–4,5, 6,7,8,11	Section 6.1-6.8, (Pages:138-156,)
III	Chapter– 10,11,14	Section 10.2-10.4,11.2-11.5,14.7-14.9(Pages:13-136,177-182)
IV	Chapter– 22,24	Section (Pages:383-425)
V	Chapter – 3,6,7	Section (Pages:73-100,217-275)

References:

- Python Complete Reference (Brown Martin C.) McGraw Hill publication
- Jeff McNeil ,"Python 2.6 Text Processing: Beginners Guide", 2010 ,Packet Publications
- Mark Pilgrim ,"Dive Into Python " , 2nd edition 2009, Apress
- Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 201
- **Programming and Problem Solving with Python (Ashok Namdev Kamthane and Amit Ashok Kamthane) McGraw Hill publication**

Web Resources-

1. http://interactivepython.org/courselib/static/pythonds
2. http://www.ibiblio.org/g2swap/byteofpython/read/ \
3. http://www.diveintopython3.net/ ¬
4. http://greenteapress.com/wp/think-python-2e/
5. https://www.javatpoint.com/python-mysql-database-connection

Pedagogy: Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	To Understand the principles of Python and acquire skills in programming in python	**K1, K2, K3, K4**
CO2	To develop the emerging applications of relevant field using Python	**K2, K3, K4,K5**
CO3	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.	**K1,K3, K4, K6**
CO4	Able to develop simple turtle graphics programs in Python	**K2,K5,K6**
CO5	To develop the emerging applications Django	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;**K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	2	3
CO2	3	3	3	3	3	3	3
CO3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	2	3
CO5	3	3	2	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
II	**23U2CSCP2**	**Practical: Python Programming with Bioinformatics**	**5**	**4**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- Acquire programming skills in core Python.
- Acquire Object-oriented programming skills in Python.
- Develop the skill of designing graphical-user interfaces (GUI) in Python.
- Develop the ability to write database applications in Python.
- Acquire Python programming skills to move into specific branches

SYLLABUS		
S.No	**Content**	**No. of Hours**
1.	Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.	**5**
2.	Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria: Grade A: Percentage >=80 Grade B: Percentage >=70 and 80 Grade C: Percentage >=60 and <70 Grade D: Percentage >=40 and <60 Grade E: Percentage < 40	**5**
3.	Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.	**5**
4.	Program to find factorial of the given number using recursive function.	**5**

5.	Write a Python program to count the number of even and odd numbers from array of N numbers and Reverse string word by word.	**5**
6.	Given a tuple and a list as input, write a program to count the occurrences of all items of the list in the tuple. (Input : tuple = ('a', 'a', 'c', 'b', 'd'), list = ['a', 'b'], Output : 3)	**5**
7.	Create a Savings Account class that behaves just like a Bank Account, but also has an interest rate and a method that increases the balance by the appropriate amount of interest (Hint: use Inheritance).	**5**
8.	Write a Python program to construct the following pattern, using a nested loop * ** *** **** ***** **** *** ** *	**5**
9.	Read a file content and copy only the contents at odd lines into a new file.	**5**
10.	Create a Turtle graphics window with specific size.	**5**
11.	Create a menu driven Python program with a dictionary for words and their meanings.	**5**
12.	Devise a Python program to implement the Hangman Game.	**5**
13.	Retrieve Protein sequences from Protein Data Bank (PDB) and analyze the primary, secondary and tertiary protein structure using tools.	**5**
14.	Retrieve nucleotide sequences and perform local alignment and global alignment using EMBOSS	**5**
15.	Retrieve nucleotide sequences and perform multiple sequence alignment using CLUSTALW tool and generate phylogenetic tree.	**5**

Textbook:

1. Charles Dierbach, “Introduction to Computer Science using Python - A computational Problem solving Focus”, Wiley India Edition, 2015.

2. Wesley J. Chun, “Core Python Applications Programming”, 3rd Edition, Pearson Education, 2016

Reference Books

1. Mark Lutz, “Learning Python Powerful Object Oriented Programming”, O’reilly Media 2018, 5th Edition.

2. Timothy A. Budd, “Exploring Python”, Tata McGraw Hill Education Private Limited 2011, 1 st Edition.

3. John Zelle, “Python Programming: An Introduction to Computer Science”, Second edition, Course Technology Cengage Learning Publications, 2013, ISBN 978- 1590282410

4. Michel Dawson, “Python Programming for Absolute Beginers”, Third Edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1435455009

Web Resources-

1. https:// www.codechef.com
2. http://www.cs.cmu.edu
3. https://www.geeksforgeeks.org

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	To understand the problem solving approaches	**K1, K2, K3, K4**
CO2	To learn the basic programming constructs in Python	**K2, K3, K4,K5**
CO3	To practice various computing strategies for Python-based solutions to real world problems	**K2,K3, K4, K6**
CO4	To use Python data structures - lists, tuples, dictionaries.	**K2,K3,K6**
CO5	To do input/output with files in Python.	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	2	2
CO2	3	3	3	3	3	3	3
CO3	2	2	3	3	2	2	3
CO4	2	2	3	3	3	2	3
CO5	3	3	2	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated;
0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I & II	**23U2CSMAA2**	**Allied-II DISCRETE MATHEMATICS (NS)**	**3+3**	**4**

Nature of the course

Employability Oriented	√	Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	

Course Objectives

The main objectives of this course are to:

1. Throughout the course, students will be expected to demonstrate their understand of Discrete mathematics.
2. To impart the basic knowledge use mathematics correct terminology and notation. Construct correct direct and indirect proofs.
3. 3. To provide a use division into cases in a Proof. Use counter examples. Apply logical reasoning to solve a variety of problems

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Mathematical Logic:** statements and notation – connectives – negation conjunction - disjunction – Statement formulas and truth tables - conditional and bi - conditional – well-formed formulae - Tautologies – equivalence of formulae – duality law – disjunctive normal forms – conjunctive Normal forms	**18**
II	**Set Theory:** Basic concepts – Notation – Inclusion and equality – Power set – some operations on sets – Venn diagrams – Some basic set identities – principle of specification – ordered pairs and n-tuples – Cartesian products.	**18**
III	**Relations and ordering**: relations – properties of binary relations – relation matrix – partition and covering of a set – equivalence relations – compatibility relations composition of binary relations – partial ordering – partially ordered set. ***Self-Study :Functions: Definition and introduction - composition – inverse function - binary and n-array operation.***	**18**
IV	**Graph:** Graph - Sub-graphs – Walks, paths and Circuits – Connected graphs –Euler graphs – operations on graphs – Hamiltonian paths and circuits – Traveling salesman problem.	**18**

V	**Trees**: Trees – properties of trees – pendant vertices – distance and centers in a Tree- Rooted and Binary Trees – on counting trees – Spanning Trees –Fundamental circuits – Spanning Trees in a weighted graph – Shortest spanning tree: kruskal algorithm.	**18**

Note:** Questions may be asked from the ***Self-study content for only CIA test (Mid and End semesters) and **NOT** for the external (Semester Examinations)

Text Book:

1. *J.P.Tremblay, R.Manohar, **"Discrete Mathematical structures with Applications to Computer Science"** Tata McGraw Hill International, 2004.*
2. *NarsingDeo**"Graph Theory with Applications to Engineering and Computer Science".**PHI. Private Ltd., 2014.*

Unit	Text Book	Chapter	Section	Page
I	1	**1**	**Sec(1.1-1.2.10)& Sec(1.3.1-1.3.2)**	Page:2-32,50-53
II	1	2	**Sec(2.1.1-2.1.9)**	Page:105-125
III	1	2	**Sec(2.3&2.4.1-2.4.4)**	Page:148-192
IV	2	1,2	**Sec(1.1-1.6)&Sec(2.1-2.10)**	Page:1-38
V	2	3	**Sec(3.1-3.10)**	Page:39-65

References:

1. Bernard Kolman& Robert C.Busby "Discrete Mathematical Structure for Computer Science" (Revised) PHI.
2.Hamary "Graph Theory" Addison Wesley Publishing Company

Web resources:

1.https://explorecourses.stanford.edu/search?q=CS157[Stanford]
2.https://www.cst.cam.ac.uk/teaching/2021/DiscMath[University of Cambridge]

Pedagogy: Teaching / Learning methods:

Chalk and Board, Virtual Class room, LCD projector, Video Conference, Guest Lectures, Tutorial, Assignment, Seminar.Library, Net Surfing, NPTEL Course Materials, Use of Mathematical software.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	apply mathematical logic to solve problems. understand sets, relations, functions and discrete structures.	**K5**
CO2	use logical notations to define and reas.son about fundamental mathematical concept such as set relations and function.	**K3, K5**
CO3	formulate truth table for expressions involving the logical connectives :negation, conjunction, disconjunction, conditional and biconditional.	**K4, K5**
CO4	model and solve real world problems using graphs and trees.	**K3, K5**
CO5	extend their knowledge to pursue research using this field	**K4**

Cognitive Level :K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomeswith Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	2	3	2	2	3
CO2	3	3	3	3	3	3
CO3	2	3	3	2	2	3
CO4	3	1	3	2	3	3
CO5	1	3	3	3	1	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Mapping of Course Outcomeswith Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	2	3	3	3	3	3	3
CO2	2	3	2	3	3	3	3	3	3
CO3	3	2	2	3	2	3	3	2	2
CO4	2	2	3	3	2	1	2	2	1
CO5	2	1	1	2	3	2	3	1	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
II	**23U2CSMAA3**	**Allied: MATHEMATICS-III**	**5**	**3**

Nature of the course

Employability Oriented	√	Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	

Course Objectives

The main objectives of this course are:

1. To introduce various methods to solve the partial differential solution.
2. To teach the concept of curl & divergence of vector field
3. To introduce the concept of Laplace transforms and Fourier series.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Ordinary Differential Equation:** Variable Separable – Homogeneous equations – Non – homogeneous equations of the first degree in x & y – Linear equation – Bernoulli's equation – Exact differential of equations	**15**
II	**Vector differentiation:** Vector differential operator – Gradient – Direction and magnitude of gradient – Divergence and curl– Formulae involving operator ∇.	**15**
III	**Vector integration:** Surface Integral –Guass Divergence theorem –Stoke's theorem (without proof)	**15**
IV	**Laplace Transforms**:Definition – Results and proofs: Laplace Transform of functions f(t) + g(t), cf(t), f'(t), f'' (t), e^{at}, coshat, sinhat, cosat, sinat,t^n- some general theorems – Inverse transforms relating to the above standard forms - solution of ordinary differential equation with constant coefficients.	**15**
V	**Fourier Series**:Definition – finding Fourier coefficients for the given periodic function with period 2π - Even and odd functions – Properties of odd and even functions. ***Self-Study*: Half range Fourier series***	**15**

Note:** Questions may be asked from the ***Self-study content for only CIA test (Mid and End semesters) and **NOT** for the external (Semester Examinations)

Textbook:

Ancillary Mathematics, Volume-II, *S. Narayanan, R. HanumanthaRao, T.K.ManicavachagomPillay, S. Viswanathan Printers Pvt. Ltd., 2015*

Unit	Chapter	Sections
I	Chapter 4	Pages : 205 to 225
II	Chapter 8	Pages : 335 to 357
III	Chapter 8	Pages : 377 to 389, 399 to 407
IV	Chapter 7	Pages : 289 to 310
V	Chapter 2	Pages : 123 to 142

References:

1. *Engineering Mathematics – A Singaravelu(Volume I & II)*
2. *Vector Calculus – K.Viswannathan and S.Selvaraj*
3. *Ancillary Mathematics – P.R.Vittal, Margam Publications*

Web resources:

1. https://archive.nptel.ac.in/courses/111/106/111106148/
2. https://www.youtube.com/watch?v=f5WNaV4nwiQ
3. https://youtu.be/rCw-FVegWJA

Pedagogy: Teaching / Learning methods:

Chalk and Board, Virtual Class room, LCD projector, Video Conference, Guest Lectures, Tutorial, Assignment, Seminar. Library, Net Surfing, NPTEL Course Materials, Use of Mathematical software.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Know the concept of homogeneous and non homogeneous equations of first degree in x and y	**K2,K4**
CO2	Classify the method of finding gradient ,divergence and curl	**K4**
CO3	Classify the method of Surface integral ,Guass Divergence and Stoke's theorems	**K4**
CO4	Solve the problems using Laplace and its inverse transforms	**K4**
CO5	Find the problems using Fourier series	**K3,K5**

Cognitive Level: **K1 -** Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	2	3	3	3
CO2	2	1	3	3	3	2
CO3	3	2	2	2	2	2
CO4	2	3	3	3	2	3
CO5	2	3	2	1	3	1

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	2	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3
CO3	3	2	2	3	2	1	1	2	2
CO4	3	2	1	3	1	3	2	2	1
CO5	2	1	2	2	3	2	3	3	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
III	**23U3CST3**	**பொதுத் தமிழ் – 3**	**6**	**3**

Nature of the Course

1.Employablity Oriented வேலை வாய்ப்புச் சார்ந்தது		7. Addresses Professional Ethics தொழில் நெறிமுறைகளை நிறைவு செய்தல்	✓
2. Entrepreneurship Oriented தொழில் முனைவு சார்ந்தது		8.Relevent To Local Need உள்ளூர் தேவைகளோடு தொடர்புடையது	✓
3. Skill Development Oriented திறன்மேம்பாடு சார்ந்தது	✓	9. Relevent To Regional Need மண்டல அளவிலான தேவைகளோடு தொடர்புடையது	
4. Addresses Gender Sensitization பாலின உணர்திறன் பூர்த்தி செய்தல்		10. Relevent To National Need தேசிய அளவிலான தேவைகளோடு தொடர்புடையது	
5. Addresses Environment and Sustainablity சுற்றுச் சூழல் மற்றும் நிலைத் தன்மை நிறைவு செய்தல்		11. Relevent To Global Development Need உலக அளவிலான தேவைகளோடு தொடர்புடையது	
6. Addresses Human Values மனித மதிப்புகளை நிறைவு செய்தல்	✓		

Course Objectives

1.இலக்கியங்களின் சிறப்பினை உணர்த்துதல்.
2.காலந்தோறும் எழுந்த காப்பியங்களின் போக்கையும், புதினத்தின் இலக்கிய வடிவத்தை மாணவர்கள் உணருமாறு செய்தல்.
3.யாப்பு, அணி போன்ற இலக்கிய வகைகளையும் மொழி பெயர்ப்புத் திறனையும் மாணவர்கள் உணருமாறு செய்தல்.
4.தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்பக் கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

Unit	Details	Hours
Unit-I	பெருங்காப்பியங்கள் *1.சிலப்பதிகாரம் - வழக்குரைகாதை-இளங்கோவடிகள்* *2.மணிமேகலை ஆதிரை பிச்சையிட்ட காதை சீத்தலைச்சாத்தனார்* *3.சீவகசிந்தாமணி - பூமகள் இலம்பகம் திருத்தக்கதேவர்* *4.வளையாபதி—நாதகுத்தனார்*	**18 Hrs**
Unit-II	சமயக் காப்பியங்கள் *1.பெரியபுராணம் - பூசலார் நாயனார்புராணம்-சேக்கிழார்* *2.கம்பராமாயணம்- மந்தரை சூழ்ச்சிப் படலம்-கம்பர்* *3.வில்லிபாரதம் - மற்போர் சருக்கம்-வில்லிப்புத்தூராழ்வார்* *4.சீறாப்புராணம் - புலி வசனித்த படலம்-உமறுப்புலவர்*	**18 Hrs**

Unit-III	*புதினம்* *1.வஞ்சிமாநகரம் (வரலாற்றுப் புதினம்) -நா. பார்த்தசாரதி*	**18 Hrs**
Unit-IV	*1.பாடம் தழுவிய இலக்கிய வரலாறு* *2.குரல் கொடுக்கும் வானம்பாடி - கேட்டிவி*	**18 Hrs**
Unit-V	*மொழித்திறன்/போட்டித் தேர்வுத் திறன்* *1. நூல் மதிப்புரை* *2. திறனாய்வு செய்தல்* *3. கடிதம் வரைதல்* *4. விண்ணப்பம் எழுதுதல்*	**18 Hrs**

CO Number	CO Statement	Cognitive Level
CO1	*காப்பியங்கள் அறிமுகப்படுத்தப்படுவதால் தமிழ் மொழியின் உயர்வையும் சிறப்பையும் உணர்தல்.*	**K1, K2**
CO2	*தமிழ்ப் புதினங்களின்வழி சமகாலப் படைப்புகளின் வாழ்வியல் சிந்தனைகளை அறிந்து கொள்வர்.*	**K2**
CO3	*நாவல் இலக்கியம் அறிமுகப்படுத்தப்படுவதால் சிந்தனை ஆற்றல், படைப்பாற்றல், கற்பனைத்திறன் வளர்தல்.*	**K4**
CO4	*யாப்பு, அணி இலக்கணங்கள், மொழிபெயர்ப்புத்திறன் ஆகியவற்றைக் கற்பதன் மூலம் போட்டித் தேர்வுகளை எதிர் கொள்ளுதல்.*	**K3**
CO5	*காப்பியங்கள் அறிமுகப்படுத்தப்படுவதால் தமிழ் மொழியின் உயர்வையும் சிறப்பையும் உணர்தல்.*	**K4**

Text Books

1. *தமிழ் இலக்கிய வரலாறு -செம்பதிப்பு- பெ.சுபாஷ் சந்திரபோஸ்*

பார்வை நூல்கள்

1. *தமிழ் இலக்கிய வரலாறு - சிற்பி.பாலசுப்பிரமணியன்*
2. *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு - தமிழண்ணல்*
3. *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு - எஃப்.பாக்கியமேரி*

Web Resources

Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc.)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org> Tamil virtual University Library-
2. www.tamilvu.org/ library
3. http://www.virtualvu.org/library Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamale books downloads. blogspot.com
7. Tamil Books on line- books. tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

பொதுத்தமிழ் —3												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	2	3	2	2
CLO3	2	2	2	3	2	3	3	2	2	2	2	3
CLO4	3	2	2	2	3	2	3	3	2	3	3	3
CLO5	2	2	2	3	2	3	2	3	3	2	3	3

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III	**23U3CSE3**	**PART - II GENERAL ENGLISH**	**6**	**3**

Learning Objectives	
LO1	To make students realize the importance of resilience
LO2	To enable them to become good decision makers
LO3	To enable them to imbibe problem-solving skills
LO4	To enable them to usetenses appropriately
LO5	To help the muse English effectively at the work place.

Unit No.	Unit Title &Text	No.of Periods for the Unit
I	**ACTIVE LISTENING** **Short Story** Ina Grove–Akutagawa Ryunosuke Translated from Japanese by TakashiKojima The Gift of the Magi – O' Henry **Prose** Listening – Robin Sharma Nobel Prize Acceptance Speech –Wangari Maathai	**20**
II	**INTERPERSONAL RELATIONSHIPS** **Prose** Telephone Conversation–Wole Soyinka Of Friendship – Francis Bacon **Songon (Motivational/ Narrative)** Ulysses–Alfred Lord Tennyson And Still IRise– MayaAngelou	**20**
III	**COPING WITH STRESS** **Poem** Leisure– W.H. Davies Anxiety Monster– RhonaMcFerran **Readers Theatre** The Forty Fortunes: A Tale of Iran Where there is a Will–Mahesh Dattani	**20**
IV	**Grammar** Phrasal Verb & Idioms Modals and Auxiliaries Verb Phrases–Gerund, Participle, Infinitive	15
V	**Composition/Writing Skills** Official Correspondence–Leave Letter, Letter of Application, Permission Letter Drafting Invitations Brochures for Programmes and Events	15

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Listen actively	PO1,PO7
CO2	Develop interpersonal relationship skills	PO1,PO2,PO10
CO3	Acquire self-confidence to cope with stress	PO4,PO6,PO9
CO4	Master grammar skills	PO4,PO5,PO6
CO5	Carryout business communication effectively	PO3,PO8

Text Books (Latest Editions)

1	Wangari Maathai–Nobel Lecture. Nobel Prize Outreach AB 2023.Jul 2023.
2	Mahesh Dattani,Where there is W ill. Penguin, 2013.
3	Martin Hewings, Advanced English Grammar, Cambridge University Press,2000
4	EssentialEnglishGrammarbyRaymondMurphy

WebResources

1	WangariMaathai–NobelLecture.NobelPrizeOutreachAB2023.Mon.17Jul 2023. https://www.nobelprize.org/prizes/peace/2004/maathai/lecture/
2	TelephoneConversation-Wole Soyinka https://www.k-state.edu/english/westmank/spring_00/SOYINKA.html
3	AnxietyMonster- RhonaMcFerran- www.poetrysoup.com

Mapping with Programme Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3– Strong, 2– Medium, 1 -Low

Mapping with Programme Specific Outcomes:

CO /PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weight age	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III	**23U3CSC3**	**Microprocessor and Microcontroller**	**5**	**5**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented		Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

1. To introduce the internal organization of Intel 8085 Microprocessor.
2. To enable the students to write assembly language programs using 8085.
3. To interface the peripheral devices to 8085 using Interrupt controller and DMA interface.
4. To provide real-life applications using microcontroller.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Digital Computers** – Microcomputer Organization-Computer languages – Microprocessor Architecture and its operations – Microprocessor initiated operations and 8085 Bus organization – Internal Data operations and 8085 registers - Peripheral or External initiated operations.	**15**
II	**8085 Microprocessor –** Pinout and Signals – Functional block diagram - 8085 Instruction Set and Classifications. Flip flops: SR, JK, D, T. Karnaugh maps- Product of Sums method- Sum of product method,-Don't Care condition -Decoders. Multiplexer - Demultiplexer.	**15**
III	**BCD to Binary and Binary to BCD conversions** - ASCII to BCD and BCD to ASCII conversions - Binary to ASCII and ASCII to Binary conversions. BCD Arithmetic - BCD addition and Subtraction - Multibyte Addition and Subtraction - Multiplication and Division.	**15**
IV	**The 8085 Interrupts** – RIM AND SIM instructions-8259 Programmable Interrupt Controller-Direct Memory Access (DMA) and 8257 DMA controller. Data Representation: Data types-Number systems: Octal &	**15**

	Hexadecimal numbers, Decimal Representation, Alphanumeric representation. Logic Circuits: Gates –AND, OR, NOT, NAND,NOR Gates & Truth tables-Boolean Algebra	
V	**Introduction to Microcontroller -** Microcontroller Vs Microprocessor - 8051 Microcontroller architecture - 8051 pin description. Timers and Counters – Operating Modes- Control Registers. **Self Study:** Interrupts – Interrupts in 8051 - Interrupts Control Register – Execution of interrupt.	**15**

Textbook:

1. R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with 8085"- 5th Edition- Penram International Publications, 2009. [For unit I to unit IV].
2. Soumitra Kumar Mandal -"Microprocessors and Microcontrollers – Architectures, Programming and Interfacing using 8085, 8086, 8051", Tata McGraw Hill Education Private Limited. [For unit V].

Unit	Chapter	Sections
I	Chapter – 1	Section 1.1-1.9 (Pages:1-31)
II	Chapter– 2	Section 2.1-2.9 (Pages:32-77)
III	Chapter– 3	Section 3.1-3.11(Pages:78-146)
IV	Chapter–4,6	Section 4.1-4.7,6.1-6.9 (Pages: 147-162,219-243)
V	Chapter – 5	Section 5.1-5.7,(Pages:163-218)

References:

- Mathur- "Introduction to Microprocessor"- 3rd Edition- Tata McGraw-Hill -1993.
- Raj Kamal - "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005.
- Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096", PHI, 2008.

Web Resources-

Web resources from NDL Library, E-content from open source libraries

1. https://www.geektonight.com/microprocessor-and-microcontrollers-notes/
2. https://www.tutorialsduniya.com/notes/microprocessor-and-microcontrollers-notes/
3. https://treasurehunt.kba.ai/viewcontent?docid=50753&FileName=Lecture%20Note%20On%20Microprocessor%20And%20Microcontroller%20Theory.pdf

Pedagogy: Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Remember the Basic binary codes and their conversions. Binary concepts are used in Microprocessor programming and provide a good understanding of the architecture of 8085.	**K1,K2**
CO2	Understanding the 8085 instruction set and their classifications, enables the students to write the programs easily on their own using different logic.	**K2,K3,K4,K5**
CO3	Applying different types of instructions to convert binary codes and analyzing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.	**K1,K3,K5**
CO4	Analyze how peripheral devices are connected to 8085 using Interrupts and DMA controller.	**K2,K3**
CO5	An exposure to create real time applications using microcontroller.	**K3,K4,K5,K6**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;**K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	2	3	3	3	3	3
CO2	3	2	3	3	3	3	3
CO3	2	3	3	2	3	2	3
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III	**23U3CSCP3**	**Simulation and Modeling**	**5**	**4**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented		Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- In this course, modelling and simulation (M&S) methodologies considering the theoretical aspects.
- A wide range of Modelling and Simulation concepts that will lead you to develop your own M&S applications.
- Students learn the methodologies and tools for simulation and modelling of a real time problem/ mathematical model.

Syllabus
Content
1. Write a program to read a csv file and analyze the data in the file in R. 2. Exploratory data analysis for histogram 3. Random number generation Distributions 4. Stochastic Process 5. Horizon Simulations 6. Warm-up Interval 7. Event-Scheduling Approach, 8. Process Interaction Approach 9. Federation Development and Execution Process (FEDEP) 10. Decision Trees 11. Optimization Algorithms. 12. Genetic Algorithms 13.Human Eye Modeling

Textbook:

1. Introduction to Scientific Programming and Simulation Using R Second Edition, Chapman & Hall/CRC the R Series.

Web Resources-

Web resources from NDL Library, E-content from open source libraries

1. https://www.inspirenignite.com/mh/itl804-r-programming-lab-syllabus-for-it-8th-sem-2019-pattern-mumbai-university/
2. http://nptel.ac.in/courses/106104135/48
3. http://nptel.ac.in/courses/110106064/

Pedagogy: Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Introduction To Modeling & Simulation, Input Data Analysis and Modeling.	**K1,K2**
CO2	Random Variate and Number Generation. Analysis of Simulations and methods.	**K2,K3,K4,K5**
CO3	Comparing Systems via Simulation	**K1,K3,K5**
CO4	Entity Body Modeling, Visualization, Animation.	**K2,K3**
CO5	Algorithms and Sensor Modeling	**K3,K4,K5,K6**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;
K5 – Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	2	3	3	3	3	3
CO2	3	2	3	3	3	3	3
CO3	2	3	3	2	3	2	3
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated;
0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III	**23U3CSPHA1**	**APPLIED PHYSICS-I**	**5**	**3**

Nature of the course

Employability Oriented	√	Relevant to Local need	
Entrepreneurship Oriented		Relevant to regional need	
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization		Addresses Professional Ethics	
Addresses Environment and Sustainability			
Addresses Human Values	√		

The main objectives of this course:

1. To get knowledge on semiconductor devices.
2. To get introductory knowledge on IC fabrication.
3. To introduce the linear integrated circuits.

SYLLABUS		
Unit	**Content**	**No. of Hrs**
I	**Semiconductors Physics** Semiconductor - Intrinsic and Extrinsic semiconductor- P-type and N-type semiconductors-Semiconductor diode – Characteristics – Zener diode – Characteristics –Regulated power supply –Rectifiers – Transistors– CE characteristics – Field effect transistor – construction – characteristics – SCR – Characteristics –SCR as a switch.	15
II	**Transistor Amplifiers** Transistor biasing – R-C coupled amplifier – positive and negative feedback – feedback amplifier – current and voltage feedback – power amplifier – push pull amplifier – class A and class B and class C amplifier.	15
III	**Transistor oscillators** General theory – feedback requirements for oscillators – Hartley, Colpitt and Phase shift oscillator – Multivibrators–Astable, Bistable and Monostable.	15
IV	**IC Fabrication** Integrated circuit – advantages and disadvantages of IC – Scaleof integration – Making monolithic IC – Fabrication of components on monolithic IC (Diodes – Transistors–Resistors – Capacitors) – IC packings – IC symbols.	15
V	**Linear Integrated Circuits** Operational amplifier – Characteristics – Parameters – Applications – Summing – Integrating – Differentiating– Sin, Square, Triangular and Ramp Wave generation – Multi vibrators – Astable and Bistable – Schmitt trigger.	15

Books for study

1. Integrated Electronics (Analog and digital circuits and systems),JacobMillman and Christos C. HalKias,Tata McGraw Hill edition, New Dehli-2010
2. Electronic Devices and Circuits,Millman and HalKias-2008
3. Micro Electronics, Digital and Analog circuit and System – Jacob Mill man2010 -

Books for Reference

1. Principles of electronics,V.K.Mehtha and Shalumehtha, S.Chand&Company Ltd-2008
2. Basic Electronics, B.L. Theraja, :S. Chand Limited-2007

Web resources:

1. https://byjus.com/jee/semiconductors/
2. https://www.elprocus.com/transistor-as-an-amplifier-circuit-diagram-and-its-working/
3. https://www.electronics-tutorials.ws/opamp/opamp_8.html

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Understand the characteristics of semiconductors and related devices.	K1,K2
CO2	Apply transistors for various applications like amplifiers and oscillators.	K4
CO3	Understand the properties and suitability of oscillators for various electronic devices	K2,K3
CO4	Design the integrated circuits	K6
CO5	Apply operational amplifier for various applications like summing and wave generator	K4, K6

Cognitive Level:K1 - Remember; K2 - Understanding; K3 - Apply; K4 - Analyze;
K5 – Evaluate; K6 – Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	2	2	3
CO2	3	3	3	3	1	2	2
CO3	3	3	3	3	2	3	3
CO4	3	3	3	3	1	2	3
CO5	3	3	3	3	1	2	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III & IV	**23U3CSPHAPL**	**APPLIED PHYSICS LAB (NS)**	**3**	**3**

Nature of the course

Employability Oriented	√	Relevant to Local need	
Entrepreneurship Oriented		Relevant to regional need	
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization		Addresses Professional Ethics	
Addresses Environment and Sustainability			
Addresses Human Values	√		

The main objectives of this course:

1. To get knowledge on digital and general electronics experiments.
2. To acquire skills to develop their own electronic circuits.

List of Experiments

1. Zener diode – Forward and Reverse Characteristics
2. R-C coupled amplifier – Study of frequency response
3. Hartley oscillator – Determination of L
4. Boolean Law - Verification
5. NAND and NOR – Universal gates
6. Logic gates – Truth table Verification
7. Demorgan's theorem verification
8. FET – amplifier
9. Emitter follower Amplifier
10. Semiconductor Diode - Characteristics
11. AND, OR and, NOT Logic ,Circuits using – discrete components
12. Half and Full adder circuits
13. Half and Full Subtractor circuits.
14. Parallel Binary adder – IC 7483 function

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	set up experimentation in analog and digital electronics and to correlate the results	K2 ,K3
CO2	Review Boolean algebra and draw arithmetic circuits	K2, K3

Cognitive Level:K1 - Remember; K2 - Understanding; K3 - Apply; K4 - Analyze;
K5 – Evaluate; K6 – Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	2	2	3
CO2	3	3	3	3	1	2	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

B.Sc. Computer Science

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
IV	**23U4CST4**	**பொதுத் தமிழ் – 4**	**6**	**3**

Nature of the Course

1.Employablity Oriented *வேலை வாய்ப்புச் சார்ந்தது*		7. Addresses Professional Ethics *தொழில் நெறிமுறைகளை நிறைவு செய்தல்*	
2. Entrepreneurship Oriented *தொழில் முனைவு சார்ந்தது*		8.Relevent To Local Need *உள்ளூர் தேவைகளோடு தொடர்புடையது*	✓
3. Skill Development Oriented *திறன்மேம்பாடு சார்ந்தது*	✓	9. Relevent To Regional Need *மண்டல அளவிலான தேவைகளோடு தொடர்புடையது*	
4. Addresses Gender Sensitization *பாலின உணர்திறன் பூர்த்தி செய்தல்*		10. Relevent To National Need *தேசிய அளவிலான தேவைகளோடு தொடர்புடையது*	
5. Addresses Environment and Sustainablity *சுற்றுச் சூழல் மற்றும் நிலைத் தன்மை நிறைவு செய்தல்*	✓	11. Relevent To Global Development Need *உலக அளவிலான தேவைகளோடு தொடர்புடையது*	
6. Addresses Human Values *மனித மதிப்புகளை நிறைவு செய்தல்*	✓		

Course Objectives

1. சங்க இலக்கியத்தின் சிறப்பையும், நாடகம் என்னும் இலக்கிய வகையின் தன்மையையும் அகத்திணை, புறத்திணை இலக்கணங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்.
2. தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்பக் கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.
3.சங்க இலக்கியத்தில் காணப்பெறும் வாழ்வியல் சிந்தனைகளை அறிந்து கொள்வர்.
4.தமிழின் தொன்மையையும், செம்மொழித் தகுதியையும் அறிந்து கொள்ளுதல்.

Unit	Details	Hours
Unit-I	*எட்டுத்தொகை 1* *நற்றிணைஎ (10, 14, 16), குறுந்தொகை (16, 17, 19, 20, 25, 29, 38, 440* *கலித்தொகை (38, 51),அகநானூறு(15, 33, 55,) புறநானூறு (37, 86, 112,)* *பரிபாடல் —55*	**18 Hrs**
Unit-II	*எட்டுத்தொகை 2* *நெடுநல்வாடை-நக்கீரர்*	**18 Hrs**
Unit-III	*நாடகம் - சபாபதி-பம்மல் சம்பந்த முதலியார்*	**18 Hrs**
Unit-IV	*1.பாடம் தழுவிய இலக்கிய வரலாறு* *2.பயணங்கள் தொடரும் - கேட்டிவி*	**18 Hrs**
Unit-V	*1. மொழிபெயர்ப்பு / கலைச்சொற்கள்* *2. கொடுக்கப்பட்டுள்ள ஆங்கிலப்பகுதியைத் தமிழில் மொழிபெயர்த்தல்* *3. அலுவலகத் கடிதம் - தமிழில் மொழிபெயர்த்தல்*	**18 Hrs**

CO Number	CO Statement	Cognitive Level
CO1	சங்க இலக்கியத்தில் காணப்பெறும் வாழ்வியல் சிந்தனைகளை அறிந்து கொள்வர்.	**K1, K2**
CO2	தமிழின் தொன்மையையும், செம்மொழித் தகுதியையும் அறிந்து கொள்ளுதல்.	**K2**
CO3	நாடக இலக்கியம் மூலம் நடிப்பாற்றலையும். கலைத்தன்மையையும், படைப்பாற்றலையும் வளர்த்தல்.	**K4**
CO4	தமிழிலிருந்து அலுவலகக் கடிதங்களை மொழிபெயர்க்கும் அறிவைப் பெறுவர்.	**K3**
CO5	மொழியறிவோடு வேலை வாய்ப்பினைப் பெறுதல்.	**K4**

Text Books

1. தமிழ் இலக்கிய வரலாறு -செம்பதிப்பு- பெ.சுபாஷ் சந்திரபோஸ்

பார்வை நூல்கள்.

2. தமிழ் இலக்கிய வரலாறு - சிற்பி.பாலசுப்பிரமணியன்.
3. புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு - தமிழண்ணல்
4. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு - எஃப்.பாக்கியமேரி

Web Resources

Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc.)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org> Tamil virtual University Library-
2. www.tamilvu.org/ library
3. http://www.virtualvu.org/library Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamilebooks downloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

பொதுத்தமிழ் —4												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	3	2	2	2
CLO3	3	2	3	3	2	2	2	3	2	3	3	2
CLO4	2	3	3	2	2	2	3	2	3	2	3	3
CLO5	3	3	2	2	2	3	3	2	2	2	3	3

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
IV	**23U4CSE4**	**PART - II GENERAL ENGLISH**	**6**	**3**

Learning Objectives		
LO1	To make students realize the importance of resilience	
LO2	To enable them to become good decision makers	
LO3	To enable them to imbibe problem-solving skills	
LO4	To enable them to usetenses appropriately	
LO5	To help the muse English effectively at the work place.	
Unit No.	**Unit Title &Text**	**No.of Periods for the Unit**
I	**GOAL SETTING (UNICEF)** **Life Story** From Chinese Cinderella–Adeline Yen Mah Why I Write- George Orwell **Short Essay** On Personal Mastery–Robin Sharma On the Love of Life – William Hazlitt	20
II	**INTEGRITY** **Short Story** The Taxi Driver – K.S. Duggal Kabuliwala -Rabindranath Tagore A Retrieved Reformation –O Henry **Extract from a play** The Quality of Mercy (Trial Scene from the Merchant of Venice - Shakespeare)	20
III	**COPING WITH EMOTIONS** **Poem** Pride – Dahlia Ravikovitch Phenomenal Woman – Maya Angelou **Reader's Theatre** The Giant's Wife A Tall Tale of Irel and–William Carleton The Princess and the God :A Tale of Ancient India	20
IV	**Language Competency Sentences** Simple Sentences Compound Sentences Complex Sentences **Direct and Indirect Speech**	15
V	**Report Writing** Narrative Report Newspaper Report **Drafting Speeches** Welcome Address Vote of Thanks	15

Course Outcomes

Course Outcomes	On completion of this course, students will;	
CO1	Determine their goals	PO1,PO7
CO2	Identify the value of integrity.	PO1,PO2,PO10
CO3	Deal with emotions.	PO4,PO6,PO9
CO4	Frame grammatically correct sentences	PO4,PO5,PO6
CO5	Write cohesive reports.	PO3,PO8

Text Books (Latest Editions)

1	Oxford Practice Grammar, John Eastwood, Oxford University Press
2	Cambridge Grammar of English, Ronald Carter and Michael McCarthy
3.	George Orwell Essays, Penguin Classics

Web Resources

1	http:/www.gradesaver.com/George-orwell-essays/study/summary
2	O' Henry. A Retrieved Reformation. https://americanenglish.state.gov/files/ae/resource_files/a-retrieved-reformation.pdf
	Maya Angelou. Phenomenal Woman. https://www.poetryfoundation.org/poems/48985/phenomenal-woman
3	TheQuality ofMercy, https://poemana1ysis.com
4	https://www'.oxfordscho1ar1yeditions.coin/disp1ay/10.1093/actrade/9780199235742.book.1/actrade-9780199235742-div1-106-WilliamHazilitt

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3–Strong, 2–Medium, 1–Low

Mapping with Programme Specific Outcomes:

CO /PO	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weight age	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0

3– Strong, 2 –Medium, 1-Low

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
IV	23U4CSCIM	Industry Module: Java Programming	5	4

Nature of the course

Employability Oriented	√	Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to

1. Understand fundamentals of programming such as variables, conditional and iterative
2. Execution, methods, etc.
3. Understand fundamentals of object-oriented programming in Java, including defining
4. Classes, invoking methods, using class libraries, etc...
5. Be aware of the important topics and principles of software development.
6. Have the ability to write a computer program to solve specified problems.
7. Be able to use the Java SDK environment to create, debug and run simple Java programs.

SYLLABUS

Unit	Content	No. of Hours
I	**Java Introduction:** Object Oriented Programming concepts - Features of Java language - Types of Java programs - Java architecture - Program Structure – Literals - Data Types and variables – Operators - Control Statements – Arrays - **Classes and objects:** Class - Objects, Defining a class, Method declaration Constructor - Method overloading.	15
II	**Inheritance:** Creating subclasses, Method Over-riding, Super keyword, Final keyword, Abstract Classes. **Packages and Interfaces:** Package - Import statement - Access Modifiers - Interfaces. IO Packages - Java Input Stream Classes - Java Output Stream Classes - File Class**.**	15
III	**Exception:** Introduction, exception handling techniques, creating your own exceptions. **Threads:** Multitasking, Creation of new Threads, State of a thread, Multithreaded programming, Thread Priorities. Applet Programming – Graphics Programming – Introduction to AWT packages – Introduction to Swings - Managing Input Output in Files in Java.	15
IV	**Introduction to Software Design with Java :** Defining Software Design - Design in the Software Development Process - Capturing Design Knowledge - Sharing Design Know-How – **Self Study: Types and Interfaces :** Class Diagrams - Function Objects – Iterators - The ITERATOR and The STRATEGY Design Pattern - The Interface Segregation Principles	15
V	**Composition :** Composition and Aggregation - The COMPOSITE Design Pattern - Sequence Diagrams - The DECORATOR Design Pattern - Combining COMPOSITE and DECORATOR - Polymorphic Object Copying - The PROTOTYPE Design Pattern - The COMMAND Design Pattern - The Law of Demeter	15

Textbook:

1. Dr. K. Somasundaram., Programming in Java 2, Jaico publishing House
2. Martin P. Robillard., Introduction to Software Design with Java, Springer Nature Switzerland AG 2019.

Unit	Chapter	Sections
I	Chapter – 2	Section 2.3, 2.4, 2.9 (Pages: 23-26, 30-38, 86-89, 94-99)
II	Chapter– 3	Section 3.4, 3.7, 3.9 (Pages: 147-164,179-184, 189-193)
III	Chapter–4	Section 4.5, 4.7, 4.8, 4.9 (Pages: 247-251, 273 -290, 292-298)
IV	Chapter–5	Section 5.7, 5.8, 5.9(Pages: 349–355, 361–365, 380-389)
V	Chapter – 6	Section 6.3, 6.4(Pages: 425-448)

References:

- E Balagurusamy, "Programming with Java – A Primer", McGraw Hill, 2017
- Deitel, Java: How to Program, Pearson Education
- Java Programming, Schaum Outline Series

Web resources:

1. http://abel.harvard.edu/quals/index.html [Havard University]
2. http://acad.uohyd.ac.in/downloads/syllabus/PG/MSMM.pdf [Oxford University]

Pedagogy: Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java	**K1, K2, K3, K4**
CO2	Implement inheritance, packages, interfaces and exception handling of Core Java.	**K2, K3, K4**
CO3	Implement multi-threading and I/O Streams of Core Java	**K3, K4, K6**
CO4	Implement AWT and Event handling.	**K5**
CO5	Use Swing to create GUI.	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	1	1	2	2	2
CO2	3	3	2	2	2	3	2
CO3	3	3	3	3	1	3	3
CO4	2	2	3	2	2	2	2
CO5	2	3	2	3	2	1	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
IV	**23U4CSCP4**	**Practical: Java Programming**	**5**	**4**

Nature of the course

Employability Oriented	√	Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

1. Practice object-oriented programs and build java applications.
2. Implement java programs for establishing interfaces.
3. Implement sample programs for developing reusable software components

LIST OF PRACTICALS

JAVA LAB

1. Write a program to print the following triangle of numbers
   1
   1 2
   1 2 3
   1 2 3 4
   1 2 3 4 5
2. Write a java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula.
3. Write a java program to multiply two given matrices.
4. Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome?
5. Write a java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +,-,*, % operations. Add a text field to display the result. Handle any possible exception like divided by zero.

OOSD LAB

1. Write programs in JAVA with OOSD to demonstrate the working of the following a. constructs: I) do...while ii) while....do iii) if...else IV) switch v) for

2. A program written in JAVA with OOSD for Matrix Multiplication fails Introspect the causes for its failure and write down the possible reasons for its failure

3. Create a test plan document for any application (e.g. Library Management System)

4...Identify the User Interface, Domain objects, and Technical services.

5. Draw the partial layered, logical architecture diagram with UML package diagram notation.

TEXT BOOK:

1. David F Griffiths and Desmond J. Higham, Learning LaTex, SIAM (Society for Industrial and Applied Mathematics) Publishers, Phidelphia, 1996.

REFERENCE BOOKS:

1. Nambudiripad, K.B.M., 2014. LaTeX for begineers. Narosa Publishing House private limited, New Delhi.
2. Martin J.Erickson and Donald Bindner, A Student's Guide to the Study, Practice and Tools of Modern Mathematics, CRC Press, Boca Raton,FL,2011.
3. L. Lamport, LATEX: A Document Preparation System, User's Guide and Reference Manual, Addison-Wesley, Network, Second edition, 1994

Pedagogy: Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Code, debug and execute Java programs to solve the given problems	**K1, K2, K3, K4**
CO2	Implement multi-threading and exception-handling	**K2, K3, K4**
CO3	Implement functionality using String and String Buffer classes	**K3, K4, K6**
CO4	Demonstrate Event Handling.	**K5**
CO5	Create applications using Swing and AWT	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;
K5 – Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	1	1	2	2	2
CO2	3	3	2	2	2	3	2
CO3	3	3	3	3	1	3	3
CO4	2	2	3	2	2	2	2
CO5	2	3	2	3	2	1	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
IV	**23U4CSPHA2**	**APPLIED PHYSICS-II**	**5**	**3**

Nature of the course

Employability Oriented	√	Relevant to Local need	
Entrepreneurship Oriented		Relevant to regional need	
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization		Addresses Professional Ethics	
Addresses Environment and Sustainability			
Addresses Human Values	√		

The main objectives of this course:

1. To give need-based education in Digital Electronics of the highest quality and to understand the concept of various number systems and their conversions.
2. To provide the knowledge of transistor and its and to provide the knowledge of combinational logic circuit for computation.
3. To understand the function of and their application.
4. To understand basic construction of Digital to Analog and Analog to Digital circuits and their application.
5. Students will be able to understand the function of Microprocessor and to provide knowledge about the various register.

SYLLABUS

Unit	Content	No. of Hrs
I	**NUMBER SYSTEMS** Decimal Binary, Octal, Hexadecimal Number systems – conversions from one system to another – counting in binary system – binary addition, subtraction, multiplication and division - 1's and 2's complement notation – subtraction by 1's and 2's complement- BCD – ASCII – Excess 3 codes.	15
II	**BOOLEAN ALGEBRA AND COMBINATIONAL LOGIC CIRCUITS** Fundamental concepts and laws of Boolean Algebra – Evaluation of logical expressions – DeMorgan's theorem – verification – NAND and NOR as a Universal building block- Exclusive OR gate –Half adder – Full adder – Parallel binary adder – Half and Full subtractors – Parallel Binary Adder/ Subtract or using 2's complement – BCD Adder.	15
III	**SEQUENTIAL LOGIC CIRCUITS** RS – T – D – JK flip flops – Shift register – Left shift – Right shift operations.- Binary counters - (Mod 3 and 5) -Ripple counter — Synchronous counters - Decade counter –Ring counter – Up down counter	15
IV	**D/A AND A/D CONVERTERS** Accuracy and Resolution-D/A Converter – Binary Weighted resistor network – Binary ladder (R-2R)–A/D converter – Simultaneous conversion – countertype methods – Dual slope A/D converter –Voltage to frequency converters	15

V	**FUNDAMENTALS OF 8085 MICROPROCESSORS** Introduction to Microprocessor - block diagram of a micro processor – Buses-Data and address bus - Pin diagram of 8085-Architecture of 8085-ALU - Accumulator -Registers. - Program counters - Stack pointer - Flags - Timing and control unit –clock cycle-Instruction cycle :- fetch operation - execute operation - machine cycle and state -	15

Textbook:

1. Digital Principles and application – A.PMalvino and Donald P.Leach,Tata Mc Graw Hill Publishing Company, New Delhi 1976.
2. Digital Computer Electronics - A.P Malvino. 3rdEdition, McGraw-Hill Education -1992
3. Millman's Integrated Electronics - Analog and Digital Circuit and Systems- Jacob Millman, Christos Halkias, Chetan Parikh | 2nd Edition-McGraw Hill Educatio-2017

References:

1. Introduction to Integrated Electronics (Digital and Analog) by V.Vijayendran, S.Viswanathan (printers & Publishers),PVT LTD.
2. M. Morris Mano Digital System Design, Pearson Education Asia,(Fourth Edition)
3. W. H. Gothmann, Digital Electronics: An Introduction To Theory And Practice, Prentice Hall of India(2000)
4. Puri V.K., Digital Electronics circuits and systems, TATA Mcgraw hill publications, New Delhi, 2011.

Web resources:

1. https://archive.nptel.ac.in/courses/115/106/115106122/
2. https://pages.uoregon.edu/rayfrey/DigitalNotes.pdf

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Differentiate all the four number systems studied.	K1,K2
CO2	Review Boolean algebra and draw arithmetic circuits	K2
CO3	Verifying the concepts of gates, flip flop, adder and subtractor circuit. experiments	K3
CO4	Analyse and calculate the Analog and Digital value.	K4,K5
CO5	Understand the basic architecture of 8085 and Impart the knowledge about the instruction set and draw timing diagram	K1,K2

Cognitive Level:K1 - Remember; K2 - Understanding; K3 - Apply; K4 - Analyze; K5 – Evaluate; K6 – Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	2	2	3
CO2	3	3	3	3	1	2	2
CO3	3	3	3	3	2	3	3
CO4	3	3	3	3	1	2	3
CO5	3	3	3	3	1	2	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III & IV	**23U3CSPHAPL**	**APPLIED PHYSICS LAB (NS)**	**3**	**3**

Nature of the course

Employability Oriented	√	Relevant to Local need	
Entrepreneurship Oriented		Relevant to regional need	
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization		Addresses Professional Ethics	
Addresses Environment and Sustainability			
Addresses Human Values	√		

The main objectives of this course:

1. To get knowledge on digital and general electronics experiments.
2. To acquire skills to develop their own electronic circuits.

List of Experiments

1. Zener diode – Forward and Reverse Characteristics
2. R-C coupled amplifier – Study of frequency response
3. Hartley oscillator – Determination of L
4. Boolean Law - Verification
5. NAND and NOR – Universal gates
6. Logic gates – Truth table Verification
7. Demorgan's theorem verification
8. FET – amplifier
9. Emitter follower Amplifier
10. Semiconductor Diode - Characteristics
11. AND, OR and, NOT Logic ,Circuits using – discrete components
12. Half and Full adder circuits
13. Half and Full Subtractor circuits.
14. Parallel Binary adder – IC 7483 function

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	set up experimentation in analog and digital electronics and to correlate the results	K2 ,K3
CO2	Review Boolean algebra and draw arithmetic circuits	K2, K3

Cognitive Level:K1 - Remember; K2 - Understanding; K3 - Apply; K4 - Analyze;
K5 – Evaluate; K6 – Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	2	2	3
CO2	3	3	3	3	1	2	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
IV	**23U4CSSEC1**	**Skill Enhancement Course - Digital Literacy in Latex and Advanced Excel**	**2**	**2**

Nature of the course

Employability Oriented	√	Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- Prepare a Latex document, to make scientific article and project report.
- To include figures and tables in a Latex document.
- To make conference proceedings and presentations.
- Use the preamble of LaTeX file to define document class and layout options.
- Use BibTeX to maintain bibliographic information and to generate a bibliography for a particular document

LIST OF PRACTICALS

Latex:

1. Creation of a Document with different Alignments (Left, Right, Center, Justify).
2. Typing a Letter for applying a job.
3. Creation of Own Bio-Data.
4. Creating a Table Structure.
5. Typing a Mathematical Expression involving Differentiation, Integration and Trigonometry.
6. Typing a Mathematical Expression using all Expressions and Inequalities...
7. Creation of an Article using LaTex.
8. Inserting Picture in a LaTex
9. Preparing a question paper in LaTex Format.
10. Creation of Power Point Presentation in LaTex.

MS-EXCEL:

1. Creation of Worksheet, Data Validations by performing Sorting and Filtering operations.
2. Excel Function(Time functions , VlookUP with Exact Match & Text functions) and Creating Pivot tables Formatting and customizing Pivot tables
3. Inserting and Deleting Rows and Columns. Drawing Borders around Cells.
4. Creation of Chart, 3D Graphs-Bar and Line Chart and Changing Chart Type appearance.
5. Formatting Numbers and Other Numeric Formats.

TEXT BOOK:

1. David F Griffiths and Desmond J. Higham, Learning LaTex, SIAM (Society for Industrial and Applied Mathematics) Publishers, Phidelphia, 1996.

REFERENCE BOOKS:

1. Nambudiripad, K.B.M., 2014. LaTeX for begineers. Narosa Publishing House private limited, New Delhi.
2. Martin J.Erickson and Donald Bindner, A Student's Guide to the Study, Practice and Tools of Modern Mathematics, CRC Press, Boca Raton,FL,2011.
3. L. Lamport, LATEX: A Document Preparation System, User's Guide and Reference Manual, Addison-Wesley, Network, Second edition, 1994

Pedagogy: Teaching / Learning methods

- Lecture
- Tutorial
- Assignment
- PPT presentation
- Seminar

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Utilize the tools of the Numerical Mathematics in order to formulate the real-world problems and construct charts in MS-Excel.	**K1, K2, K3, K4**
CO2	Design, analyze and implement of numerical methods for solving different types of problems using data validation in MS-Excel.	**K2, K3, K4**
CO3	Create, select and apply appropriate numerical techniques with the understanding of their limitations so that any possible modification in these techniques could be carried out in further research	**K3, K4, K6**
CO4	Find appropriate solutions accurately and efficiently	**K5**
CO5	Extend their knowledge to pursue research using this field.	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;
K5 – Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	3	3	3	3
CO2	3	2	3	3	3	3	3
CO3	2	3	1	2	3	2	3
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5CSC4	Computer Networks	5	4

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented	√	Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

1. To understand the concept of Data communication and Computer network
2. To get a knowledge on routing algorithms.
3. To impart knowledge about networking and inter networking devices
4. To gain the knowledge on Security over Network communication.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media	**15**
II	Wireless Transmission - Communication Satellites – Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.	**15**
III	Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – Bluetooth	**15**
IV	Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms – IP Protocol – IP Addresses – Internet Control Protocols. **Self Study:** Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection – Simple Transport Protocol – Internet Transport Protocols (ITP) -	**15**
V	Application Layer- DNS—The Domain Name System- Electronic Mail-The World Wide Web-Multimedia Network Security: Cryptography- Symmetric-Key Algorithms-Public-Key Algorithms- Digital Signatures-Communication Security-Authentication Protocols-E-Mail Security-Web Security.	**15**

Textbook:

1. A. S. Tanenbaum, "Computer Networks", 4th Edition, Prentice-Hall of India, 2008.

Unit	Chapter	Sections
I	Chapter –1,2	Section 1.1-1.8,2.1-2.2(Pages:11-72)
II	Chapter–2,3	Section 2.3-2.8,3.1-3.2 (Pages:73-148)
III	Chapter–3,4	Section 3.3-3.6,4.1-4.6(Pages:149-239)
IV	Chapter–5,6	Section 5.1-5.6,6.1-6.6 (Pages:259-426)
V	Chapter – 7,8	Section 7.1-7.4,8.1-8.9 (Pages:557-663)

References:

- B. A. Forouzan, "Data Communications and Networking", Tata McGraw Hill, 4th Edition, 2017.
- F. Halsall, "Data Communications, Computer Networks and Open Systems", Pearson Education, 2008.
- D. Bertsekas and R. Gallagher, "Data Networks", 2nd Edition, PHI, 2008.
- Lamarca, "Communication Networks", Tata McGraw- Hill, 2002

Web Resources-

1. https://www.university.youth4work.com/study-material/computer-networking-lecture.
2. https://www.brainkart.com/subject/Computer-Networks_221/.
3. https://examupdates.in/computer-network-notes/

Pedagogy:

Teaching / Learning methods

1. Lecture 2. Tutorial 3. Assignment 4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	To Understand the basics of Computer Network architecture, OSI and TCP/IP reference models	**K1,K2**
CO2	To gain knowledge on Telephone systems and Satellite communications	**K2**
CO3	To impart the concept of Elementary data link protocols	**K2,K3,K4**
CO4	To analyze the characteristics of Routing and Congestion control algorithms	**K3,K4,K5**
CO5	To understand network security and define various protocols such as FTP, HTTP, Telnet, DNS	**K2,K3,K4**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	3	3	2	2	1	1
CO2	1	3	3	3	3	2	2
CO3	2	3	2	3	2	2	3
CO4	3	3	2	3	2	3	2
CO5	2	3	2	3	3	3	1

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5CSC5	Database Management System	5	4

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

1. This course provides an insight on the basics of database, database design, relational model and querying a database.
2. It also gives an overview of NoSQL databases and storing and accessing data in a key/value database.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Database Concepts:** Introduction -Relationships - **DBMS** -Relational data model - Integrity rules -**Theoretical relational languages**. Database Design: Data modeling -Dependency -Database design -Normal forms - **Dependency** diagrams -**Denormalization.**	**15**
II	**Structured Query Language (SQL):** Introduction - DDL - Naming rules and conventions- Data types -**Constraints** - Creating table- Displaying table information - **Altering an existing table -Dropping, renaming and truncating table** - Table type. Working with tables: DML - adding anew row/record – Updating and deleting existing rows/records - Retrieving data from table - Sorting - CASE structure.	**15**
III	**Functions and Grouping**: **Built-in functions** - Grouping data. **Joins and Views**: Join -Join types. **Views:** Views - Creating a view - Removing a view - Altering a view. **PL/SQL:** Fundamentals-Block structure - comments - Data types - Other data types - Variable declaration - Assignment operation.	**15**

IV	**Control Structures and Embedded SQL:** Control structures - Nested blocks - SQL in PL/SQL - **Data manipulation** -Transaction control statements. PL/SQL **Cursors:** Cursors -Implicit & explicit cursors and attributes - cursor FOR loops - Records - Tables - Procedures – **Self Study: Functions -Triggers.**	**15**
V	An overview of **NoSQL** - Characteristics of NoSQL - NoSQL storage types - Advantages and Drawbacks - **MongoDB Introduction** -Creating database and Dropping database - Creating collection and Dropping collection -Insert, query and update document.	**15**

Textbook:

1. Nilesh Shah," Database Systems Using Oracle", Prentice Hall of India 2ndEdition, 2016. [Unit I-IV]
2. Gaurav Vaish ,"Getting Started with NoSQL", Packt 2013[Unit-V]
3. Kristina Chodorow ,"MongoDB: The Definitive Guide"-2013[Unit-V]

Unit	Chapter	Sections
I	Chapter – 1,2	Section (Pages:1-32)
II	Chapter– 3,4	Section (Pages:43-90)
III	Chapter– 6,7,9,10	Section (Pages:132-149,157-158,191-195,226-236)
IV	Chapter–13,14	Section (Pages:244-264,268-331)
V	Chapter – 1-4 & 1-3	Section,(Pages:3-50,)

References:

- Rajesh Narang ,"Database Management Systems", Prentice Hall of India 2nd Edition, 2011.
- PramodSadalge, Martin Fowler NoSQL Distilled Addison-Wesley 2012.
- Kristina Chodorow ,MongoDB: Definitive Guide ,Oreilly 2nd Edition,2015

Web Resources-

1. http://www.analyticsvidya.com/
2. http://www.udemy.com/
3. https://towardsdatascience.com/machine-learning/home
4. http://epgp.inflibnet.ac.in/

Pedagogy:

Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Recall the basic concepts of DBMS, Design, and Rules in Theoretical relational languages.	**K1**
CO2	Understand DDL, DML SQL statements and PL/SQL programming	**K2**
CO3	Apply various queries, PL/SQL program to store and retrieve data from databases	**K3**
CO4	Analyze the working of SQL, PL/SQL program, NoSQL database to solve real-world problems	**K4**
CO5	Recall the basic concepts of database management and NoSQL Databases commands are used in real-world applications	**K1,K4,K6**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	2	3	3	3	3	3
CO2	3	2	3	3	3	3	3
CO3	2	3	3	2	3	2	3
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5CSCP5	Practical: Database Management System	5	4

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- Keep abreast of current developments to continue their own professional development.
- To engage themselves in lifelong learning of Database management systems theories and technologies this enables them to purse higher studies.
- To interact professionally with colleagues or clients located abroad and the ability to overcome challenges that arises from geographic distance, cultural differences, and multiple languages in the context of computing.
- Develop team spirit, effective work habits, and professional attitude in written and oral forms, towards the development of database applications

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Simple queries: selection, projection, sorting on a simple table** I. Small-large number of attributes ii. Distinct output values iii. Renaming attributes iv. Computed attributes v. Simple-complex conditions (AND, OR, NOT) vi. Partial Matching operators (LIKE, %, _, *,) vii. ASC-DESC ordering combinations viii. Checking for Nulls	**15**
II	**Multi-table queries(JOIN OPERATIONS)** I. Simple joins (no INNER JOIN) ii. Aliasing tables – Full/Partial name qualification iii. Inner-joins (two and more (different) tables) iv. Inner-recursive-joins (joining to itself) v. Outer-joins (restrictions as part of the WHERE and ON clauses) vi. Using where & having clauses	**10**
III	**Nested queries** I. In, Not In ii. Exists, Not Exists	**10**

	iii. Dynamic relations (as part of SELECT, FROM, and WHERE clauses)	
IV	**Set Oriented Operations** I. Union ii. Difference iii. Intersection iv. Division	**10**
V	**DDL & TCL Commands.** I. Creating objects: tables, views, users, sequences, Collections etc. ii. Privilege management through the Grant/Revoke commands iii. Transaction processing using Commit/Rollback iv. Save points.	**10**
VI	**PL/SQL Programming - I** I. Programs using named and unnamed blocks ii. Programs using Cursors, Cursor loops and records	**10**
VII	**PL/SQL Programming – II** I. Creating stored procedures, functions and packages ii. Error handling and Exception iii. Triggers and auditing triggers	**10**

Textbook:

1. Thomas M. Connolly, Carolyn E. Begg, Database Systems–A Practical Approach to Design, Implementation, and Management.

2. SQL, Pl/SQL: The Programming Language of Oracle: Ivan Bayross

Web Resources-

1. https:// www.codechef.com
2. http://www.cs.cmu.edu
3. https://www.geeksforgeeks.org

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Understand, appreciate and effectively explain the underlying concepts of database technologies	**K2**
CO2	Design and implement a database schema for a given problem-domain	**K3,K5,K6**
CO3	Populate and query a database using SQL DML/DDL commands.	**K2,K3**
CO4	Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS.	**K4,K5**
CO5	Programming PL/SQL including stored procedures, stored functions, cursors, packages.	**K5,K6**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	1	1	1	2	2
CO2	3	3	3	3	3	2	3
CO3	1	3	3	3	2	3	2
CO4	2	3	2	3	3	2	3
CO5	1	3	1	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated;
0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5CSEL1A	**Major Elective – I** **Mobile Application Development**	4	3

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

1. Student understands the working of Android OS Practically.
2. Student will be able to develop Android user interfaces
3. Student will be able to develop, deploy and maintain the Android Applications

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Android Architecture, Android-Application Components, Building you First Android application, Android Resources (Manifest file).	**10**
II	Android Applications: Android terminologies, Application Context, Android-Activities, Android-Services, Android Broadcast Receivers, Android Intents and types of objects/Filters, Android-Fragment, Manifest File and its common settings, Using Intent Filter, Permissions.	**15**
III	Android User Interface Design: UI Controls, Designing User Interfaces with Layouts, Android-Event Handling, Drawing and Working with Animation. Android UI Design, UI Patters and UI Testing.	**10**
IV	Android Advanced Concepts: Android Drag and drop, Location Based Services, Android Sending Email and SMS, Testing Android applications, Publishing Android application. Managing Application resources in a hierarchy, working with different types of resources.	**15**
V	Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with **Self Study:** Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.	**10**

Textbook:

1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011).
2. Android Mobile Application Development, ISBN-978-81-940577-2-7 June 2019 by Dr. Babasaheb Ambedkar Open University

Unit	Chapter	Sections
I	Chapter – 1-6	Section I -II (Pages:11-136)
II	Chapter– 3,4	Section (Pages:43-90)
III	Chapter– 6,7,9,10	Section (Pages:132-149,157-158,191-195,226-236)
IV	Chapter–13,14	Section (Pages:244-264,268-331)
V	Chapter – 1-4 & 1-3	Section,(Pages:3-50,)

References:

- Rajesh Narang ,"Database Management Systems", Prentice Hall of India 2nd Edition,2011.
- PramodSadalge, Martin Fowler NoSQL Distilled Addison-Wesley 2012.
- Kristina Chodorow ,MongoDB: Definitive Guide ,Oreilly 2nd Edition,2015

Web Resources-

1. http://www.analyticsvidya.com/
2. http://www.udemy.com/
3. https://towardsdatascience.com/machine-learning/home
4. http://epgp.inflibnet.ac.in/

Pedagogy:

Teaching / Learning methods

1. Lecture 2. Tutorial 3. Assignment 4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Introduction to Android, Installation process, application and resources.	**K1**
CO2	Android applications, activities and services on their design.	**K2**
CO3	Prototyping techniques to design and develop sophisticated mobile user interfaces.	**K3**
CO4	Program mobile applications for the Android operating system that use basic and advanced phone features.	**K4**
CO5	Deploy applications to the Android marketplace for distribution	**K1,K4,K6**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	2	3	3	2	3	2	3
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated;
0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5CSEL1B	Major Elective – I Cyber Security	4	3

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented	√	Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

The students will be able to

- Understand various block cipher and stream cipher models.
- Describe the principles of public key cryptosystems, hash functions and digital signature.
- To get a firm knowledge on Cyber Security Essentials.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Introduction to Security** Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm	**10**
II	**Public Key Cryptography and Hash Algorithms** Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange- Hash functions-Hash Algorithms (MD5, Secure Hash Algorithm	**15**
III	**Fundamentals of Cyber Security** How Hackers Cover Their Tracks- Fraud Techniques- Threat Infrastructure- Techniques to Gain a Foothold (Shellcode, SQL Injection, Malicious PDF Files)- Misdirection, Reconnaissance, and Disruption Methods.	**10**
IV	**Planning for Cyber Security** Privacy Concepts -Privacy Principles and Policies -Authentication and Privacy - Data Mining - Privacy on the Web - Email Security - Privacy Impacts of Emerging Technologies.	**15**
V	**Cyber Security Management [Self Study]** Security Planning - Business Continuity Planning - Handling Incidents - Risk Analysis - Dealing with Disaster – Legal Issues – Protecting programs and Data – Information and the law – Rights of Employees and Employers - Emerging Technologies - The Internet of Things - Cyber Warfare.	**10**

Textbook:

1. William Stallings, "Cryptography and Network Security", Pearson Education, 6th Edition, 2013.
2. Graham, J. Howard, R., Olson, R., Cyber Security Essentials, CRC Press, 2011.

Unit	Chapter	Sections
I	Chapter – 3	Section 3.1-3.5 (Pages:61-80)
II	Chapter– 9,10,11	Section 9.1-9.4,10.1,11.4-11.6 (Pages:253-279,286-287,328-351)
III	Chapter– 2,3	Section 2.1.1.1-2.1.4,2.2-2.3 ,3.1-3.1.6,3.2(Pages:75-79,87-111,119-147 &171-191)
IV	Chapter–9	Section 9.1-9.7 (Pages :)
V	Chapter – 10,11,13	Section, 10.1-10.5, 11.1-11.3 & 13.1-13.4(Pages :)

References:

- Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, Security in Computing, 5th Edition, Pearson Education, 2015.
- George K.Kostopoulous, Cyber Space and Cyber Security, CRC Press, 2013.

Web Resources-

- Web resources from NDL Library, E-content from open-source libraries

Pedagogy:

Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Implement basic security algorithms required by any computing system	**K1**
CO2	Analyze the vulnerabilities in any computing system and hence be able to design a security solution	**K2,K3**
CO3	Analyze the possible security attacks in complex real time systems and their effective countermeasures	**K3,K5**
CO4	Differentiate various governing bodies of cyber laws	**K3**
CO5	Impart various privacy policies for an organization	**K1,K4,K6**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	2	3	3	2	3	2	3
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5CSEL2A	Major Elective – II NATURAL LANGUAGE PROCESSING	4	3

Nature of the course

Employability Oriented	√	Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

1. To understand the algorithms available for the processing of linguistic information and computational properties of natural languages.
2. To conceive basic knowledge on various morphological, syntactic and semantic NLP tasks.
3. To familiarize various NLP software libraries and data sets publicly available.
4. To develop systems for various NLP problems with moderate complexity.
5. To learn various strategies for NLP system evaluation and error analysis.

SYLLABUS

Unit	Content	No. of Hours
I	**Introduction to NLP** NLP – introduction and applications, NLP phases, Difficulty of NLP including ambiguity; Spelling error and Noisy Channel Model; Concepts of Parts-of-speech and Formal Grammar of English.	11
II	**Language Modelling: N-gram and Neural Language Models** Language Modelling with N-gram, Simple N-gram models, Smoothing (basic techniques), Evaluating language models; Neural Network basics, Training; Neural Language Model, Case study: application of neural language model in NLP system development	15
III	**Parts-of-speech Tagging** Parts-of-speech Tagging: basic concepts; Tagset; Early approaches: Rule based and TBL; POS tagging using HMM, Introduction to POS Tagging using Neural Model.	10
IV	**Parsing** Basic concepts: top down and bottom up parsing, treebank; Syntactic parsing: CKY parsing; Statistical Parsing basics: Probabilistic Context Free Grammar (PCFG); Probabilistic CKY Parsing of PCFGs.	13
V	**Semantics [self study]** Vector Semantics; Words and Vector; Measuring Similarity; Semantics with dense vectors; SVD and Latent Semantic Analysis; Embedding's from prediction: Skip-gram and CBOW; Concept of Word Sense; Introduction to WordNet	11

Textbook:

1. Jurafsky Dan and Martin James H. "Speech and Language Processing",3rd Edition,

Unit	Chapter	Sections
I	Chapter – 2	Section 2.3, 2.4, 2.9 (Pages: 23-26, 30-38, 86-89, 94-99)
II	Chapter– 3	Section 3.4, 3.7, 3.9 (Pages: 147-164,179-184, 189-193)
III	Chapter–4	Section 4.5, 4.7, 4.8, 4.9 (Pages: 247-251, 273 -290, 292-298)
IV	Chapter–5	Section 5.7, 5.8, 5.9(Pages: 349–355, 361–365, 380-389)
V	Chapter – 6	Section 6.3, 6.4(Pages: 425-448)

References:

- Jurafsky D. and Martin J. H., "Speech and language processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition", 2nd Edition, Upper Saddle River, NJ: Prentice-Hall, 2008.
- Goldberg Yoav "A Primer on Neural Network Models for Natural Language Processing".

Web resources:

1. http://abel.harvard.edu/quals/index.html [Havard University]
2. http://acad.uohyd.ac.in/downloads/syllabus/PG/MSMM.pdf [Oxford University]

Pedagogy:

Teaching / Learning methods

1. Lecture 2. Tutorial 3. Assignment 4. PPT presentation
5. Seminar

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Describe the concepts of morphology, syntax, semantics, discourse & pragmatics of natural language.	**K1, K2, K3, K4**
CO2	Demonstrate understanding of the relationship between NLP and statistics & machine learning.	**K2, K3, K4**
CO3	Discover various linguistic and statistical features relevant to the basic NLP task, namely, spelling correction, morphological analysis, parts-of-speech tagging, parsing and semantic analysis	**K3, K4, K6**
CO4	Develop systems for various NLP problems with moderate complexity.	**K5**
CO5	Evaluate NLP systems, identify shortcomings and suggest solutions for these shortcomings	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	2	2
CO2	3	3	3	3	2	2	2
CO3	1	3	3	3	3	2	1
CO4	3	3	3	3	3	3	3
CO5	3	3	2	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5CSEL2B	**Major Elective- II** **Data Mining with R programming**	4	3

Nature of the course

Employability Oriented	√	Relevant to Local need			Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need			Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need			Addresses Human Values	
		Relevant to Global development need		√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

1. Apply various Data manipulation techniques in R to import and export data
2. Apply classification and regression techniques in R
3. Implement programs of clustering & outlier detection in R
4. Build association rules & perform time series forecasting in R
5. Explore R for various applications

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**BASICS OF R & DATA IMPORT EXPORT:** Introduction to Data Mining – Basics of R – Working with Datasets in R – Data Import and Export – Save and Load Data in Different Formats - Data Types – Vectors & operations – Matrices – Arrays – Factors & operations – Data Frames – Sub setting of Data Frames – List – Data Exploration and Visualization	**15**
II	**CLASSIFICATION & REGRESSION:** Supervised Learning – Classification – Decision Tress – Working with party and rpart module – Random Forest – Regression – Linear Regression – Logistic Regression – Non Linear Regression	**10**
III	**CLUSTERING & OUTLIER DETECTION:** Unsupervised Learning – K-Means Clustering – K-Medoids Clustering – Hierarchical Clustering – Density-based Clustering – Outlier Detection – Univariate Outlier Detection – Detect by Clustering – Time Series – With LOF.	**12**
IV	**TIME SERIES & ASSOCIATION RULES :** Time Series Data in R – Decomposition – Time Series Forecasting – Time Series Clustering – Time Series Classification – Association Rule Mining – Removing Redundancy – Interpreting Rules – Visualizing Association Rules	**10**
V	**TEXT MINING &SOCIAL NETWORK ANALYSIS: [Self Study]** Text Mining – Applications in R – Social Network Analysis – Network of Terms – Network of Tweets – Two-Mode Network – Analysis and Forecasting of House Price Indices - Customer Response Prediction and Profit Optimization.	**13**

TEXT BOOKS:

1. Yanchang Zhao, "R and Data Mining: Examples and Case Studies", Academic Press, First Edition, 2013.

Unit	Chapter	Sections
I	Chapter – 1,2 & 3	Section 1.1 – 3.5 (Pages:1-32)
II	Chapter– 4,5	Section4.1-4.3,5.1-5.4 (Pages:33-52)
III	Chapter– 6,7	Section6.1-6.4,7.1-7.5 (Pages: 53-72)
IV	Chapter–8,9	Section 8.1-8.5, 9.1-9.6(Pages:75-95)
V	Chapter – 10,11	Section 10.1-10.9,11.1-11.4 (Pages:101-129)

Reference Books:

1. K.G.Srinivasa, G M Siddesh, Chetan Shetty, "Statistical Programming in R", Oxford University Press, New Delhi, 2017
2. John Chambers, "Software for Data Analysis: Programming with R ", Springer; 1st ed. 2008. 2nd printing 2009 edition
3. Thomas Lumley," Complex Surveys: A Guide to Analysis Using R", Wiley Series in survey methodology, 2010
4. Nicholas J. Horton, Ken Kleinman," Using R and Studio for Data Management, Statistical Analysis, and Graphics", CRC Press, Second edition, 2015
5. John Main Donald, W. John Braun,"Data Analysis and Graphics Using R: An Example-Based Approach", University Press, Cambridge, Third edition, 2010

Pedagogy: Teaching / Learning methods

1. Lecture 2. Tutorial 3. Assignment 4. PPT presentation 5. Seminar

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Apply the basics of R programming to perform import & export	**K1, K2, K3, K4**
CO2	Apply the supervised learning techniques in R	**K2, K3, K4**
CO3	Use R to perform clustering and to detect outliers	**K3, K4, K6**
CO4	Explore data analysis for time series and build association rules	**K5**
CO5	Apply R for text mining and other applications	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	1	2	2	3	3	3
CO2	3	3	3	3	3	3	1
CO3	1	1	3	3	3	3	3
CO4	2	2	3	3	3	3	3
CO5	1	3	3	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5CSNME	Non Major Elective - Content Writer	2	2

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented	√	Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

1. To learn the features of Python.
2. To understand why Python is a useful scripting language for developers.
3. To learn how to design and program Python applications.
4. To learn how to use lists, tuples, and dictionaries in Python programs.
5. Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Basics of Content writing:** Writing for the Web-The Concept of Content Writing and its relevance-Role and Functions of Content Writers-. Print and Web Content Writing- Types of Content Writing-**Social Media**: Understanding the basics of social media-Understanding social media content writing- Understanding PR-Plagiarism laws in Content Writing	**15**
II	**Visual communications:** Visual Content-Interactive Content-Adding Motion-Sound-Images-Free tools and paid tools-Writing Blogs	**15**

Textbook:

1. Writing for the web, LYNDA FELDER

Unit	Chapter	Sections
I	Chapter –2	Section (Pages:13-28)
II	Chapter–3,4,5,6,12	Section (Pages:31-80,141-152)

References:

- ❖ Content Writing Handbook 2021**.**
- ❖ "Everybody Writes: Your Go-To Guide to Creating Ridiculously Good Content" by Ann Handley

Web Resources-

1. https://www.simplilearn.com/how-to-become-content-writer-article
2. https://www.digitalvidya.com/blog/how-to-start-content-writing/ 3. http://www.diveintopython3.net/
3. https://www.masterclass.com/articles/types-of-content-writing

Pedagogy: Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	The basic concepts of Content Writing	K1, K2, K3, K4
CO2	The knowledge of various styles and techniques of writing and editing	K2, K3, K4,K5
CO3	A nourishment of their creative skills	K1,K3, K4, K6
CO4	An enhancement of their employability	K2,K5,K6
CO5	A creation of an industry-academia interface through institutional support	K3, K4, K5

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;**K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	1	3	3	2	2	3	3
CO4	2	3	3	3	3	2	3
CO5	2	3	2	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5CSC6PR	PROJECT	5	4

Main Project

- To teach technical and software development skills.
- To inculcate the importance of the front end and back and tools in developing the modules.
- To explain the working principles of the modules and test the modules.
- To illustrate the different phases of software development life cycle.
- To describe the different testing types and know the importance of testing and debugging.
- To cultivate have to undergo industrial software development projects using recent technologies.

Course Outcomes

After completion of the course students will be able to:

- To develop the software codes using front end and the back end tools.
- Build the modules.
- Understand the different process modes involved in project development.
- Develop the skills to test the code.
- Work in a MNC project leader and project manager.

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6CSC7**	**Software Engineering**	**6**	**4**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented		Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- This course provides the basic concepts of software engineering to design a new software project and develops skills to construct software of high quality.
- This Course also covers the fundamental techniques for modelling software requirements, analysis and design.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Introduction:** The software engineering discipline, programs vs. software products, why study software engineering, emergence of software engineering, Notable changes in software development practices, computer systems engineering. **Software Life Cycle Models:** Why use a life cycle model, Classical waterfall model, iterative waterfall model, prototyping model, evolutionary model, spiral model, comparison of different life cycle models.	**18**
II	**Requirements Analysis and Specification:** Requirements gathering and analysis, Software requirements specification (SRS) **Software Design:** Good software design, cohesion and coupling, neat arrangement, software design approaches, object- oriented vs function-oriented design	**18**
III	**Function-Oriented Software Design:** Overview of SA/SD methodology, structured analysis, data flow diagrams (DFD's), structured design, detailed design. **[Self Study]** **User-Interface design:** Characteristics of a good interface; basic concepts;	**18**

	types of user interfaces; component based GUI development, a user interface methodology.	
IV	**Coding and Testing:** Coding; code review; testing; testing in the large vs testing in the small; unit testing; black-box testing; white-box testing; debugging; program analysis tools; integration testing; system testing; some general issues associated with testing. **Software Reliability and Quality Management:** Software reliability; statistical testing; software quality; software quality management system; SEI capability maturity model; personal software process.	**18**
V	**Computer Aided Software Engineering:** CASE and its scope; CASE environment; CASE support in software life cycle; other characteristics of CASE tools; towards second generation CASE tool; architecture of a CASE environment. **Software Maintenance:** Characteristic of software maintenance; software reverse engineering; software maintenance process models; estimation of maintenance cost.	**18**

Textbook:

1. Rajib Mall, Fundamentals of Software Engineering, Fifth Edition, Prentice-Hall of India, 2018

Unit	Chapter	Sections
I	Chapter – 1-4	Section (Pages:2-45)
II	Chapter– 5-9	Section (Pages:47-109)
III	Chapter–10 ,20	Section (Pages:111-149)
IV	Chapter–24,32-35	Section (Pages:295-321,393-431)
V	Chapter –36, 37	Section (Pages:430-457)

References:

- Richard Fairley, Software Engineering Concepts, Tata McGraw-Hill publishing company Ltd, Edition 1997.
- Roger S. Pressman, Software Engineering, Seventh Edition, McGraw-Hill.
- James A. Senn, Analysis & Design of Information Systems, Second Edition, McGraw-Hill International Editions.

Web Resources-

1. https://www.vssut.ac.in/lecture_notes/lecture1428551142.pdf
2. https://www.slideshare.net/smrutisarangi2/software-engineering-study-materials
3. https://www.cs.cornell.edu/courses/cs5150/2014fa/materials.html
4. https://mrcet.com/downloads/digital_notes/CSE/III%20Year/SOFTWARE%20ENGINEERING%20NOTES.pdf

Pedagogy: Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Gain basic knowledge of analysis and design of systems	**K1, K2, K3, K4**
CO2	Ability to apply software engineering principles and techniques	**K2, K3, K4,K5**
CO3	Model a reliable and cost-effective software system	**K1,K3, K4, K6**
CO4	Ability to design an effective model of the system	**K2,K5,K6**
CO5	Perform Testing at various levels and produce an efficient system.	**K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;
K5 – Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	2	1	2	2
CO2	3	3	3	3	2	3	3
CO3	2	3	3	3	3	3	3
CO4	3	2	3	3	3	2	3
CO5	3	3	2	3	3	3	2

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated;
0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6CSC8**	**DOT Net Programming**	**5**	**4**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented		Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- To develop ASP.NET Web application using standard controls.
- To create rich database applications using ADO.NET.
- To implement file handling operations.
- To utilize ASP.NET security features for authenticating the web site.
- To handles SQL Server Database using ADO.NET.

SYLLABUS

Unit	Content	No. of Hours
I	Overview of .NET framework: Common Language Runtime (CLR), Framework Class Library- C# Fundamentals: Primitive types and Variables – Operators - Conditional statements -Looping statements – Creating and using Objects – Arrays – String operations.	**15**
II	Introduction to ASP.NET – Working with Web Forms – Web form standard controls: Properties and its events – HTML controls - List Controls: Properties and its events. (**Self-study**)IDE-Languages supported Components.	**15**
III	Rich Controls: Properties and its events – validation controls: Properties and its events. File Stream classes - File Modes – File Share – Reading and Writing to files – Creating, Moving, Copying and Deleting files – File uploading.	**15**

IV	ADO.NET Overview – Database Connections – Commands – Data Reader - Data Adapter - Data Sets - Data Binding. **(Self-study)**Data Controls and its Properties	**15**
V	Grid View control: Deleting, editing, Sorting and Paging. XML classes – Web form to manipulate XML files - Website Security - Authentication - Authorization – Creating a Web application	**15**

Textbook:

1. Svetlin Nakov, VeselinKolev& Co, Fundamentals of Computer Programming with C#, Faber publication, 2019.
2. Mathew, Mac Donald, the Complete Reference ASP.NET, Tata McGraw-Hill, 2015.

Unit	Chapter	Sections
I	Chapter – 1-7	Section (Pages:69-235)
II	Chapter– 5-7	Section (Pages:87-167)
III	Chapter–8-11	Section (Pages:167-319)
IV	Chapter–12-14	Section (Pages:319-371)
V	Chapter –15-18	Section (Pages:411-565)

References:

- Herbert Scheldt, The Complete Reference C#.NET, Tata McGraw-Hill, 2017.
- Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtech press, 2013.
- Anne Boehm, Joel Murach, Murach's C# 2015, Mike Murach& Associates Inc. 2016.
- DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGraw Hill, 2008.
- Matthew MacDonald, Beginning ASP.NET 4 in C# 2010, APRESS, 2010.

Web Resources-

1. https://memberfiles.freewebs.com/02/83/78118302/documents/McGraw.Hill.CSharp.4.0.The.Complete.Reference.Apr.2010.pdf

Pedagogy: Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	To identify and understand the goals and objectives of the .NET framework and ASP.NET with C# language.	**K1, K2, K3, K4**
CO2	To develop web application using various controls	**K2, K3, K4,K5**
CO3	To analyze C# programming techniques in developing web applications.	**K1,K3, K4, K6**
CO4	To assess a Web application using Microsoft ADO.NET.	**K2,K5,K6**
CO5	To develop a software to solve real-world problems using ASP.NET	**K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	2	1	2	2
CO2	3	3	3	3	2	3	3
CO3	2	3	3	3	3	3	3
CO4	3	2	3	3	3	2	3
CO5	3	3	2	3	3	3	2

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated;
0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6CSCP6**	**Practical: DOT Net Programming**	**5**	**4**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented	√	Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- To develop ASP.NET Web application using standard controls.
- To create rich database applications using ADO.NET.
- To implement file handling operations.
- To utilize ASP.NET security features for authenticating the web site.
- To handles SQL Server Database using ADO.NET.

SYLLABUS		
Sl. No	**Content**	**No. of Hours**
1	Create an exposure of Web applications and tools	5
2	Implement the Html Controls	5
3	Implement the Server Controls	5
4	Web application using Web controls.	5
5	Web application using List controls.	5
6	Web Page design using Rich control. Validate user input using Validation controls. Working with File concepts.	8
7	Web application using Data Controls.	5
8	Data binding with Web controls	5
9	Data binding with Data Controls.	5
10	Database application to perform insert, update and delete operations.	5
11	Database application using Data Controls to perform insert, delete, edit, paging and sorting operation.	7

12	Implement the Xml classes.	5
13	Implement Authentication – Authorization.	5
14	Ticket reservation using ASP.NET controls.	5

Textbook:

1. Svetlin Nakov, VeselinKolev& Co, Fundamentals of Computer Programming with C#, Faber publication, 2019.
2. Mathew, Mac Donald, the Complete Reference ASP.NET, Tata McGraw-Hill, 2015.

References:

❖Herbert Scheldt, The Complete Reference C#.NET, Tata McGraw-Hill, 2017.
❖ Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtech press, 2013.
❖Anne Boehm, Joel Murach, Murach's C# 2015, Mike Murach& Associates Inc. 2016.
❖DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGraw Hill, 2008.
❖Matthew MacDonald, Beginning ASP.NET 4 in C# 2010, APRESS, 2010.

Web Resources-

1. https://memberfiles.freewebs.com/02/83/78118302/documents/McGraw.Hill.CSharp.4.0.The.Complete.Reference.Apr.2010.pdf

Pedagogy:

Teaching / Learning methods

1. Lecture 2. Tutorial 3. Assignment 4. PPT presentation
2. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	To identify and understand the goals and objectives of the .NET framework and ASP.NET with C# language.	**K1, K2, K3, K4**
CO2	To develop web application using various controls.	**K2, K3, K4,K5**
CO3	To analyze C# programming techniques in developing web applications.	**K1,K3, K4, K6**
CO4	To assess a Web application using Microsoft ADO.NET.	**K2,K5,K6**
CO5	To develop a software to solve real-world problems using ASP.NET	**K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;**K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	2	1	2	2
CO2	3	3	3	3	2	3	3
CO3	2	3	3	3	3	3	3
CO4	3	2	3	3	3	2	3
CO5	3	3	2	3	3	3	2

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated;
0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6CSEL3A**	**Major Elective - III Data Science**	**5**	**3**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

1. To introduce the concepts, techniques and tools with respect to the various facets of data science practice, including data collection and integration, exploratory data analysis, predictive modelling, descriptive modelling and effective communication.
2. Understand the principles and tools of data analytics
3. Apply different analytical theories and methods to represent the Data
4. Collect data, apply data pre-processing, and visualize the data for the given case study.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Introduction to Data Science:** Data Science-Methods of Data Repository-Personnel Involved in Data Science-Types of Data-Data Design Process-Data Science Toolkit-Familiarity with example Applications	**15**
II	**Data Management using IBM SPSS:**Data Management Planning-Data Plan-Collection and Management-Application Programming Interface-Exploring Data-Building Models-Storage Management-Importing Data	**15**
III	**Data analysis using R programming languages:** Introduction-Types of Statistical data-Types of Big Data Analytics-Collection of Data-Probability-Frequency Distribution-Population and Parameters-Central Tendency-Measures-Types of Statistical Means-Problems of Estimation-Normal Distribution Curve	**15**
IV	**Data Visualization:** Data Visualization-Importance-Conventional Data Visualization Methods-Retinal Variables-Mapping Variables to Encoding-**Recent Trends in Data Science:** Trends in Data collection and analysis-Big data visualization tools-Visualizing Big Data-Preattentive attributes-Challenges-Potential Solutions-Future progress of Big Data Visualization.	**15**
V	**Applications of Data Science, Technologies for Visualization:** Applications of Data Science Technologies for Visualization-Introduction to Python-Basic Operations-Data types-Modules-Libraries-Introduction to Bokeh **[Self Study]**	**15**

Textbook:

1. Data Science and Analytics with Python and SPSS Programming,VK.Jain

Unit	Chapter	Sections
I	Chapter – 1	Section 1.1-1.9 (Pages:1-31)
II	Chapter– 2	Section 2.1-2.9 (Pages:32-77)
III	Chapter– 3	Section 3.1-3.11(Pages:78-146)
IV	Chapter–4,6	Section 4.1-4.7,6.1-6.9 (Pages: 147-162,219-243)
V	Chapter – 5	Section 5.1-5.7,(Pages:163-218)

References:

- WILEY, Data Science & Big Data Analytics- Discovering, Analyzing, Visualizing and Presenting Data, EMC Education Services, John Wiley & Sons, Inc, 2018 Jake VanderPlas
- Python Data Science Handbook - Essential Tools for Working With Data, O'ReilyMedia,Inc, 2016.
- Eliot P. Reznor, "Big Data: A Beginner's Guide to using Data Science for Business", 2017.

Web Resources-

1. http://www.analyticsvidya.com/
2. http://www.udemy.com/
3. https://towardsdatascience.com/machine-learning/home
4. http://epgp.inflibnet.ac.in/

Pedagogy: Teaching / Learning methods

1. Lecture 2. Tutorial 3. Assignment 4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	To understand the fundamental concepts of big data platform and know about the basic concepts of nature and evolution of big data.	**K1,K2**
CO2	To Implement Data, Knowledge Management and to classify Real World problems in Data Science.	**K2,K3,K4,K5**
CO3	Remember purpose of data analytics and techniques used in Data Science	**K1,K3,K5**
CO4	Understand the principles and tools of data analytics	**K2,K3**
CO5	Apply different analytical theories and methods to represent in Visualization	**K3,K4,K5,K6**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	2	3	3	3	3	3
CO2	3	2	3	3	3	3	3
CO3	2	3	3	2	3	2	3
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated;
0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6CSEL3B**	**Major Elective - III VIRTUAL AND AUGMENTED REALITY**	**5**	**3**

Nature of the course

Employability Oriented	√	Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

1. To introduce the relevance of this course to the existing technology through demonstrations, case studies and applications with a futuristic vision along with socio-economic impact and issues
2. To understand virtual reality, augmented reality and using them to build Biomedical engineering applications
3. To know the intricacies of these platform to develop PDA applications with better optimality

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**INTRODUCTION:** The three I's of virtual reality-commercial VR technology and the five classic components of a VR system - Input Devices: (Trackers, Navigation, and Gesture Interfaces): Three- dimensional position trackers, navigation and manipulation-interfaces and gesture interfaces-Output Devices: Graphics displays-sound displays & haptic feedback.	**15**
II	**R DEVELOPMENT PROCESS:** Geometric modeling - kinematics modeling- physical modeling - behavior modeling – model Management.	**15**
III	**CONTENT CREATION CONSIDERATIONS FOR VR:** Methodology and terminology-user performance studies-VR health and safety issues-Usability of virtual reality system- cyber sickness -side effects of exposures to virtual reality environment.	**15**
IV	**VR ON THE WEB & VR ON THE MOBILE:** JS-pros and cons-building blocks (WebVR, WebGL, Three.js, device orientation events)-frameworks (A-frame, React VR)-Google VR for Android-Scripts, mobile device configuration, building to android-cameras and interaction-teleporting-spatial audio-Assessing human parameters-device development and drivers-Design Haptics	**15**

V	**APPLICATIONS:** Medical applications-military applications-robotics applications- Advanced Real time Tracking other applications- games, movies, simulations, therapy	**15**

TEXT BOOKS:

1. C. Burdea & Philippe Coiffet, "Virtual Reality Technology", Second Edition, Gregory, John Wiley & Sons, Inc., 2008
2. Jason Jerald. 2015. The VR Book: Human-Centred Design for Virtual Reality. Association for Computing Machinery and Morgan & Claypool, New York, NY, USA.

Reference Books:

1. Augmented Reality: Principles and Practice (Usability) by Dieter Schmalstieg & Tobias Hollerer, Pearson Education (US), Addison-Wesley Educational Publishers Inc, New Jersey, United States, 2016. ISBN: 9780321883575
2. Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR (Usability),Steve Aukstakalnis, Addison-Wesley Professional; 1 edition, 2016.
3. The Fourth Transformation: How Augmented Reality & Artificial Intelligence Will Change Everything, Robert Scoble & Shel Israel, Patrick Brewster Press; 1 edition, 2016

Pedagogy:

Teaching / Learning methods

1. Lecture 2. Tutorial 3. Assignment 4. PPT presentation
5. Seminar

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Analyze & Design a system or process to meet given specifications with realistic engineering constraints.	**K1, K2, K3, K4**
CO2	Identify problem statements and function as a member of an engineering design team.	**K2, K3, K4**
CO3	Utilize technical resources	**K3, K4, K6**
CO4	Propose technical documents	**K5**
CO5	Give technical oral presentations related to design mini project results.	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	3	3	3	2
CO2	2	3	3	3	3	3	3
CO3	3	2	3	3	2	2	3
CO4	3	2	3	3	3	3	3
CO5	3	3	3	3	3	2	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6CSEL4A**	**Major Elective – IV Information Security**	**5**	**3**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need	√	Addresses Environment and Sustainability	
Skill development Oriented		Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- To know the objectives of information security
- Understand the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms
- Understand the basic categories of threats to computers and networks

Unit	Content	No. of Hours
I	**Introduction to Information Security :** Security mindset, Computer Security Concepts (CIA), Attacks, Vulnerabilities and protections, Security Goals, Security Services, Threats, Attacks, Assets, malware, program analysis and mechanisms.	15
II	**The Security Problem in Computing**: The meaning of computer Security, Computer Criminals, Methods of Defense. Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption	15
III	**Symmetric and Asymmetric Cryptographic Techniques:** DES, AES, RSA algorithms .Authentication and Digital Signatures: Use of Cryptography for authentication, Secure Hash function, Key management – Kerberos.	15
IV	**Program Security :** Non-malicious Program errors – Buffer overflow, Incomplete mediation, Time-of-check to Time-of- use Errors, Viruses, Trapdoors, Salami attack, Man-in-the- middle attacks, Covert channels. File protection Mechanisms, User Authentication Designing Trusted O.S: Security polices, models of security, trusted O.S design, Assurance in trusted O.S. Implementation examples.	15
V	**Security in Networks:** Threats in networks, Network Security Controls – Architecture, Encryption, Content Integrity, Strong Authentication, Access Controls, Wireless Security, Honeypots, and Traffic flow security. Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction.	15

Textbook:

1. Security in Computing, Fourth Edition, by Charles P. Pfleeger, Pearson Education
2. Cryptography And Network Security Principles And Practice, Fourth or Fifth Edition, William Stallings, Pearson

Unit	Chapter	Sections
I	Chapter – 1	Section 1.1-1.8
II	Chapter–1-3	Section 1.1-3.8
III	Chapter– 8-10	Section 8.1-10.7
IV	Chapter–3	Section 3.1-3.8
V	Chapter – 4-6	Section 4.1-6.9

References:

- Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, lst Edition.
- 2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2"d Edition
- 3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
- 4. Principles of Computer Sceurity: WM.Arthur Conklin, Greg White, TMH

Web Resources-

1. http://www.analyticsvidya.com/
2. http://www.udemy.com/

Pedagogy: Teaching / Learning methods

1. Lecture 2. Tutorial 3. Assignment 4. PPT presentation 5.Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Understand network security threats, security services, and countermeasures	**K1, K2, K3, K4**
CO2	Understand vulnerability analysis of network security	**K2, K3, K4,K5**
CO3	Acquire background on hash functions; authentication; firewalls; intrusion detection techniques.	**K1,K3, K4, K6**
CO4	Gain hands-on experience with programming and simulation techniques for security protocols.	**K2,K5,K6**
CO5	Apply methods for authentication, access control, intrusion detection and prevention.	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;**K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	3	3	3	3	2	2
CO2	3	3	3	3	3	3	3
CO3	2	3	3	3	2	3	3
CO4	2	2	3	3	3	2	3
CO5	3	3	2	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated;
0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6CSEL4B**	**Major Elective – IV Operating System**	**5**	**3**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need	√	Addresses Environment and Sustainability	
Skill development Oriented		Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- This course provides the basic operating system fundamentals and Linux operating system.
- The course covers deadlock, storage management, file system, I/O systems, virtual machines and distributed systems.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Introduction:** Operating Systems - Operating-System Structure -**Operating System operations**. Operating System Structures: Operating System Services - User and Operating System Interface - System Calls - System Programs - Operating System Design and Implementation - **Operating System Debugging- Operating System Generation - Types of System Calls.**	15
II	**Process Management:** Process Concept - Process Scheduling - Operations on Processes. **Threads:** Overview - Multicore Programming - Multithreading Models. **Process Synchronization:** Synchronization Hardware - Mutex Locks - Semaphores. **CPU Scheduling:** Basic Concepts - Scheduling Criteria - Scheduling Algorithms- Thread Scheduling.	15
III	**Deadlock:** System Model - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention- Deadlock Avoidance- Deadlock Detection- Recovery from Deadlock. **Storage Management:** Overview of Mass Storage Structure -Disk Structure - Disk Attachment - Disk Scheduling - Disk Management- Swap Space Management -**RAID Structure.**	15

IV	**File System Interface:** File Concept- Access Methods -Directory and Disk Structure- File-System Mounting - File Sharing - **Protection. I/O Systems:** Overview- I/O Hardware - Application I/O Interface- Kernel I/O Subsystem	15
V	**Virtual Machines**: Overview - Benefits and Features- Building Blocks - **Types of Virtual Machines** and their implementations - Virtualization and Operating System Components - Examples **Self-study :(Distributed Systems: Advantages of Distributed Systems - Types of Network based Operating Systems.) Linux System**: Introduction - Programming Linux. Shell Programming: Shell Introduction - Pipes and Redirection - Shell Syntax - Working with Files: Linux File Structure -The Standard i/o Library - Formatted Input Output - **File and Directory Maintenance**	15

Textbook:

1. Abraham G ,Silberschatz Operating System Wiley ,Publisher.10thEdition, 2017

Unit	Chapter	Sections
I	Chapter – 2,3,4&5	Section 2.3, 2.4,3.1,3.3,4.1,5.1 (Pages: 25-29)
II	Chapter– 6,7,8&9	Section 6.1,6.3,8.1,8.3,9.1,9.3(Pages:6.12-6.30,8.1-9.16)
III	Chapter–6,7	Section6.3,6.4,7.2,7.3,7.4,7.6 (Pages:147-200)
IV	Chapter–8	Section8.3,8.4,8.5,8.6,8.7 (Pages:208-232)
V	Chapter – 10	Section10.1,10.2,10.3 (Pages:261-296)

References:

- Andrew.S. Tannenbaum Modern operating System Pearson Education 2014.
- Abraham Silberschatz, PeterB.Galvin, GregGane Operating System Concepts Wiley Global Education 9th Edition, 2012

Web Resources-

1. https:// csit.ust.edu.sd/files/2019/10/
2. https:// www.codechef.com
3. http://www.cs.cmu.edu
4. https://www.geeksforgeeks.org
5. https://www. viterbi-web.usc.edu
6. https:// cse.iitkgp.ac.in/~pds/semester/2017s/DSM/

Pedagogy:

Teaching / Learning methods

1. Lecture
2. Tutorial
3. Assignment
4. PPT presentation
5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Define the fundamentals of OS and identify the concepts relevant to process , process life cycle, Scheduling Algorithms, Deadlock and Memory management	**K1, K2, K3, K4**
CO2	Know the critical analysis of process involving various algorithms, an exposure to threads and semaphores	**K2, K3, K4,K5**
CO3	Have a complete study about Deadlock and its impact over OS. Knowledge of handling Deadlock with respective algorithms and measures to retrieve from deadlock. .	**K1,K3, K4, K6**
CO4	Have complete knowledge of Scheduling Algorithms and its types.	**K2,K5,K6**
CO5	Understand memory organization and management	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	2	2
CO2	1	3	3	3	3	3	3
CO3	2	3	3	3	2	3	3
CO4	2	2	3	3	3	2	3
CO5	3	3	2	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6CSSEC2**	**Skill Enhancement Course - Agile Project Management**	**2**	**2**

Nature of the course

Employability Oriented	√	To introduce various techniques for representation of the data in the real world	√	Addresses Gender Sensitization	
Entrepreneurship Oriented	√	Relevant to regional need	√	Addresses Environment and Sustainability	√
Skill development Oriented	√	Relevant to national need		Addresses Human Values	√
		Relevant to Global development need	√	Addresses Professional Ethics	√

Course Objectives

The main objectives of this course are to:

- To provide students with a theoretical as well as practical understanding of Agile software development practices and how small teams can apply them to creating high-quality software.
- To provide a good understanding of software design and a set of software technologies and APIs.
- To provide a detailed examination and demonstration of Agile development and testing techniques.
- To provide an understanding of the benefits and pitfalls of working in an Agile team

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Introduction: Understanding Agile- Modernizing Project Management Applying the Agile Manifesto and Principles -Being Agile-Agile Approaches-Agile Planning & Execution- Defining the Product Vision and Roadmap: Agile planning – Defining the product vision – Creating a product roadmap – Completing the product backlog.- Working Throughout the Day.	15
II	Agile Management- Managing Scope and Procurement - Managing Time and Cost and Communication-Scaling across Agile Teams- Being a Change Agent	15

Textbook:

1. Abraham G ,Silberschatz Operating System Wiley ,Publisher.10thEdition, 2017.

Unit	Chapter	Sections
I	Chapter – 1-11	Section (Pages:1-200)
II	Chapter– 12-16 &18	Section (Pages:203-359)

References:

- Andrew.S. Tannenbaum Modern operating System Pearson Education 2014.
- Abraham Silberschatz, PeterB.Galvin, GregGane Operating System Concepts Wiley Global Education 9th Edition, 2012

Web Resources-

1. https://www.tutorialspoint.com/management_concepts/agile_project_management.htm
2. https://www.tutorialspoint.com/management_concepts/agile_project_management.htm
3. https://www.simplilearn.com/tutorials/project-management-tutorial/what-is-agile-project-management

Pedagogy: Teaching / Learning methods

1. Lecture 2. Tutorial 3. Assignment
4. PPT presentation 5. Seminar & Quizzes

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Understanding of the Agile manifesto and its advantages over other SDLC paradigms.	**K1, K2**
CO2	Understanding essential Agile concepts.	**K2, K3**
CO3	Understanding how to plan and execute a project using Agile concepts	**K2,K3, K4, K6**
CO4	Understanding Agile management concepts.	**K2,K5,K6**
CO5	Practical application of Agile principles.	**K3, K4, K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;**K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	2	2
CO2	1	3	3	3	3	3	3
CO3	2	3	3	3	2	3	3
CO4	2	2	3	3	3	2	3
CO5	3	3	2	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated;
0 – No correlation