A.V.V.M. Sri Pushpam College (Autonomous), Poondi – 613 503

PG & Research Department of Mathematics

B.Sc. Programme in Mathematics

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. Mathematics Programme

PO1: Disciplinary Knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.

PO2: Critical Thinking: Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

PO3: Problem Solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's earning to real life situations.

PO4: Analytical Reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints.

PO5: Scientific Reasoning: Ability to analyse, interpret and draw conclusions from quantitative / qualitative data; and critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.

PO6: Self-directed & Lifelong Learning: Ability to work independently, identify and manage a project. Ability to acquire knowledge and skills, including "learning how to learn", through self-placed and self-directed learning aimed at personal development, meeting economic, social and cultural objectives.

PROGRAMME SPECIFIC OUTCOMES for B. Sc. Mathematics Programme

PSO1: Acquire good knowledge and understanding, to solve specific theoretical & applied problems in different area of mathematics & statistics.

PSO2: Understand, formulate, develop mathematical arguments, logically and use quantitative models to address issues arising in social sciences, business and other context /fields.

PSO3: To prepare the students who will demonstrate respectful engagement with other's ideas, behaviors, beliefs and apply diverse frames of references to decisions and actions. To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations

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	
	Allied	06	600	18	
	Elective Courses	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**
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. Mathematics (2023)

S. No.	Semester	Part	Category	Course Code	Title of the Course	Maximum Marks			Minimum Marks			Hours/ Week	Credits
						CIA	EE	Total	CIA	EE	Total		
1.	I	I	Language	23U1MAT1/H1	Tamil – I / Hindi – I	25	75	100	10	30	40	6	3
2.		II	Language	23U1MAE1	English – I	25	75	100	10	30	40	4	3
3.		III	Core	23U1MAC1	Algebra &Trigonometry	25	75	100	10	30	40	5	5
4.			Core	23U1MAC2	Differential Calculus	25	75	100	10	30	40	5	5
5.			Allied	23U1MAPHA1	Allied Physics – I	25	75	100	10	30	40	5	3
			Allied	23U2MAPHAPL	Physics Practical (NS)	-	-	-	-	-	-	3	-
6.		IV	ES	23U1MAES	Environmental Studies	-	100	100	-	-	40	SS	2
7.	II	I	Language	23U2MAT2/H2	Tamil – II / Hindi – II	25	75	100	10	30	40	6	3
8.		II	Language	23U2MAE2	English – II	25	75	100	10	30	40	4	3
9.		III	Core	23U2MAC3	Analytical Geometry 3-D and Integral Calculus	25	75	100	10	30	40	5	4
10.			Core	23U2MACP1	LATEX Practical	25	75	100	10	30	40	5	4
11.			Allied	23U2MAPHA2	Allied Physics – II	25	75	100	10	30	40	3	3
12.			Allied	23U2MAPHAPL	Allied Physics Practical (NS)	25	75	100	10	30	40	5	3
13.		IV	VE	23U2MAVE	Value Education	25	75	100	10	30	40	SS	2
			Extra Credit	MOOC(Massive open online course)		-	-	-	-	-	-		
14.	III	I	Language	23U3MAT3/H3	Tamil – III / Hindi – III	25	75	100	10	30	40	6	3
15.		II	Language	23U3MAE3	English – III	25	75	100	10	30	40	4	3
16.		III	Core	23U3MAC4	Vector Calculus, Fourier series and its Applications	25	75	100	10	30	40	5	5
17.			Core	23U3MAC5	Differential Equations and Applications	25	75	100	10	30	40	5	4
18.			Allied	23U3MAMSA1	Allied Mathematics Statistics - I	25	75	100	10	30	40	5	3
			Allied	23U4MAMSAPL	Allied Statistics Practical using SPSS (NS)	-	-	-	-	-	-	3	-
			Extra Credit	MOOC / Field visit / Hands on Training		-	-	-	-	-	-		

S. No.	Semester	Part	Category	Course Code	Title of the Course	Maximum Marks			Minimum Marks			Hours/ Week	Credits
						CIA	EE	Total	CIA	EE	Total		
19	IV	I	Language	23U4MAT4/H4	Tamil – IV / Hindi – IV	25	75	100	10	30	40	6	3
20		II	Language	23U4MAE4	English – IV	25	75	100	10	30	40	4	3
21		III	Core - CIM	23U4MCIM	Core Industry Module: Resource Management Techniques	25	75	100	10	30	40	5	4
22			Core	23U4MAC6	Graph Theory	25	75	100	10	30	40	5	4
23			Allied	23U4MAMSA2	Allied Mathematics Statistics – II	25	75	100	10	30	40	3	3
24.			Allied	23U4MAMSAPL	Statistics Practical using SPSS (NS)	25	75	100	10	30	40	5	3
25.		IV	SEC	23U4MASECPL1	Digital Literacy in Mathematics – Practical	25	75	100	10	30	40	2	2
26.			GS	23U4MAGS	Gender Studies	-	100	100	-	-	40	SS	2
			Extra Credit	Field visit / Hands on Training		-	-	-	-	-	-	-	-
27.	V	III	Core	23U5MAC7	Abstract Algebra	25	75	100	10	30	40	5	4
28			Core	23U5MAC8	Real Analysis	25	75	100	10	30	40	5	4
29			Core	23U5MAC9	Mathematical Modelling	25	75	100	10	30	40	5	4
30			Major Elective-I	23U5MAEL1A/ 23U5MAEL1B	Programming in C / Special functions with Applications	25	75	100	10	30	40	4	3
31			Major Elective-II	23U5MAEL2AP/ 23U5MAEL2B	Programming in C Practical / Number theory	25	75	100	10	30	40	4	3
32			NME	23U5MANME	Non Major Elective: Mathematical Finance	25	75	100	10	30	40	2	2
33			Core	23U5MAC10PR	Project with Viva Voce	25	75	100	10	30	40	5	4
		IV	Internship / Industrial Training (Carried out in II Year summer vacation – 30 hours)									-	2
34	VI	III	Core	23U6MAC11	Complex Analysis	25	75	100	10	30	40	5	5
35			Core	23U6MAC12	Mechanics	25	75	100	10	30	40	6	5
36			Core	23U6MACPL	Programming in R Practical	25	75	100	10	30	40	5	5
37			Major Elective-III	23U6MAEL3A/ 23U6MAEL3B	Numerical Methods / Fuzzy Sets and its applications	25	75	100	10	30	40	5	3
38			Major Elective-IV	23U6MAEL4A/ 23U6MAEL4B	Astronomy / Stochastic processes	25	75	100	10	30	40	5	3
39		IV	SEC	23U6MASEC2	Arithmetic Ability	25	75	100	10	30	40	2	2
40			PCSE	23U6MAPCSE	Comprehensive Knowledge	-	100	100	-	40	40	2	2
		V	Extension Activities		Extension Activities (Outside College hours)	-	-	-	-	-	-	-	1
					Total			**4000**					**140**

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 Mathematics Department

1. Digital Literacy in Mathematics
2. Non Verbal Reasoning

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

Mathematics for Finance

A.VEERIYA VANDAYAR MEMORIAL SRI PUSHPAM COLLEGE (AUTONOMOUS),POONDI, THANJAVUR DIST.
(NAAC Re-Accredited with A grade in 4th cycle)
Question Pattern for UG and PG Programmes
(For the students admitted from 2023 – 2024 onwards)

Bloom's Taxonomy based Assessment pattern

Bloom's category	Section	Choice	Marks	Total
K1 to K6	A	Compulsory	10 x 2 = 20	75
	B	Either / Or	5 x 5 = 25	
	C	3 out of 5	3 x 10 = 30	

OBE QUESTION PATTERN

Total Marks: 75

SECTION – A (10 x 2 = 20) **Answer All the questions** (Two Questions from each units)			
CO	**K Level**	**Q. No.**	**Questions**
		1.	
		2.	
		3.	
		4.	
		5.	
		6.	
		7.	
		8.	
		9.	
		10.	
SECTION – B (5 x 5 = 25) **Answer All the questions** (One Question from each unit)			
		11(a).	
(OR)			
		11(b).	
		12(a).	
(OR)			
		12(b).	
		13(a).	
(OR)			
		13(b).	
		14(a).	
(OR)			
		14(b).	
		15(a).	
(OR)			
		15(b).	
SECTION – C (3 x 10 = 30) **Answer ANY THREE questions** (One Question from each unit)			
		16.	
		17.	
		18.	
		19.	
		20.	

Bloom's Taxonomy Action Verbs

K1 Remember	K2 Understand	K3 Apply	K4 Analyze	K5 Evaluate	K6 Create
• Choose • Copy • Define • Describe • Discover • Duplicate • Enumerate • Examine • Find • How • Identify • Label • List • Locate • Match • Memorize • Name • Omit • Recall • Recognize • Relate • Select • Show • Spell • State • Tabulate • Tell • What • When • Where • Which • Who • Why	• Associate • Classify • Compare • Contrast • Convert • Demonstrate • Describe • Differentiate • Discuss • Distinguish • Estimate • Explain • Express • Extend • Identify • Illustrate • Indicate • Infer • Interpret • Outline • Paraphrase • Predict • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Calculate • Change • Choose • Complete • Construct • Demonstrate • Develop • Discover • Dramatize • Experiment • Identify • Interview • Interpret • Illustrate • Make use of • Manipulate • Model • Modify • Organize • Paint • Plan • Prepare • Produce • Relate • Select • Show • Sketch • Solve • Use • Utilize	• Advertise • Appraise • Analyze • Assume • Break down • Categorize • Classify • Compare • Conclusion • Connect • Contrast • Differentiate • Discover • Dissect • Distinguish • Discriminate • Divide • Examine • Explain • Function • Inference • Inspect • List • Motive • Order • Point out • Prioritize • Relationships • Select • Separate • Simplify • Subdivide • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Convince • Criteria • Criticize • Decide • Deduct • Defend • Determine • Discriminate • Estimate • Evaluate • Explain • Find errors • Grade • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Order • Predict • Prioritize • Prove • Rank • Rate • Recommend • Reframe • Select • Summarize	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Generalize • Hypothesize • Imagine • Improve • Integrate • Invent • Make up • Maximize • Minimize • Modify • Originate • Organize • Plan • Predict • Prepare • Produce • Propose • Rearrange • Rewrite • Role-play • Solution • Solve

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
I	**23U1MAT1**	**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	**23U1MAE1**	**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	**23U1MAC1**	**ALGEBRA AND TRIGONOMETRY**	**5**	**5**

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 provide students with the basic concepts of Eigen values, matrix, etc...
- To develop the skill of Solving problem in summation series.
- To understand the concept of hyperbolic functions and summation of trigonometric series.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Reciprocal Equations-Standard form–Increasing or decreasing the roots of a given equation- Removal of terms, Approximate solutions of roots of polynomials by Horner's method – related problems.	**15**
II	Summation of Series: Binomial– Exponential –Logarithmic series (Theorems without proof) – Approximations - related problems	**15**
III	Characteristic equation – Eigen values and Eigen Vectors-Similar matrices - Cayley – Hamilton Theorem (Statement only) - Finding powers of square matrix, Inverse of a square matrix up to order 3, Diagonalization of square matrices - related problems.	**15**
IV	Expansions of $\sin n\theta$, $\cos n\theta$ in powers of $\sin\theta$, $\cos\theta$ - Expansion of $\tan n\theta$ in terms of $\tan\theta$, Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta\sin^n\theta$ –Expansions of $\tan(\theta_1+\theta_2+,\ldots,+\theta_n)$-Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in terms of θ - related problems.	**15**
V	Hyperbolic functions – Relation between circular and hyperbolic functions Inverse hyperbolic functions, Logarithm of complex quantities, - related problems.	**15**

	***Self-Study*:** Summation of trigonometric series.	

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:

Mathematics, Volume - I and II, P.KANDASAMY, K.THILAGAVATHY, S.CHAND Publication, 1st Edition, 2004.

Unit	Chapter	Pages
I	1 [Vol-I]	21-23, 36-43, 65-70
II	2, 3, 4 [Vol-I]	71-100
III	4 [Vol-II]	59-96
IV	6 [Vol-I]	122-141
V	7 [Vol-I], 1 [Vol-II]	143-155, 242-247.

References:

1. J. Stewart, L. Redlin, and S. Watson, Algebra and Trigonometry, Cengage Learning, 2012.
2. Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9th Edition, 2010.

Web resources:

https://nptel.ac.in

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	Understand the Reciprocal Equations and evaluate the Increasing or decreasing the roots of a given equation.	**K2,K5**
CO2	Apply the summation of the series	**K3**
CO3	Remember the basic matrix and analyze the Diagonalization of square matrices	**K1,K4**
CO4	Evaluate the Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in terms of θ	**K5**
CO5	Create solutions for trigonometric problems in Logarithm of complex quantities.	**K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	1	3	3	1	3	3	2	1
CO2	2	1	3	1	1	2	3	2	1
CO3	3	1	3	1	2	2	3	2	1
CO4	3	1	3	2	1	3	3	2	1
CO5	3	1	3	3	2	1	3	2	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
I	23U1MAC2	DIFFERENTIAL CALCULUS	5	5

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 equip the student with necessary analytic and technical skills to handle the problems of mathematical in nature as well as practical problems.
2. To explore the different tools for higher order derivatives,
3. To plot the various curves and to solve the problems associated with differentiation of functions.

SYLLABUS

Unit	Content	No. of Hours
I	**Successive Differentiation:** Introduction (Review of basic concepts) – The n^{th} derivative – Standard results – Fractional expressions – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the n^{th} derivative of a product. ***Self-Study*:*** Feynman's method of differentiation.	**15**
II	**Partial Differentiation:** Partial derivatives - Successive partial derivatives – Function of function rule – Total differential coefficient – Implicit functions.	**15**
III	**Partial Differentiation (Continued):**Homogeneous functions – Partial derivatives of a function of two functions – - Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.	**15**
IV	**Envelope :** Method of finding envelope – Another definition of envelope- Envelope of family of curves which are quadratic in the parameter.	**15**
V	**Curvature:** Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involutes – Radius of curvature in polar co-ordinates.	**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:

Calculus Volume I, S. Narayanan and T.K.Manicavachagom Pillay, S. Viswanathan Pvt. Ltd., 2014.

Unit	Chapter	Sections
I	Chapter III	All sections(Pages 69 to 87)
II	Chapter VIII	Sections: 1.1 to 1.5(Pages 178 to 191)
III	Chapter VIII	Sections: 1.6 to 1.7,4 & 5 (Pages 191 to 204,222 to 237)
IV	Chapter X	Sections : 1.1 to 1.4,(Pages 281 to 291)
V	Chapter X	Sections :2.1 to 2.3& 2.5, 2.6 (Pages 291 to 301,309 to 313)

References:

1. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.
2. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2010.
3. M.J. Strauss, G.L. Bradley and K. J. Smith, Calculus, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007.
4. R. Courant and F. John, Introduction to Calculus and Analysis (Volumes I & II), Springer- Verlag, New York, Inc., 1989.
5. T. Apostol, Calculus, Volumes I and II.
6. S. Goldberg, Calculus and mathematical analysis.

Web resources:

1.https://nptel.ac.in
2. https://www.math.columbia.edu/programs-math/undergraduate-program/ [ColumbiaUniversity]
3. https://www.math.harvard.edu/undergraduate/?courseid=63/(Hardvard University)

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	Find the nth derivative successive differentiation and its standard results	**K1,K4**
CO2	Understand the partial derivatives function	**K2,K4**
CO3	Identify the maxima and minima function of two variables and Lagrange's method	**K2,K3**
CO4	Find the method of envelope	**K5,K6**
CO5	Find the method of curvature and its evolute and involute	**K5,K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	3	3	3	3
CO2	3	3	3	2	2	2	3	3	3
CO3	3	2	3	3	3	3	1	2	3
CO4	3	3	2	3	2	2	3	3	1
CO5	1	3	3	2	3	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
I	23U1MAPHA1	ALLIED 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	✓
Addresses Gender Sensitization		Relevant to Global development need	✓
Addresses Environment and Sustainability		Addresses Professional Ethics	
Addresses Human Values			

Course Objectives

The main objectives of this course are:

1. To impart basic principles of Physics that which would be helpful for students who have taken programmes other than Physics.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**WAVES, OSCILLATIONS AND ULTRASONICS:** simple harmonic motion (SHM) – composition of two SHMs at right angles (periods in the ratio 1:1) – Lissajous figures – uses – laws of transverse vibrations of strings – determination of AC frequency using sonometer (steel and brass wires) – ultrasound – production – piezoelectric method – application of ultrasonics.	15
II	**PROPERTIES OF MATTER:** *Elasticity*: elastic constants – bending of beam – theory of non- uniform bending – determination of Young's modulus by non-uniform bending - torsion of a wire – determination of rigidity modulus by torsional pendulum *Viscosity*: streamline and turbulent motion – critical velocity – coefficient of viscosity – Poiseuille's formula – comparison of viscosities – burette method, *Surface tension*: definition – molecular theory – droplets formation–shape, size and lifetime – drop weight method – interfacial surface tension.	15
III	**HEAT AND THERMODYNAMICS:** Joule-Kelvin effect – Joule-Thomson porous plug experiment – theory – temperature of inversion – liquefaction of Oxygen– Linde's process of liquefaction of air– thermodynamic system – thermodynamic equilibrium – laws of thermodynamics – heat engine – Carnot's cycle – efficiency – entropy – change of entropy in reversible and irreversible process.	15

IV	**ELECTRICITY AND MAGNETISM:** Potentiometer – principle – measurement of thermo emf using potentiometer –magnetic field due to a current carrying conductor – Biot-Savart's law – field along the axis of the coil carrying current. Peak, average and RMS values of ac current and voltage – power factor and current values in an AC circuit – types of switches in household and factories.	15
V	**DIGITAL ELECTRONICS AND DIGITAL INDIA:** logic gates, OR, AND, NOT, NAND, NOR , EXOR logic gates – universal building blocks – Boolean algebra – De Morgan's theorem – verification – overview of Government initiatives: software technological parks under MeitY, NIELIT- semiconductor laboratories under Dept. of Space – an introduction to Digital India	15

Text books:

1. R. Murugesan (2001), Allied Physics, S. Chand &Co, New Delhi.
2. Brijlal and N. Subramanyam (1994), Waves and Oscillations, Vikas Publishing House, New Delhi.
3. Brijlal and N. Subramaniam (1994), Properties of Matter, S. Chand & Co., New Delhi.
4. J.B. Rajam and C.L. Arora (1976). Heat and Thermodynamics (8th edition), S. Chand & Co., New Delhi.
5. R. Murugesan (2005), Optics and Spectroscopy, S. Chand & Co, New Delhi.
6. A. Subramaniyam, AppliedElectronics2ndEdn., National Publishing Co., Chennai.

References:

1. Resnick Halliday and Walker (2018). Fundamentals of Physics (11thedition), John Willey and Sons, Asia Pvt. Ltd., Singapore.
2. V.R. Khanna and R.S. Bedi (1998), Textbook of Sound1stEdn. Kedharnaath Publish & Co, Meerut.
3. N.S. Khare and S.S. Srivastava (1983), Electricity and Magnetism 10thEdn., Atma Ram & Sons, New Delhi.
4. D.R. Khanna and H.R. Gulati (1979).
5. Optics, S. Chand &Co. Ltd., New Delhi.
6. V.K. Metha (2004). Principlesofelectronics6thEdn. S. Chand and company.

Web resources:

1. 1. https://youtu.be/M_5KYncYNyc
2. https://youtu.be/ljJLJgIvaHY
3. https://youtu.be/7mGqd9HQ_AU
4. https://youtu.be/h5jOAw57OXM
5. https://learningtechnologyofficial.com/category/fluid-mechanics-lab/

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminar	

Course Outcomes

On completion of this course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Explain types of motion andextend their knowledge in the study of various dynamic motions analyze and demonstrate mathematically.	K1, K2
CO2	Explain their knowledge of understanding about materials and their behaviors and apply it to various situations in laboratory and real life.	K1, K2
CO3	Comprehend basic concepts of thermodynamics and associated theorems able to interpret the process of low temperature physics in the background of growth of this technology.	K1, K2
CO4	Articulate the knowledge about electric current, potential, electric field and correlate the connection between electric field and magnetic field.	K2, K3
CO5	Interpret the real life digital circuits using AND, OR, NOT basic logic gates and intend their ideas to universal building blocks. Acquire information about various Govt. programmes/ institutions in this field and will have an idea on Digital India.	K2, 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	2	3	1	2
CO2	3	3	3	2	3	1	2
CO3	3	3	3	1	3	1	1
CO4	3	3	3	1	1	1	1
CO5	3	3	3	3	3	1	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
I & II	23U2MAPHAPL	ALLIED PHYSICS PRACTICALS (NS)	3	-

Nature of the course

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

Course Objectives

The main objectives of this course are:

1. Apply various physics concepts to understand Properties of Matter and waves, set up experimentation to verify theories, quantify and analyse, able to do error analysis and correlate results
2. Apply various Physics concepts to understand concepts of Light, electricity and magnetism and waves, set up experimentation to verify theories, quantify and analyse, able to do error analysis and correlate results

List of Experiments – Any 14 Experiments

1. Young's modulus by non-uniform bending using pin and microscope
2. Rigidity modulus by static torsion method.
3. Surface tension and interfacial Surface tension – drop weight method
4. Calibration of low range voltmeter using potentiometer
5. Verification of truth tables of basic logic gates using ICs
6. Verification of De Morgan's theorems using logic gate ICs.
7. Use of NAND as universal building block.
8. Radius of curvature of lens by forming Newton's rings
9. Thickness of a wire using air wedge
10. Specific resistance of a wire using PO box
11. Determination of figure of merit table galvanometer
12. Determination of Earth's magnetic field using field along the axis of a coil
13. Characterisation of Zener diode

14. Construction of AND, OR, NOT gates using diodes and transistor
15. NOR gate as a universal building block
16. Wavelength of mercury lines using spectrometer and grating

Course Outcomes

On completion of this course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Do experiments related with properties of matter and waves	K1, K2
CO2	set up experimentation in analog and digital electronics and to correlate the results	K1, K2
CO3	Understand physics concepts of light, electricity and magnetism and do the experiments	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	2	3	1	2
CO2	3	3	3	2	3	1	2
CO3	3	3	3	1	3	1	1

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	**23U2MAT2**	**பொதுத் தமிழ் – 2**	**6**	**3**

Nature of the Course

1.Employablity Oriented வேலை வாய்ப்புச் சார்ந்தது	✓	7. Addresses Professional Ethics தொழில் நெறிமுறைகளை நிறைவு	
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	**23U2MAE2**	**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	Langston Hughes.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

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
II	**23U2MAC3**	**ANALYTICAL GEOMETRY 3-D AND INTEGRAL CALCULUS**	**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 equip the student with necessary analytic and technical skills.
- to explain the principles of integral
- to explore the standard concepts and tools at an intermediate to advance level that will serve them well towards taking more advance level course in mathematics.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Sphere- Tangent plane- intersection of two spheres – Equation of tangent plane to a sphere.	**15**
II	The equation of surface – cone- Right Circular Cone- Tangent plane and normal –Cylinder- Enveloping Cylinder.	**15**
III	Properties of definite integrals - Reduction formulae of the types: $\int x^n e^{ax} dx, \int x^n \cos ax \ dx, \int \sin^n x \ dx, \int \cos^n x \, dx, \int \sin^m x \cos^n x \, dx,$ $\int \tan^n x \, dx$	**15**
IV	Beta and Gamma Functions: Definitions – Convergence of Γ(n) – Recurrence formula of gamma function – Properties of beta function – relation between beta and gamma functions. **Self-study*:** Properties of beta function	**15**
V	Multiple integral: Double integral – Evaluation of double integral - change of order of integration – Polar coordinates - Triple integrals - Application of multiple integrals.	**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:

1. ***"Analytical geometry Part II – Three Dimensions:*** *T.K. M. Pillai, 2015 (for Unit I ,II)*
2. ***Calculus Vol II :*** *T.K. M. Pillai, 2015 (for Unit III, IV & V)*

Unit	Text Book	Chapter	Sections
I	1	4	Sec: 1 – 8 (pages:92 -111)
II	1	5	Sec: 1 – 8(pages :115-139)
III	2	1	Sec: 11, 13.1 – 13.6(pages: 66-72,79-88)
IV	2	7	Sec: 2 – 5 (pages 278-290)
V	2	5	Sec: 2 – 5.4(pages 203-231)

References:

1. Analytical Geometry and Vector Calculus, S. Arumugam and Issac**.**
2. Engineering Mathematics Dr. M.K. Venkatraman.
3. Ancillary Mathematics *T.K. M.* Pillai, P. Natarajan

Web resources:

1. https://sites.math.washington.edu/~m125/ [Washington University]
2. https://courses.maths.ox.ac.uk/node/28 [Oxford University]

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	enrich their knowledge in various types and methods of integral calculus.	**K2,K3,K4**
CO2	Understand Planes, Straight lines and Spheres in Three Dimensional spaces.	**K1,K2**
CO3	solve the problems related to multiple integrals, Beta and Gamma functions.	**K3,K4**
CO4	solve a variety of practical problems in science and engineering.	**K3,K4,K6**
CO5	acquire the knowledge to write TNPSC Statistical and UG TRB exams	**K4,K5**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	3	3	3	3
CO2	2	3	3	2	3	3	3	3	3
CO3	3	3	2	3	3	3	2	2	3
CO4	3	2	3	2	3	3	3	3	1
CO5	1	2	3	1	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
II	23U2MACPL1	LATEX Practical	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:

1. To understand the features of LaTeX, for the preparation of high quality documents
2. To handle mathematical symbols and equations in a document easily
3. To make scientific articles and project reports

SYLLABUS

S. No.	Content	No. of Hours
1	Installation of Miktex and Texstudio	5
2	Text Positioning, Fonts and Type size	5
3	Document class and Page style	5
4	Parts of a document	5
5	Table of contents and Index	5
6	Lists	5
7	Rows and Columns	5
8	Tables	5
9	Equations	5
10	Symbols and Operators	5
11	Sequences and Functions	5
12	Matrices and Dots	5
13	Typesetting Theorems	5
14	Including Figures	5
15	Creating a bibliographic database	5

References:

1. Latex tutorials – a primer, Indian Tex users group (Edited by E. Krishnan), 2003
2. Stefan Kottwitz, Latex – Beginner's guide, Packt Publishing, Birmingham, Mumbai, 2011

Web resources:

1. http://www.gang.umass.edu/~franz/latexmanual.pdf
2. https://www.tug.org/twg/mactex/tutorials/ltxprimer-1.0.pdf

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	Create high-quality and professional looking documents	K6
CO2	Use Latex to type complicated mathematical equations	K3
CO3	Design texts, articles and books for business and science	K6
CO4	Choose appropriate commands to design the documents	K5
CO5	Demonstrate the significance of Latex in preparing documents	K2

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	1	3	2	3	3	3	2	1
CO2	2	2	3	2	3	3	3	2	2
CO3	3	2	3	1	3	3	2	3	1
CO4	3	2	1	2	3	2	3	2	2
CO5	3	2	2	3	1	3	3	2	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
II	**23U2MAPHA2**	**ALLIED 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	✓
Addresses Gender Sensitization		Relevant to Global development need	✓
Addresses Environment and Sustainability		Addresses Professional Ethics	
Addresses Human Values			

Course Objectives

The main objectives of this course are:

1. To understand the basic concepts of optics, modern Physics, concepts of relativity and quantum physics, semiconductor physics, and electronics.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**OPTICS: i**nterference – interference in thin films –colors of thin films – air wedge – determination of diameter of a thin wire by air wedge – diffraction – diffraction of light vs sound – normal incidence – experimental determination of wavelength using diffraction grating (no theory) – polarization – polarization by double reflection – Brewster's law – optical activity – application in sugar industries	15
II	**ATOMIC PHYSICS:** atom models – Bohr atom model – mass number – atomic number – nucleons – vector atom model – various quantum numbers – Pauli's exclusion principle – electronic configuration – periodic classification of elements – Bohr magneton – Stark effect – Zeeman effect (elementary ideas only) – photo electric effect – Einstein's photoelectric equation	15
III	**NUCLEAR PHYSICS:** nuclear models – liquid drop model – magic numbers – shell model – nuclear energy – mass defect – binding energy – radioactivity – uses – half life – mean life - radio isotopes and uses – controlled and uncontrolled chain reaction – nuclear fission – energy released in fission – chain reaction – critical reaction – critical size- atom bomb – nuclear reactor –nuclear fusion – thermonuclear reactions – differences between fission and fusion.	15

IV	**INTRODUCTION TO RELATIVITY AND GRAVITATIONAL WAVES**: frame of reference – postulates of special theory of relativity – Galilean transformation equations – Lorentz transformation equations – derivation – length contraction – time dilation – twin paradox – mass-energy equivalence –introduction on gravitational waves	15
V	**SEMICONDUCTOR PHYSICS:** p-n junction diode – forward and reverse biasing – characteristic of diode – zener diode – characteristic of zener diode – voltage regulator – full wave bridge rectifier – construction and working – advantages (no mathematical treatment) – USB cell phone charger –introduction to e-vehicles and EV charging stations	15

Text books:

1. R. Murugesan (2005), Allied Physics, S. Chand & Co, New Delhi.
2. K. Thangaraj and D. Jayaraman (2004), Allied Physics, Popular Book Depot, Chennai.
3. Brijlal and N.Subramanyam (2002), Textbook of Optics, S.Chand &Co ,New Delhi.
4. R. Murugesan (2005), Modern Physics, S.Chand &Co, NewDelhi.
5. A. Subramaniyam Applied Electronics, 2nd Edn., National Publishing Co., Chennai.

References:

1. Resnick Halliday and Walker (2018), Fundamentals of Physics, 11th Edn., John Willey and Sons, Asia Pvt. Ltd., Singapore.
2. D.R.KhannaandH.R. Gulati (1979).
3. Optics, S. Chand &Co. Ltd., New Delhi.
4. Thomas L. Floyd (2017), Digital Fundamentals, 11th Edn., Universal Book Stall, NewDelhi.
5. V.K. Metha (2004), Principles of electronics, 6th Edn.,S.Chandand Company, New Delhi.

Web resources:

1. https://www.berkshire.com/learning-center/delta-p-facemask/https://www.youtube.com/watch?v=QrhxU47gtj4https://www.youtube.com/watch?time_continue=318&v=D38BjgUdL5U&feature=emb_logo
2. https://www.youtube.com/watch?v=JrRrp5F-Qu4
3. https://www.validyne.com/blog/leak-test-using-pressure-transducers/
4. https://www.atoptics.co.uk/atoptics/blsky.htm

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminar	

Course Outcomes

On completion of this course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Explain the concepts of interference diffraction using principles of superposition of waves and rephrase the concept of polarization based on wave patterns	K1, K2
CO2	Outline the basic foundation of different atom models and various experiments establishing quantum concepts. Relate the importance of interpreting improving theoretical models based on observation.	K1, K2
CO3	Summarize the properties of nuclei, nuclear forces structure of atomic nucleus and nuclear models. Solve problems on delay rate half-life and mean-life. Interpret nuclear processes like fission and fusion.	K1, K2
CO4	To describe the basic concepts of relativity like equivalence principle, inertial frames and Lorentz transformation. Extend their knowledge on concepts of relativity and vice versa.	K2, K3
CO5	Summarize the working of semiconductor devices like junction diode, Zenerdiode, transistors and practical devices we daily use like USB chargers and EV charging stations.	K2, 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	2	3	1	2
CO2	3	3	3	2	3	1	2
CO3	3	3	3	1	3	1	1
CO4	3	3	3	1	1	1	1
CO5	3	3	3	3	3	1	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
I & II	23U2MAPHAPL	ALLIED PHYSICS PRACTICALS (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	✓
Addresses Gender Sensitization		Relevant to Global development need	✓
Addresses Environment and Sustainability		Addresses Professional Ethics	
Addresses Human Values			

Course Objectives

The main objectives of this course are:

3. Apply various physics concepts to understand Properties of Matter and waves, set up experimentation to verify theories, quantify and analyse, able to do error analysis and correlate results
4. Apply various Physics concepts to understand concepts of Light, electricity and magnetism and waves, set up experimentation to verify theories, quantify and analyse, able to do error analysis and correlate results

List of Experiments – Any 14 Experiments

17. Young's modulus by non-uniform bending using pin and microscope
18. Rigidity modulus by static torsion method.
19. Surface tension and interfacial Surface tension – drop weight method
20. Calibration of low range voltmeter using potentiometer
21. Verification of truth tables of basic logic gates using ICs
22. Verification of De Morgan's theorems using logic gate ICs.
23. Use of NAND as universal building block.
24. Radius of curvature of lens by forming Newton's rings
25. Thickness of a wire using air wedge
26. Specific resistance of a wire using PO box
27. Determination of figure of merit table galvanometer
28. Determination of Earth's magnetic field using field along the axis of a coil
29. Characterisation of Zener diode

30. Construction of AND, OR, NOT gates using diodes and transistor

31. NOR gate as a universal building block

32. Wavelength of mercury lines using spectrometer and grating

Course Outcomes

On completion of this course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Do experiments related with properties of matter and waves	K1, K2
CO2	set up experimentation in analog and digital electronics and to correlate the results	K1, K2
CO3	Understand physics concepts of light, electricity and magnetism and do the experiments	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	2	3	1	2
CO2	3	3	3	2	3	1	2
CO3	3	3	3	1	3	1	1

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	**23U3MAT3**	**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.

2. *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	**23U3MAE3**	**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		
	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	Essential English Grammar by Raymond Murphy

Web Resources

1	WangariMaathai–NobelLecture.NobelPrizeOutreachAB2023.Mon.17Jul 2023. https://www.nobelprize.org/prizes/peace/2004/maathai/lecture/
2	Telephone Conversation-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	23U3MAC4	VECTOR CALCULUS, FOURIER SERIES AND ITS APPLICATIONS	5	5

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:

- Knowledge about differentiation of vectors and on differential operators. Knowledge about derivatives of vector functions.
- Skills in evaluating line, surface and volume integrals.
- The ability to analyze the physical applications of derivatives of vectors.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Vector point function - Scalar point function - Derivative of a vector and derivative of a sum of vectors - Derivative of a product of a scalar and a vector point function - Derivative of a scalar product and vector product.	15
II	The vector operator 'del', The gradient of a scalar point function - Divergence of a vector - Curl of a vector - solenoidal and irrotational vectors – simple applications - Laplacian operator - Vector identities.	15
III	Line integral - simple problems - Surface integral - Volume integral – Applications. ***Self – study**:** line integral of a conservative vector.	15
IV	Gauss divergence Theorem, Stoke's Theorem, Green's Theorem in two dimensions – Applications to real life situations.	15
V	**Fourier series:** Periodic functions – Fourier series – Dirichlet's Conditions – Even and odd functions- Half range sine series – Half range cosine 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:

1. ***P. Durai Pandian, Laxmi Duraipandian*, Vector Analysis** – Emerald Publishers.
2. ***P. Kandasamy and K. Thilagavathy,* Mathematics, Volume IV,** S. Chand & Company Ltd, New Delhi.

Unit	Textbook	Chapter	Sections
I	1	2	Sections 2.1, 2.2., 2.3
II	1	2	Sections 2.4, 2.5, 2.6, 2.7, 2.8
III	1	3	Sections 3.1, 3.2, 3.3., 3.4, 3.5, 3.6
IV	1	4	Sections 4.2, 4.3, 4.4, 4.5
V	2	3	Pages 93 - 144

General References:

1. J.C. Susan ,Vector Calculus, , (4th Edn.) Pearson Education, Boston, 2012.
2. A. Gorguis, Vector Calculus for College Students, Xilbius Corporation, 2014.
3. J.E. Marsden and A. Tromba ,Vector Calculus, , (5th edn.) W.H. Freeman, New York, 1988.

Web resources:

http://mathforum.org,
http://www.opensource.org
http://nptel.ac.in

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	Find the derivative of vector and sum of vectors, product of scalar and vector point function and to Determine derivatives of scalar and vector products	**K1, K2**
CO2	Applications of the operator 'del' and to Explain soleonidal and ir-rotational vectors	**K5**
CO3	Solve simple line integrals	**K3, K4**
CO4	Solve surface integrals and volume integrals	**K3**
CO5	Verify the theorems of Gauss, Stoke's and Green's(Two Dimension)	**K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	1	3	2	3	3	3	2	1
CO2	2	1	3	1	3	3	3	2	1
CO3	3	2	3	1	3	3	3	2	1
CO4	1	2	3	2	3	3	3	2	1
CO5	3	1	2	3	3	3	3	2	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
III	23U3MAC5	DIFFERENTIAL EQUATIONS AND APPLICATIONS	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:

- Knowledge about the methods of solving Ordinary and Partial Differential Equations.
- The understanding of how Differential Equations can be used as a powerful tool in solving problems in science.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Ordinary Differential Equations:** Variable separable - Homogeneous Equation-Non-Homogeneous Equations of first degree in two variables - Linear Equation - Bernoulli's Equation-Exact differential equations.	15
II	**Equation of first order but not of higher degree:** Equation solvable for dy/dx- Equation solvable for y-Equation solvable for x- Clairauts' form - Linear Equations with constant coefficients-Particular integrals of algebraic, exponential, trigonometric functions and their products.	15
III	**Simultaneous linear differential equations** - Linear Equations of the Second Order -Complete solution in terms of a known integrals-Reduction to the Normal form-Change of the Independent Variable-Method of Variation of Parameters. **Self – Study :** Change of the Independent Variable.	15
IV	**Partial differential equation:** Formation of PDE by Eliminating arbitrary constants and arbitrary functions – complete integral – singular integral-General integral-Lagrange's Linear Equations –Simple Applications.	15
V	Special methods – Standard forms - Charpit's Methods – Simple Applications.	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:

S. Narayanan, T. K. Manickavachagam Pillay, ***Differential Equations and its applications***, S. Viswanathan Printers – Chennai.

Unit	Chapter	Sections
I	2	Sections 1- 6
II	4, 5	Sections 1 – 3, 1 - 4
III	8	Sections 1 - 4
IV	12	Sections 1 – 4
V	12	Sections 5 – 6

General References:

1. Shepley L. Ross, Differential Equations, 3rd Ed., John Wiley and Sons, 1984.
2. I. Sneddon, Elements of Partial Differential Equations, McGraw-Hill, International Edition, 1967.
3. G.F. Simmons, Differential equations with applications and historical notes, 2nd Ed, Tata Mcgraw Hill Publications, 1991.

Web resources:

http://science.korea.edu/science_en/undergraduate/under_math3.do
http://scinece.utm.my/ug/course_list_old/sscm1703/
http://nptel.ac.in

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	Determine solutions of homogeneous equations, non-homogeneous equations of degree one in two variables, solve Bernoulli's equations and exact differential equations	K1, K2
CO2	Find the solutions of equations of first order but not of higher degree and to Determine particular integrals of algebraic, exponential, trigonometric functions and their products	K5
CO3	Find solutions of simultaneous linear differential equations, linear equations of second order and to find solutions using the method of variations of parameters	K3, K4
CO4	Form a PDE by eliminating arbitrary constants and arbitrary functions, find complete, singular and general integrals, to solve Lagrange's equations	K3
CO5	Explain standard forms and Solve Differential equations using Charpit's method	K6

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	1	3	2	1	2	3	2	1
CO2	2	1	3	1	1	3	3	2	1
CO3	3	2	3	2	1	3	3	2	1
CO4	1	2	3	2	2	3	3	2	1
CO5	3	1	2	3	2	3	3	2	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
III	**23U3MAMSA1**	**ALLIED STATISTICS--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 to:

1. To make the student to gain wide knowledge in probability.
2. To acquire more knowledge in distributions and to enrich the knowledge of discrete and continuous probability distributions.
3. To make the students to get knowledge in rank correlation at real life situation

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Random variables: discrete random variable - continuous random variable	**15**
II	Two-dimensional random variables: joint probability mass function-conditional probability function- marginal distribution function- stochastic independence-mathematical expectations-properties of expectation-properties of variance- simple problems only	**15**
III	M.G.F – Cumulants - Characteristic Functions - Binomial, Poisson distributions – Moments, mode and MGF only	**15**
IV	Normal distribution- Gamma distribution- Beta distribution (without problems) - Exponential distribution ***Self- Study****: Uniform distribution.	**15**
V	Correlation: Karl Pearson coefficient of correlation–Rank correlation – Regression: Linear regression – Regression coefficient – properties of regression coefficients – related problems-Angle Between Two Lines of Regression.	**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:

S.C. GUPTA, V.K. KAPOOR, *"Fundamentals of Mathematical statistics",* Sultan Chand & Sons, 2014 (11th revised edition)

Unit	Chapter	Sections	pages
I	5	5.1-5.4	5.2-5.31
II	5, 6	5.5-5.5.6, 6.1-6.5	5.32-5.39, 6.2-6.10
III	7, 8	7.1-7.3.1, 8.4-8.4.6, 8.5, 8.5.2-8.5.5	7.2-7.14, 8.4-8.16, 8.28-8.29, 8.31-8.33
IV	9	9.2, 9.2.1-9.2.5, 9.5, 9.6, 9.8	9.3-9.8,9.38-9.41,9.50-9.53
V	10, 11	10.2-10.4,10.7,11.1-11.2.3	10.2-10.17,10.23-10.28,11.2-11.7

References:

1. General Reference Dr. P.R. Vittal "Mathematical Statistics" Margham Publications Chennai.

Web resources:

1. https://www.cuemath.com/data/continuous-random-variable/
2. https://www.vedantu.com/commerce/karl-pearson-coefficient-of-correlation

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	Understand Random variables	K2
CO2	Apply the properties of expectation-properties of variance- simple problems only	K3
CO3	Explain the Characteristic Functions - Binomial, Poisson distributions	K2
CO4	Extend their knowledge for further exploration of the subject.	K6
CO5	Acquire the knowledge to write Polytechnic TRB/ UG TRB Competitive Exams	K5

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	3	2	2
CO2	2	3	3	1	3	3	3	3	2
CO3	3	2	3	2	2	3	3	3	3
CO4	3	2	1	2	1	2	2	2	3
CO5	2	1	2	3	2	3	2	2	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
III & IV	**23U4MAMSAPL**	**Allied – STATISTICS PRACTICAL USING SPSS (NS)**	**3+3**	**-**

Nature of the course

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

Course Objectives

The main objectives of this course are to:

1. teach how to work with SPSS
2. Impart the knowledge of integrate information and build models
3. explain how to effectively summarize research findings

S.No.	Content
1.	Measures of Central Tendencies
2.	Measures of Dispersion
3.	Moments, Skewness and Kurtosis
4.	Fitting a Straight line
5.	Fitting a Quadratic equation
6.	Linear Correlation
7.	Linear Regression
8.	Fitting of Binomial Distribution
9.	Fitting of Poisson Distribution
10.	Fitting of Normal Distribution
11.	Chi Square test: Goodness of fit
12.	Exact sample test: t-test
13.	ANOVA – One way classification
14.	ANOVA – Two-way classification
15.	Randomized Block design

Textbook:

1. **"Fundamentals of Mathematical statistics",** S.C. GUPTA, V.K. KAPOOR, Sultan Chand & Sons, 2014 (11^{th} revised edition).
2. **"A Handbook of Statistical Analyses Using SPSS",** Dr. Brijesh Awasthi, Redshine Publications.

References:

1. **"Data Analysis Using SPSS",** Lokesh Jasrai, Sage Publications Pvt Ltd
2. **"SPSS for you",** A. Rajathi, P. Chandran, Mjp Publication
3. **"Data analysis using SPSS",** Dr. Lalit Prasad, Dr. Priyanka Mishra, Nirali Prakasam Publications

Web resources:

1. https://www.pdfdrive.com/spss-statistics-for-dummies-3rd-edition-e34460729.html
2. https://www.pdfdrive.com/how-to-use-spss-a-step-by-step-guide-to-analysis-and-interpretation-e184800120.html
3. https://www.pdfdrive.com/discovering-statistics-using-spss-e33406911.html

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	perform highly complex data manipulation and analysis with ease	**K3, K4**
CO2	identify the nature of the variable and recognize the tools to be used	**K2, K3**
CO3	use new features of SPSS on their own.	**K3, K6**
CO4	understand the basic principles behind inferential statistics	**K2**
CO5	analyze SPSS output to produce scientifically sound research reports.	**K4**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	3	2	3
CO2	2	3	3	2	3	3	3	3	2
CO3	3	2	3	2	1	2	1	2	2
CO4	1	2	3	1	2	3	2	3	3
CO5	3	1	2	3	2	1	3	2	1

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
IV	**23U4MAT4**	**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	**23U4MAE4**	**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	**GOALSETTING(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 o f 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)

	tford Practice Grammar, John Eastwood, Oxford University Press
	mbridge Grammar of English, Ronald Carter and Michael McCarthy
	orge Orwell Essays, Penguin Classics

Web Resources

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

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
IV	23U4MACIM	Industry Module – RESOURCE MANAGEMENT TECHNIQUES	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. To introduce the field of operations research which has many applications in management techniques.
2. To help students to find optimum solutions in business and management problems.
3. To develop scientific ability.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Operations Research- An overviews: Nature and characteristic Features of OR-Models in OR- OR and Decision Making- Applications and Limitations of OR- Linear Programming Problem: Formulation and Graphical methods.	15 Hrs
II	Simplex Method- Big M method- Two phase- Simplex Method- Duality in Linear Programming: Formulation of Primal Dual Pairs- Mathematical formulation of duality- problems ***Self- study*:** *Dual simplex method*	15 Hrs
III	Network Scheduling by PERT/CPM: Critical path Method and PERT calculations.	15 Hrs
IV	Transportation Problem and Assignment Problem	15 Hrs
V	Game Theory: Optimal solution of two person zero- sum games- games with mixed strategies- The graphical method- Dominance property- general solution of (mxn) rectangular games(LPP only)	15 Hrs

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:

P.K. Gupta & Man Mohan, ***Problems in operations Research,*** Sultan Chand & Sons, New Delhi

UNIT	CHAPTER	PAGES
I	0,1,2	1-62,(self study:1-10)
II	4,5,6,8,9	75-141,155-194
III	27	691-738
IV	15,16	293-382
V	20	471-510

References:

Kantiswarup, PK. Gupta and ManMohan, Operation Research, Sultan Chand & Sons, New Delhi.

Web resources:

1. https://web.stanford.edu/group/sis1/k12/optimization/#!index.md [Standard University]
2. https://courses.rice.edu/courses/!SWKSCAT.cat?p action=COURSE&pterm=201910&p crn=14054 [Rice]

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	Learn mathematical techniques that will help them to understand and analyze managerial problems in industry so that resources (capitals, Materials, staffing and machines) may be utilized more effectively.	K2,K3
CO2	Use mathematical software to solve the Transportation Problems.	K3,K4
CO3	Identify and develop operational research models from the verbal description of the real system.	K2
CO4	Solve replacement problem.	K3,K6
CO5	Understand the Network scheduling of PERT/CPM method.	K3,K4

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	3	2	3
CO2	2	3	3	3	2	3	3	3	3
CO3	3	2	2	2	1	3	2	3	2
CO4	1	2	3	3	2	3	1	3	1
CO5	3	1	2	3	2	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
IV	23U4MAC6	GRAPH THEORY	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:

1. To explain the applications of graph Theory in other disciplines.
2. To teach the basic concepts of Graphs, sub-graphs, degrees, connectivity, walks, trials and paths.
3. To enrich the knowledge of Planarity and Directed graphs.

SYLLABUS

Unit	Content	No. of Hours
I	**Graphs and Subgraphs:** Introduction - Definition and Examples – Degrees- Subgraphs- Isomorphism - Independent sets and coverings.	15
II	**Connectedness:** Introduction - Walks, trials and paths – Connectedness and Components – Blocks - Connectivity.	15
III	**Eulerian and Hamiltonian Graphs, Trees:** Introduction**-** Eulerian Graphs- Hamiltonian Graphs – Trees (Introduction) – Characterization of trees. ***Self-study*:*** Centre of a tree.	15
IV	**Planarity:** Introduction**-** Definition and Properties – Characterization of planar graphs – Thickness, crossing and outer planarity	15
V	**Directed Graphs:** Introduction- Definitions and Basic Properties- Paths and Connections- Digraphs and Matrices.	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)

Text Book:

Dr. S. Arumugam & S. Ramachandran, ***"An invitation to Graph theory" -*** *SCITECH publications (India) Pvt. Ltd., Chennai, 2006*

Unit	Chapter	Sections
I	2	Sec 2.0-2.4, 2.6 (Pages:5-17, 18-21)
II	4	Sec 4.0-4.4 (Pages: 34-47)

III	5 & 6	Sec 5.0-5.2, 6.0-6.2 (Pages: 48-65)
IV	8	Sec 8.0-8.3 (Pages: 73-84)
V	10	Sec 10.0-10.4 (Pages: 99-114)

References:

1. Graphs Theory with Applications to Engineering and Computer Science – Narsingh Deo, Prentice- Hall of India Private Ltd, 1974.
2. Introduction to Graph Theory – Gary Chartrand and Ping Zhang, Tata McGraw-Hill Edition, 2004.
3. Graph Theory- F.Harary, Addison- Wesley Publishing Company, Inc., 1969.

Web resources:

1. https://archive.nptel.ac.in/courses/111/106/111106102/
2. https://www.youtube.com/watch?v=sWsXBY19o8I
3. https://www.youtube.com/watch?v=3VeQhNF5-rE

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	Understand the knowledge of basic concepts in graph theory.	**K1, K2**
CO2	Apply the principles of walks, trials and paths in practical situations.	**K3, K4, K5**
CO3	Analyze the properties of Eulerian graphs and Hamiltonian graphs.	**K3, K4, K5**
CO4	Remember and Analyze the concept of Planar graphs in real situations.	**K1, K4, K5**
CO5	Evaluate and create the problems involving paths, connections and tournaments.	**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 and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	3	3	2	3
CO2	3	2	3	3	2	3	3	3	3
CO3	3	3	2	2	3	1	2	3	3
CO4	1	2	2	3	2	3	2	3	2
CO5	3	2	3	1	3	2	1	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
1V	23U4MAMSA2	Allied - STATISTICS--II	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 Update and expand the basic knowledge of mathematical statistics
2 To review the basic concepts and knowledge in Continuous distribution
3 To Learn about theory of estimation
4 To study about the Test of significance using t- test and chi-square test.
5 To apply the techniques of ANOVA.

SYLLABUS

Unit	Content	No. of Hours
I	**Large sampling theory:** Types of sampling- test of significance- null hypothesis -error in sampling- Critical regions and level of significance - sampling of attributes.	15
II	χ^2**Distribution**: χ^2- variates- derivation of the χ^2distribution (Method of M.G.F only)- M.G.F, C.G.F- mode and skewness - additive property – χ^2 probability curve - Theorems on χ^2distribution - Application of χ^2-distribution: Inference about a population variance – goodness of fit test.	15
III	**Student's t-distribution:** Derivation of t-distribution - constants of t distribution-limiting of t-distribution- application of t-distribution - test of single mean, Difference of mean.	15
IV	**F-distribution:** Derivation of F-distribution- constant of F-distribution- mode of F-distribution- application of F-distribution - test for equality of two population variance (Only simple problems of F- distribution). – Relation between t and F and relation between F and χ^2 tests	15
V	**Analysis of variance**: Introduction - one way, two way classifications – Experimental designs: Randomized block design ***Self-Study*:** *Latin squares design*	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:

1. "Fundamentals of Mathematical statistics", S.C. GUPTA, V.K. KAPOOR, Sultan Chand & Sons, 2014 (11th revised edition)
2. . **'Statistical Methods'** Vol. II, Dr. S.P. Gupta, Sultan Chand & Sons 2008.(45th Revised Edition,2017)

Unit	Text Book	Chapter	Sections	Pages
I	1	Chapter: 14	14.1 – 14.7.2	14.1-14.23.
II	1	Chapter: 15	15.1- 15.4, 15.6(15.6.1-15.6.2)	15.2-15.13,15.24-15.31
III	1	Chapter: 16	16.2, 16.3(16.3.1, 16.3.2)	16.2-16.18
IV	1	Chapter: 16	16.5- 16.8	16.29-16.41
V	2	Chapter 5,6	Pages (1033-1072)	1033-1072

References:

1. Dr. P.R. Vittal "Mathematical Statistics" Margham Publications Chennai.

Web resources:

1. https://www.questionpro.com/blog/types-of-sampling-for-social-research/
2. https://www.statlect.com/probability-distributions/student-t-distribution

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	Understand the concepts of testing of hypothesis.	**K3**
CO2	Acquire the knowledge of χ^2distribution	**K3**
CO3	Identify the characteristics of t distribution.	**K2**
CO4	Develop the skills to practice to solve problem in t and f distribution	**K5**
CO5	Collect and analyze data using ANOVA.	**K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	3	3	2	3
CO2	3	2	3	3	2	3	3	3	3
CO3	2	3	2	2	3	1	2	2	3
CO4	1	2	3	1	2	3	2	3	2
CO5	3	2	2	2	3	2	2	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
IV	23U4MAMSAPL	Allied – STATISTICS PRACTICAL USING SPSS (NS)	3+3	3

Nature of the course

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

Course Objectives

The main objectives of this course are to:

1. teach how to work with SPSS
2. Impart the knowledge of integrate information and build models
3. explain how to effectively summarize research findings

S.No.	Content
1.	Measures of Central Tendencies
2.	Measures of Dispersion
3.	Moments, Skewness and Kurtosis
4.	Fitting a Straight line
5.	Fitting a Quadratic equation
6.	Linear Correlation
7.	Linear Regression
8.	Fitting of Binomial Distribution
9.	Fitting of Poisson Distribution
10.	Fitting of Normal Distribution
11.	Chi Square test: Goodness of fit
12.	Exact sample test: t-test
13.	ANOVA – One way classification
14.	ANOVA – Two-way classification
15.	Randomized Block design

Textbook:

3. **"Fundamentals of Mathematical statistics",** S.C. GUPTA, V.K. KAPOOR, Sultan Chand & Sons, 2014 (11^{th} revised edition).
4. **"A Handbook of Statistical Analyses Using SPSS",** Dr. Brijesh Awasthi, Redshine Publications

References:

1. **"Data Analysis Using SPSS",** Lokesh Jasrai, Sage Publications Pvt Ltd
2. **"SPSS for you",** A. Rajathi, P. Chandran, Mjp Publication
3. **"Data analysis using SPSS",** Dr. Lalit Prasad, Dr. Priyanka Mishra, Nirali Prakasam Publications

Web resources:

4. https://www.pdfdrive.com/spss-statistics-for-dummies-3rd-edition-e34460729.html
5. https://www.pdfdrive.com/how-to-use-spss-a-step-by-step-guide-to-analysis-and-interpretation-e184800120.html
6. https://www.pdfdrive.com/discovering-statistics-using-spss-e33406911.html

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	perform highly complex data manipulation and analysis with ease	**K3, K4**
CO2	identify the nature of the variable and recognize the tools to be used	**K2, K3**
CO3	use new features of SPSS on their own.	**K3, K6**
CO4	understand the basic principles behind inferential statistics	**K2**
CO5	analyze SPSS output to produce scientifically sound research reports.	**K4**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	3	2	3
CO2	2	3	3	2	3	3	3	3	2
CO3	3	2	3	2	1	2	1	2	2
CO4	1	2	3	1	2	3	2	3	3
CO5	3	1	2	3	2	1	3	2	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
IV	23U4MASEC1	Skill Enhancement Course - DIGITAL LITERACY IN MATHEMATICS - PRACTICAL	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 familiarize the students in preparation of documents and presentations with office automation tool.
- To educate MS-office system, internet operations, online, offline working areas.
- To train them to work on the comment-based activities in MS-office system.
- To acquire knowledge on editor, spread sheet and presentation software.

Content

MS-Word:

1. Text Manipulations &Picture Insertion (Formatting & Alignment).
2. Usage of Numbering, Bullets, Tools and Headers.
3. Usage of Spell Check and Find and Replace.
4. Mail Merge Concept.
5. Creation of Tables, Formatting Table.

MS-EXCEL:

6. Creation of Worksheet, Entering Data in Cell by Aligning, Editing.
7. Excel Function (Date , Time, Statistical, Mathematical, Financial Functions).
8. Inserting and Deleting Rows and Columns. Drawing Borders around Cells.
9. Creation of Chart and Changing Chart Type appearance.
10. Formatting Numbers and Other Numeric Formats.

Textbook:

Peter Norton, "Introduction to Computers" –Tata McGraw-Hill.

References:

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGraw- Hill.
2. Dinesh Maidasani, "Learning Computer Fundamentals, MS Office and Internet & Web Technology", Firewall Media.

Web resources:

1. https://www.docdroid.net/XoyHN0e/office-automation-pdf#page=8
2. https://www.msuniv.ac.in/images/e-content/6.Computer%20%20Fundamentals%20and%20Office%20Automation.pdf
3. https://www.tndalu.ac.in/econtent/8_Computer_Fundamentals_and_Office_Automation.pdf

Pedagogy: Teaching / Learning methods:

Virtual Class room, LCD projector, Guest Lectures, Tutorial, Assignment, Net Surfing, NPTEL Course Materials.

Course Outcomes

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

CO Number	CO Statement	Cognitive Level
CO1	understand the basics of computer systems and its components.	**K1, K2**
CO2	understand and discuss about the use of Office package in daily life.	**K2, K5**
CO3	create and format documents using MS-Word	**K3, K6**
CO4	construct charts in MS-Excel.	**K6**
CO5	design presentation with efficient slides.	**K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	3	3	2	3
CO2	2	3	3	2	3	3	3	2	3
CO3	3	3	3	2	3	3	3	2	3
CO4	2	2	3	2	3	3	3	3	3
CO5	3	2	2	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	23U5MAC7	ABSTRACT ALGEBRA	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:

1. to know the Concepts of Sets, Groups and Rings.
2. Construction, characteristics and applications of the abstract algebraic structures

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Introduction to groups- Subgroups- cyclic groups and properties of cyclic groups- Lagrange's Theorem-A counting principle – Examples	**15**
II	Normal subgroups and Quotient group- Homomorphism- Automorphism - Examples.	**15**
III	Cayley's Theorem-Permutation groups - Examples ***Self-Study*:*** *Sylow's theorem, Direct products*	**15**
IV	Definition and examples of ring- Some special classes of rings- homomorphism of rings- Ideals and quotient rings- More ideals and quotient rings.	**15**
V	The field of quotients of an integral domain-Euclidean Rings - The particular Euclidean Ring – Examples	**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)

Text Book:

***Topics in Algebra – I.N.Herstein**, Wiley Eastern Ltd. Second Edition (1st January 2006)*

Unit	Chapter	Sections
I	2	Sec: 2.1 – 2.5
II	2	Sec: 2.6 – 2.8
III	2	Sec: 2.9 – 2.10
IV	3	Sec: 3.1 – 3.5
V	3	Sec: 3.6 – 3.8

References:

1. John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.
2. M. Artin, Abstract Algebra, 2nd Ed., Pearson, 2011.
3. Joseph A Gallian, Contemporary Abstract Algebra, 4th Ed., Narosa, 1999.

Web resources:

1. https://nptel.ac.in
2. https://franciscan.smartcatalogiq.com/en/2021-2022/Undergraduate-Catalog/Courses/MTH-Mathematics-Course-Descriptions/300
3. http://catalog.yale.edu/ycps/courses/math/
4. https://www.princeton.edu/academics/area-of-study/mathematics
5. https://lsa.umich.edu/math/undergraduates/undergraduate-math-courses/500-level-math-courses.html

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	Explain groups, subgroups and cyclic groups	**K1, K2**
CO2	Explain about Normal subgroup, Quotient groups, Homomorphisms and Automorphisms and verify the functions for homomorphism and automorphism properties	**K3, K4, K5**
CO3	Explain Permutation groups and apply Cayley's theorem to problems	**K3, K4, K5**
CO4	Explain Rings, Ideals and Quotient Rings and examine their structure	**K1, K4, K5**
CO5	Discuss about the field of quotient of an integral domain and to Explain in detail about Euclidean Rings	**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 and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	2	3	1	3	3	3	1
CO2	3	3	2	3	1	2	3	3	1
CO3	3	3	2	3	2	2	2	3	1
CO4	3	3	2	3	1	3	3	3	1
CO5	3	3	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	23U5MAC8	REAL ANALYSIS	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:

- Real Numbers and properties of Real–valued functions.
- Connectedness, Compactness, Completeness of Metric spaces.
- Convergence of sequences of functions, Examples and counter examples

Unit	Content	No. of Hours
I	**Continuous Functions on Metric Spaces:** Open sets– closed sets– Discontinuous function on R^1. **Connectedness, Completeness and Compactness**: More about open sets - Connected sets.	15
II	**Bounded sets and totally bounded sets:** Complete metric spaces - compact metric spaces - continuous functions on a compact metric space - continuity of inverse functions - uniform continuity.	15
III	**Calculus:** Sets of measure zero - definition of the Riemann integral - existence of the Riemann integral - properties of Riemann integral.	15
IV	**Derivatives** - Rolle's theorem - The Law of the mean - Fundamental theorems of calculus. ***Self-Study*:** *Improper Integrals*	15
V	**Taylor's theorem** - Point wise convergence of sequences of functions - uniform convergence of sequences of functions.	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:

Richard R. Goldberg, *Methods of Real Analysis* (John Wiley & sons, 2nd edition) (Indian edition –Oxford and IBH Publishing Co, New Delhi, 1st January 2020)

Unit	Chapter	Sections
I	5 & 6	Sec (5.4 – 5.6 & 6.1 – 6.2) Pages : 134 – 145 , 148 - 153
II	6	Sec (6.3 – 6.8) Pages : 153 - 170
III	7	Sec (7.1 – 7.4) Pages : 179 - 191
IV	7	Sec (7.5 – 7.8) Pages : 193 - 210
V	5	Sec (8.5, 9.1 – 9.2) Pages : 235 – 241, 252 - 259

General References:

1. Tom M Apostal, *Mathematical Analysis,* Narosa Publishing House, 2nd edition (1974), Addison-Wesley publishing company, New Delhi.
2. Walter Rudin, *Principles of Mathematical Analysis,* Tata McGraw Hill Education, Third edition (1 July 2017).

Web resources:

1. https://nptel.ac.in
2. https://www.google.com/url?sa=t&source=web&rct=j&url=https://alansinyal.files.wordpress.com/2012/08/method-of-real-analysis.pdf&ved=2ahUKEwiHw4Ozusr-AhUdwjgGHQsaBSYQFnoECBsQAQ&usg=AOvVaw0V9zo2qyZvq3sS2eEWAbkY
3. https://minds.wisconsin.edu/handle/1793/67009
4. https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.pdfdrive.com/mathematical-analysis-e184071294.html&ved=2ahUKEwjwzcTm4cr-AhXpR2wGHQN4B0sQFnoECFwQAQ&usg=AOvVaw0m0LTBSXXkdwmMcrqkHeAF

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	Explain the concepts of Continuous and Discontinuous functions, open and close sets, Connectedness, Completeness and Compactness.	**K1, K2**
CO2	Explain the concepts of bounded and totally bounded sets, continuity of inverse functions and Uniform continuity.	**K2, K4**
CO3	Define the sets of measure zero, to Explain about the existence and properties of Riemann integral.	**K3, K4**
CO4	Explain the concept of differentiability and to Explain Rolle's theorem, Law of mean, and Fundamental theorem of calculus.	**K2, K6**
CO5	Explain the point wise and uniform convergence of sequence of function and to derive the Taylor's theorem.	**K5**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	1	3	1	3	3	1	1
CO2	3	3	1	3	1	3	3	1	1
CO3	3	3	1	3	1	3	3	1	1
CO4	3	3	1	3	1	2	3	1	1
CO5	3	3	1	3	1	2	3	1	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	23U5MAC9	MATHEMATICAL MODELLING	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:

- Construction and Analysis of Mathematical models found in real life problems.
- Modelling through differential and difference equations

Unit	Content	No. of Hours
I	**Mathematical Modelling:** Simple situations requiring mathematical modelling- Technique of mathematical models – Classification of mathematical models - Characteristics of mathematical models- Mathematical modelling through algebra.	15
II	**Mathematical Modelling through differential equations:** Linear Growth and Decay Models - Non-Linear growth and decay models - Compartment models.	15
III	**Mathematical Modelling, through system of Ordinary differential equations of first order:** Mathematical modelling in population dynamics – Mathematical modelling of epidemics through systems of ordinary differential equations – Mathematical models Medicine.	15
IV	**Introduction to difference equations:** The need for mathematical modelling through difference equation – basic theory of linear difference equations with constant coefficients.	15
V	**Mathematical Modelling through difference equations:** Mathematical modelling through difference equations in economics and finance - Mathematical modelling through difference equations in population dynamics and genetics. ***Self-Study*:** *Mathematical modelling through difference equations in Probability theory.*	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:

***J N Kapur, "Mathematical Modelling"**, New Age International publishers, Reprint 2018.*

Unit	Chapter	Sections
I	1	Sections: 1.1 – 1.6 (Pages 1 – 20)
II	2	Sections: 2.1 – 2.4 (Pages 30 – 42)
	3	Sections: 3.1 – 3.2, 3.5 (Pages 53 – 62 & 69 -72)
III	4	Sections: 4.1 – 4.3 (Pages 76 – 93)
IV	5	Sections: 5.1 – 5.2 (Pages 96 – 105)
V	5	Sections: 5.3 – 5.5 (Pages 106 – 121)

General References:

1. Mathematical Modeling by Bimal K. Mishra and Dipak K.Satpathi. Ane Books Pvt. Ltd (1 Januuary 2009)
2. Mathematical Modeling Models, Analysis and Applications, by Sandip Banerjee, CRC Press, Taylor & Francis group, 2014
3. Mathematical Modeling applications with Geogebra by Jonas Hall & Thomas Ligefjard, John Wiley & Sons, 2017

Web resources:

1. https://www.digimat.in/nptel/courses/video/111107113/L19.html
2. https://www.youtube.com/watch?v=AccTsyDtV_8

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	Explain simple situations requiring Mathematical Modelling and to Determine the characteristics of such models.	**K1, K2, K4**
CO2	Model using differential equations in-terms of linear growth and Decay models.	**K2, K3, K4, K5**
CO3	Model using systems of ordinary differential equations of first order, to discuss about various models under the categories 'Epidemics' and 'Medicine'.	**K2, K3, K4, K5**
CO4	Explain in detail about difference equations	**K3, K5**
CO5	Model using difference equations	**K2, K5, K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	2	3	3	3	2	2	2	3	2
CO2	2	3	3	3	2	2	2	3	2
CO3	2	3	3	3	2	2	2	3	2
CO4	3	2	2	2	2	3	2	3	2
CO5	2	3	3	3	2	2	2	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
I	23U5MAEL1A	Major Elective – I PROGRAMMING IN C	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. provide knowledge about usage of data,operators and library functions.
2. the course is oriented to those who want to advanced structured procedural programming understanding and to impart knowledge to handle arrays, strings,structures and unions.
3. provide a comprehensive use of functions and storage class.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Constants, Variables and Data types-Operators and Expressions - Input and Output operators.	**12**
II	Decision Making and Branching-Decision Making and Looping .	**12**
III	Arrays-Character Arrays and Strings.	**12**
IV	User –Defined functions.	**12**
V	Structures and Unions. ***Self-Study*:*** *Pointers*	**12**

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:

Programming in ANSI C by E.Balagurusamy; second Edition,1992, Tata McGraw-Hill publishing Company limited,New Delhi.

UNIT	CHAPTER	SECTION	PAGES
I	2,3,4	Sec 2.1-2.14 Sec 3.1-3.14 Sec 4.1-4.5	22-45 51-70 80-103
II	5,6	Sec 5.1-5.9 Sec 6.1-6.5	110-135 145-168

III	7,8	Sec 7.1-7.7 Sec 8.1-8.8	180-197 217-232
IV	9	Sec 9.1-9.20	247-292
V	10	Sec 10.1-10.14	301-321

References:

1. D.M.Ritche,The c programming language,Prentice Hall of India,1977.
2. Y.Kanetkar,Understanding Pointers in C,schaum outline series,1996.
3. P.Pandiaraja,Programming in C,Vijay Nicole Imprint Private Linited,2005

Web resources:

1. https://web.stanford.edu/class/archive/cs/cs107/cs107.1174/syllabus.html [Stanford University]
2. https://www.mccormick.northwestern.edu/computer-science/academics/courses/descriptions/211.html [North Western]
3. https://www.freecodecamp.org/news/what-is-the-c-programming-languages-beginner-tutorial
4. https://www.w3schools.com/c/c_intro.php#:~:text=What%20is%20C%3F,write%20the%20UNIX%20operating%20system.

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	Interpret Data types,Variables and Constants.	K2,K3
CO2	Illustrate with examples the idea of conditional statements and looping statements.	K3,K4
CO3	Categorize one dimensional,two dimensional arrays.	K3,K5
CO4	Write and use function,calls and strings.	K4,K6
CO5	Interpret and use the common data structures typically found in c-programes- namely arrays and structures.	K4,K6

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	2	3
CO2	3	3	3	2	3	3	3	3	3
CO3	2	2	1	3	3	3	3	3	2
CO4	2	3	3	2	1	2	3	2	3
CO5	3	1	2	3	3	2	3	1	3

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

Semester	Subject Code	Titles of the Paper	Hours of Teaching / Week	No. of Credits
V	**23U5MAEL1B**	**Major Elective – I SPECIAL FUNCTIONS**	**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:

1. To impart the properties of special functions by their integral representations and symmetries.
2. To explain the properties of Bessel Equations which may be solved by application of special functions.
3. To teach the Legendre equations and Legendre Polynomials.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**IMPROPER INTEGRALS AND SERIES SOLUTIONS -** Improper integrals-Gamma and Beta functions, Series solutions-Ordinary point, regular singular point of second order linear ordinary differential equation, series solution to a second order linear ordinary differential equation about an ordinary point and a regular singular point.	**12**
II	**BESSEL FUNCTIONS -** Bessel's equation, Bessel functions, Recurrence relations, Orthogonality property, Generating function, Equations reducible to Bessel's equation. ***Self-Study&:*** *Modified Bessel functions*	**12**
III	**LEGENDRE POLYNOMIALS -** Legendre's equation, Legendre Polynomials, Rodrigue's formula generating function, recurrence relations, orthogonality property.	**12**
IV	**HERMITE AND LAGUERRE POLYNOMIALS -** Hermite and Leguerre equations and their solutions-Polynomials, Rodrigue's formula, generating functions, recurrence relations, orthogonality property.	**12**
V	**BOUNDARY VALUE PROBLEMS -** Solution of Boundary Value Problems involving Bessel functions & Legendre polynomials.	**12**

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:

"Higher Mathematics for Engineering and Sciences", Venkatraman. M. K., The National Publishing Company, Fourth Edition, 2006.

Unit	Chapter(s)	Section(s)
I	3	3.1.1 – 3.4.3
II	4	4.1 – 4.3, 4.7 – 4.9

III	6	6.1- 6.7
IV	9	9.1, 9.2, 9.3, 9.9, 9.12, 9.13, 9.14, 9.15
V	11	11.5, 11.9 – 11.12

References:

1. Andrews.L.A., "Special Function for Scientist and Engineers", McGraw-Hill, 1992.
2. Narayanan, S. Manicavachagam Pillay and Ramanaiah.G, "Advanced Mathematics for Engineering Students", Vol. II S.Viswanathan Printers Private Limited, Madras, 1985
3. Grewal, B.S., "Higher Engineering Mathematics", Khanna Publishers, Delhi, 2005.
4. Jain R.K &Iyengar, S.R.K. "Advanced Engineering Mathematics", Narosa Publishing House, New Delhi, 2002.

Web resources:

1. https://link.springer.com
2. https://math.stackexchange.com
3. https://www.math.tamu.edu

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	Understand basis of numerical analysis	**K1, K2**
CO2	apply numerical methods to obtain approximate solutions to mathematical problems.	**K3, K4,**
CO3	Analyse and evaluate the accuracy of common numerical methods.	**K3, K4, K5**
CO4	Obtain approximate solutions to intractable mathematical problems.	**K2, K3, K4**
CO5	Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution linear or non linear to equation.	**K4, K5, K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	2	3	3	2
CO2	3	3	2	2	3	3	3	1	3
CO3	3	3	2	3	3	3	1	3	1
CO4	3	2	3	3	2	2	3	3	2
CO5	1	3	2	2	2	3	2	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
V	23U5MAEL2A	Major Elective – II PROGRAMMING IN C PRACTICAL	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. encourage the students to work on basic concepts of the C-programming language.
2. make the students handle and analyze arrays and strings.
3. implement structures and file operations and hence improve the programming skills through C language.

CONTENT
1. Employee Pay bill calculation
2. Students Mark List
3. Ascending and Descending orders
4. Test the string palindrome.
5. Standard deviation for raw data.
6. Coefficient of correlation and Regression Equations.
7. Matrix multiplication with order 3 x 3.
8. Lagrange's Interpolation.
9. Range- Kutta method (IV Order).
10. Trapezoidal rule and Simpson rule.
11. Tempreature conversion(Fahrenheit to Celsius and vice-versa)
12. Drawing a reliability graph.
13. Printing the Binomial co-efficient table
14. Plotting of two functions
15. Sorting of Strings in alphabetical order

Textbook:

Programming in ANSI C by E.Balagurusamy; second Edition,1992, Tata McGraw-Hill publishing Company limited, New Delhi.

Web resources:

3. https://web.stanford.edu/class/archive/cs/cs107/cs107.1174/syllabus.html [Stanford University]
4. https://www.mccormick.northwestern.edu/computer-science/academics/courses/descriptions/211.html [North Western]
5. https://www.freecodecamp.org/news/what-is-the-c-programming-languages-beginner-tutorial

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	Compile and trace the execution of programs in C language.	K2,K3
CO2	Use control structures and loops and strings.	K3,K4
CO3	Analyze and implement two-dimensional arrays for matrix operations.	K4,K5
CO4	Experiment with user defined functions using recursion.	K2,K3,K6
CO5	Execute simple programs using input/output and conditional statements.	K3,K4,K5

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	2	3
CO2	3	3	3	2	3	3	3	3	3
CO3	2	2	1	3	3	3	3	3	2
CO4	2	3	3	2	1	2	3	2	3
CO5	3	1	2	3	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
V	23U5MAEL2B	Major Elective – II NUMBER THEORY	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. Teach the basic concept of divisibility, prime numbers and their primitive roots.
2. Introduce the Mobius function, Mangoldt function and Liouvilles function.
3. Explain congruences and residue systems.

SYLLABUS

Unit	Content	No. of Hours
I	**The Fundamental Theorem of Arithmetic**: Introduction – Divisibility - Greatest Common divisor - Prime numbers - The fundamental theorem of arithmetic - The series of reciprocals of the primes - The Euclidean algorithm. **Self-study* :** The greatest Common divisor of more than two numbers.	12
II	**Arithmetical Functions and Dirichlet multiplication**: Introduction - The mobius function $\mu(n)$ - The Euler totient function $\varphi(n)$ - A relation connecting φ and μ - A product formula for $\varphi(n)$ - The Dirichlet product of arithmetical functions - Dirichlet inverses and the Mobius inversion formula.	12
III	**Multiplicative functions and Dirichlet Multiplication**: The Mangoldt function $\Lambda(n)$ - Multiplicative functions - Multiplicative function and Dirichlet multiplication - The inverse of a completely multiplicative function Liouvilles function $\lambda(n)$ - The divisor functions $\sigma_\alpha(n)$ - Generalized convolutions.	12
IV	**Averages of Arithmetical Functions**: Introduction - The big oh notation Asymptotic equality of functions - Eulers summation formula - Some elementary asymptotic formulas - The average order of d(n) - The Average Order of the Divisor functions $\sigma_\alpha(n)$ - The Average Order of $\varphi(n)$.	12
V	**Congruences**: Definition and basic properties of congruence's - Residue classes and complete residue systems - Linear congruence's - Reduced Residue Systems and the Euler Fermat Theorem.	12

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:

Tom. M. Apostol, Introduction to Analytic Number Theory, Springer, Newyork, 1976.

Unit	Chapter	Sections
I	1	(1.1 - 1.8) (Pages: 13 – 21)
II	2	(2.1 - 2.7) (Pages: 24 – 32)
III	2	(2.8 - 2.14) (Pages: 32 – 40)
IV	3	(3.1 - 3.7) (Pages: 52 – 62)
V	5	(5.1 - 5.4) (Pages: 106 – 114)

References:

1. David M Burton, Elementary Number Theory, McGraw Hill Education, Seventh edition, 2017.
2. K. C. Chowdhury, A First Course In Number Theory, Asian Books Pvt. Ltd, New Delhi, 2007.

Web resources:

1. https://lsa.umich.edu/math/undergraduates/undergraduate-math-courses/500-level-math-courses.html
2. http://collegecatalog.uchicago.edu/thecollege/mathematics/#courseinventory
3. https://www.princeton.edu/academics/area-of-study/mathematics

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 basic definitions and theorems in number theory.	**K1, K2**
CO2	find the primitive roots, Mobius values and Euler totient values	**K3, K5**
CO3	Interpret the concepts of divisibility, prime number, congruence and number theorems.	**K4, K6**
CO4	Understand the logic and methods behind the major proofs in Number Theory.	**K2, K3**
CO5	Extend their knowledge to pursue research in this field.	**K5, K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	3	3	2
CO2	2	3	3	3	3	3	2	3	2
CO3	3	2	2	2	3	3	2	2	3
CO4	3	2	3	3	2	2	3	3	2
CO5	3	3	2	3	3	3	3	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
V	23U5MANME	Non Major Elective - MATHEMATICAL FINANCE	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:

- enable other department students to know some basic ideas on algebra.
- enrich the knowledge of simple interest and compound interest.

SYLLABUS

Unit	Content	No. of Hours
I	Arithmetic progression and geometric progression - Determinants - Cramer's rule.	15
II	Simple interest- Compound interest and Depreciation- present value- Discounting- Annuity.	15

Text Book:

Business Mathematics and Statistics, *P. Navaneetham, Jai Publication, June-2010*

Unit I : Chapter 1, Part I (Pages: 1 – 33)
Chapter 4, Part I (Pages: 147 – 175)
Unit II : Chapter 2 Part II (Pages: 43 – 74)

References:

Business Mathematics: D.C. Sancheti, V.K. Kapoor Sultan Chand & Sons, New Delhi.

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	acquire the problem-solving skills.	**K1, K2**
CO2	calculate AP and GP	**K3, K5**
CO3	analyse simple interest	**K4, K6**
CO4	finding compound interest	**K2, K3**
CO5	acquire the knowledge to write competitive exams.	**K5, K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	3	3	2
CO2	2	3	3	3	3	3	2	3	2
CO3	3	2	2	2	3	3	2	2	3
CO4	3	2	3	3	2	2	3	3	2
CO5	3	3	2	3	3	3	3	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
VI	23U6MAC11	COMPLEX ANALYSIS	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. To study the techniques of complex variables and functions together with their derivatives
2. To understand and find Taylor Series and integrals of multivariable functions
3. To study calculus of residues and its applications

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Complex Numbers:** Functions of a complex variable –Limits-Theorems on limit- Continuous Functions – Differentiability - The Cauchy Riemann equations – Analytic functions – Harmonic functions.	**15**
II	**Conformal mapping:** Elementary Transformations – Bilinear Transformations – Cross Ratio – Fixed paints of Bilinear transformations – Some special Bilinear Transformations.	**15**
III	**Complex Integration**: Definite Integrals- Some examples **–** Simply and Multiply connected domains**–** Cauchy integral formula **–** Formula for derivatives**–** Liouville's theorem –Fundamental theorem of Algebra**–** Maximum modulus principle.	**15**
IV	**Sequences and Series:** Convergence of sequences **–** Convergence of series**–** Taylor's series **–** Laurent series**–** Absolute and uniform convergence of power Series. ***Self-Study*:*** *Integration & differentiation of power series*	**15**
V	**Residues and Poles:** Isolated singular points **–** Residues **–** Cauchy Residue theorem **–** Residue at infinity **–** The three types of isolated singular points **–** Residues at poles **–** Zeros of analytical functions **–** Zeros and poles.	**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

Text book:

"Complex Analysis" *by S.Arumugam, A. Thangapandi Isaac, A. Somasundaram, Scitech Publications, 2014.*

Unit	Chapter	Sections
I	Chapter – 2	(Sec: 2.1 – 2.8), Pages: 24 – 52
II	Chapter – 3	(Sec: 3.1 – 3.5), Pages: 74 – 100
III	Chapter – 6	(Sec: 6.1 – 6.4), Pages: 132 – 172
IV	Chapter - 4 Chapter – 7	(Sec:4.1 to 4.3),Pages: 101 to 110 (Sec: 7.1 – 7.2), Pages: 173 – 194
V	Chapter-7 Chapter – 8	(Sec:7.3 -7.4),Pages:197 -208 (Sec: 8.1 – 8.2), Pages: 209 – 226

References:

1. "Foundations of complex Analysis" by S.Ponnusamy- Narosa Publishing House-New Delhi Chennai.
2. "Functions of a complex variables with applications" by E.G. Phillis (1968)-Oliver & Boy D, Edinburg.
3. "Complex variables and application", Seventh Edition by James Ward Brown and Ruel V. Churchill, Mc-Graw Hill Book Co., International Edition, 2009.

Web resources:

1.https://courses.maths.ox.ac.uk/node/9 [Oxford]

2.https://services.math.duke.edu/~ng/math633s14/syllabus.pdf [Duke]

3. https://nptel.ac.in

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	Equipped with the understanding of the fundamental concepts of complex variable	**K1 & K2**
CO2	Discriminate the concept of bilinear transformation, elementary functions	**K3 & K4**
CO3	Recall the fundamental theorems of algebra in complex integration	**K4 & K5**
CO4	Apply Laurent's Series and Taylor's Series	**K3 & K5**
CO5	Examine definite integrals using Cauchy residue theorem	**K3 & K5**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	3	3	3	2
CO2	2	3	2	2	2	3	2	3	2
CO3	3	3	3	2	2	2	2	3	2
CO4	3	2	3	2	2	3	3	2	3
CO5	3	3	3	2	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	23U6MAC12	MECHANICS	6	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:

- know Equilibrium of a particle under the action of given forces
- understand Simple Harmonic Motion
- know the concept of Projectiles

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Force:** Newton's laws of motion – Resultant of two forces on a particle - Equilibrium of a Particle: Equilibrium of a particle – Limiting equilibrium of a particle on an inclined plane.	**18**
II	**Forces on a Rigid Body:** Moment of a Force – General motion of a body – Equivalent systems of forces- Parallel Forces – Forces acting along a Triangle - A specific reduction of Forces: Reduction of coplanar forces into a force and couple. ***Self-Study*:*** Problems involving frictional forces	**18**
III	**Work, Energy and Power:** Work – Conservative field of force – Power - Rectilinear Motion under Varying Force: Simple Harmonic Motion - along a horizontal line – along a vertical line.	**18**
IV	**Projectiles:** Forces on a projectile – Projectile projected on an inclined plane	**18**
V	**Central Orbits:** General orbits – Central orbit – Conic as a centered orbit	**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)

Textbook:

P. Duraipandian, Laxmi Duraipandian, Muthamizh Jayapragasam, Mechanics, S. Chand & Company Ltd., Fourth Edition, 1979.

Unit	Chapter	Sections
I	2 & 3	Sections: 2.1 – 2.2 (Pages35 – 52) & Sections: 3.1 – 3.2 (Pages 53-70)
II	4 & 5	Sections: 4.1 – 4.5 (Pages 71 – 88) & Sections 5.1 – 5.2 (Pages 124 – 149)
III	11 & 12	Sections: 11.1 – 11.2 (Pages: 224 – 234) & Sections: 12.1 – 12.2 (Pages 235 -251)
IV	13	Sections: 13.1 – 13.2 (Pages 260 – 282)
V	16	Sections: 16.1 – 16.3 (Pages 332 – 352)

References:

1. A. Ruina and R. Pratap, Introduction to Statics and Dynamics, , Oxford University Press, 2014.
2. S.L. Loney, The Elements of Statics and Dynamics, Cambridge University Press, 1904.
3. J.L. Meriam and L. G. Kraige, Engineering Mechanics: Statics, Seventh Edition,Wiley and sons Pvt ltd., New York, 2012.
4. J.L. Meriam, L. G. Kraige, and J.N. Bolton, Engineering Mechanics: Dynamics, 8thedn, Wiley and sons Pvt ltd., New York, 2015.
5. K. Dhiman, P.Dhinam and D. Kulshreshtha, Engineering Mechanics (Statics and Dynamics) ,McGraw Hill Education(India) Private Limited, New Delhi, 2015.

Web resources:

1. https://nptel.ac.in
2. https://archive.nptel.ac.in/courses/115/104/115104094/
3. https://www.youtube.com/watch?v=FD4BQjMuhYY
4. https://www.youtube.com/watch?v=olTD-mpsU4E
5. https://www.digimat.in/nptel/courses/video/122104015/L27.html

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	Define Resultant, Component of a Force, Coplanar forces, like and unlike parallel forces, Equilibrium of a Particle, Limiting equilibrium of a particle on an inclined plane.	**K1, K2, K3**
CO2	Define Moment of a force and Couple with examples. Define Parallel Forces and Forces acting along a Triangle, Solve problems on frictional forces	**K3, K4, K5**
CO3	Define work, energy, power, rectilinear motions under varying forces. Define Simple Harmonic Motion and find its Geometrical representation.	**K2, K4,K5**
CO4	Define Projectile, impulse, impact and laws of impact. Prove that the path of a projectile is a parabola. Find the direct and oblique impact of smooth elastic spheres	**K4, K5, K6**
CO5	Define central orbits, explain conic as centered orbits and solve problems related to central orbits	**K3, K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	2	3	2	1	1	3	3	2
CO2	3	2	3	2	1	1	3	3	2
CO3	3	2	3	2	1	1	3	3	2
CO4	3	2	3	2	1	1	3	3	2
CO5	3	2	3	2	1	1	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	23U6MACPL	PROGRAMMING IN R PRACTICAL	5	4

Nature of the course

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

Course Objectives

The main objectives of this course are to:

1. Learn the Open-Source platform.
2. Be familiar with the workspace in R.
3. Handle Vectors
4. Work with Matrices in R – Programming.

Syllabus Content
1. Graphical Representation (a) Bar Diagram (b) Line Diagram (c) Scatter Diagram (d) Histogram (e) Pie Chart
2. Measures of Central Tendency
3. Measures of Dispersion
4. Sum, Mean and Product of Vectors
5. Newton Raphson Method
6. Gauss Elimination Method
7. Degree Sequence of a Graph
8. Shortest path of a Spanning Tree
9. Transportation Problem
10. Assignment Problem

Textbook:

1. The Book of R: A First Course in Programming and Statistics -Tilman M. Davis, 1st Edition, No Starch Press.

2. R for Data Science – Hadley Wickham, 1st Edition, O'Reilly Publications

References:

1. The Art of R Programming – Norman Matloff, 1st Edition, No Starch Press.
2. Discovering Statistics Using R – Andy Field, 1st Edition, SAGE Publications Ltd
3. Statistics Using R - Sudha G. Purohit, Sharad D. Gore, Shailaja R. Deshmukh, 2nd Edition, Narosa Publishing House Pvt. Ltd.

Web resources:

1. https://www.pdfdrive.com/beginning-data-science-in-r-data-analysis-visualization-and-modelling-for-the-data-scientist-e181093942.html
2. https://www.pdfdrive.com/learn-r-for-applied-statistics-with-data-visualizations-regressions-and-statistics-d176176267.html
3. Statistical Analysis with R For Dummies (For Dummies by Joseph Schmuller - PDF Drive

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	Understand the basis in R - Programming	**K2**
CO2	Handle big data analysis using R - Programming	**K1, K5**
CO3	Apply R – Programming for Vectors and Matrices	**K3**
CO4	Plot Special graphics	**K3**
CO5	Calculate Statistical Computations	**K4, K5**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	3	3	3	2
CO2	3	3	3	2	3	3	3	3	2
CO3	1	2	3	3	2	2	2	3	2
CO4	3	3	3	1	3	2	3	2	1
CO5	3	1	3	3	3	3	1	2	3

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

Semester	Subject Code	Titles of the Paper	Hours of Teaching / Week	No. of Credits
VI	**23U6MAEL3A**	**Major Elective – III NUMERICAL MEHODS**	**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:

4. To develop numerical computational skills and to study their applications.
5. To focuses on the topics interpolation, the solution of equations, Numerical differentiation and Numerical integration.
6. On the successful completion to the course, students will be able to learn various tools in solving numerical problems and prepare competitive examinations.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Solution of numerical algebraic and Transcendental Equations:** The Bisection Method- iteration method- Order of convergence- Regula False method- Newton Raphson Method- order of convergence. (Problems only)	**15**
II	**Solution of simultaneous linear algebraic equation:** Gauss elimination method- Gauss Jordan method- Inversion of a matrix using Gauss elimination method- Gauss Jacobi method- Gauss- Seidel method. (Problems only)	**15**
III	**Interpolation:** Newton forward interpolation formula, Newton backward interpolation formula – Error in polynomial interpolation, Error in Newton's forward interpolation formula, Error in Newtons' backward interpolation formula – Equidistant terms with one or more missing values. (Problems only) ***Self-Study****: Error in polynomial interpolation*	**15**
IV	**Numerical Differentiation and integration:** Newton's forward difference formula to get the derivative, Newton's	**15**

	backward difference formula to compute the derivative – Trapezoidal rule, Ramberg's method- Simpson's 1/3rd rule- Simpson's 3/8 rule- Weddle's rule. (Problems only)	
V	**Numerical Solution of ordinary Differential Equations:** Taylor's method, Euler method, Improved Euler method - modified Euler method- Runge- Kutta method 4th order method. (Problems only)	**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

Text Book:

"Numerical methods" by, P.Kandasamy, K.Thilagavathy K.Gunavathy, S.Chand & Company Ltd., New Delhi.

Unit	Chapter(s)	Section(s)	Page (s)
I	3	3.1.1 – 3.4.3	69 – 96
II	4	4.1 – 4.3, 4.7 – 4.9	112 – 126, 145 – 158
III	6	6.1- 6.7	209 – 227
IV	9	9.1, 9.2, 9.3, 9.9, 9.12, 9.13, 9.14, 9.15	281-284, 285-289, 300, 302-306, 308-314
V	11	11.5, 11.9 – 11.12	352-538, 369-378, 379-389

References:

1. S.S.Sastri - Introduction to methods of Numerical Analysis
2. M.K.Ventataraman - Numerical methods in science and Engineering.
3. A.Singaravelu - Numerical methods.

Web resources:

4. https://explorecourses.stanford.edu/search?q=CME206 [Stanford University]
5. https://courses.maths.ox.ac.uk/node/44065 [Oxford]
6. https://nptel.ac.in/courses/111106101
7. https://cosmolearning.org/courses/elementary-numerical-analysis/video-lectures.
8. https://freevideolectures.com/course/3597/numericalanalysis.

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	Understand basis of numerical analysis	**K1, K2**
CO2	apply numerical methods to obtain approximate solutions to mathematical problems.	**K3, K4,**
CO3	Analyse and evaluate the accuracy of common numerical methods.	**K3, K4, K5**
CO4	Obtain approximate solutions to intractable mathematical problems.	**K2, K3, K4**
CO5	Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution linear or non linear to equation.	**K4, K5, K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	1	3	3	3
CO2	3	3	3	3	3	3	3	3	3
CO3	3	2	3	3	3	3	3	3	2
CO4	2	3	2	3	3	2	1	1	3
CO5	3	1	2	2	2	2	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	23U6MAEL3B	Major Elective – III FUZZY SETS AND ITS APPLICATIONS	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 teach the concept of fuzzy sets and their properties.
2. To teach the domain knowledge for Standard fuzzy operations and De Morgan's Laws in fuzzy sets.
3. To teach the domain knowledge for the Representations of fuzzy sets.
4. To teach fuzzy arithmetic, Linguistic variables and examine Fuzzy equations

SYLLABUS

Unit	Content	No. of Hours
I	**Fuzzy sets:** Basic Definitions – Basic set theoretic operations for Fuzzy sets – Extensions: Types of Fuzzy sets – algebraic operations - Extension Principle: operation for type 2 fuzzy sets – algebraic operations with fuzzy numbers – special extended operations – Extended operations for LR-representation of fuzzy sets.	15
II	**Fuzzy relations and Fuzzy Graphs:** Fuzzy relations and fuzzy sets – Composition of Fuzzy relations – Min-max composition and its properties – Fuzzy graphs – Special fuzzy relation - Possibility Theory – Possibility of fuzzy events – Possibility Vs Probability.	15
III	**Fuzzy Logic: Classical logic:** An overview – Multivalued logic – Fuzzy propositions – Fuzzy quantifiers – Linguistic hedges – Inference from conditional fuzzy propositions–Approximate reasoning: An overview of fuzzy expert system – Fuzzy implications and their selection – Multiconditional approximate reasoning – The role of fuzzy relation equation.	15
IV	**Fuzzy Systems: Fuzzy controllers:** An overview – Fuzzy rule base. Fuzzy inference engine.Fuzzification.Defuzzification and the various	15

	Defuzzification methods (the centre of area, the centre of maxima and the mean of maxima methods) – Fuzzy controllers: An example – Fuzzy systems and Neural Networks – Automata – Dynamical Systems.	
V	**Decision making in Fuzzy environment:** Individual decision making – Multiperson decision making – Multicriteria decision making – Multi stage decision making – Fuzzy ranking methods – Fuzzy linear programming. ***Self-Study****: Applications in Civil Engineering, Mechanical Engineering, Industrial Engineering and Medicine.*	**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

Text Book:

1. Fuzzy set theory and its applications Fourth edition, H. J. Zimmermann. Springer, 2015.
2. Fuzzy sets and Fuzzy Logic, Theory and Applications, George J. Klir and Bo Yuan, PHI, 2013.

Unit	Textbook	Chapter(s)	Section(s)
I	1	2, 3, 5	2, 3.1 – 3.2.1, 5
II	1	6, 8	6, 8.2 – 8.4
III	2	8, 11	8, 11.1 – 11.5
IV	2	12	12
V	2	15, 16, 17	15, 16.2 – 16.3, 17.2

Web resources:

1. http://www.tezu.ernet.in/dmaths/programme/PhD-MathSc-syllabus_2013.pdf [Cambridge University]
2. http://www.imperial.ac.uk/civil-engineering/prospective-students/postgraduatetaught-admissions/environmental-engineering-cluster/syllabus/cive97035/ [Imperial College London]
3. https://giocher.woirdpress.com/chapter-2par-2-2-fuzzy-relations-and-the-extension-principle/
4. https://nptel.ac.in/courses/108/104/108104157/

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 domain knowledge from classical sets to fuzzy sets with illustrations,	**K1, K2**
CO2	Determine fuzzy logic and fuzzy propositions and examine fuzzy Decision making problem	**K3, K4,**
CO3	Learn the Fuzzy Linear programming problem, Classify fuzzy relations and properties of fuzzy relations.	**K3, K4, K5**
CO4	Learn the measure in fuzzy and its real life applications.	**K2, K3, K4**
CO5	Extend their knowledge to pursue research in this field.	**K4, K5, K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	1	3	3	2
CO2	3	3	3	3	3	3	3	3	2
CO3	2	3	3	1	1	3	3	3	1
CO4	3	1	3	3	3	2	3	1	3
CO5	1	3	2	2	2	2	1	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	**23U6MAEL4A**	**Major Elective – IV ASTRONOMY**	**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. introduce the existing world of Astronomy to the students
2. understand the movements of the Celestial Objects
3. motivate to Learn Kepler's Laws
4. teach about astronomical concepts through mandatory Astronomical tour to Planetarium and Science Museums.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Celestial sphere – Diurnal motion	**15**
II	**The Earth:** Zones of Earth – Terrestrial latitudes and longitudes – Radius of earth – Rotation of earth – Dip of horizon	**15**
III	Twilight – Refraction	**15**
IV	Kepler's Laws	**15**
V	Time: Equation of time - Seasons ***Self-Study*:*** *Calendar*	**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:

"Astronomy" *by S. Kumaravelu and Susheela Kumaravelu, Agasthiyar Publication, 2013.*

Unit	Chapter	Sections
I	Chapter – 2	Article 39 – 79
II	Chapter – 3	(Sec: 3.1 – 3.5), Article 87 – 110
III	Chapter – 3	(sec: 3.6), Chapter IV, Article 111 – 134
IV	Chapter – 6	Article 146 – 165
V	Chapter – 7	Article 166 - 174

References:

1. Astronomy by Dr.S.M. Sirajudeen
2. Astronomy by G.V.Ramachandran.
3. Textbook on Astronomy H.SubramaniAiyar 1970.

Web resources:

1. http://bulletin.columbia.edu/columbia-college/departments-instruction/astronomy/#coursestext [Columbia University]
2. Https://Www.Physics.Utoronto.Ca/~Jharlow/Teaching/Astron03/Fullnotes/ [University Of Toronto]

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	Recall the basic knowledge on Celestial Objects	K1& K2
CO2	Summarize about Stars, longitudes and latitudes	K3 & K4
CO3	Inspect the concepts of Refraction	K3 & K4
CO4	Utilize the Kepler's Laws	K3 & K4
CO5	Students will be able to identify, classify and compare the bodies of our solar system	K2 & K6

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	3	3	3	3
CO2	2	3	2	2	2	2	3	3	2
CO3	1	3	3	3	2	3	2	2	2
CO4	3	2	1	2	2	3	3	2	1
CO5	3	3	3	2	1	2	2	1	3

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

Semester	Subject Code	Titles of the Paper	Hours of Teaching / Week	No. of Credits
VI	**23U6MAEL4B**	**Major Elective – IV STOCHASTIC PROCESSES**	**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 teach sequences of events governed by probabilistic laws and many applications of stochastic processes.
2. To explain stochastic concepts uses in physics, Engineering, biology, medicine and other disciplines.
3. To bridge the gap between an elementary probability course and the many excellent advanced works on stochastic processes.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Elements of Stochastic Processes-Two simple examples of Stochastic processes-Classification of general Stochastic processes – Markov Chains- Definitions – Examples of Markov Chain-Transition probability matrices of a Markov chain - classification of states of a Markov chain-Recurrence.	**15**
II	The basic limit theorem of Markov chains and applications-Discrete renewal equation-proof of theorem-Absorption probabilities - criteria for recurrence- A queuing Example.	**15**
III	Classical Examples of continuous time Markov chains-General pure birth processes and Poisson processes-more about Poisson processes- A counter model birth and death processes-Differential equations of birth and death processes-Examples of birth and death processes.	**15**
IV	Renewal processes - Definition of Renewal process and related concepts – Some examples of Renewal Processes – More on some special Renewal processes – Renewal equations and elementary Renewal theorem. ***Self-Study****: *The Renewal Theorem – Applications of Renewal theorem*.	**15**
V	Martingales - Preliminary definitions and examples – Super martingales and Sub martingales- The optional sampling theorem.	**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.

Text Book:-

A First course in Stochastic Processes - Second Edition by Samuel karlin and M.Taylor, Academic Press New York.

Unit	Chapter(s)	Section(s)
I	I	1.2 – 1.3
II	II	2.1 – 2.5
III	III	3.1 – 3.5
IV	IV	4.1 – 4.6
V	VI	6.1 – 6.3

References:

1. "Stochastic Processes" S.K.Srinivasan and K.M.Mehata, Tata Mcgraw - Hill Publishing Company Ltd., New Delhi.
2. "Stochastic Processes "Medhi Second Edition Wiley Eastern Ltd., New Delhi.

Web resources:

1. http://nptel.ac.in/courses/111/102/111102014/#
2. http://nptel.ac.in/courses/111/102/111102014/#
3. http://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=2145&context=graduatereports.

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	Classify a stochastic process in a real-life situation.	**K1, K2**
CO2	Apply Markov chain in real life problems.	**K3, K4,**
CO3	Acquire more detailed knowledge about Markov processes with a discrete state space, including Markov chains, Poisson processes, birth and death process.	**K3, K4, K5**
CO4	Formulate simple stochastic process models in the time domain and provide qualitative and quantitative analyses of such models.	**K2, K3, K4**
CO5	Extend their knowledge to pursue research in this field.	**K4, K5, K6**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	1	3	3	2
CO2	3	3	3	3	2	3	2	3	2
CO3	3	2	2	3	3	3	3	3	1
CO4	2	1	3	1	3	2	2	1	3
CO5	2	3	2	2	1	2	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	23U6MASEC2	Skill Enhancement Course - ARITHMETIC ABILITY	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:

1. Enrich the problem-solving skills
2. Teach mathematical ideas for real-world problems.
3. Inculcate the habit of self-learning.

SYLLABUS

Unit	Content	No. of Hours
I	H.C.F and L.C.M of numbers, Simplifications	15
II	Average, Problems on Ages and Percentage	15

Textbook:

R.S. Aggarwal, Quantitative Aptitude - S. Chand and company Ltd. New Delhi, 2009.

Unit	Chapter	Section
I	I	Sec: 2 (Page 30-36), Sec: 4(Page 67 to 75)
II	I	Sec: 6 (Page 139 to 155), Sec: 8 (Page 182 to 189), Sec: 10 (Page 208 to 217)

References:

1. Abhijit Guha, Quantitative Aptitude, Tata McGraw-Hill Publication, 1996.

2. Dinesh Khattar, Quantitative Aptitude, Pearson Publication, 2014.

Web resources:

1. 8700+ Quantitative Aptitude Topic wise PDF (MCQ) - Download Free (letsstudytogether.co)
2. Basic-Arithmetic-v1.pdf (lacounty.gov)
3. Quantitative Aptitude Tricks (ugcportal.com)

Pedagogy: Teaching / Learning methods

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Course Outcomes

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

CO Number	CO Statement	Cognitive Level
CO1	recognise, describe and represent numbers and their relationships	**K1, K2**
CO2	estimate, calculate with competence and confidence in solving problems	**K3, K6**
CO3	Analyze the problems logically and approach the problems in a different manner	**K4, K5**
CO4	Understand and solve the puzzle related questions	**K2, K5**
CO5	acquire the knowledge to write competitive exams	**K3, K5**

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

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	2	3	3	2	3	3	3	2
CO2	3	3	2	3	3	2	3	3	2
CO3	2	3	2	3	3	3	2	3	2
CO4	3	3	2	3	3	3	3	2	3
CO5	3	3	3	3	2	3	3	2	3

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