P.K.R. ARTS COLLEGE FOR WOMEN

(Re-Accredited with 'A' Grade by NAAC)

Autonomous Institution-Affiliated to Bharathiar University

Gobichettipalayam-638 476

DEPARTMENT OF MATHEMATICS

BACHELOR OF SCIENCE IN MATHEMATICS

SYLLABUS

SCHOLASTIC COURSES
AND
CO-SCHOLASTIC COURSES

For all the candidates admitted from the Academic Year

2024-2025 and onwards

Under CBCS PATTERN

P.K.R ARTS COLLEGE FOR WOMEN
(An Autonomous Institution, Re-Accredited by NAAC with 'A' Grade)
Gobichettipalayam-638476
B.Sc MATHEMATICS – PROGRAMME STRUCTURE
CBCS Pattern: 2024-2025

Scholastic Courses:

Category	Component	No. of Courses	Credit(s) / Course	Total Credits	Proposed Semester
Part – I	Tamil / Hindi / French / Kannada / Malayalam / Sanskrit	4	3	12	I – IV
Part – II	English	4	3	12	I – IV
Part - III	**Core Courses:** (Core Theory / Core Allied Practical / Core Allied / Core Elective / Open Elective)	14 / 1 / 4 / 3 / 1	62 / 3 / 16 / 11 / 2	94	I-VI / I-II / I-IV / V-VI / V
	Core Courses: Institutional Training / Industrial Training / Article ship Training / Mini Project	1	1	1	To be done in Summer Vacation of Semester IV, ESE in Semester V
Part –IV	**A. Foundation Courses:** i. Environmental Studies ii. Yoga and Ethics	1 1	2 2	4	I II
	B. Ability Enhancement Courses: i. Information Security ii. Consumer Rights	1 1	2 2	4	III IV
	C. Skill Enhancement Courses: i. C Programming - Practical ii. Web Programming – HTML and PHP - practical iii.Latex - Practical	1 1 1	2 2 2	6	IV V VI
	D. Non-Major Elective: i. Indian Women and Society / Advanced Tamil	1	2	2	III
Part –V	**A.Proficiency Enhancement** i. Numerical Aptitude (Self Study) **B.Competency Enhancement:** i. NSS/YRC/RRC/CCC/PHY.EDU/ OTHERS ii. Professional Grooming iii. Students Social Activity	1 1 1 1	2 1 1 1	5	V Sem I to VI Sem I to VI Sem I to VI

Total Marks: 3700   Total Credits: 140

P.K.R ARTS COLLEGE FOR WOMEN
(An Autonomous Institution, Re-Accredited by NAAC with 'A' Grade)
Gobichettipalayam-638476
BACHELOR OF SCIENCE - MATHEMATICS
Programme Scheme and Scheme of Examinations
(For students admitted from 2024-2025 & onwards)
(For branches offering Part-I and Part-II for four semesters)

Scholastic Courses:

Category/ Part	Component	Course Code	Title of the Course	Hrs/ week	Exam hrs	CIA	ESE	Total marks	Credits
			SEMESTER - I						
Part I	Language : I	24LTU01 / 24LHU01 / 24LFU01 / 24LKU01 / 24LMU01 / 24LSU01	Tamil – I / Hindi – I / French – I / Kannada – I / Malayalam – I / Sanskrit - I	4	3	25	75	100	3
Part II	English: I	24LEU01	English - I	4	3	25	75	100	3
Part III	Core : I	24MAU01	Classical Algebra	6	3	25	75	100	4
Part III	Core : II	24MAU02	Differential Calculus	6	3	25	75	100	4
Part III	Core : III Allied : I	24MAU03	Physics - I	5	3	25	75	100	4
Part III	****	****	Physics Practical	3	-	-	-	-	-
Part IV	Foundation : I	24FCU01	Environmental studies	2	3	50	--	50	2
			TOTAL	**30**				**550**	**20**
			SEMESTER - II						
Part I	Language : II	24LTU02 / 24LHU02 / 24LFU02 / 24LKU02 / 24LMU02 / 24LSU02	Tamil- II / Hindi-II / French II / Kannada-II / Malayalam-II / Sanskrit-II	4	3	25	75	100	3

Part II	English : II	24LEU02	English: II	4	3	25	75	100	3
Part III	Core : IV	24MAU04	Analytical Geometry	6	3	25	75	100	4
Part III	Core : V	24MAU05	Integral Calculus	6	3	25	75	100	4
Part III	Core : VI Allied : II	24MAU06	Physics – II	5	3	25	75	100	4
Part III	Core : VII Allied Practical: I	24MAU07	Physics Practical	3	3	40	60	100	3
Part IV	Foundation : II	24FCU02	Yoga and Ethics	2	3	50	--	50	2
			TOTAL	**30**				**650**	**23**
			SEMESTER - III						
Part I	Language : III	24LTU03 / 24LHU03 / 24LFU03 / 24LKU03 / 24LMU03 / 24LSU03	Tamil- III / Hindi-III / French-III / Kannada-III / Malayalam-III / Sanskrit-III	4	3	25	75	100	3
Part II	English : III	24LEU03	English: III	4	3	25	75	100	3
Part III	Core : VIII	24MAU08	Differential Equations and Laplace Transforms	6	3	25	75	100	4
Part III	Core : IX	24MAU09	Trigonometry, Vector Calculus and Fourier Series	6	3	25	75	100	4
Part III	Core : X Allied : III	24MAU10	Statistics	6	3	25	75	100	4
Part IV	Ability Enhancement : I	24AEU01	Information Security	2	3	50	-	50	2
Part IV	Non- Major Elective	24NMU01A / 24NMU01B	Indian Women and Society / Advanced Tamil	2	3	50	-	50	2
			TOTAL	**30**				**600**	**22**
			SEMESTER - IV						
Part I	Language : IV	23LTU04 / 23LHU04 / 23LFU04 / 23LKU04 / 23LMU04 / 23LSU04	Tamil- IV Hindi-IV / French-IV / Kannada-IV / Malayalam-IV / Sanskrit-IV	4	3	25	75	100	3

Part II	English : IV	24LEU04	English: IV	**4**	3	25	75	100	**3**
Part III	Core : XI	24MAU11	Mechanics	6	3	25	75	100	4
Part III	Core : XII	24MAU12	Numerical Methods	5	3	25	75	100	4
Part III	Core : XIII Allied : IV	24MAU13	C Programming	6	3	25	75	100	4
Part IV	Skill Enhancement : I	24SEMAU01	C Programming – Practical	3	3	50	-	50	2
Part IV	Ability Enhancement : II	24AEU02	Consumer Rights	**2**	3	**50**	-	50	**2**
			TOTAL	**30**				**600**	**22**
			SEMESTER - V						
Part III	Core : XIV	24MAU14	Abstract Algebra	6	3	25	75	100	5
Part III	Core : XV	24MAU15	Real Analysis - I	6	3	25	75	100	5
Part III	Core : XVI	24MAU16	Complex Analysis - I	6	3	25	75	100	5
Part III	Core : XVII	24MAU17A / 24MAU17B / 24MAU17C / 24MAU17D	Institutional Training / Industrial Training / Article ship Training / Mini Project	--	3	100	--	100	1
Part III	Core : XVIII (Open Elective)	***	Opted by the students offered by other departments	4	3	25	75	100	2
Part III	Core : XIX Elective : I	24MAU18A / 24MAU18B	Operations Research – I / Applied Algebra - I	5	3	25	75	100	4
Part IV	Skill Enhancement : II	24SEMAU02	Web Programming – HTML and PHP - practical	**3**	3	50	-	50	2
Part V	Proficiency Enhancement	24PEMAU01	Numerical Aptitude (Self Study)	--	3	--	100	100	2
			TOTAL	**30**				**750**	**26**

			SEMESTER - VI						
Part III	Core : XX	24MAU19	Linear Algebra	6	3	25	75	100	5
Part III	Core : XXI	24MAU20	Real Analysis - II	6	3	25	75	100	5
Part III	Core : XXII	24MAU21	Complex Analysis - II	6	3	25	75	100	5
Part III	Core : XXIII Elective : II	24MAU22A / 24MAU22B	Operations Research – II / Applied Algebra - II	5	3	25	75	100	4
Part III	Core : XXIV Elective : III	24MAU23A / 24MAU23B	Graph Theory / Fuzzy Mathematics	4	3	25	75	100	3
Part IV	Skill Enhancement: III	24SEMAU03	**Latex -** Practical	3	3	50	-	50	2
			TOTAL	**30**				**550**	**24**

Part V	Competency Enhancement	NSS/YRC/RRC/CCC/PHY.EDU/ Others	SEMESTER I – VI		1
		Professional Grooming	SEMESTER I – VI		1
		Students Social activity (Related to the Curriculum)	SEMESTER I – VI		1

Total Marks: 3700 & Total credits: 140

LIST OF ELECTIVE COURSES

S. No	Core Elective	Course Code	Course	Weekly Contact Hours	Credits
1	Core Elective – I	24MAU18A / 24MAU18B	Operations Research – I / Applied Algebra– I	5	4
2	Core Elective – II	24MAU22A / 24MAU22B	Operations Research – II / Applied Algebra– II	5	4
3	Core Elective – III	24MAU23A / 24MAU23B	Graph Theory / Fuzzy Mathematics	4	3

LIST OF ALLIED COURSES

S. No	Course Code	Course	Weekly Contact Hours	Credits
1	24MAU03	Physics – I	5	4
2	24MAU06	Physics – II	5	4
3	24MAU07	Physics Practical	3	3
4	24MAU10	Statistics	6	4
5	24MAU13	Programming in C	6	4

LIST OF SKILL BASED COURSES

S. No	Course Code	Course	Weekly Contact Hrs	Credits
1	24SEMAU01 /	C - Practical	3	2
2	24SEU01	WEB PROGRAMMING – HTML and PHP - PRACTICAL	3	2
3	24SEUMA03 /	LATEX - Practical	3	2

LIST OF ABILITY ENHANCEMENT

S. No	Course Code	Course	Weekly Contact Hrs	Credits
1.	24AEU01	Information Security	2	2
2.	24AEU02	Consumer Rights	2	2

LIST OF NON-MAJOR ELECTIVE

S. No	Course Code	Course	Weekly Contact Hrs	Credits
1.	24NMU01A / 24NMU01B	Indian Women and Society / Advanced Tamil	2	2

LIST OF PROFICIENCY ENHANCEMENT (Self Study)

S. No	Course Code	Course	Weekly Contact Hrs	Credits
1.	24PEMAU01	Numerical Aptitude	--	2

LIST OF OPEN ELECTIVE COURSES

Course Code	Department	Course	Evaluation	Credits
24ENUOE1	Department of English	English for Effective Communication	Both CIA and ESE	2
24TAUOE1	Department of Tamil	திறன் மேம்பாட்டுக் கல்வி		
24PHUOE1	Department of Physics	Physics in day to day life		
24ITUOE1	Department of Computer Science	Basics of Computer Technology		
24CSUOE1		Internet For Everyone		
24CAUOE1		Machine Learning		
24AMUOE1		Advanced Excel - Practical		
24CGUOE1	Department of Commerce	Basics of Accounting		
24CPUOE1		Human Resource Management		
24CCUOE1		E- Advertising		
24BAUOE1	Department of Management	Start-up Business		

II. CO-SCHOLASTIC COURSES:

a) VALUE ADDED COURSES:

Semester	Course Code	Course Title	Contact Hours / week	Exam Duration Hours	Max. Marks @ Annual Exam				
					Aptitude	Writing	Self Intro	Personal	Total
Course to be taught after regular hours									
Value Added Course I									
Semester I		FUNDAMENTAL MATHEMATICS AND COMMUNICATION SKILLS		-	25	25	25	25	100
Semester II									
Value Added Course II									
Semester III		NUMBER ANALOGIES AND COMPREHENSIVE EVALUATION			25	25	25	25	100
Semester IV									
Value Added Course III									
Semester V		SPATIAL ABILITY			25	25	25	25	100
Semester VI									
								TOTAL	300

b) CERTIFICATE COURSE

Semester	Course Code	Course Title	Contact Hours / week	Exam Duration Hours	Max. Marks @ Annual Exam		
					Theory	Practical	Total
Course to be taught after regular hours							
Certificate Course							
Semester III		MATLAB					
Semester IV							

c) COURSES WITH CREDIT TRANSFERABILITY

d) ADD-ON COURSES

Category	Course Code	Course Title	Contact Hours / week	Exam Duration Hours	Max. Marks @ Annual Exam Total
ADD-ON COURSE - I		Functional English (Offered by the Department of English)	2	3	100
ADD-ON COURSE - II		Yoga and meditation (Offered by the Department of Tamil)	2	3	100

e) EXTRA CREDIT COURSES (Self-study courses)

1. Courses offered by parent department for ALL STUDENTS OF THE PROGRAMME

2. Courses offered by parent department for ADVANCED LEARNERS OF THE PROGRAMME

3. Courses offered in a department under PART-III for STUDENTS OF OTHER PROGRAMMES – Inter- disciplinary courses

4. Credit transferability for Disciplinary / Inter-disciplinary / Trans-disciplinary / General courses offered in UGC SWAYAM MOOCS

5. Comprehension Courses

List of courses offered for ADVANCED LEARNERS ONLY (Self-study)

Course Code	Department	Courses offered for ADVANCED LEARNERS ONLY
	Department of Mathematics	1) Numerical Techniques 2) Matrix Theory 3) Group Theory 4) Vedic Mathematics

SYLLABUS

(For students admitted from 2024-2025 & onwards)
SEMESTER - I

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credit
PART : I	LANGUAGE : I	**24LTU01**	**Tamil –I**	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External marks	Total Marks
I	**I**	**25**	**75**	**100**

முகப்புரை:

தமிழ்மொழி குறித்த அடிப்படை அறிவினையும் வகைமையினையும் அறிதல்.
COURSE OUTCOME:

பொதுத்தமிழைப் படிப்பதன் வாயிலாக கீழ்க்கண்ட திறன்களைப் பெறுவர்.

COs	CO Statement	Knowledge Level
CO1	தமிழ் இலக்கிய வகைமைகளைக் கற்றல்	K1
CO2	மொழியை பிழையில்லாமல் எழுதவும் பேசவும் கற்றல்	K2
CO3	பெண்ணியம் சார்ந்த சிந்தனைகளை வளர்த்தல்	K3
CO4	புதுக்கவிதை, சிறுகதை உத்திகளை திறனாய்தல்	K4
CO5	படைப்பாளர்களாக உருவாக்கம் பெறுதல்	K5

K1: Remember Level, K2: Understand Level, K3: Apply Level , K4: Analyze Level, K5: Evaluate Level

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	3	9	3	3	9	9
CO2	9	9	9	9	3	3	3
CO3	9	3	9	9	9	3	3
CO4	9	3	9	9	3	3	3
CO5	9	9	9	3	9	9	3
Total contribution of COs to POs	45	27	45	33	27	27	21
Weighted Percentage of COs contribution to POs	**2.29**	1.71	**2.84**	**2.10**	**2.24**	**2.22**	**1.94**

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

அலகு 1 இயற்கை   *8 மணி நேரம்*

காலைப்பொழுது, அந்திப்பொழுது, மழை — பாரதியார்
ஆறு — பாரதிதாசன்
இயற்கை வாழ்வு —கவிமணி
நெய்தல் நீர் - சுரதா
மரங்கள் - மு.மேத்தா

அலகு 2 பெண்ணியம்   *10 மணி நேரம்*

நவீன தாலாட்டு - வைரமுத்து
பெண்ணுரிமை பேணுநர் - பொன்மணி வைரமுத்து
அம்மா - இளம்பிறை

அலகு 3 சிறுகதைகள் - சமுதாயம்   10 *மணி நேரம்*

கன்னி — இந்திரா பார்த்தசாரதி
அம்மாவுக்கு ஓய்வு — ஜோதர்லதா கிரிஜா
கழிவு— ஆண்டாள் பிரியதர்சினி
பூக்களும் விற்பனைக்கே — திலகவதி

அலகு 4 இலக்கணம்   10 *மணி நேரம்*

வல்லினம் மிகும் இடங்கள்
வல்லினம் மிகா இடங்கள்
ந ண ன, ல ள ழ, ர ற வேறுபாடு
மரபுச் சொற்கள்

அலகு 5 இலக்கிய வரலாறு   10 *மணி நேரம்*

புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்
சிறுகதையின் தோற்றமும் வளர்ச்சியும்
படிமம் - குறியீடு பற்றிய விளக்கங்கள்

பயிற்சிக்குரியன - கடிதம் வரைதல், விண்ணப்பம் எழுதுதல்

பாடநூல்கள் :

1. மகாகவி பாரதியார் கவிதைகள், ஸ்ரீ செண்பகா பதிப்பகம், கிருஷ்ணா தெரு, தியாகராயநகர், சென்னை-600 017. எட்டாம் பதிப்பு: 2005.
2. உவமைக்கவிஞர் சுரதா கவிதைகள்(முதற்தொகுதி), வள்ளுவர் தமிழ்ப்பீடம், 56-அ, டாக்டர் லட்சுமணசாமி சாலை, கலைஞர் கருணாநிதி நகர், சென்னை-600 078 முதற்பதிப்பு: பிப்ரவரி 2007.
3. மு.மேத்தா கவிதைகள் (தேர்ந்தெடுத்த கவிதைகள்) கவிதா பப்ளிகேஷன், 8,மாசிலாமணி தெரு, பாண்டிபஜார்,தி.நகர், சென்னை-600 017 இரண்டாம் பதிப்பு: ஆகஸ்ட் 2011.
4. வைரமுத்து கவிதைகள், சூர்யா லிட்ரேச்சர்(பி)லிட், 22,நான்காம் குறுக்குத்தெரு,,டிரஸ்ட் புரம், சென்னை-24 பத்தாம் பதிப்பு: ஜூலை 2009.
5. பொன்மணி வைரமுத்து கவிதைகள், சூர்யா லிட்ரேச்சர்(பி)லிட், 22,நான்காம் குறுக்குத்தெரு, டிரஸ்ட் புரம், சென்னை-24. நான்காம் பதிப்பு: 1996

பார்வை நூல் :

வல்லிக்கண்ணன், புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும், சீதை பதிப்பகம், சென்னை 600005, 6 ஆம் பதிப்பு 2014.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
Part – II	English: I	**24LEU01**	**ENGLISH - I**	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
I	**I**	**25**	**75**	**100**

PREAMBLE:

To impart basic knowledge about the English Language and various genres in Literature

COURSE OUTCOME:

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

COs	CO Statement	Knowledge Level
CO1	Identify the main ideas of the different genres.	**K1**
CO2	Enhance their four skills of language learning.	**K2**
CO3	Avoid the common grammatical errors.	**K3**
CO4	Detect the correct usage of vocabulary.	**K4**
CO5	Interpret the grammatical forms of English through activities, assignments, reading the texts.	**K5**

K1 – Remember;K2 – Understand;K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	3	3	3	3	1	1
CO3	9	3	3	1	1	1	1
CO4	3	3	1	1	1	1	1
CO5	3	1	1	1	1	1	0
Total contribution of COs to POs Weightage	33	19	17	15	9	7	6
Weight Percentage of COs contribution to POs	2.42	1.73	1.87	1.94	2.34	2.17	2.48

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

Course Content:

UNIT I: Poetry (7 Hours)

1. All the world's a stage – William Shakespeare

2. On killing a tree – Gieve Patel

3. Night of the Scorpion - Nissim Ezekiel

UNIT II: Prose (8 Hours)

1 Good Manners **-** J.C. Hill

2. Of love – Francis Bacon

3. The worship of wealthy- G.K. Chesterton

UNIT III: Short Stories (9 Hours)

1. The Lost Child – Mulk Raj Anand

2. Happy Prince - Oscar Wilde

3. The Lottery Ticket - Anton Chekhov

UNIT IV: One-Act Play (10 Hours)

 1. Refund – Fritz Karinthy

2. The Never, Never nest – Cedric Mount.

UNIT V: Grammar and Composition (14 Hours)

1. Parts of Speech

2. Nouns

3. Pronouns

4. Verbs

5. Adjectives

6. Adverbs

7. Prepositions

8. Conjunctions and Interjections

TEXT BOOK: BLOSSOM

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE - I	**24MAU01**	**CLASSICAL ALGEBRA**	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
I	**I**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn about the convergence and divergence of the series and to find the roots for the different types of the equations.

COURSE OUTCOME:

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

CO'S	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the concepts of Binomial, Exponential, Logarithmic series, Convergence and Divergence of series, multiple roots of an equation.	K_1
CO2	express the summation of series, Theory of equations, Convergence and Divergence of series.	K_2
CO3	apply Binomial, Exponential, Logarithmic series for finding summation of series, different types of methods to find convergence and divergence of series and the roots of an equation.	K_3
CO4	analyze the Binomial, Exponential, Logarithmic, convergence and divergence of series and roots of an equation.	K_4
CO5	evaluate the multiple roots and summation of series the problems by using different types of methods.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	3	3
CO3	9	9	9	9	3	3	3
CO4	9	3	3	3	1	1	1
CO5	3	3	3	3	1	1	1
Total Contribution of COs to POs	39	33	33	33	11	11	11
Weighted Percentage of COs contribution to POs	2.24	2.08	2.23	2.41	1.29	1.45	1.61

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

15

COURSE CONTENT:

UNIT - I   BINOMIAL AND EXPONENTIAL THEOREMS   (15 Hours)

Binomial theorem (statement only)- Application of the Binomial theorem to the summation of series - Exponential theorems (statement only) - Summation of series.

UNIT - II   LOGARITHMIC SERIES   (15 Hours)

Logarithmic series theorem - Statement and proof - Immediate application to summation and approximation only.

UNIT III   CONVERGENCE AND DIVERGENCE OF SERIES   (15 Hours)

Convergence and divergence of series –Definitions -Comparison tests-Cauchy's condensation test - De Alembert's test-Cauchy's root test - Raabe's test -Absolute convergence.

UNIT IV   THEORY OF EQUATIONS   (15 Hours)

Roots of an equation-Relations between the roots and coefficients-Transformations of equations-Reciprocal equations.

UNIT V   THEORY OF EQUATIONS (cont…)   (12 Hours)

Descartes's rule of signs -Rolle's Theorem - Multiple roots - Horner's method.

TEXT BOOK

Manicavachagom Pillay, T.K., Natarajan.T, Ganapathy.K.S. (2017)– "Algebra Volume - I", publishedby: Divya Subramanian for Ananda book Depot, Chennai.

UNIT	CHAPTER	PAGE NUMBER
I	3	143-152
	4	188-207
II	4	213-230
III	2	41-89
IV	6	282-303, 318-327
V	6	351-362, 376-382

REFERENCE BOOK

1. Kandasamy.P. Thilagavathy .K (2004) –"Mathematics for B.Sc. Branch I -Vol. I.

   S. Chand and Company Ltd, New Delhi.

WEB REFERENCES:

1.   http://www.jjernigan.com/172/ConvergenceDivergenceNotes.pdf

2.   http://home.iitk.ac.in/~psraj/mth101/lecture_notes/Lecture11-13.pdf

3.   https://maths4uem.files.wordpress.com/2015/09/1028-infinite-series.pdf

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE - II	**24MAU02**	**DIFFERENTIAL CALCULUS**	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
I	**I**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn and gain knowledge about differentiation.

COURSE OUTCOME:

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

CO'S	CO STATEMENT	KNOWLEDGE LEVEL
CO1	remember all the formulae in differentiation	**K_1**
CO2	explain the differentiation of derivatives, successive differentiation, maxima and minima, partial differentiation and curvature	**K_2**
CO3	apply various differential formulae for solving successive differentiation, maxima and minima, partial differentiation and curvature	**K_3**
CO4	analyze the properties of derivatives, successive differentiation, maxima and minima, partial differentiation and curvature	**K_4**
CO5	evaluate the two variable and three variable functions by using derivatives, successive differentiation, maxima and minima, partial differentiation and curvature	**K_5**

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	3
CO2	9	9	9	9	9	9	3
CO3	9	9	9	9	3	3	1
CO4	9	9	9	9	1	1	1
CO5	9	9	3	3	0	0	0
Total Contribution of COs to POs	45	45	39	39	22	22	8
Weighted Percentage of COs contribution to POs	2.58	2.83	2.63	2.85	2.59	2.89	1.17

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   DERIVATIVES   (15 Hours)

Introduction – Derivative of a constant function – Algebra of derivatives – Derivative of $y = x^n$ - Derivative of $y = e^x$ - Derivative of $y = a^x$ - Derivative of $y = \log_e x$ - Derivative of Trigonometric functions – Derivatives of inverse Trigonometric functions – Derivative of hyperbolic functions – Derivative of inverse hyperbolic functions – Derivative of parametric function – Differentiation of implicit function – Logarithm differentiation – Differentiation of infinite series.

UNIT - II   **SUCCESSIVE DIFFERENTIATION**   **(15 Hours)**

Definition – n^{th} derivatives of some standard functions – Determination of nth derivative of rational functions – The derivatives of the products of the powers of sines and cosines – Leibnitz's theorem.

UNIT - III   **MAXIMA AND MINIMA**   **(15 Hours)**

Maxima and Minima values of a function – A necessary condition for extreme values – Sufficient condition for extreme values – Use of II order derivatives – Application to problems.

UNIT - IV   **PARTIAL DIFFERENTIATION**   **(15 Hours)**

Introduction – Functions of two variables – Functions of three or more variables – Neighbourhood of a point (a,b) – Continuity of a function of two variables – Limit of a function of two variables – Partial derivatives – Geometrical representation of a function of two variables – Homogenous function – Total differentials – Differentiation of composite function – Change of variables – Differentiation of implicit function.

UNIT - V   **CURVATURE**   **(12 Hours)**

Curvature – Radius of curvature in Cartesian and Polar coordinates – Centre of curvature – Evolutes & Involutes.

TEXT BOOK

1) Mohanty R.K (2014) – "Differential Calculus" – ANMOL Publications pvt ltd.

2) Narayanan.S. and Manicavachasam Pillai.T.K (2017) – "Calculus vol 1"- Viswanathan Publishers.

TEXT BOOK	UNIT	CHAPTER	PAGE NUMBER
Book 1	Unit - I	Chapter 4	Page: 82 - 125
Book 1	Unit – II	Chapter 5	Page: 129 - 160
Book 1	Unit –III	Chapter 8	Page: 241 – 265
Book 1	Unit -IV	Chapter 10	Page: 288-323
Book 2	Unit – V	Chapter 7	Page: 281-316

REFERENCE BOOK

Kandasamy. P & Thilagavathy (2004) - "Mathematics for B.Sc. –Vol I and. II", S.Chand and Co.

WEB REFERENCES:

https://youtu.be/KijGLjxKlsY

https://youtu.be/mzj25fNxobc

https://www.slideshare.net/lohit91/maxima-minima

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
Part – III	Allied	**24MAU03**	**PHYSICS – I**	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
I	I	25	75	100

PREAMBLE: To understand the fundamentals of physics, give the basic understanding of material properties and to acquire knowledge on magnetism and electricity

COURSE OUTCOME: After completion of the course, the learners will be able to

COs	Course Statement	Knowledge Level
CO1	Remember the basic terms of universal law of gravitation and elastic properties of solids, sound propagation, solar energy electric and magnetic fields	**K1**
CO2	Discuss the fundamentals of thermodynamic state properties for liquids and vapors, and for ideal gases	**K2**
CO3	Examine the working principle of bending moment and conversions of Galvanometer concepts	**K3**
CO4	Categorize techniques related with fabrication of solar cell, measurement of solar radiations.	**K4**
CO5	Assess the acceleration due to gravity, Young's modulus bending method, Frequency of AC circuits	**K5**

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs \ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	3
CO2	9	9	9	9	9	3	3
CO3	9	9	9	3	3	3	3
CO4	9	3	3	3	3	3	1
CO5	9	3	3	1	1	1	1
Total Contribution of COs to Pos	45	33	33	25	25	19	11
Weighted Percentage of COs Contribution to POs	2.31	1.78	2.00	1.62	2.80	2.13	1.49

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and Pos

COURSE CONTENT

UNIT- I (12 Hours)

Gravitation: Newton's law of Gravitation-Determination of G by Boy's method- mass and density of earth – acceleration due to gravity- Determination of g by compound pendulum

Elasticity: Bending of beams - Bending moment - Depression at the free end of a cantilever - Hooke's law – Kinds of moduli of Elasticity - Experimental determination of Young's Modulus by Uniform and Non-Uniform bending methods

UNIT- II (12 Hours)

Heat and Thermodynamics: Vanderwaal's equation of state-critical constants of a gas-derivation of critical constants in terms of Vanderwaal's contants – Theory of porous plug experiment – Joule-Kelvin effect: Temperature of inversion - Liquefaction of air (Linde's process) - Liquefaction of hydrogen - Liquefaction of Helium - Properties of liquid Helium I and Helium II - II law of thermodynamics - Carnot's theorem and its proof

UNIT- III (12 Hours)

Sound: Transverse waves – velocity along a stretched string-laws of transverse vibration of strings verification of laws- Melde's string - Determination of frequency of a tuning fork (Transverse and longitudinal modes) - Frequency of AC by sonometer- Production of ultrasonic waves by piezo-electric method - Applications of Ultrasonic Waves

UNIT- IV (12 Hours)

Solar Physics: Solar constant – measurement of solar radiations by Pyroheliometer and Pyranometer – general applications of solar energy – flat–plate collector - box type cooker - solar water heaters – solar photo – voltaic cells – general applications of solar cells

UNIT- V (12 Hours)

Electricity: Moving coil Galvanometer - Conversion of Galvanometer into Ammeter and voltmeter – Ballistic Galvanometer – construction and theory – Electromagnetic induction - Transformers – theory, energy loss and applications

Magnetism: Basic concepts of magnetic materials – magnetic properties of Dia, Para and Ferro magnetic materials– Antiferro magnetism and Ferri magnetism - electric and magnetic circuits – Curie temperature

Text Books

1. Properties of Matter and Sound - R. Murugesan,1998, S.Chand & Company Pvt. Ltd.,
   (Unit 1)
2. Heat and Thermodynamics - Brijlal and Subramaniam,2012, S.Chand & Company Pvt.
   Ltd., (Unit 2)
3. Sound - Brijlal and Subramaniam,1994, Vikas Publishing House Pvt. Ltd., (Unit 3)
4. Solar physics - G.D. Rai,2012, Khanna Publishers New Delhi (Unit 4)
5. Electricity and Magnetism - Brijlal and Subramanyam, 2011, Vikas Publishing House
   Pvt. Ltd., (Unit 5)

Web References

1. https://web.njit.edu/~vitaly/121/notes121.pdfhttps://ncert.nic.in›textbook›pdf›iesc110

2. https://www.stcharlesprep.org › Elasticity(statics)

3. https://books.google.co.in/books?id=0zP8wAEACAAJ&printsec=copyright

4. https://ncert.nic.in/ncerts/l/iesc112.pdf

5. http://science.sciencemag.org/content/245/4919/770.1.full.pdf

6. https://web.njit.edu/~vitaly/121/notes121.pdf

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART IV	Foundation - I	**24FCU01**	**ENVIRONMENTAL STUDIES**	24	2

Contact hours per week: 2

Year	Semester	Internal Marks	External Marks	Total Marks
I	**I**	**50**	**-**	**50**

PREAMBLE:

To bring about an awareness of a variety of environmental concerns and to create a pro-environmental attitude and a behavioral pattern in society that is based on creating sustainable lifestyle

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Define environment, ecosystem, biodiversity, environmental pollution and social issues.	K1
CO2	Explain the natural resources, types of ecosystem, geographical classification of India, causes of environmental pollution and the problems related to the society.	K2
CO3	Identify the information related to environment and the resources to protect it.	K3
CO4	Analyze the classification of natural resources, energy flow in the ecosystem, threats to biodiversity, disaster management and the role of information technology in environment and human health.	K4
CO5	Assess the environmental issues with a focus on sustainability.	K5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	1	3
CO3	9	9	9	9	1	1	3
CO4	9	9	9	9	1	1	3
CO5	9	9	3	3	1	1	3
Total Contribution of COs to POs	45	45	39	39	9	7	15
Weighted Percentage of COs contribution to POs	2.58	2.83	2.63	2.85	1.06	0.92	2.20

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT – I   (4 Hours)

Multidisciplinary Nature of Environmental Studies:

Environment: Definition, Components, Segments and Types. **Natural Resources:** Meaning, Components: (1. **Forest**-Meaning, Importance and Types 2. **Water** - Meaning, Types and Problems 3. **Mineral**- Meaning and Classification 4.**Food**-Meaning and Problems 5.**Energy**-Meaning, Forms and Types 6.**Land**- Meaning, Structure and Functions, Components), **Classification**: Renewable and Non-Renewable Resources, Role of an Individual in Conservation of Natural Resources.

UNIT II   (5 Hours)

Ecosystems – Definition, Features, Structure and Function of an Ecosystem, Producers, Consumers and Decomposers, Energy Flow in the Ecosystem (Water, Carbon, Nitrogen, Oxygen and Energy), Food Chains, Food Webs and Ecological Pyramids

Introduction Types, Characteristics Features, Structure and Function of the following Ecosystem:

* Forest Ecosystem
* Grassland Ecosystem
* Desert Ecosystem
* Aquatic Ecosystems (Ponds, Streams, Lakes, Rivers, Ocean, Estuaries)

UNIT III   (5 Hours)

Biodiversity and its Conservation-Introduction – Definition – Genetic, Species and Ecosystem Diversity, Bio geographical Classification of India -Value of Biodiversity – Consumptive Use, Productive Use, Social, Ethical, Aesthetic and Option Value- Biodiversity at Global, National and Local Levels- India as a Mega-Diversity Nation- Hot-Spots of Biodiversity- Threats to Biodiversity – Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts- Endangered and Endemic Species of India Conservation of Biodiversity – In-situ and Ex-situ and Conservation of Biodiversity.

UNIT IV   (5 Hours)

Environmental Pollution: Definition, Causes, Effects, control measures and Prevention Acts for Air, Water, Soil, Noise, Thermal Pollutions and Nuclear Hazards. **Solid Waste Management**: Meaning, Causes, effects and control measures of urban andindustrial wastes.**Disaster Management**: Meaning, Types of Disasters: floods, earthquake, cyclone and landslides.**Environmental Ethics:** Issues and possible solutions- Climate change, global warming, acid rain, ozone layer depletion, nuclear - accidents and holocaust. Consumerism and waste products, Public Awareness.

UNIT V   (5 Hours)

Social Issues and the Environment: From Unsustainable to Sustainable development- Urban problems related to energy- Water conservation, rain water harvesting, watershed management- Resettlement and rehabilitation of people; its problems and concerns.

Human Population and the Environment: Population growth and distribution- Population explosion – Family Welfare Programme-Environment and human health- HIV/AIDS- Role of Information Technology in Environment and human health- Medical transcription and bio-informatics.

REFERENCE

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.

2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad

3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p

4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)

5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001,

6. Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p

7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

8. Down to Earth, Centre for Science and Environment (R)

9. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev.,

10. Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p

11. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural

12. History Society, Bombay (R)

13. Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment,Cambridge   Univ. Press 1140p.

14. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws, Himalaya Pub. House, Delhi 284 p.

15. Mckinney, M.L. & School, R.M. 1996. Environmental Science systems &Solutions, Web enhanced edition. 639p.

16. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)

17. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)

18. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p

19. Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ.Co. Pvt. Ltd. 345p.

20. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut

21. Survey of the Environment, The Hindu (M)

22. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, BlackwellScience (TB)

SEMESTER – II

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credit
Part : I	Language: II	**24LTU02**	**TAMIL - II**	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
I	**II**	**25**	**75**	**100**

முகப்புரை:

நீதி இலக்கியம் சார்ந்த நூல்களைப் படிப்பதன் மூலம் வாழ்வில் அற உணர்வினைப் பெறுவர்.

COURSE OUTCOME:

இதனைக் கற்பதன் மூலம் கீழ்க்காணும் நிலையை அடைவர்.

COs	CO Statement	Knowledge Level
CO1	அறஇலக்கிய வகைமைகளை அறிந்து கொள்ளுதல்.	K1
CO2	அறஇலக்கியங்கள் வழிகாட்டும் ஒழுக்கங்களைக் கற்றல்.	K2
CO3	மனித நேய மாண்புடன் விளங்குதல்.	K3
CO4	இலக்கியங்களுக்கிடையே உள்ள உறவு நிலைகளைத் தொடர்புப்படுத்துதல்.	K4
CO5	சுற்றுச்சூழல் குறித்த விழிப்புணர்வைக் கொண்டு சமூகத்தை மதிப்பிடல்.	K5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	3	3	9	9	9	3
CO3	9	9	9	3	9	3	3
CO4	9	9	9	9	3	3	3
CO5	9	3	9	3	3	3	3
Total contribution of COs to POs Weightage	45	33	39	33	33	27	21
Weight Percentage of COs contribution to POs	**2.29**	**2.09**	**2.46**	**2.10**	**2.74**	**2.22**	**1.94**

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

அலகு - 1 அறநூல்கள்   10 மணி

1. திருக்குறள் - அ) இன்னா செய்யாமை (1-10)
                   ஆ) சொல்வன்மை (1-10)
2. நாலடியார் - அ) கல்வி (1-10)
                   ஆ) நட்பாராய்தல் (1-10)
3. நன்னெறி - 10 பாடல்கள் (4,5,8,9,11,15,16,18,19,24)

அலகு - 2 தனிப்பாடல் திரட்டு   10 மணி

1. அருணாச்சலக் கவிராயர் - 'வெண்ணெயுற்று நெய்தேட்...'
2. அவ்வையார் - 'வான்குருவியின் கூடு...'
                   'சித்திரமும் கைப்பழக்கம்...'
                   'சொல்லாமலே பெரியர்...'
                   'கற்றது கைமண்ணளவு...'
                   'எட்டேகால் லட்சணமே...'
                   மதியாதார் முற்றம் மதித்து...'
3. காளமேகப் புலவர் - 'வாரிக்ககளத்து அடிக்கும்...'

அலகு - 3 உரைநடை   10 மணி

1. கைகேயி உள்ளம் - தீப.நடராஜன்
2. வியர்வையின் வெகுமதி - வெ.இறையன்பு
3. கோ.வை. கோதைநாயகி அம்மாள் - பைம்பொழில் மீரான்
4. நண்பரின் பண்பு - தமிழண்ணல்

அலகு- 4 -இலக்கணம்   8 மணி

சொல் வகைகள் - பெயர்ச்சொல் - இடுகுறிப்பெயர், காரணப்பெயர்

வினைச்சொல் - தெரிநிலை வினைமுற்று, ஏவல் வினைமுற்று, வியங்கோலள் வினைமுற்று, குறிப்பு வினைமுற்று, இடைச்சொல்லின் இலக்கணம் - வகைகள், உரிச்சொல்லின் இலக்கணம் - வகைகள்

அலகு- 5   இலக்கிய வரலாறு   10 மணி

1. பதினெண் கீழ்க்கணக்கு நூல்கள்
2. உரைநடையின் தோற்றமும் வளர்ச்சியும்
   பயிற்சிக்குரியன - மொழிபெயர்ப்பு (ஆங்கிலத்திலிருந்து தமிழில்)

பாடநூல்கள் :

1. ச.வே.சுப்பிரமணியன், இலக்கிய வரலாறு, மணிவாசகர் பதிப்பகம் 31, சிங்கர் தெரு பாரிமுனை, சென்னை 600 108
2. தண்டபாணி தனிப்பாடல் திரட்டு உரை (மூலமும் உரையும்), உமா பதிப்பகம், 58 ஐயப்ப செட்டி தெரு, மண்ணடி, சென்னை 600 001.
3. பேரா. முனைவர் மு.பெரி.மு.இராமசாமி, திருக்குறள், ஸ்ரீ இந்து பப்ளிகேஷன்ஸ், 40 பஞ்சால் சுப்பிரமணிய தெரு, சென்னை 600 017.
4. பேரா. மாணிக்கம், நாலடியார் தெளிவுரை, மணிவாசகர் பதிப்பகம், சென்னை 6 ஆம் பதிப்பு, ஆகஸ்ட் 2014.
5. கவிஞர் பத்மதேவன், நீதி நூல் களஞ்சியம், கொற்றவை வெளியீடு, 4/2 சுந்தரம் தெரு, சென்னை - 600017. முதற்பதிப்பு 2014
6. எளிய நடையில் தமிழ் இலக்கணம் - சுரா பதிப்பகம், அண்ணாநகர், சென்னை-40. முதற்பதிப்பு 2012.

பார்வை நூல்:

ச.வே.சுப்பிரமணியன், பதினெண் கீழ்க்கணக்கு நூல்கள் (மூலமும் தெளிவுரையும்) , மணிவாசகர் பதிப்பகம், 31 சிங்கர் தெரு, பாரிமுனை, சென்னை 600 108.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
Part – II	English: II	**24LEU02**	**ENGLISH - II**	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
I	**II**	**25**	**75**	**100**

PREAMBLE:

To make the students understand the various literary forms in English Literature.

COURSE OUTCOME:

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

COs	CO Statement	Knowledge Level
CO1	Recognize contextual meaning of the word.	**K1**
CO2	Communicate effectively using wider range of vocabulary.	**K2**
CO3	Apply their acquired knowledge to identify the sentence structure.	**K3**
CO4	Examine the themes and literary devices.	**K4**
CO5	Assess the passages for logical arrangement of sentences in a given text.	**K5**

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	3	3	3	3
CO2	9	3	3	3	1	1	1
CO3	3	3	3	1	1	1	1
CO4	3	1	1	1	1	1	1
CO5	1	1	1	1	1	0	0
Total contribution of COs to POs Weightage	25	17	17	9	7	6	6
Weight Percentage of COs contribution to POs	1.84	1.55	1.87	1.16	1.82	1.86	2.48

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

Course Content:

UNIT I: Poetry   (7 Hours)

1. Stopping by woods on a snowy evening - Robert Frost

2. How do I Love thee? - Elizabeth Barrett browning

3. Don'ts– D.H.Lawrence

UNIT II: Prose   (8 Hours)

1. Positive Thinking- Francie Baltazar-Schwartz

2. The Last Cab Ride- Kent Nerburn

3. Toasted English – R.K.Narayan

UNIT III: Short Stories   (9 Hours)

1. The Postmaster - Rabindranath Tagore

2. Springtime- O.Henry

3. The Lady, or the Tiger? - Frank R. Stockton

UNIT IV: One-Act Play   (10 Hours)

1. The Death Trap – Saki

2. **Moonshine -** Arthur Hopkins

UNIT V: Grammar and Composition   (14 Hours)

1. Tenses

2. Articles

3. Letter Writing

TEXT BOOKS: SEVENTH SENSE

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE- IV	**24MAU04**	**ANALYTICAL GEOMETRY**	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
I	**II**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn and visualize the fundamental ideas about conic, straight line, Sphere, cone, cylinder and conicoid.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Recall the definitions based on conic, Straight line, Sphere, cone, cylinder and conicoid.	K_1
CO2	express the concepts of conic, Straight line, Sphere, cone, cylinder and conicoid.	K_2
CO3	Apply the various concepts of straight lines, conic, sphere, cone, cylinder and conicoid to determine the respective equations.	K_3
CO4	Analyze the concepts of two dimensional and three dimensional Analytical Geometry.	K_4
CO5	Evaluate the equation of a conic, sphere, cone, cylinder and shortest distance between two straight lines.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COS-POS MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	3	3
CO3	9	9	9	9	3	3	3
CO4	9	3	3	3	3	3	3
CO5	3	3	3	3	1	1	1
Total Contribution of COs to POs	39	33	33	33	13	13	13
Weighted Percentage of COs contribution to POs	2.24	2.08	2.23	2.41	1.53	1.71	1.90

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation; 9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   **CONIC**   **(15 Hours)**

Polar coordinates equation of a conic - Directrix-Chord- Tangent-Normal- Simple problems.

UNIT - II   **STRAIGHT LINES**   **(15 Hours)**

Straight lines - Coplanarity of straight-line-Shortest Distance (S.D) and equation of S.D between two lines-Simple problems.

UNIT - III SPHERE   **(15 Hours)**

Sphere-Standard equation of sphere-Results based on the properties of a sphere-Tangent plane to a sphere- Equation of a circle.

UNIT - IV   **CONE AND CYLINDER**   **(15 Hours)**

Cone whose vertex is at the origin- Envelope cone of a sphere - Right circular cone-Equation of a cylinder- Right circular cylinder.

UNIT - V   **CONICOIDS**   **(12 Hours)**

Nature of a conicoid- Standard equation of central conicoid –Enveloping cone tangent
Plane- Condition for tangency – Director Sphere.

TEXT BOOKS

1. Manickavasagam Pillai.T. K. and Natarajan.T, (2016) - ''Analytical Geometry of 2D'' ,
   S. Viswanathan Printers and Publishers Pvt. Ltd, Chennai.
2. Manickavasagam Pillai.T. K. and Natarajan.T, (2016) - ''Analytical Geometry of 3D'' ,
   S. Viswanathan Printers and Publishers Pvt. Ltd, Chennai.

UNIT	BOOK	CHAPTER	PAGE NUMBER
Unit - I	Book - 1	Chapter 9	**Page: 325-330 Results without proof and Page 331-363**
Unit – II	Book –2	Chapter 3	**Page: 46- 71**
Unit – III	Book - 2	Chapter 4	**Page: 92 – 110**
Unit – IV	Book - 2	Chapter 5	**Page: 115 – 138**
Unit - V	Book - 2	Chapter 5	**Page: 141 – 160**

REFERENCE BOOK

Bali.N.P. (1991) – ''Solid Geometry'', Laxmi Publications (P) Ltd.

WEB RESOURCES:

1. http://www.brainkart.com/article/Three-Dimensional-Analytical-Geometry_6453/

2. http://egyankosh.ac.in/bitstream/123456789/11990/1/Unit-2.pdf

3. https://en.wikipedia.org/wiki/Analytic_geometry

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE - V	**24MAU05**	**INTEGRAL CALCULUS**	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
I	**II**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn and gain knowledge about integration.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic definitions of Integration	K_1
CO2	explain the integration of rational, irrational, trigonometric and Improper integrals	K_2
CO3	apply various integral formulae to solve rational, irrational, trigonometric and Improper integrals	K_3
CO4	analyze the properties of Methods of integration, integration of rational-irrational- trigonometric functions, Beta and Gama functions and convergence/divergence of integrals	K_4
CO5	evaluate double and triple integrals by using Methods of integration, Integration of rational- irrational- trigonometric functions and Improper integrals.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	3
CO2	9	9	9	9	9	9	3
CO3	9	9	9	9	3	3	1
CO4	9	9	9	9	1	1	1
CO5	9	9	3	3	0	0	0
Total Contribution of COs to POs	45	45	39	39	22	22	8
Weighted Percentage of COs contribution to POs	2.58	2.83	2.63	2.85	2.59	2.89	1.17

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   METHODS OF INTEGRATION   (15 Hours)

Methods of integration – Integration by substitution – Three important deduction of substitution – Six important integrals – Integration of some important forms – Integration by parts of a product – Extension of the rule of integration by parts.

UNIT - II   INTEGRATION OF RATIONAL FUNCTION   (15 Hours)

Introduction – Linear non-repeated factors only in the denominator – Linear repeated factors only in the denominator – Quadratic non-repeated factors only in the denominator – Quadratic repeated factors only in the denominator – Integration without breaking into partial fraction – Integrand consisting of even power of x only – Integration of algebric rational functions by substdxitution2 - Integration of algebric rational functions of e^x.

UNIT - III   INTEGRATION OF IRRATIONAL FUNCTIONS   (15 Hours)

Integration of rational function of $(ax+b)^{1/n}$ - Integrals of the type (i) $\int \sqrt{(ax^2+bx+c)}dx$ (ii) $\int (px+q)\sqrt{(ax^2+bx+c)}dx$ - Integrals of the type (i) $\int \frac{dx}{\sqrt{(ax^2+bx+c)}}$ (ii) $\int \frac{px+q}{\sqrt{(ax^2+bx+c)}}dx$ - Integration of $\int \frac{dx}{(px+q)\sqrt{(ax+b)}}$, $\int \frac{dx}{(px^2+qx+r)\sqrt{(ax+b)}}$, $\int \frac{dx}{(px+q)\sqrt{(ax^2+bx+c)}}$, $\int \frac{dx}{(px^2+qx+r)\sqrt{(ax^2+bx+c)}}$, $\int x^p (a+bx^n)^q dx$.

UNIT - IV   INTEGRATION OF TRIGONOMETRIC FUNCTIONS   (15 Hours)

Integration of - $\sin^n x$, n>0 – $\cos^n x$, n>0 – $\tan^n x$ and $\cot^n x$, n>0 – $\sec^n x$, $\operatorname{cosec}^n x$, x>0 - $\sin^p x \cos^q x$, p>0, q>0 – Integration $\sin^p x \cos^q x$, when p+q is a negative even integer.

UNIT - V   IMPROPER INTEGRALS   (12 Hours)

Beta and Gamma integrals-their properties, relation between them-Evaluation of multiple integrals using Beta and Gamma functions.

***Introduction to Industry 4.0** – Needs – Reasons for Adopting Industry 4.0 – Definition – Goals and Design Principles – Technologies of Industry 4.0 - Skills required for Industry 4.0.*

TEXT BOOK

i) Mohanty R.K (2014) – "Integral Calculus" – ANMOL Publications Pvt ltd.

ii) Narayanan.S. and Manicavachasam Pillai.T.K (2017) – "Calculus vol 2"- Viswanathan Publishers.

iii) P. Kaliraj, T. Devi – "Higher Education for Industry 4.0 and Transformation to Education 5.0".

BOOK	UNIT	CHAPTER	PAGE NUMBER
Book I	Unit - I	Chapter 1	Page: 1 - 57
Book I	Unit – II	Chapter 2	Page: 59 - 81
Book I	Unit –III	Chapter 3	Page: 86 – 122
Book I	Unit -IV	Chapter 4	Page: 124-165
Book II	Unit – V	Chapter 7	Page: 278-300

REFERENCE BOOK

Kandasamy. P & Thilagavathy (2004) - "Mathematics for B.Sc. –Vol I and. II", S.Chand and Co.

WEB REFERENCES:

1. https://www.slideshare.net/FarzadJavidanrad/integral-calculus-43522803V

2. https://www.youtube.com/watch?v=o75AqTInKDU

3. https://www.youtube.com/watch?v=bzIrspIDYIs

4. https://hapticmedia.com/blog/industry-4.0/

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
Part – III	Allied	**24MAU06**	**PHYSICS – II**	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
I	II	25	75	100

PREAMBLE: To provide the theoretical basis for the understanding of physical measurement methods and to understand the optical, nuclear and electronic properties of solids

COURSE OUTCOME: After completion of the course, the learners will be able to

COs	Course Statement	Knowledge Level
CO1	Remember the basic concepts in Matter waves, Nuclear forces, principles of lasers, Semiconductor devices, Number system	**K1**
CO2	Explain the fundamentals of De Broglie's matter wave, Binding energy, conditions for laser actions, characteristics of Semi-conductors, laws of Boolean algebra	**K2**
CO3	Discuss the working techniques of photoelectric cells, logic gate circuits, Semiconductor devices	**K3**
CO4	Determine the concepts of photoelectric equation, Nuclear structure, Raman effect	**K4**
CO5	Estimate the Particle accelerator, Lasers, Rectifiers circuits, various semiconductor devices	**K5**

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	3
CO3	9	9	9	3	9	3	3
CO4	9	3	3	3	3	3	1
CO5	9	3	3	1	3	3	1
Total Contribution of COs to POs	45	33	33	31	33	27	17
Weighted Percentage of COs Contribution to POs	2.31	1.78	2.00	2.01	3.69	3.02	2.31

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and Pos

COURSE CONTENT

UNIT- I (12 Hours)

Modern physics: Einstein's photo electric equation – verification of Einstein's photo electric equation by Millikan's experiment – photo electric cells – applications

Wave mechanics: De Broglie concept of matter waves – Calculation of De Broglie wave length - Study of De Broglie matter wave by G.P.Thomson experiment

UNIT- II (12 Hours)

Nuclear physics: Nuclear forces – nuclear structure by liquid drop model – Binding energy –mass defect – particle accelerators – cyclotron – nuclear Fission and nuclearFusion – Nuclear Fission reactors – introduction to elementary particles – Leptons, Mesons and Baryons

UNIT- III (12 Hours)

Laser physics: Principles of laser – population inversion – Meta stable state – Spontaneous and Stimulated Emission – conditions for laser actions – Ruby Laser – Helium – neon laser – applications of lasers – Raman Effect – Raman shift– stoke and anti stokes lines

UNIT- IV (12 Hours)

Semiconductor Devices: Semi conductors – Energy band in Solids – Types of Semi conductors – PN junction Diode – Volt–Ampere Characteristics – Zener diode – Volt–Ampere Characteristics – Rectifiers – Half wave rectifier – Bridge Rectifier

UNIT- V (12 Hours)

Digital Electronics: Number systems - Binary system - Addition - Subtraction - Complement method of Subtraction-Multiplication - Division - Binary-to-decimal and decimal-to-binary conversion - AND, OR, NOT gates - NAND and NOR as universal gates - Laws of Boolean algebra – Simplification of Boolean expressions - De Morgan's theorems

Text Books

1. Modern Physics – R. Murugesan, 2016, S.Chand& Company. Pvt. Ltd, New Delhi

2. Engineering physics–M. Arumugam, 1998, Anuradha Agencies, Educational Publishers

3. Laser Physics – Thiagaraja, 2013, Narosa Publishing House

4. Basic Electronics – B.L. Theraja, 2000, S. Chand & Company LTD, New Delhi

Web References

1. http://www.ifsc.usp.br/~lavfis/images/BDApostilas/ApEfFotoeletrico/The%20Photoelectric%20Effect%20-%20m213.pdf
2. http://www.sfu.ca/~mxchen/phys1021003/P102LN34.pdf
3. https://ehs.msu.edu › _assets › docs › laser › laser-fu...
4. https://schools.aglasem.com/ncert/ncert-books-class-12-physics-chapter-14/
5. https://www.shahucollegelatur.org.in/Department/Studymaterial/sci/it/BCA/FY/digielec.pdf

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
Part – III	Allied: Practical	**24MAU07**	**PHYSICS Practical**	72	4

Contact hours per week: 3+3

Year	Semester	Internal Marks	External Marks	Total Marks
I	I & II	50	50	100

PREAMBLE: The aim of the course is to develop practical skills in mechanical, electrical, heat and optics experiments

COURSE OUTCOME: After completion of the course, the learners will be able to

COs	Course Statement	Knowledge Level
CO1	Identify the basic principle and working of Pendulum, Spectrometer, Potentiometer	**K1**
CO2	Demonstrate the construction and working model of different experiments	**K2**
CO3	Use the mathematical formulas to calculate the quantitative results obtained from various experiments	**K3**
CO4	Evaluate the different set of values from the experiments	**K4**
CO5	Interpret the values obtained from performed experiments	**K5**

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs \ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	3	3
CO2	9	9	9	9	9	3	3
CO3	9	9	9	3	9	3	3
CO4	9	9	3	3	3	3	1
CO5	9	9	3	3	3	1	1
Total Contribution of COs to POs	45	45	33	27	33	13	11
Weighted Percentage of COs Contribution to POs	2.31	2.43	2.00	1.75	3.69	1.45	1.49

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and Pos

COURSE CONTENT
ANY TWELVE (12) EXPERIMENTS ONLY

1.   Acceleration due to gravity – Compound pendulum method

2.   Moment of inertia – Torsional pendulum method

3.   Young's modulus – Uniform bending – Optic lever method

4.   Young's modulus – Non-uniform bending – Pin and microscope

5.   Rigidity modulus – Static torsion method

6.   Frequency of A.C - Sonometer

7.   Thermal conductivity – Lee's disc method

8.   Refractive index of a liquid prism - Spectrometer

9.   Refractive index of a liquid prism - Spectrometer

10. (i-d) curve-solid prism - Spectrometer

11. Wavelengths of spectral lines – Grating – Normal incidence - Spectrometer

12. Wavelength of spectral lines – Grating – Minimum deviation – Spectrometer

13. Radius of curvature of lens – Newton's rings method

14. Viscosity of highly viscous liquid – Stoke's method

15. Surface tension – Drop weight method

16. Low range voltmeter calibration - potentiometer

17. Low range ammeter calibration - Potentiometer

18. Construction of IC regulated power supply

19. Chcracteristics of Pn junction diode

20. Characterstics of Zener diode

21. Construction of Hartley oscillator

22. Construction of Colpitt's oscillator

23. Verification of truth tables of logic gate

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
Part IV	Foundation - II	**24FCU02**	**YOGA AND ETHICS**	24	2

Contact hours per week: 2

Year	Semester	Internal Marks	External Marks	Total Marks
I	**II**	**50**	**-**	**50**

PREAMBLE:

To enable the learners to acquire the knowledge on basic yogasanas and values and practice them in real life.

COURSE OUTCOME:

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

CO'S	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recollect the basic terminologies in yoga and value education	K1
CO2	demonstrate the importance of yoga, mental exercises, principles of life and components of values.	K2
CO3	apply the techniques of dynamic & mental exercises and philosophical values in real life	K3
CO4	classify the different types of asanas, stages of mind, analysis of thought, ethical values and social values.	K4
CO5	evaluate how the yoga and value education make a person strong both physically and mentally	K5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	3	1	1	3
CO2	9	9	9	3	3	1	3
CO3	9	9	9	3	3	3	3
CO4	9	9	9	3	3	3	3
CO5	9	9	9	3	3	3	3
Total Contribution of COs to POs	45	45	45	15	13	11	15
Weighted Percentage of COs contribution to POs	2.58	2.83	3.04	1.10	1.53	1.45	2.20

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT – I	YOGA AND HEALTH	(5 Hours)

Theory:

Yoga-Meaning- Importance of Yoga – Pancha Koshas - Benefits of Yoga-General Guidelines.

Practice:

Dynamic Exercise- Surya Namaskar-Basic Set of Asanas-Pranayama & Kriya.

UNIT - II	ART OF NURTURING THE MIND	(5 Hours)

Theory:

Ten Stages of Mind-Mental Frequency – Methods for Concentration

Eradication of Worries- Benefits of Blessings- Greatness of Friendship- Individual Peace and World Peace

Practice: - Worksheet

UNIT - III	PHILOSOPHY AND PRINCIPLES OF LIFE	(5 Hours)

Purpose and Philosophy of Life- Introspection – Analysis of Thought - Moralization of Desires- Neutralization of Anger.

Vigilance and Anti- Corruption- Redressal mechanism - Urban planning and Administration.

Practice - Worksheet

UNIT - IV	VALUE EDUCATION (Part-I)	(5 Hours)

Ethical Values: Meaning – Need and Significance- Types - Value education – Aim of education and value education

Components of value education: Individual values – Self discipline, Self Confidence, Self Initiative, Empathy, Compassion, Forgiveness, Honesty, Sacrifice, Sincerity, Self-control, Tolerance and Courage.

Practice - Worksheet

UNIT V	VALUE EDUCATION (Part-II)	(4 Hours)

Family Values

Constitutional or National values – Democracy, Socialism, Secularism, Equality, Justice, Liberty, Freedom and Fraternity.

Social values – Pity and probity, self control, universal brotherhood.

Professional values – Knowledge thirst, sincerity in profession, regularity, punctuality and faith.

Religious values – Tolerance, wisdom, character.

Practice - Worksheet

Reference Books:

1. Vethathiri Maharishi (2015), 'Yoga for human excellence'- Sri Vethathiri Publications.

2. Value Education for human excellence- study material by Bharathiar University.

3. Value Education - Study Material by P.K.R Arts College for Women.

SEMESTER – III

Category	Component	Course Code	Course Title	Contact Hours /Semester	Credit
Part : I	Language : III	**24LTU03**	**TAMIL - III**	48	3

Contact hours per week : 4

Year	Semester	Internal marks	External marks	Total Marks
II	**III**	**25**	**75**	**100**

முகப்புரை:

காப்பியங்கள் , நவீன இலக்கியம் மற்றும் அணியிலக்கணம் குறித்து அறிவர்.

COURSE OUTCOME:

பொதுத்தமிழ் கற்பதன் மூலம் கீழ்க்காணும் பயிற்யினை பெறுவர்.

COs	CO Statement	Knowledge Level
CO1	காப்பியங்கள் உணர்த்தும் அன்பு நெறியை உணர்தல்	K1
CO2	நவீன இலக்கியங்களின் தன்மைகளைப் புரிந்து கொள்ளுதல்.	K2
CO3	அணி இலக்கணம் கற்று கொள்வதன் வாயிலாக படைப்பாளுமையை வளர்த்தல்.	K3
CO4	இலக்கணங்களைப் பயில்வதன் மூலம் இலக்கணங்களை உருவாக்க முடியும்.	K4
CO5	காப்பியங்கள் வாயிலாக பெண் கதாபாத்திரத்தைத் திறனாய்தல்.	K5

K1: Remember Level, K2: Understand Level, K3: Apply Level, K4: Analyze Level, K5: Evaluate Level

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	3
CO2	3	9	9	9	9	9	9
CO3	9	9	3	9	9	3	9
CO4	9	9	9	9	3	3	3
CO5	9	3	9	9	9	3	3
Total contribution of COs to POs Weightage	39	39	39	45	33	27	27
Weight Percentage of COs contribution to POs	**1.98**	**2.47**	**2.46**	**2.87**	**2.74**	**2.22**	**2.49**

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

அலகு— 1 காப்பியங்கள்   10 மணி

சிலப்பதிகாரம் - ஊர்சூழ் வரி (75 வரிகள்)

இயேசுகாவியம் - பாரச்சிலுவை,தாயும் சேயும்,கசிந்தநெஞ்சங்கள்.

சீறாப்புராணம் - மானுக்குப் பினைநின்றபடலம்.

அலகு— 2 புராணம்   10 மணி

கம்பராமாயணம் - கைகேயி சூழ்வினைப்படலம் (40 பாடல்கள்)

பெரியபுராணம் - காரைக்கால் அம்மையார் புராணம் (66 பாடல்கள்)

அலகு— 3 நாவல்   10 மணி

வாடிவாசல் - சி.சு.செல்லப்பா

அலகு— 4 இலக்கணம்   10 மணி

அணி இலக்கணம்

உவமையணி—எடுத்துக்காட்டுஉவமையணி—வஞ்சப் புகழ்ச்சியணி—சொற்பொருள் பின்வருநிலையயணி—தீவகயணி.

அலகு— 5 இலக்கிய வரலாறு   8 மணி

புதினத்தின் தோற்றமும் வளர்ச்சியும்,

காப்பியங்களின் தோற்றமும் வளர்ச்சியும் (ஐம்பெருங்காப்பியங்கள்,ஐஞ்சிறுங்காப்பியங்கள்)

பொதுக்கட்டுரை.

பாடநூல்கள்:

1. ந.மு.வேங்கடசாமிநாட்டார் - சிலப்பதிகாரம் - ராமையாபதிப்பகம்,சென்னை - 600 014.

2. ந.மு. வேங்கடசாமிநாட்டார்,ஒளவை சு. துரைசாமிப்பிள்ளை - மணிமேகலை - சாரதாபதிப்பகம், ஜி-4,சாந்திஅடுக்ககம்,ராயப்பேட்டை,சென்னை.

3. உமறுப்புலவர்,சீறாப்புராணம்,முல்லைநிலையம், 9,பாரதிநகர்,தி.நகர்,சென்னை. முதற்பதிப்பு -2009.

4. வ.த.இராமசுப்பிரமணியம் - பெரியபுராணம்,திருமகள் நிலையம்,தி.நகர்,சென்னை.

5. வாடிவாசல் - சி.சு.செல்லப்பா,காலச்சுவடுபதிப்பகம்,பதிப்பு 2009, 669,கே.பி.ரோடு,நாகர்கோவில்

பார்வை நூல்:

1. தமிழ் இலக்கியவரலாறு—பேரா.மது.ச.விமலானந்தம்,முல்லைநிலையம், 9,பாரதிநகர்,- முதல் தெரு,தி.நகர்,சென்னை - 17

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
Part – II	English :III	**24LEU03**	**ENGLISH - III**	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
II	**III**	**25**	**75**	**100**

PREAMBLE:

To cater the most required LSRW skills in students along with bridging the gap among perception,

communication and practice of the English Language.

COURSE OUTCOME :

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

COs	CO Statement	Knowledge Level
CO1	Recognize the genres in literature.	**K1**
CO2	Explain the literary devices and themes used in the works.	**K2**
CO3	Make oral presentation on any given situation.	**K3**
CO4	Examine the sentence structure and types of advertisements.	**K4**
CO5	Assess the situations and concepts to construct dialogues and slogans.	**K5**

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	3	3	3	3
CO2	9	9	3	3	3	1	1
CO3	9	3	3	1	1	1	1
CO4	3	3	1	1	1	1	0
CO5	3	3	1	1	0	0	0
Total contribution of COs to POs	33	27	17	9	8	6	5
Weight Percentage of COs contribution to POs	2.42	2.45	1.87	1.16	2.08	1.86	2.07

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

Course Content

UNIT I: POETRY   **(9 Hours)**

1. The Highwayman - Alfred Noyes

2. Do Not Go Gentle into That Good Night **-** Dylan Thomas

3. A Different History - Sujata Bhatt

UNIT II: PROSE   **(9 Hours)**

1. Tree Speaks - C.Rajagopalachary

2. Third thoughts – E.V.Lucas

3. On the Rule of the Road – A.G.Gardiner

UNIT III: SHORT STORIES   **(9 Hours)**

1. The Monkey' Paw – W.W.Jacobs

2. The Thief's Story - Ruskin Bond

3. A Hero- R.K.Narayan

UNIT IV: ONE-ACT PLAY   **(8 Hours)**

1. Mother's Day – J.B.Priestly

2. The Proposal – Anton Checkhov

UNIT V: GRAMMAR AND COMPOSITION   **(13 Hours)**

1. Concord

2. Dialogue writing

3. E-Mail writing

TEXT BOOK: LILACS

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE - VIII	**24MAU08**	**DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS**	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
II	**III**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn the method of solving Differential Equations and Laplace Transforms.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic concepts of ordinary, partial, linear differential equations and Laplace transforms.	K_1
CO2	identify the solutions of ordinary, partial differential equations, Laplace and inverse Laplace transformations.	K_2
CO3	apply Clairaut's form, Laplace and inverse Laplace transforms, direct integration to solve Differential Equations.	K_3
CO4	analyze the difference between Laplace and inverse Laplace transforms, ordinary and partial differential equations.	K_4
CO5	evaluate the solutions for ordinary, partial, linear differential equations and Laplace transforms.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	3	3
CO3	9	9	9	9	3	3	3
CO4	9	9	9	9	3	3	3
CO5	9	9	9	9	3	3	3
Total Contribution of COs to POs	45	45	45	45	15	15	15
Weighted Percentage of COs contribution to POs	2.58	2.83	3.04	3.29	1.76	1.97	2.20

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I **ORDINARY DIFFERENTIAL EQUATIONS** **(15 Hours)**

Equations of I Order and of Degree Higher than one – Solvable for p, x, y – Clairaut's Equation.

UNIT – II **LINEAR DIFFERENTIAL EQUATIONS** **(15 Hours)**

Finding the solution of II and higher order with constant coefficients with Right Hand Side is of the form Ve^{ax} where V is a function of x.

UNIT - III **PARTIAL DIFFERENTIAL EQUATIONS** **(15 Hours)**

Formation of equations by eliminating arbitrary constants and arbitrary functions – Solutions of P.D Equations – Solutions of Partial Differential Equations by direct integration – Methods to solve the I order P.D. Equations in the standard forms - Lagrange's Linear Equations.

UNIT - IV **LAPLACE TRANSFORMS** **(15 Hours)**

Definition – Laplace Transforms of standard functions – Linearity property – I Shifting Theorem – Transform of $tf(t)$, $\frac{f(t)}{t}$.

UNIT - V **INVERSE LAPLACE TRANSFORMS** **(12 Hours)**

Inverse Laplace Transforms – Applications to solutions of I Order and II Order Differential Equations with constant coefficients.

TEXTBOOK

Kandasamy. P, Thilagavathi. K (2004) "Mathematics for B.Sc. – Volume III", S. Chand and Company Ltd, New Delhi.

UNIT	CHAPTER	PAGE NUMBER
Unit - I	Chapter 1	Page: 1-15
Unit – II	Chapter 2,4,5	Page: 16-40
Unit - III	Chapter 1	Page: 117 – 143, 150 – 162
Unit - IV	Chapter 1	Page: 187-201
Unit - V	Chapter 1	Page: 202-236

REFERENCE BOOK

Narayanan. S and Manicavachagam Pillai. T. K.(1996) - "Differential Equations", S. Viswanathan (Printers and Publishers) Pvt. Ltd, Chennai.

WEB RESOURCES:
1. http://www.nptelvideos.in/2012/11/mathematics-iii.html
2. https://www.digimat.in/nptel/courses/video/111108081/L02.html
3. https://www.ijsr.net/archive/v2i1/ijsron2013331.pdf
4. https://www.whitman.edu/mathematics/calculus_online/chapter17.html

Category	Course Type	Course Code	Course Title	Contact Hours	Credit
PART III	CORE - IX	24MAU09	TRIGONOMETRY, VECTOR CALCULUS AND FOURIER SERIES	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
II	III	25	75	100

PREAMBLE:

To enable the students to gain knowledge about expansion in series of trigonometric functions and its applications, vector field and Fourier series.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic concepts of cosines and sines of multiples of θ, logarithmic of complex quantity, scalar and vector fields, integration of vectors and periodic functions	K_1
CO2	illustrate the concepts of summation of series using binomial, exponential and logarithmic series theorem, differentiation of vectors, line integral and surface integral and Fourier series of periodicity 2π	K_2
CO3	apply C+ iS method, Green's theorem, Gauss divergence theorem, Stoke's theorem and Half range series for finding summation of series and values of integrals.	K_3
CO4	analyze the relation between trigonometric series and hyperbolic series, Grogory's series and gradient, divergent, curl, also Gauss theorem and Stoke's theorem, even and odd function	K_4
CO5	evaluate the integrals using Gauss divergence theorem, Stoke's theorem and Fourier series of periodicity 2π using Dirichlet conditions	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	3	3
CO3	9	9	9	3	3	3	3
CO4	9	3	3	3	1	0	0
CO5	3	3	3	1	0	0	0
Total Contribution of COs to POs	39	33	33	25	10	9	9
Weighted Percentage of COs contribution to POs	2.24	2.08	2.23	1.83	1.18	1.18	1.32

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation; 9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   **EXPANSION IN SERIES**   **(15 Hours)**

Expansion in Series – Expansion of $\cos^n\theta$, $\sin^n\theta$, in a series of cosines and sines of multiples of θ– Expansions of $\cos n\theta$ and $\sin n\theta$ in powers of sines and cosines – Expansion of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in powers of θ.

UNIT - II   **SUMMATION OF SERIES**   **(15 Hours)**

Logarithm of complex quantities - Summation of series – C + iS method of summation-Exponential series-Trigonometric and Hyperbolic series- Gregory's series.

UNIT – III   **DIFFERENTIATION OF VECTORS**   **(15 Hours)**

Scalar and vector fields –Differentiation of vectors – Gradient, Divergence and Curl.

UNIT - IV   **INTEGRATION OF VECTORS**   **(15 Hours)**

Integration of vectors – Line integral – Surface integral – Green's theorem in the plane – Gauss divergence theorem – Strokes theorem – (Statements only) - Verification of the above said theorems.

UNIT – V   **FOURIER SERIES**   **(12 Hours)**

Periodic functions – Fourier series of periodicity 2π – Even and Odd functions - Half range series.

TEXT BOOK:

     Kandasamy. P, Thilagavathi. K - "Mathematics for B.Sc. Branch I", Volume I, II (2104) and Volume IV (2105), S.Chand and Company Ltd, New Delhi.

UNIT	VOLUME	CHAPTER	PAGE NUMBER
I	I	2	122 – 139
II	II	1	242 – 247
		2	248 – 276
III	IV	1	1-7
		2	8-23
IV	IV	3	24 – 92
V	IV	1	93-145

REFERENCE BOOKS:

1. Manichavasagam Pillai T.K and Narayanan S. (2112) -"Trigonometry", Viswanathan
   Publishers and Printers Pvt. Ltd.
2. Manichavasagam Pillai T.K and Narayanan S., Hanumantha Rao (2111) –
   "Ancillary Mathematics", Volume II, Viswanathan Publishersand Printers Pvt. Ltd.

WEB RESOURCES:

1. https://mathworld.wolfram.com/FourierSeries.html
2. https://math.libretexts.org/Bookshelves/Calculus/Book%3A_Vector_Calculus_(Corral)/04%3
A_Line_and_Surface_Integrals/4.06%3A_Gradient_Divergence_Curl_and_Laplacian
3. https://youtu.be/Gk70xiGQlw8

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE – X ALLIED - III	**24MAU10**	**STATISTICS**	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
II	**III**	**25**	**75**	**100**

PREAMBLE:

To enable the students to understand the basic concepts of probability, estimation, testing of hypothesis and distributions.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic definitions and notations of probability, distributions, estimation, test of hypothesis.	K_1
CO2	identify the concepts of probability, distribution functions, t, F and z distributions, methods of estimation, test of hypothesis and test of significance.	K_2
CO3	classify the distribution, method of estimation, test of hypothesis and test of significance.	K_3
CO4	examine the problems based on probability, t, F and z distributions, estimation, test of hypothesis and distribution function.	K_4
CO5	evaluate the problems on probability, t, F and z distributions, methods of estimation, distribution function and test of significance.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	3	3
CO3	9	9	9	9	3	3	3
CO4	9	9	9	9	3	3	3
CO5	9	9	3	3	3	3	3
Total Contribution of COs to POs	45	45	39	39	15	15	15
Weighted Percentage of COs contribution to POs	2.58	2.83	2.63	2.85	1.76	1.97	2.20

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   **PROBABILITY**   **(15 Hours)**

Addition and Multiplication theorem of probability– Conditional probability –Independent Events - Multiplication theorem of probability for Independent Events - Extension of Multiplication theorem of probability to n Events.

UNIT - II   RANDOM VARIABLES AND MATHEMATICAL EXPECTATION   **(15 Hours)**

Random variables - Discrete and continuous random variables - Distribution function - Properties - Probability mass function, probability density function - Simple problems. Mathematical Expectation: Addition and multiplication theorems on expectations - Moment generating function.

UNIT - III   **ESTIMATION AND METHODS OF ESTIMATION**   **(15 Hours)**

Consistency, unbiasedness, efficiency – Sufficiency(Simple theorems only) – Cramer Rao inequality - Simple problems. Methods of estimation : Method of maximum likelihood estimation- method of minimum variance-method of moments-method of least square.

UNIT - IV   **TEST OF HYPOTHESIS & TEST OF SIGNIFICANCE**   **(12 Hours)**

Type-I error and II errors - Power test – Standard error - Large sample: single proportion - difference proportion.

UNIT - V   **t, F and z DISTRIBUTIONS**   **(15 Hours)**

Introduction -Application of t and F distributions-relation between t and F distributions relation between t and χ^2 distributions- fisher's Z distribution.

TEXT BOOK:

1. Guptha, S.C & Kapoor, V.K.,(2017) - "Fundamentals of Mathematical statistics", Sultan chand & Sons.

UNIT	CHAPTER	SECTION	PAGE
I	III	3.9 - 3.14	3.30 - 3.46
II	V,VI, VII	5.1 - 5.4, 6.1 - 6.6 , 7.1	5.2-5.11, 6.1-6.10, 7.2-7.5
III	XVII	17.1-17.3,17.9-17.14	17.2-17.9,17.30-17.46
IV	XIV ,XVIII	14.3-14.7 ,18.1,18.2	14.5-14.23 ,18.2 – 18.6
V	XVI	16.3, 16.6-16.9	16.12 – 16.16, 16.36 – 16.42

REFERENCE BOOKS

1. Guptha C.B and Vijay Guptha (2008) "Introduction to Statistical methods", Vikas publishing house pvt Ltd.

2. Guptha S.P. (2014) "Statistical methods", Sultan Chand & Sons.

WEB REFERENCES:

1. https://stats.libretexts.org/Bookshelves/Introductory_Statistics/Book%3A_Introductory_Statistics_(Shafer_and_Zhang)/00%3A_Front_Matter/03%3A_Table_of_Contents

2. https://en.wikipedia.org/wiki/Statistics

3. https://dailymedicos.com/application-of-statistics-in-the-medical-field/

4. https://study.com/academy/lesson/application-of-statistics-in-daily-life.html

5. https://study.com/academy/lesson/application-of-statistics-in-business.html

Category	Course Type	Course Code	Course Title	Contact Hours	Credit
PART IV	ABILITY ENHANCEMENT - I	**24AEU01**	**INFORMATION SECURITY**	24	2

Contact hours per week: 2

Year	Semester	Internal Marks	External Marks	Total Marks
II	III	50	-	50

PREAMBLE:

To learn about the basics of Information Security.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Recall the fundamental concepts of Information Security, Risk and Security policies	K1
CO2	Discuss the concepts of Risks, vulnerabilities, ethical and privacy issues	K2
CO3	Apply the ideas in security planning and construct the policies	K3
CO4	Categorize the Privacy, Ethical Issues, Laws, Software Issues and Crimes	K4
CO5	Summarize Cryptography, cipher text and threats in information security	K5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	3	3
CO3	9	9	9	9	3	3	3
CO4	9	9	9	9	3	1	3
CO5	9	9	9	9	3	0	1
Total Contribution of COs to POs	45	45	45	45	27	16	19
Weighted Percentage of COs contribution to POs	2.58	2.83	3.04	3.29	3.17	2.11	2.78

**Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs**

COURSE CONTENT:

UNIT - I   **Introduction to Information Security**   **(5 Hours)**

Information Security: Principles, Concepts and Definitions - The need for Information Security - Benefits of Information Security. The Security Problem in Computing: The Meaning of Computer Security - Computer Criminals.

UNIT - II   **Information Risk**   **(4 Hours)**

Information Risk: Threats and Vulnerabilities of Information Systems – Introduction to Risk Management. Information Security Management Policy, Standards and Procedures.

UNIT - III   **Security Planning**   **(5 Hours)**

Administering Security: Security Planning - Security Planning Team Members - Assuring Commitment to a Security Plan - Business Continuity Plan - Incident Response Plan - Organizational Security Policies, Physical Security.

UNIT - IV   **Privacy and Ethical Issues in Information Security**   **(5 Hours)**

Legal Privacy and Ethical Issues in Information Security: Protecting Programs and Data - Information and the Law - Rights of Employees and Employers - Software Failures - Computer Crime - Ethical Issues in Information Security.

UNIT - V   **Cryptography**   **(5 Hours)**

Cryptography: Introduction to Cryptography -What is Cryptography – Plain Text – Cipher Text – Substitution Ciphers - Transposition Ciphers.

TEXT BOOK:

1. SumitraKisan and D.ChandrasekharRao,Information Security Lecture Notes, Departmentof Computer Science and Engineering & Information Technology, Veer SurendraSaiUniversity of Technology (Formerly UCE, Burla) Burla, Sambalpur, Odisha.

REFERENCE BOOK:

1. Andy Taylor (Editor), David Alexander, Amanda Finch & David Sutton, Information Security Management Principles An ISEB Certificate, The British ComputerSociety, 2008.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART IV	NON- MAJOR ELECTIVE	24NMU01A	INDIAN WOMEN AND SOCIETY	24	2

Contact hours per week: 2

Year	Semester	Internal Marks	External Marks	Total Marks
II	III	50	-	50

PREAMBLE:

To familiarize students with the specific cultural contexts of women in India

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	know women status in Indian society as an academic discipline	K1
CO2	interpret the various roles of women, challenges and issues faced by them in the society	K2
CO3	find out solutions to their legal issues and product themselves from the violence against women emphasize on women entrepreneurship for their empowerment	K3
CO4	critically analyze the lifestyle and challenges of women	K4
CO5	discuss the importance of women health and issues related to women in general	K5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	0	0	0
CO2	9	9	9	9	3	0	3
CO3	9	9	9	9	9	9	9
CO4	3	3	3	9	9	9	9
CO5	3	3	1	1	1	9	9
Total Contribution of COs to POs	33	33	31	37	22	27	30
Weighted Percentage of COs contribution to POs	1.90	2.08	2.09	2.70	2.59	3.55	4.39

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs
COURSE CONTENT:

UNIT - I   **Historical Background**   **(5 Hours)**

History of Women's status from Vedic times, Women's participation in India's Pre and Post Independence movement and Economic Independence, fundamental rights and importance of women in Modern Society

UNIT – II   **Role of Women (Challenges &Remedies)**   **(5 Hours)**

Women in Family, Agriculture, Education, Business, Media, Defense, Research and Development, Sports, Civil Services, Banking Services, Social Work, Politics and Law

UNIT - III   **Women and Health**   **(5 Hours)**

Women and health issues, Malnutrition, Factors leading to anemia, Reproductive maternal health and Infant mortality, Stress

UNIT – IV   **Issues of Women**   **(5 Hours)**

Women's issues, Dowry Related Harassment and Dowry Deaths, Gender based violence against women, Sexual harassment, Loopholes in Practice to control women issues

UNIT - V   **Women Empowerment**   **(4 Hours)**

Meaning, objectives, Problems and Issues of Women Empowerment, Factors leading to Women Empowerment, Role and Organization of National Commission for Women, Central and State Social Welfare Board for Women Empowerment, Reality of women empowerment in the era of globalization

Reference Books

CO's	Authors	Title	Publishers	Year of Publication
1	Mala Khullar	Writing the Women's Movement: A Reader	Zubaan	2005
2	IAWS	The State and the Women's Movement in India	IAWS, Delhi	1994
3	Kosambi,Meera	Crossing Thresholds: Feminist Essays in Social History	Permanent Black	2007
4	TRowbotham, Sheila	Hidden from History: Women's Oppression and the Fightagainst It	Pluto Press, London	1975
5	Susheela Mehta	Revolution and the Status of Women	Metropolitan Bookco.pvt ltd, New Delhi	1989

Category	Component	Course Code	Course Title	Contact Hours /Semester	Credit

Part: IV	Non- Major Elective	24NMU01B	அடிப்படைத் தமிழ் (Advanced Tamil)	24	1

Contact hours per week: 2

Year	Semester	Internal marks	External marks	Total Marks
II	III	50	-	100

முகப்புரை:

எழுத்துக்களின் வகைமைகள், சொற்றொடர் அமைப்பு, மாற்றம் குறித்து அறிந்து கொள்வர்.

COURSE OUTCOME

அடிப்படைத் தமிழ் கற்பதன் வாயிலாகக் கீழ்க்காணும் தன்மைகளை அறிவர்.

COs	CO Statement	Knowledge Level
CO1	தமிழ் மொழியின் அடிப்படைக் கூறுகளை அறிவர்.	K1,K2
CO2	எழுத்துக்களின் வகைமைகளைக் கற்பர்.	K3
CO3	சொற்பொருள் மாற்றங்களை அறிந்து பின்பற்றுவர்.	K3,K5
CO4	சொற்றொடர் அமைப்பினைப் பகுத்தாராய்வர்.	K4
CO5	தமிழ் மொழியின் மேன்மையை உணர்ந்து மதிப்பிடுவர்.	K5

K1: Remember Level, K2: Understand Level, K3: Apply Level, K4: Analyze Level, K5: Evaluate Level

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	3	3	9	3	9
CO2	9	9	9	3	3	3	3
CO3	9	9	9	9	3	9	3
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	9	3	9
Total Contribution of COs to POs	45	45	39	33	27	27	33
Weightage Percentage of COs contribution to POs	2.29	2.85	2.46	2.10	2.24	2.22	3.04

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

இளங்கலை 2021-22 கல்வியாண்டு முதல் சேர்வோர்க்குரியது

(12-ஆம் வகுப்பு வரை தமிழ் மொழிப்பாடம் பயிலாதவர்களுக்கு)

புற மதிப்பீட்டுத் தேர்வு மட்டும்

1. தமிழ் மொழியின் அடிப்படைக் கூறுகள்.

   எழுத்துகள்   : முதலெழுத்துகள் (உயிர் எழுத்து, மெய் எழுத்து, உயிர்மெய் எழுத்து)

   சொற்கள்   : பெயர்ச்சொல், வினைச்சொல், இடைச்சொல், உரிச்சொல்

   தொடர்   : தொடரமைப்பு (எழுவாய், செயப்படுபொருள், பயனிலை)

2. குறிப்பு எழுதுதல் : பத்துப் பதினைந்து தொடர்களில் குறிப்பு வரைதல்

   பிழைநீக்கி எழுதுதல் : (ஒற்றுப்பிழை, எழுத்துப்பிழை)

2021– 2022 கல்வியாண்டு முதல் பயில்பவர்களுக்குப் பின்வரும் வினாத்தாள் அமைப்பு பின்பற்றப்பட வேண்டும்.

Course	Sections	Assessment Domain	Marks and Unit Weightage	Total ESE
Non-Major Elective I (Basic Tamil)	**Section A**	K1: Remember Level K2: Understand Level	4 X 5 = 20 Four out of Six *(Open choice)* *(At least one question from each unit)*	50*
	Section B	K3: Apply Level K4: Analyze Level K5: Evaluate Level	3 X 10 = 30 Three out of Five *(Open choice)* *(At least one question from each unit)*	

SEMESTER - IV

Category	Component	Course Code	Course Title	Contact Hours	Credit

Part: I	Language : IV	**24LTU04**	**TAMIL - IV**	/Semester	
				48	3

Contact hours per week: 4

Year	semester	Internal marks	External marks	Total Marks
II	**IV**	**25**	**75**	**100**

முகப்புரை:
சங்க இலக்கிய நூல்களின் அறிமுகத்தினையும் பாடல் மேன்மையையும் அறிவர்.

COURSE OUTCOME:
பொதுத்தமிழ் நான்கு கற்பதன் வழி கீழ்காணும் தன்மையைப் பெறுவர்.

COs	CO Statement	Knowledge Level
CO1	எட்டுத்தொகை நூல்கள் மற்றும் பத்துப்பாட்டு நூல்கள் குறித்த அறிவைப் பெறுவர்..	K1
CO2	சங்ககால மக்களின் வாழ்வியல் விழுமியங்களை சங்க இலக்கிய அகப்புறப் பாடல்களின் வழி கற்பர்.	K2
CO3	சங்கப் பாடல்களில் புலப்படும் உவமை , உருவகம், உள்ளுறை,இறைச்சி தன்மையை இன்றைய நவீன இலக்கியங்களுள் பொருத்திப் பார்ப்பர்.	K3
CO4	பட்டினப்பாலை உணர்த்தும் பண்டைய வணிகவியல் முறையோடு நவீன வணிக மேலாண்மையியலுடன் ஒப்பிட்டு பகுத்தாராய்வர்.	K4
CO5	கலித்தொகைப் பாடல்,பிசிராந்தையார் நாடகம் இவற்றின் மூலம் நாடகத்துறையின் பரிணாம வளர்ச்சியினை அறிந்து மதிப்பிடுவர்.	K5

K1: Remember Level, K2: Understand Level, K3: Apply Level, K4: Analyze Level, K5: Evaluate Level

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	3	9	9	9	9
CO2	9	9	3	9	9	9	3
CO3	9	3	9	9	3	3	3
CO4	9	3	9	3	3	3	3
CO5	9	9	9	3	3	3	3
Total contribution of COs to POs Weightage	45	33	33	33	27	27	21
Weightage Percentage of COs contribution to POs	**2.29**	**2.09**	**2.08**	**2.10**	**2.24**	**2.22**	**1.94**

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

அலகு– 1   10 மணி

நற்றிணை:குறிஞ்சி (83) பெருந்தேவனார் - "எம்மூர் வாயில் உண்துறைத் தடையிய"

குறுந்தொகை : குறிஞ்சி(24)ஒளவையார் -"அகவன் மகளேஅகவன் மகளே"

ஐங்குறுநூறு:அன்னாய் வாழிபத்து–கபிலர் (203) - "அன்னாய் வாழிவேண்டன்னைநம் படைப்பை"

பதிற்றுப் பத்து–ஐந்தாம்பத்து–42 ஆம் பாடல் - பரணர் - "இரும்பனம் புடைய லீகைவான்கழல"

பரிபாடல் :வையை 7 – ஆம் பாடல் - "இறுவரைபுரையுமானு இருகரையேமத்து" (வரி- 40 -50)

புறநானூறு– 243 ஆம் பாடல் - குடவாயிற் கீத்தனார் - இளையோர் சூடார் வளையோர் கொய்யார்"

அலகு– 2   10 மணி

    பத்துப்பாட்டு

    பட்டினப்பாலைமுழுவதும்

அலகு– 3   10 மணி

    நாடகம் - பிசிராந்தையார் - பாரதிதாசன்

அலகு– 4   10 மணி

    அகத்திணைப் பாகுபாடுகள்

    புறத்திணைப் பாகுபாடுகள்

அலகு– 5   8 மணி

    எட்டுத்தொகை-விளக்கம்

    பத்துப்பாட்டு-விளக்கம்

படைப்பிலக்கியப் பயிற்சி

    கவிதை,சிறுகதை,எழுதச்செய்தல்.

படைப்பிலக்கியப் பயிற்சி

    கவிதை,சிறுகதை,எழுதச்செய்தல்.

பாடநூல்கள்:

1. குறுந்தொகை–கழகவெளியீடு–சென்னை,
2. நற்றிணை–கழகவெளியீடு–சென்னை,
3. பட்டினப்பாலை - நியூ செஞ்சுரிபுக் ஹவுஸ்,அம்பத்தூர்,சென்னை
4. பிசிராந்தையார் - பாரதிதாசன் மணிக்கவாசகர் பதிப்பகம் சென்னை-8
5. புறநானூறு –திருமகள் பதிப்பகம், 55,வெங்கட் நாராயணாசாலை,திநகர்   சென்னை -17
6. புதிற்றுப்பத்து–வர்த்தமானன் பதிப்பகம்,ஏ.ஆர்.ஆர். காம்ப்ளெக்ஸ் , 141 உஸ்மான் சாலை,திநகர் சென்னை -17
7. ஐங்குறுநூறு–சைவசித்தாந்த நூற்பதிப்புக் கழகம்,சென்னை - 18
8. பரிபாடல் -சாரதாபதிப்பகம்,சென்னை -14 –முதற்பதிப்பு 2009.
9. கலித்தொகை - சாரதாபதிப்பகம்,சென்னை -14 –முதற்பதிப்பு 2009.
10. அகநானூறு - சாரதாபதிப்பகம்,சென்னை -14 – மூன்றாம் பதிப்பு 2012.

    பார்வை நூல்:

1. இலக்கிய வரலாறு - கா.கோ. வேங்கடராமன்,கலையகவெளியீடுபரமத்திவேலூர் ,நாமக்கல்

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit

Part – II	English: IV	**24LEU04**	**ENGLISH- IV**	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
II	**IV**	**25**	**75**	**100**

PREAMBLE :

To acquaint the students an idea about the genres of English Literature with enhancing the communication competence among them.

COURSE OUTCOME:

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

COs	CO Statement	Knowledge Level
CO1	Find the genres in literature.	**K1**
CO2	Summarize the literary devices used in the works.	**K2**
CO3	Make use of wider range of words and expressions in their writing.	**K3**
CO4	Examine the themes and techniques in literary works.	**K4**
CO5	Select appropriate words for writing.	**K5**

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	3	3	3	1	1
CO3	3	3	3	1	1	1	1
CO4	3	3	1	1	1	1	0
CO5	3	1	1	1	1	0	0
Total contribution of COs to POs Weightage	27	25	17	15	9	6	5
Weight Percentage of COs contribution to POs	1.98	2.27	1.87	1.94	2.34	1.86	2.07

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

Course Content

UNIT I: POETRY (8 Hours)

1. The Bird Sanctuary - Sarojini Naidu

2. The Justice of the Peace – Hilaire Belloc

3. The Pulley - George Herbert

UNIT II: PROSE (9 Hours)

1. I Won't let him go –Madhavan Kutty

2. A Little Bit of What You Fancy - Desmond Morris

3. Character is Destiny – Dr.S. Radhakrishnan

UNIT III: SHORT STORIES (9 Hours)

1. An Astrologer's Day – R.K.Narayan

2. Valiant Vicky – Flora Annie Steel

3. The Nightingale and the rose- Oscar Wilde

UNIT IV: ONE-ACT PLAY (10 Hours)

1. The Bishop's Candlesticks – Norman McKinnel

2. The Count's Revenge - J.H. Walsh

UNIT V: GRAMMAR AND COMPOSITION (12 Hours)

1. Framing Questions

2. Resume Writing

3. Agenda & Minutes

TEXT BOOK: MODERN VOICES

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits

PART III	CORE - XI	24MAU11	MECHANICS	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
II	IV	25	75	100

PREAMBLE:

To enable the students to gain the knowledge about parallel forces, resultant forces, coplanar forces, projectiles, impact on a fixed surface, central orbits.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the concepts of fundamental laws, moments, coplanar forces, projectiles and equations of motion of central orbits.	K_1
CO2	explain the different types of laws, forces, radial and transverse components of orbits, height, time and range of a projectile, direct and oblique impact.	K_2
CO3	apply the principles of static equilibrium, projectiles, conservation of momentum, reduction of forces to solve simple real life problems.	K_3
CO4	analyze the equilibrium of a particle, projectiles, radial and transverse components of orbits and impact of elastic bodies.	K_4
CO5	evaluate two fold problems in central orbits, magnitude and resultant of the forces, before and after impact velocities, range on an inclined plane.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluat.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	3	3
CO3	9	9	9	9	3	3	3
CO4	9	9	9	9	3	3	3
CO5	9	9	9	9	1	1	1
Total Contribution of COs to POs	45	45	45	45	13	13	13
Weighted Percentage of COs contribution to POs	2.58	2.83	3.04	3.29	1.53	1.71	1.90

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   FORCES ACTING AT A POINT AND MOMENTS   (15 Hours)

Parallelogram law-triangle law –Converse of Triangle Law-Polygon Law of Forces-Lami's Theorem - Parallel Forces – Moments- Varignon's Theorem of moments - Generalized theorem of moments

UNIT – II   COPLANAR FORCES   (15 Hours)

Coplanar forces acting on a rigid body- Theorem on three co-planar forces- Reduction of coplanar forces- Equation to the line of action of the resultant.

UNIT - III   PROJECTILES   (15 Hours)

Path of a projectile - Greatest height -Time of flight-Range on an inclined plane through the point of projection-Maximum range.

UNIT - IV   CENTRAL ORBITS   (15 Hours)

Radial and transverse components of velocity and acceleration - Differential equation of central orbit - Pedal equations- Two-fold problems in central orbits

UNIT - V   IMPACT ON A FIXED SURFACE   (12 Hours)

Fundamental laws of impact: Newton's Experimental Law-Principle of conservation of Momentum -Impact on a smooth fixed plane

IMPACT OF SMOOTH ELASTIC SPHERES

Direct impact of two smooth spheres – Oblique impact of two smooth spheres - Loss of kinetic energy due to impact of two smooth spheres.

TEXT BOOK

1. Venkataraman M.K., (2005) – "Statics", Eleventh edition, Agasthiar Publications, Trichy.
2. Venkataraman.M.K., (2014) –"Dynamics", 16thedition, Agasthiar Publications, Trichy.

Unit	Chapter	Page
I	2 , 3	06-26, 52-75
II	5	98 & 99
	6	143-167
III	6	139-160, 172-182
IV	11	356-359, 371-383
V	8	215-228, 232-241, 244-248

REFERENCE BOOKS

2. Dharmapadam A.V. (2011) –"Statics" , S.Viswanathan Printers and Publishing Pvt., Ltd.
3. Duraipandian. P. and Laxmi Duraipandian(1988) –" Mechanics" , S.Chand and Company Ltd, Ram Nagar, New Delhi -55.
4. Prof.Khanna.M.L.(1995) –" Statics" , Fifteenth edition,Jai Prakash Nath & Co., Meerut.
5. Dharamapadam.A.V.(2011) – "Dynamics", S.Viswanathan Printers and Publishers Pvt., Ltd, Chennai.
6. Naryanamurthi.M. &Nagaratnam.N (2008)-"Dynamics", National Publishers, New Delhi.

WEB RESOURCES:

1. https://www.askiitians.com/iit-jee-physics/mechanics/motion-of-projectile.aspx
2. https://youtu.be/Shm1diiyrPY
3. https://en.wikipedia.org/wiki/Dynamics_(mechanics)

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits

PART III	CORE - XII	24MAU12	NUMERICAL METHODS	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
II	IV	25	75	100

PREAMBLE:

To enable the students to learn and gain knowledge about linear algebraic and transcendental equations, system of linear equations, Finite differences, Interpolation and Numerical Differentiation.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic concepts of linear algebraic and transcendental equations, simultaneous equations, numerical integration, Numerical Solution of Ordinary differential equations	K_1
CO2	explain the procedure in finding the roots and values of an equation and numerical integration, Euler methods and predictor –corrector methods	K_2
CO3	apply various methods to solve the Algebraic, Transcendental, Simultaneous equations, Numerical Differentiation and Integration.	K_3
CO4	compare the various methods involved in numerical solution of ODE	K_4
CO5	evaluate the problems by using Bisection method, iterative method, Newton-Raphson method, direct and indirect method, Newton's formula and numerical solution of ODE	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	9	9	9
CO4	9	9	9	3	3	3	3
CO5	9	3	3	3	3	3	3
Total Contribution of COs to POs	45	39	39	33	33	33	33
Weighted Percentage of COs contribution to POs	2.58	2.45	2.63	2.41	3.88	4.34	4.83

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation; 9- High Correlation between COs and POs

COURSE CONTENT:

UNIT – I **(10 Hours)**

THE SOLUTION OF NUMERICAL ALGEBRAIC AND TRANSCENDENTAL EQUATIONS

Introduction – The Bisection Method – Method of Successive Approximations or the Iteration Method –Newton's Iteration Method or Newton-Raphson Method - Order of Convergence of Newton-Raphson Method.

UNIT - II   SIMULTANEOUS LINEAR ALGEBRAIC EQUATIONS   (10 Hours)

Introduction – Gauss Elimination Method – Gauss Jordan Method - Iterative Methods – Gauss Jacobi Method of Iteration – Gauss-Seidal Method of Iteration.

UNIT – III   NUMERICAL DIFFERENTIATION   (15 Hours)

Introduction – Newton's Forward difference Formula –Newton's Backward difference Formula -Derivative using Stirling's Formula.

NUMERICAL INTEGRATION

Numerical Integration – Trapezoidal rule – SimPO1n's rule

UNIT – IV **(15 Hours)**

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

Introduction – n^{th} order ODE – Power series approximations-Point wise method-Taylor Series .

UNIT - V **(10 Hours)**

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

Euler's Method-Improved Euler's method – Runge – Kutta methods –Milne's predicator corrector formulae – Adam's predicator corrector equations.

TEXT BOOK:

Dr. Venkataraman.M.K.(2013) – "Numerical Methods in Science and Technology", The National Publishing Company, Chennai.

UNIT	CHAPTER	PAGE NUMBER
I	3	81– 90 97-105
II	4	113 – 120, 140 – 146
III	9	280 - 302
IV	11	330 – 362
V	11	369- 390

REFERENCE BOOK:

Kandasamy. P, Thilagavathi. K and Gunavathi. K (2010) - "Numerical methods" – S. Chand and Company Ltd, New Delhi.

WEB REFERENCES:

1. https://brilliant.org/wiki/newton-raphson-method/
2. https://www.geeksforgeeks.org/newton-forward-backward-interpolation/
3. https://youtu.be/v7kapVuoWhY

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits

PART III	CORE – XIII ALLIED - IV	24MAU13	C PROGRAMMING	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
II	IV	25	75	100

PREAMBLE:

To learn about the C programming language concepts.

COURSE OUTCOME:

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

CO's	CO Statement	Knowledge Level
CO1	Learning the basics of C Tokens, Input and Output functions and Operators	K1
CO2	Summarize the concepts of Decision Making and Looping functions	K2
CO3	Classifying Arrays and its Types	K3
CO4	Analyze the concepts of Structures & Union and files	K4
CO5	Determine the usage of pointers and files	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	1
CO2	9	9	9	9	9	3	1
CO3	9	9	9	9	9	1	1
CO4	9	9	9	9	9	1	3
CO5	9	9	9	9	9	0	3
Total Contribution of COs to POs	45	45	45	45	39	14	9
Weighted Percentage of COs Contribution to POs	2.58	2.83	3.04	3.29	4.58	1.84	1.32

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and Pos .As per UGC Notification

COURSE CONTENT:

UNIT – I   **Data Types & Control Statements I**   **(15 Hours)**

Introduction- Compilation- Data Types- Variables- Declaration- Input and Output- Operators- Arithmetic and Bit Manipulations- Programs Based on Operators- Introduction to Decision Making and Control Statements- Syntax- Examples- List of Programming Questions- 1 to 5

UNIT - II   **Control Statements II**   **(15 Hours)**

Programs Based on Decision Making- Programs Based on Iterations- Pattern Programming- List of Programming Questions- 6 to 19

| **UNIT - III** | **Arrays and Pointers** | **(15 Hours)** |

Introduction to 1D Array- Programs Based on 1D Array- Pointers Introduction- Syntax and Declaration- Example Programs- 2D Arrays- Static and Dynamic Introduction- 2D Array Programs- Multi Dimensional Arrays Introduction- Syntax and Declaration- Examples- List of Programming Questions- 20 to 27

| **UNIT - IV** | **Functions** | **(15 Hours)** |

Functions – With and Without Reference- Recursion- Recursion Using Functions- Strings Introduction- String using Functions- String Programs- List of Programming Questions- 28 to 36

| **UNIT - V** | **Structures, Unions and Files** | **(12 Hours)** |

Structure- Union- Example Programs- Static and Dynamic Memory Allocation- Structure using Pointers- Macros- Files- List of Programming Questions- 37 to 38

Books for Reference:

CO's	Authors	Title	Publishers	Year of Publication
1.	Stephen G. Kochan	Programming in C	Sams Publishing	2004
2.	Greg Perry and Dean Miller	C Programming Absolute Beginner's Guide	Pearson Education, Inc	2014
3.	E. Balaguruswamy	Programming in ANSI C	McGraw Hill Education	2019
4.	Paul Deitel & Harvey Deitel	C How to Program	Phi Learning Pvt Ltd	2013
5.	Madhav M. Bokare & Nishigandha G. Kurale	C Programming For Beginners	Sankalp Publication	2021
6.	Greg Perry	C Programming Absolute Beginner's Guide	Pearson Education	2014

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART IV	SKILL ENHANCEMENT - I	**24SEMAU01**	**C PROGRAMMING - PRACTICAL**	36	2

Contact hours per week: 3

Year	Semester	Internal Marks	External Marks	Total Marks
II	**IV**	**50**	**-**	**50**

PREAMBLE:

To learn, practice and innovate using C language.

COURSE OUTCOME:

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

CO's	CO Statement	Knowledge Level
CO1	Define the basics of arithmetic operations using C tokens.	K1
CO2	Choose the True/ False statements for checking the given numbers using decision making.	K2
CO3	Classify the given input based on iteration process	K3
CO4	Analyze the array operations in various formats	K4
CO5	Define the use of functions , structure and union	K5

K1 – Remember; K2 – Understand; K3 – Apply;   K4 – Analyze; K5 – Evaluate

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	9	3	9	9	3	9
CO 2	9	9	9	9	9	3	3
CO 3	9	9	9	9	9	3	9
CO 4	9	9	9	9	9	3	9
CO 5	9	9	9	9	9	3	9
Total Contribution of COs to POs	45	45	39	45	45	15	39
Weighted Percentage of COs Contribution to POs	2.58	2.83	2.63	3.29	5.29	1.97	5.71

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and Pos

COURSE CONTENT:

1. Write a C program to print character data types.
2. Write a C program to illustrate Arithmetic operators.
3. Write a C program to illustrate Relational operators.

4. Write a C program to illustrate Logical operators.
5. Write a C program to illustrate Bitwise operators.
6. Write a C program to find the largest of three numbers.
7. Write a C program to check whether the given year is leap year or not.
8. Write a C program to print the entered digit in word form.
9. Write a C program to find whether the given number is prime or not.
10. Write a C program to count the number of digits in the given number.
11. Write a C program to reverse a 3- digit number.
12. Write a C program to print Right half Pyramid. (star/ numbers/ alphabets)
13. Write a C program to print full half Pyramid. (star/ numbers/ alphabets)
14. Write a C program to print Inverted Left half Pyramid. (star/ numbers/ alphabets)
15. Write a C program to print Rhombus Pattern. (star/ numbers/ alphabets)
16. Write a C program to print Hollow Square Pattern. (star/ numbers/ alphabets)
17. Write a C program to print Hollow Inverted Full Pyramid Pattern. (star/ numbers/ alphabets)
18. Write a C program to print Hollow Diamond Pattern. (star/ numbers/ alphabets)
19. Write a C program to print Floyd's Triangle. (star/ numbers/ alphabets)
20. Write a C program to sort the 1D-array in the ascending order.
21. Write a C program to print the largest and the II largest element of the 1D-array.
22. Write a C program to search an element in the given 1D-array.
23. Write a C program to remove the duplicate elements in the given 1D-array.
24. Write a C program to insert an element in the given list of sorted 1 D-array.
25. Write a C program to transpose a given matrix. (2d-array)
26. Write a C program to access and to print the 1D array elements using pointers.
27. Write a C program to swap two numbers using pointers.
28. Write a C program to count the number of vowels in a string using null character.
29. Write a C program to access and to print the string using pointers.
30. Write a C program to copy the content of one string to another string using pointers.
31. Write a C program to add two numbers using function.
32. Write a C program to check whether the given string is palindrome or not.
33. Write a C program to swap 2 numbers using functions.
34. Write a C program to sort the numbers in the descending order using functions.
35. Write a C program to find the factorial if given number using recursive method.
36. Write a C program to print the Fibonacci series using recursive method.
37. Define a structure that will describe the following information. Student name, Class, Roll number, Subject, Marks and Total. Using student declare an array stu_list with 30 elements. Write program in C to read the information about all the 30 students and to display the information.
38. Define a union that will describe the following information. Student name, Class, Roll number, Subject, Marks and Total. Using student declare an array stu_list with 30 elements. Write program in C to read the information about all the 30 students and to display the information.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART IV	ABILITY ENHANCEMENT - II	**24AEU02**	**CONSUMER RIGHTS**	24	2

Contact hours per week: 2

Year	Semester	Internal Marks	External Marks	Total Marks
II	**IV**	**50**	**-**	**50**

PREAMBLE:

This paper seeks to familiarize the students with their rights and responsibilities as a consumer, the social framework of consumer rights and legal framework of protecting consumer rights.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Memorize the procedure of redress of consumer complaints, and the role of different agencies in establishing product and service standards	K1
CO2	Explain the Consumer Protection Law in India	K2
CO3	Impart sound practical grounding about the practice of consumer law and the procedure followed	K3
CO4	Evaluate the regulations and legal actions that helps to protect consumers	K4
CO5	Analyze the knowledge and skills needed for a career in this field	K5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	1	0	1
CO2	9	9	9	9	1	0	1
CO3	9	9	9	3	3	1	1
CO4	9	3	1	1	3	3	3
CO5	9	1	3	0	9	9	9
Total Contribution of COs to POs	45	31	31	22	17	13	15
Weighted Percentage of COs contribution to POs	2.58	1.95	2.09	1.61	2.00	1.71	2.20

**Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs**

COURSE CONTENT:

UNIT - I   **CONCEPTUAL FRAMEWORK**   **(5 Hours)**

Consumer and Markets: Concept of Consumer, Nature of markets: Liberalization and Globalization of markets with special reference to Indian Consumer Markets, E-Commerce with reference to Indian Market, Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP), Fair Price, GST, labeling and packaging along with relevant laws, Legal Metrology.

Experiencing and Voicing Dissatisfaction: Consumer buying process, Consumer Satisfaction/dissatisfaction-Grievances-complaint, Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Complaint Handling Process: ISO 10000 suite

UNIT – II   THE CONSUMER PROTECTION LAW IN INDIA   (5 Hours)

Objectives and Basic Concepts: Consumer rights and UN Guidelines on consumer protection, Consumer goods, defect in goods, spurious goods and services, service, deficiency in service, unfair trade practice, and restrictive trade practice.

Organizational set-up under the Consumer Protection Act: Advisory Bodies: Consumer Protection Councils at the Central, State and District Levels; Adjudicatory Bodies: District Forums, State Commissions, and National Commission: Their Composition, Powers, and Jurisdiction (Pecuniary and Territorial), Role of Supreme Court under the CPA with important case law.

UNIT – III   **(5 Hours)**
GRIEVANCE REDRESSAL MECHANISM UNDER THE INDIAN CONSUMER PROTECTION LAW

Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Enforcement of order, Appeal; Offences and penalties. **Leading Cases decided under Consumer Protection law by Supreme Court/National Commission**: Medical Negligence; Banking; Insurance; Housing & Real Estate; Electricity and Telecom Services; Education; Defective Products; Unfair Trade Practices.

UNIT - IV   **(5 Hours)**
ROLE OF INDUSTRY REGULATORS IN CONSUMER PROTECTION

  i. Banking: RBI and Banking Ombudsman
 ii. Insurance: IRDA and Insurance Ombudsman
iii. Telecommunication: TRAI
 iv. Food Products: FSSAI
  v. Electricity Supply: Electricity Regulatory Commission
 vi. Real Estate Regulatory Authority

UNIT - V   CONTEMPORARY ISSUES IN CONSUMER AFFAIRS   (4 Hours)

Consumer Movement in India: Evolution of Consumer Movement in India, Formation of consumer organizations and their role in consumer protection, Misleading Advertisements and sustainable consumption, National Consumer Helpline, Comparative Product testing, Sustainable consumption and energy ratings.

Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance; Role of International Standards: ISO an Overview

Note: Unit 2 and 3 refers to the Consumer Protection Act, 1986. Any change in law would be added appropriately after the new law is notified

Suggested Readings:

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. (2007) *Consumer Affairs,* Universities Press.

2. Choudhary, Ram Naresh Prasad (2005). *Consumer Protection Law Provisions and Procedure,* Deep and Deep Publications Pvt Ltd.

3. G. Ganesan and M. Sumathy. (2012). *Globalisation and Consumerism: Issues and Challenges*, Regal Publications

4. Suresh Misra and Sapna Chadah (2012). Consumer Protection in India: Issues and Concerns, IIPA, New Delhi

5. Rajyalaxmi Rao (2012), *Consumer is King,* Universal Law Publishing Company

6. Girimaji, Pushpa (2002). *Consumer Right for Everyone* Penguin Books.

7. E-books :- www.consumereducation.in

8. Empowering Consumers e-book,

9. ebook, www.consumeraffairs.nic.in

10. *The Consumer Protection Act, 1986 and its later versions.* www.bis.org

Articles

1. Misra Suresh, (Aug 2017) "Is the Indian Consumer Protected? One India One People.

2. Raman Mittal, Sonkar Sumit and Parineet Kaur (2016) Regulating Unfair Trade Practices: An Analysis of the Past and Present Indian Legislative Models, Journal of Consumer Policy.

3. Chakravarthy, S. (2014). MRTP Act metamorphoses into Competition Act. CUTS Institute for Regulation and Competition position paper. Available online at www.cuts-international.org/doc01.doc.

4. Kapoor Sheetal (2013) "Banking and the Consumer" Akademos (ISSN 2231-0584)

5. Bhatt K. N., Misra Suresh and Chadah Sapna (2010). Consumer, Consumerism and Consumer Protection, Abhijeet Publications.

6. Kapoor Sheetal (2010) "Advertising-An Essential Part of Consumer's Life-Its Legal and Ethical Aspects", Consumer Protection and Trade Practices Journal, October 2010.

7. Verma, D.P.S. (2002). Regulating Misleading Advertisements, Legal Provisions and Institutional Framework. Vikalpa. Vol. 26. No. 2. pp. 51-57.

Periodicals

1. Consumer Protection Judgments (CPJ) (Relevant cases reported in various issues)

2. Recent issues of magazines: International Journal on consumer law and practice, National Law School of India University, Bengaluru

3. '*Consumer Voice*', Published by VOICE Society, New Delhi.

WEB REFERENCES:

www.ncdrc.nic.in
www.consumeraffairs.nic.in
www.iso.org.
www.bis.org.in
www.consumereducation.in
www.consumervoice.in
www.fssai.gov.in
www.cercindia.org

SEMESTER - V

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE - XIV	24MAU14	ABSTRACT ALGEBRA	72	5

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE:

To enable the students to learn and gain knowledge about Sets, Groups and Rings.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the definition and basic ideas of Sets, Mappings, Groups, Rings and Ideals.	K_1
CO2	interpret the basic concepts of Abstract Algebra.	K_2
CO3	apply theoretical ideas of set theory and group theory for solving the simple problems .	K4
CO4	analyze the various theorems and lemmas for groups and Rings .	K_3
CO5	evaluate the simple problems of set theory ,Group theory and ring theory.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	3	3	3
CO3	9	9	9	9	3	3	1
CO4	9	9	9	9	1	1	1
CO5	9	9	3	3	1	1	1
Total Contribution of COs to POs	45	45	39	39	17	17	15
Weighted Percentage of COs contribution to POs	2.58	2.83	2.63	2.85	2.00	2.24	2.20

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   **SETS AND GROUPS**   **(12 Hours)**

Sets – Mappings – The integers.

Groups: Abelian group, Symmetric group Definitions and Examples – Basic properties.

UNIT - II   **SUB GROUPS**   **(15 Hours)**

Subgroups – Cyclic subgroup - Index of a group – Order of an element – Fermat theorem – A Counting Principle - Normal Subgroups and Quotient Groups.

UNIT - III   **HOMOMORPHISMS OF GROUPS**   **(15 Hours)**

Homomorphisms – Cauchy's theorem for Abelian groups – Sylow's theorem for Abelian groups Automorphisms – Inner automorphism - Cayley's theorem, permutation groups.

UNIT - IV   **RINGS**   **(15 Hours)**

Rings: Definition and Examples –Some Special Classes of Rings – Commutative ring – Field – Integral domain - Homomorphisms of Rings.

Field Theory and Homomorphic Encryption in Industry 5.0

UNIT - V   **IDEALS AND QUOTIENT RINGS**   **(15 Hours)**

Ideals and Quotient Rings – More Ideals and Quotient Rings – Maximal ideal - The field of Quotients of an Integral Domain.

TEXT BOOK

Herstein.I.N (2014)—"Topics in Algebra", 2nd edition, John Wiley & Sons, New York

UNIT	CHAPTER	SECTION
I	1,2	1.1-1.3, 2.1-2.3
II	2	2.4-2.6
III	2	2.7-2.10
IV	3	3.1-3.3
V	3	3.4-3.6

REFERENCE BOOKS

1. Fraleigh John .B (1986) - "An I course in Abstract Algebra",Narosa Publishing House ,New Delhi Madras Bombay Calcutta.
2. Arumugam and Issac A.T (2003) - "Scitech Publishing (India) Pvt Ltd.
3. Vasishtha A.R (1994 – 95) - "Modern Algebra", Krishna Prakashan Mandir, Meerut.

WEB REFERENCES:

https://www.youtube.com/watch?v=maACVONq5IU

https://www.youtube.com/watch?v=BVf5FFIbaaQ

https://www.youtube.com/watch?v=KCSZ4QhOw0I

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjkt-

bSjpfzAhV63jgGHSgfAGsQFnoECAYQAQ&url=https%3A%2F%2Fwww.slideshare.net%2FYuriyMaturin%2Fabstract-algebra-58750320&usg=AOvVaw0SOjw-8D-gD_ZB6FM2ekVH

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE - XV	**24MAU15**	**REAL ANALYSIS - I**	72	5

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
III	**V**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn and gain knowledge about Real number system and Point set topology.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Recall the definitions of upper bounds, lower bounds, countable sets, uncountable sets, open sets, closed sets and metric space.	K_1
CO2	Explain the concepts of upper bounds, lower bounds, countable sets, uncountable sets, open sets, closed setsand metric space.	K_2
CO3	Apply the concepts of limits for a vector – valued functions, finite and infinite sets for countable and uncountable sets, adherent points, accumulation points, interior points in open and closed sets.	K_3
CO4	Analyze the concepts of countable sets, uncountable sets, open sets, closed sets, adherent points and accumulation points.	K_4
CO5	Verify the concepts of upper bounds, lower bounds, supremum, infimum for real number system, relations, functions, Open balls, open sets, Closed sets, Adherent points and Accumulation points.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	1	3	3	3	3
CO2	9	9	1	3	3	3	3
CO3	9	9	9	9	3	9	3
CO4	9	9	9	9	9	9	9
CO5	9	9	9	9	9	9	9
Total Contribution of COs to POs	45	45	29	33	27	33	27
Weighted Percentage of COs contribution to POs	2.58	2.83	1.96	2.41	3.17	4.34	3.95

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   THE REAL AND COMPLEX NUMBER SYSTEMS   (15 Hours)

The Real and Complex number systems : Introduction - The field axioms, the order axioms –Integers –The unique Factorization theorem for integers –Rational numbers –Irrational numbers –Upper bounds, maximum Elements, least upper bound –The completeness axiom –Some properties of the supremum – The Archimedian property of the real number system –Absolute values and the triangle inequality –The Cauchy-Schwarz inequality .

UNIT - II   BASIC NOTIONS OF SET THEORY   (15 Hours)

Basic notions of set theory : Introduction - Relations and functions - Further terminology concerning functions –One –one functions and inverses –Composite functions –Sequences – Similar sets-Finite and infinite sets –Countable and uncountable sets –Uncountability of the real number system –Set algebra - Countable collection of countable sets.

UNIT - III   ELEMENTS OF POINT SET TOPOLOGY   (15 Hours)

Elements of point set topology: Introduction - Euclidean space R^n –Open balls and open sets in R^n. The structure of open Sets in R^1 –Closed sets - Adherent points- Accumulation points - closed sets and adherent points -The Bolzano Weierstrass theorem – The Cantor intersection Theorem.

UNIT - IV   ELEMENTS OF POINT SET TOPOLOGY   (15 Hours)

Covering –Lindelof covering theorem –the Heine Borel covering theorem –Compactness in R^n –Metric Spaces –Point set topology in metric spaces –Compact subsets of a metric space – Boundary of a set.

UNIT – V   LIMITS   (12 Hours)

Limits: Introduction - Convergent sequences in a metric space –Cauchy sequences – Complete metric Spaces. Limit of a function - Limit of a vector valued functions.

TEXTBOOK

APOSTOL.T.M – (2002) "Mathematical Analysis", 2nd edition, 20th Reprint., Addison-Wisely, Narosa Publishing Company, Chennai.

UNIT	CHAPTER	SECTION
I	**1**	**1.1-1.3, 1.6-1.12, 1.14, 1.18, 1.19**
II	**2**	**2.1, 2.5-2.15**
III	**3**	**3.1-3.9**
IV	**3**	**3.10-3.16**
V	**4**	**4.1- 4.5, 4.7**

REFERENCE BOOKS

1. Goldberg.R.R –(1990), "Methods of Real Analysis", NY, John Wiley, New York.
2. Simmons.G.F – (1963), "Introduction to Topology and Modern Analysis", McGraw – Hill, New York.

WEB REFERENCES:

1. https://ocw.mit.edu/courses/mathematics/18-100c-real-analysis-fall-2012/
2. https://www.jirka.org/ra/
3. https://www.macalester.edu/aratra/

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE - XVI	**24MAU16**	**COMPLEX ANALYSIS- I**	72	5

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
III	**V**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn complex functions, mappings and complex integration.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic concepts of complex functions, power series, simple mappings and complex integration.	K_1
CO2	explain the differentiability and analyticity of complex functions, properties of complex function, convergence of power series, conformal mapping and contour integrals.	K_2
CO3	apply the theorem and results to solve a variety of problems arising in analytic function.	K_3
CO4	analyze the linear transformations, conditions for differentiability, conformal mapping and convergence of power series.	K_4
CO5	evaluate integrals of analytic functions and the effect of various transformations and mappings.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	3	1
CO3	9	9	9	9	3	3	1
CO4	9	9	9	9	1	1	1
CO5	9	9	9	3	1	1	0
Total Contribution of COs to POs	45	45	45	39	11	11	6
Weighted Percentage of COs contribution to POs	2.58	2.83	3.04	2.85	1.29	1.45	0.88

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   **COMPLEX NUMBER SYSTEM**   **(12 Hours)**

Complex number –Field of Complex numbers – Conjugation –Absolute value -Argument –Simple Mappings. i) $w = z + \alpha$ ii) $w = az$ iii) $w = 1/z$ - invariance of cross-ratio under bilinear transformation –Definition of extended complex plane – Stereographic projection.

UNIT - II   **ANALYTIC FUNCTIONS**   **(15 Hours)**

Limit of a function –Continuity –Differentiability – Analytical function defined in a region –Necessary conditions for differentiability –Sufficient conditions for differentiability –Cauchy-Riemann equation in polar coordinates –Complex function as a function of z and $\bar{z}$

UNIT - III   **POWER SERIES AND ELEMENTARY FUNCTIONS**   **(15 Hours)**

Absolute convergence –Circle of convergence –Analyticity of the sum of power series in the Circle of convergence (term differentiation of a series) Exponential, Logarithmic, Trigonometric and Hyperbolic functions.

UNIT - IV   **ELEMENTARY ANDCONFORMAL MAPPING**   **(15 Hours)**

Conjugate Harmonic functions: Definition and determination, Conformal Mapping: Isogonal mapping –Conformal mapping-Mapping $z \rightarrow f(z)$, where f is analytic, particularly the Mappings: $w = e^z$; $w = z^{1/2}$; $w = \sin z$, $w = \cos z$

UNIT - V   **COMPLEX INTEGRATION**   **(15 Hours)**

Simply and multiply connected regions in the complex plane. Integration of f(z) from definition along a curve joining z_1 and z_2. Proof of Cauchy's Theorem (using Goursat's lemma for a simply connected region). Cauchy's integral formula for higher derivatives (statement only)-Morera's theorem.

TEXT BOOK:

Duraipandian.P and Kayalal Pachaiyappa (2014) ," Complex analysis", S.Chand & Company PVT.Ltd. New Delhi.

UNIT	CHAPTER	SECTION
I	1	**1.1 to 1.3, 1.6 to 1.9**
	2	**2.1 , 2.6 to 2.10,**
	7	**7.1& 7.10**
II	4	**4.1 to 4.10**
III	6	**6.1 to 6.11**
IV	6	**6.12 to 6.13**
	7	**7.5 to 7.9**
V	8	**8.1 to 8.9& 8.13**

REFERENCE BOOKS:

1.   Pillai.T.K.M. & Narayanan.S (1997)" Complex Analysis ", S.Viswanathan pvt ltd – Chennai.

2.   Sharma.J.N. (2116),"Complex Analysis", Krishan Prakashan Media – Meerut.

WEB REFERENCES:

https://nptel.ac.in/courses/111/103/111103070/

https://nptel.ac.in/courses/111/107/111107056/

https://nptel.ac.in/courses/122/103/122103012/

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE - XVII	24MAU17A / 24MAU17B / 24MAU17C/ 24MAU17D	INSTITUTIONAL TRAINING / INDUSTRIAL TRAINING / ARTICLE SHIP TRAINING / MINI PROJECT	-	1

Contact hours per week: -

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	100	-	100

PREAMBLE:

To enable the students to learn and gain knowledge about their principal areas of study.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic concepts related to the project work	K_1
CO2	illustrate the knowledge about their principal areas of project work	K_2
CO3	applying the relative notions in the respective areas and finding the results	K_3
CO4	analyzing results with the existing results	K_4
CO5	interpreting the results with suitable examples	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	9	9	9
CO4	9	9	9	9	3	3	3
CO5	9	9	9	9	3	3	3
Total Contribution of COs to POs	45	45	45	45	33	33	33
Weighted Percentage of COs contribution to POs	2.58	2.83	3.04	3.29	3.88	4.34	4.83

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

Category	Components	Course code	Course Title	Contact Hours	Credit
Part : III	Core: XVIII Open Elective	**24TAUOE1**	திறன் மேம்பாட்டு கல்வி	48	2

Contact hours per week: 4

Year	semester	Internal mark	External marks	Total Marks
III	**V**	**25**	**75**	**100**

முகப்புரை **(PREAMBLE)**

    தனிதிறன் மேலாண்மையையும் செயல்பாட்டினையும் வளர்கும் முறையினை அறிவர்.

COURSE OUTCOME

    தனிதிறன் அறிவினைக் கற்பதன் மூலம் கீழ்க்காணும் நிலையை அடைவர்.

COs	CO Statement	Knowledge Level
CO1	பேசுதல், எழுதுதல், தொடர்புகொள்ளுதல் ஆகியவற்றைக் குறித்து அறிந்து கொள்வர்.	K1
CO2	திட்டமிடல், செயல்படுத்துதல் ஆகியவற்றை கற்பர்.	K2
CO3	நேர மேலாண்மை, குழு கலந்துரையாடல், நேர்காணல் செய்தல் போன்றவற்றில் திறம்பட செயலாற்றுவர்.	K3
CO4	தனிநபர் செயல்பாடு, ஆக்கத்திறன், தனிமனித விழுமியங்கள் ஆகியவற்றை பகுத்து ஆராய்வர்.	K4
CO5	தன்னப்பிக்கை, ஊக்கம், முயற்சி, நேர்மறை சிந்தனை, மக்கள் தொடர்பு ஆகியவற்றை உணர்ந்து மதிப்பிடுவர்	K5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	3	3	9	9	9
CO2	9	9	9	9	9	3	3
CO3	9	3	9	9	9	9	9
CO4	9	3	3	9	3	9	9
CO5	9	9	9	9	9	9	9
Weightage	45	33	33	39	39	39	39
Weightage Percentage	**2.29**	**2.09**	**2.08**	**2.48**	**3.24**	**3.22**	**3.60**

Level of Correlation: 0 – Nil; 1 – Low; 3 – Medium; 9 – High

Course Content:

அலகு -1   10 மணி

ஆளுமைத் திறன் மேம்பா தலைமைப் பண்பு, பேசுதல், எழுதல், தொடர்பு கொள்ளுதல், குழு செயல்பாடு, தனிநபர் செயல்பாட்டு விளக்கம்.

அலகு-2   9 மணி

செயல் திறன் மேம்பாடு திட்டம் அமைத்தல், செயல்படுத்துதல், இடர்பாடுகள், செயலாக்கம்

அலகு-3   10 மணி

நேர்காணல்நேர மேலாண்மை, செயல்படுத்துதல், முன்தயாரிப்பு, உடல் அசைவு மொழிகள், குழு கலந்துரையாடல், அறிமுக நிகழ்வு, இன்றைய தகவல்கள் குறித்த விழிப்புணர்வு

அலகு-4   10 மணி

உணர்வு மேலாண்மைதனிநபர் செயல்பாடு, ஆக்கத்திறன், தனி மனித விழிமியங்கள், வெற்றி உன் கையில்

அலகு -5   9 மணி

உன்னை நீ அறிவாய்தன்னம்பிக்கை, ஊக்குவித்தல், முயற்சி, நேர்மையான சிந்தனை, மக்களுடன் தொடர்பு கொளளுதல்

பாட நூல்கள்:

ஆளுமைத் திறன், பாதை தெரியுது பார், நெல்லைகவினேசன், தினத்தந்தி வெளியீடு,

பார்வை நூல்கள் :

1.சாதிக்க ஆசைப்படு, டாக்டர் சே.சைலேந்திரபாபு, சுரா பதிப்பகம், அண்ணா நகர், சென்னை

2. நேர்முகத் தேர்வை எதிர்கொள்வது எப்படி?, சே.ஆனந்த முருகன், சிவம் புத்தகாலயம், சென்னை

3. முடியும் என்றால் முடியும், ரவி பாரதி, நர்மதா பதிப்பகம், தி.நகர், சென்னை.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
Part: III	Core: XVIII Open Elective	**24ENUOE1**	**ENGLISH FOR EFFECTIVE COMMUNICATION**	48	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	**V**	**25**	**75**	**100**

PREAMBLE:

To focus the theory and fundamental tools of communication and various dimensions of communication skills.

COURSE OUTCOME:

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

COs	CO Statement	Knowledge Level
CO1	Define the verbal and Non-Verbal Communication	**K1**
CO2	Explain the practice in four modes of literacy.	**K2**
CO3	Make use of appropriate Verbal and Non Verbal signs for effective communication.	**K3**
CO4	Examine the primary academic writing associated with the communication.	**K4**
CO5	Assess the communicative competencies such as managing conflict, understanding group processes, active listening, appreciate self-disclosure, etc...	**K5**

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	3	3	3	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	0	0
CO5	3	3	3	1	0	0	0
Total contribution of COs to POs Weightage	**39**	**33**	**27**	**17**	**10**	**7**	**5**
Weight Percentage of COs contribution to POs	**2.86**	**3.00**	**2.97**	**2.20**	**2.60**	**2.17**	**2.07**

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

Course Content:

UNIT I : Aspects Of Communication (9 Hours)

1. Communication through Words

2. Communication through Body Language

3. Communication through Technology

UNIT II : Oral Communication (10 Hours)

1. Dyadic communication

2. Active listening

3. Meetings

4. Seminars and conferences

5. Group discussions

UNIT III : Written Communication (10 Hours)

1. Reading Comprehension

2. Précis writing

3. Business and Technical Reports

4. Style

5. Technical Proposals

UNIT IV : Written Communication (10 Hours)

1. Memorandum Writing

2. Notice, Agenda, Minutes

3. Handbooks and Manuals

4. Research Papers and Articles

5. Advertising and Job Description

UNIT V : Mechanics Of Manuscript Preparation (9 Hours)

1. Editing and Proofreading

2. Copy Editing

3. Punctuation and Capitalization

4. Abbreviations and Numerals

TEXT BOOK:

Developing Communication Skills by Krishna Mohan &Meera Banerji

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
Part – III	Core: XVIII Open Elective	24PHUOE1	**PHYSICS IN DAY TO DAY LIFE**	48	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE: To demonstrate knowledge and understanding of the fundamental concepts in Physics

COURSE OUTCOME: After completion of the course, the learners will be able to

COs	Course Statement	Knowledge Level
CO1	Identify the measurements, Electric Current, Electricity, Magnetism, Electrolysis, Magnetic field effect and Natural Phenomena's in Atmosphere	K1
CO2	Explain the concepts in Electricity, standard units and Types of Motion, Electric power, Effects of current and Magnet, lightning, thunder, water harvesting, coal and petroleum	K2
CO3	Perform different SI units in measurement, electricity and magnetism, electric potential, resistance, chemical effect of Electric current and magnetism	K3
CO4	Criticize the measurements of different units, Electricity, Resistance, associate reaction of magnetic Poles, Protection against natural calamities,	K4
CO5	Interpret the measuring, electric current, Laws in Physics, electricity and magnetism, Natural Resources	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	3	3	1	1
CO3	9	9	3	3	2	1	1
CO4	9	3	3	1	1	1	1
CO5	3	3	3	1	1	1	1
Total Contribution of COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs Contribution to POs	2.25	2.17	1.96	1.47	1.12	0.98	0.70

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and Pos

COURSE CONTENT

UNIT- I - Motion and Measurements of Distances (10 Hours)

History of Transportation-Measurement of Length – Distance-Conventional Methods of Measurement-Standard Units of Measurement-Types of Motion

UNIT- II - Electricity (10 Hours)

Electric current-Electric circuit-Components of basic electric circuit: Cell, Switch, and Bulb Conductor-Insulator-Electric potential and potential difference-Circuit diagram-Ohm's law Factors on which the resistance of conductor depends-Resistance of a system of resistors-Heating effect of electric current-Electric power

UNIT- III - Chemical Effects of Electric Current and Magnetism (10 Hours)

Conduction of Electricity-Conduction of Electricity in Liquids – Electrolysis-Electrolysis and Electroplating - Discovery of Magnets-Magnet-Poles of a magnet-Like poles repel and unlike poles attract Magnetic Field of Earth and Compass

UNIT- IV - Some Natural Phenomena (9 Hours)

Lightning-Charging by rubbing-Transfer of Charge-The Story of Lightning-Lightning Safety Phenomena related to earthquakes-Protection against earthquakes

UNIT- V - Management of Natural Resources (9 Hours)

Save the Environment from Environmental Pollution – Reuse– Recycle-Why do we need to manage our natural resources-Forest and wildlife-Sustainable management-Water for all : dam-Water harvesting-Coal and petroleum

Reference Book

1.Monograph – Department of Physics

Web reference
 1. https://www.researchgate.net/publication/277130091_Energy_Resources_Indian_Scenario
 2. https://www.aps.edu/energy-conservation/energy-lessons-and-games/energy-lessons-and-games/26_HS-IssueOfRenewableEnergy.pdf
 3. https://ncert.nic.in/textbook/pdf/hesc114.pdf
 4. https://www.learncbse.in/motion-and-measurement-of-distances-class-6-notes/
 5. https://web.njit.edu/~vitaly/121/notes121.pdf

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART: III	Core: XVIII Open Elective	24CSUOE1	**INTERNET FOR EVERYONE**	48	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE :

This course provides an insight of formal introduction to internet, WWW, finding information in the Internet and awareness on Internet Security and Privacy, illustrate the Possibilities of Social Networking. Learning discussion forum software, Effective use of video conferencing, Blogging& Making Money in the Internet.

COURSE OUTCOME:

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

COs	CO Statement	Knowledge Level
CO1	To get familiar with basics of the Internet, World Wide Web and Web browsers.	K1
CO2	Obtain the Knowledge of Finding Information in the Internet and awareness on Internet Security and Privacy.	K2
CO3	Understand How to email, tips for effective use of Email, Advantages and Disadvantages of Email.	K3
CO4	To illustrate the Possibilities of Social Networking. Learning discussion forum software & effective use of video conferencing.	K4
CO5	To learn Blogging & Making Money in the Internet.	K5

K1 – Remember; K2 – Understand; K3 – Apply;   K4 – Analyse; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	3	3	3	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	0	1
CO5	3	3	3	1	0	0	1
Total Contribution of COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs Contribution to POs	2.18	1.97	1.67	1.09	1.09	0.58	0.36

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;   9- High correlation between COs and POs. As per UGC Notification

COURSE CONTENT

UNIT I   Introduction to Internet, WWW & Web Browsers   (10 Hours)

What is Internet? - How does Internet Work? - What is Special about the Internet? - What is WWW? - Internet and Web - How does the web works? - What are web browsers? - Types of Browsers - Web Browsing Tips.

UNIT II   Searching the Web, Safety & Privacy   (10 Hours)

Information Sources - Finding Information on the internet - Searching the Web - Search Engines - Making Your Search- Improving Your Searching - Tips for Internet Research- Privacy - Anonymity - Understanding Security and Privacy.

UNIT III   E- Mail   (10 Hours)

Introduction - How E-mail works? - Why uses E-mail? - E-mail Names and Addresses - Mailing Basics - How Private is the e-mail? - Email Ethics - Spamming - E-mail Advantages and Disadvantages - Tips for effective E-mail use - E-mail Safety tips.

UNIT IV   Social Networking and Discussion Forums   (8 Hours)

Introduction - Social Networking Timeline - Why Social Networking? - Dangers of Social Networking? -Discussion Forums - Discussion Forum Software - Internet Telephony - Video Conferencing.

UNIT V   Making Money on the Internet and Blogging   (10 Hours)

What is a Blog? - Why Blog? - Why is Blogging so Popular? - Blog Search Engines and Communities - Blogs and Employment - Pitfalls to avoid while blogging. Introduction - Writing Product Reviews - Sharing Your Knowledge - Advertising - Affiliate programs -Selling - Online Tutoring.

TEXT BOOK(S):

1. Alexis Leon, Mathews Leon , INTERNET FOR EVERYONE ,Vikas Publishing Housing Pvt Ltd , 15th Anniversary Edition

REFERENCE BOOK(S):

1. Keiko Pitter, Sara Amato,JohnCallahan,Niger Kerr, Eric Tilton, Robert Minato,Tata McGraw-Hill Edition 2003

2. Peter Weverka, The Everyday Internet All-in-One Desk Reference for Dummies,Wiley Publishing Inc, 3rd Edition

WEB REFERENCES

1. https://www.tutorialspoint.com/computer_concepts/computer_concepts_introduction_to_internet_www_web_browsers.htm
2. https://www.tutorialspoint.com/internet_technologies/e_mail_overview.htm
3. https://geekflare.com/make-money-with-blogging

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART: III	Core: XVIII Open Elective	**24ITUOE1**	**BASICS OF COMPUTER TECHNOLOGY**	48	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE :
To learn about the basics of Computer Technology

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

COs	CO Statement	Knowledge Level
CO1	Recall the basics of Computer	**K1**
CO2	Illustrate the concepts of data communication and Computer networks	**K2**
CO3	Utilize Middleware and Gateways	**K3**
CO4	Analyze the concepts of Mobile Computing	**K4**
CO5	Examine the DBMS Architecture	**K5**

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyse; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	3	3	3	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	0	1
CO5	3	3	3	1	0	0	1
Total Contribution of Cos to Pos	**39**	**33**	**27**	**17**	**10**	**7**	**5**
Weighted Percentage of Cos Contribution to Pos	**2.18**	**1.97**	**1.67**	**1.09**	**1.09**	**0.58**	**0.36**

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between Cos and Pos. As per UGC Notification

COURSE CONTENT

UNIT I   **Computer Basics**   **(9 Hours)**

Introduction-Generations of Computers-Classification of Computers- Central Processing Unit-Communication among Various Units-Memory Hierarchy-RAM-ROM-Secondary Storage Devices-Operating System: Introduction- Definition-Types.

UNIT II   **Data Communication and Computer Networks**   **(10 Hours)**

Introduction- Data Communication- Transmission Media- Multiplexing- Switching. Computer Network: Types of Computer Networks- Network Topologies- Communication Protocol. Internet: Introduction-Basic Internet Terms- Internet Applications-Search Engines.

UNIT III   **Database Fundamentals**   **(9 Hours)**

Introduction-Definition-Logical Data Concepts-Physical Data Concepts-Database Management System-DBMS Architecture-Types of Databases.SQL: Introduction-Getting Started with SQL.

UNIT IV   **Mobile Computing**   **(10 Hours)**

Wireless The beginning –Mobile Computing –Dialogue Control—Networks –Middleware and Gateways –Application and Services-Developing Mobile Computer Applications –Security in Mobile Computing–Architecture for Mobile Computing-Mobile Computing through Telephone—IVR Applications.

UNIT V   **Cloud Computing**   **(10 Hours)**

Introduction- From- Collaboration to cloud- Working of cloud computing-Pros and Cons-Benefits- Developing cloud computing services- Cloud service development-Discovering cloud services-Collaborating on schedules-Collaborating on calendars-Evaluating web conference tools-Creating groups on social networks- Understanding cloud storage- Evaluating on line file storage.

TEXT BOOK(S):
1. Alexis Leon ,MathewsLeon,Introduction to Information Technology, 2nd Edition, ITL Limited ITL Education Solutions Limited,Publisher(s): Pearson Education India,ISBN: 9789332525146
2. Asoke K Talukder , Roopa R Yavagal,Mobile Computing, TMH, 2005
3. Anthony T. Velte, "Cloud Computing- A Practical Approach", Tata McGraw Hill Education Private Limited, 1st Edition (2013).

REFERENCE BOOK(S):
1. Alexis Leon ,MathewsLeon,Fundamentals of Information Technology, ITL Limited
2. KumkumGarg,Mobile Computing, Pearson Education, 2010.
3. Michael Miller, Cloud Computing, Pearson Education, New Delhi, First Edition, 2013

WEB REFERENCES:
1. https://mrcet.com/pdf/Lab%20Manuals/IT/R15A0529_CloudComputing_Notes-converted.pdf
2. https://mjginfologs.com/mobile-computing-architecture/
3. https://www.guru99.com/dbms-architecture.html
4. https://www.tutorialspoint.com/data_communication_computer_network/index.htm

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART: III	Core: XVIII Open Elective	**24CAUOE1**	**MACHINE LEARNING**	48	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE :
To learn about the basics of Computer Technology

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

COs	CO Statement	Knowledge Level
CO1	Remember Machine Learning Fundamentals	K1
CO2	Understanding the Machine Learning Concepts	K2
CO3	Summarize the Impact of Machine Learning Applications	K3
CO4	Analyze How Machine Learning Support to Business Goals	K4
CO5	Evaluate the Knowledge of Machine Skills	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyse; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	3	3	3	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	0	1
CO5	3	3	3	1	0	0	1
Total Contribution of COs to POs	**39**	**33**	**27**	**17**	**10**	**7**	**5**
Weighted Percentage of COs Contribution to POs	**2.18**	**1.97**	**1.67**	**1.09**	**1.09**	**0.58**	**0.36**

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs. As per UGC Notification

COURSE CONTENT

UNIT I   **Overview of Machine learning**   **(9 Hours)**

Understanding Machine Learning- What Is Machine Learning? - Defining Big Data- Big Data in Context with Machine Learning- The Need to Understand and Trust your Data- The Importance of the Hybrid Cloud- Leveraging the Power of Machine Learning- The Roles of Statistics and Data Mining with machine learning- Putting Machine Learning in Context- Approaches to Machine Learning.

UNIT II   **Machine Learning Techniques**   **(10 Hours)**

Getting Started with a Strategy- Understanding Machine Learning Techniques- Tying Machine Learning Methods to Outcomes- Applying Machine Learning to Business Needs.

UNIT III   **Machine Learning on Applications**   **(9 Hours)**

Looking Inside Machine Learning- The Impact of Machine Learning on Applications- Data Preparation- The Machine Learning Cycle.

UNIT IV   **Getting Started with Machine Learning**   **(10 Hours)**

Getting Started with Machine Learning- Understanding How Machine Learning Can Help- Focus on the Business Problem- Machine Learning Requires Collaboration- Executing a Pilot Project- Determining the Best Learning Model.

UNIT V   **Learning Machine Skills**   **(10 Hours)**

Learning Machine Skills- Defining the Skills That You Need- Getting Educated- Using Machine Learning to Provide Solutions to Business Problems- Applying Machine Learning to Patient Health- Leveraging IoT to Create More Predictable Outcomes- Proactively Responding to IT Issues- Protecting Against Fraud- Ten Predictions on the Future of Machine Learning.

TEXT BOOK(S):

1. Judith Hurwitz and Daniel Kirsch,Machine Learning for dummies, IBM Limited Edition,2018

REFERENCE BOOK(S):

1. Ethem Alpaydin, Introduction to Machine Learning, Second Edition, The MIT Press Cambridge, Massachusetts London, England

WEB REFERENCES:

1. https://www.sciencedirect.com/topics/computer-science/machine-learning#:~:text=Machine%20learning%20(ML)%20refers%20to,being%20programmed%20with%20that%20knowledge.
2. https://www.javatpoint.com/machine-learning-techniques
3. https://www.simplilearn.com/tutorials/machine-learning-tutorial/machine-learning-applicationS

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	Core: XVIII Open Elective	24AMUOE1	ADVANCED EXCEL - PRACTICAL	48	2

Contact Hours: 4

Year	Semester	Internal Marks	ExternalMarks	Total Marks
III	V	40	60	100

PREAMBLE :

To provide skills and knowledge which will allow the attendee to Learn MS Excel tools andtechniques

COURSE OUTCOME:

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

COs	CO Statement	KnowledgeLevel
CO1	Use a range of lookup and reference functions.	K1
CO2	Modify Excel options.	K2
CO3	Customize the formatting of charts in Excel.	K3
CO4	Create and use labels and names in a workbook.	K4
CO5	Group cells and use outlines to manipulate the worksheet	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	3	3	3	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	0	1
CO5	3	3	3	1	0	0	1
Total Contributionof COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs Contribution toPOs	2.18	1.97	1.67	1.09	1.09	0.58	0.36

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

Microsoft Excel

1. Find out the Total, minimum , maximum and average values using the formula in the given table

First Name	Last Name	Hours	Rate	Gross Pay	Tax	Net Pay	Superannuation
Virginia	Bernard	16	25.90	414.40	82.88	331.52	33.15
Catherine	Harvest	24	16.40	393.60	78.72	314.88	31.49
Steve	Jones	40	28.50	1,140.00	228.00	912.00	91.20
Sam	McGregor	40	25.70	1,028.00	205.60	822.40	82.24
Sandra	O'Shea	35	29.60	1,036.00	207.20	828.80	82.88
Eddie	Smith	40	28.50	1,140.00	228.00	912.00	91.20

2. Prepare a bar chart using the below table

2	Sales				
3		Week 1	Week 2	Week 3	Week 4
4					
5	Monday	296,114	565,042	429,746	123,445
6	Tuesday	70,500	78,967	85,889	117,015
7	Wednesday	520,830	360,389	244,488	110,585
8	Thursday	83,296	520,242	82,467	112,728
9	Friday	520,140	83,333	87,611	119,158
10		1,490,880	1,607,973	930,201	582,931

3. Write down the formula to concatenate the data in two different cells into a single cell

Example:

	A	B	C	D	E
1					
2		New York		NY	
3					
6					
7					
8		New York, NY			
9					
10					

4. Enter the student details as Reg. No, Name, Age, Marks for 3 subject and display the count of the students whose avg>=60

5. Find out the week No and day of the given table using date function

Current Date	Week No	Day of the year
5/3/2018		
5/23/2021		
2/23/2022		
5/23/2010		
5/23/2008		
12/27/2021		

6. Create a workbook with the following details

Emp. No	Name	Basic Salary	House Rent	Conv. Allowance	Medical Allowance	Gross	Tax	Net
1	ABC	8000						
2	XYZ	3500						
3	KLM	8900						
4	WXY	4500						
5	MNO	6500						
6	PQR	4000						
7	STU	7800						

Total Salary

Find out the following details
i) Calculate House Rent (if Basic Salary is greater than 5000 then 45% otherwise 30%)
ii) Calculate Conv. Allowance (if Basic Salary is greater than 5000 then 30% otherwise 20%)
iii) Calculate Medical Allowance (if Basic Salary is greater than 5000 then 60% otherwise 45%)
iv) Calculate Gross Pay, Net Pay

7. From the above given table find

i) Calculate Tax (if Gross is greater than 15000 then 10% otherwise 0)

ii) Calculate total salary of those employees whose salary is less than 5000

iii) Count no. of employees who are not giving tax

8. Create a workbook with the following details

Reg. ID	Name	Quizes (10)	Mid-Terms		Mids (Total) (30)	Assignment (10)	Project + Pres (10)	Final (40)	Total (100)	Grade
			M1	M2						
101	ABC	10	13	8		9	10	35		
201	XYZ	9	12	12		8	9	32		
301	KLM	7	15	15		7	8	28		
401	WXY	8	13	13		9	7	31		
501	MNO	9	10	12		10	5	36		
601	PQR	8	7	2		9	9	30		
701	STU	6	2	12		8	7	21		

No. of D's [   ]   No. of F's [   ]

Find out the following

i) Calculate Mid-Total, Total

ii) Calculate Grade using If condition

iii) Calculate no. of D (below 60 and above 40) and F (below 40) grades

9. Find out the following details from the given table

i) Find out the city, departure time and terminal of Flight No. LH 5842 using lookup formula

ii) Find out the no. of flights coming on terminal 2 using formula.

flight-Nr	city	departure	terminal	gate
EW 730	Bremen	14:50	T1	164
6E 235	Dortmund	16:00	T1	170
KL 1874	Amsterdam	16:00	T2	146
AF 2009	Paris	16:15	T1	114
LH 299	Berlin	16:20	T2	162
LH 5860	Madrid	16:25	T1	164
LH 5842	Barcelona	16:30	T1	166
LH 1369	München	17:00	T2	131
LH 5966	London	17:10	T1	161

10. Create a google sheet with the following details

i) Subtract both A and B series, then find the ABSOLUTE value in the next column.

ii) Share the sheet with your friend

Series A	Series B
10	8
6	8
7	9
5	8

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credit
Part – III	Core: XVIII Open Elective	**24CGUOE1**	**BASICS OF ACCOUNTING**	52	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	50	50	100

PREAMBLE:

To equip the students with the fundamental principles of accountancy for sole trading concerns

COURSE OUTCOME:

After completion of the course, the learners will be able to

COs	CO Statement	Knowledge Level
CO1	explain the basic concepts of business accounting	K1
CO2	Prepare journal, ledger, subsidiary books and final accounts of business organization.	K2
CO3	Justify and rectify the errors in the preparation of accounts.	K3
CO4	Analyze the accounting concepts and conventions, assets and liabilities of the trading organization.	K4
CO5	Apply golden rules to prepare financial statements for business organization.	K5

K1- Remember; K2- Understand; K3 - Apply; K4 - Analyze; K5 – Evaluate; K6 - Create.

CO-PO MAPPING (COURSE ARTICUALTION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	1	1
CO2	9	9	9	3	3	1	1
CO3	9	9	3	3	3	3	1
CO4	9	3	3	1	1	1	1
CO5	3	3	3	1	0	1	1
Total Contribution of COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs contribution to POs	2.22	2.17	1.76	1.71	1.52	0.98	0.82

Level of correlation:0–No correlation;1–Lowcorrelation;3–Medium correlation;
9-High correlation between COs and POs.

Course Content

UNIT I   **(11Hours)**

Introduction to Accounting: Accounting – meaning and definition – need – steps – objectives – advantages – limitations – users of accounting information – book keeping Vs accounting – double entry system – dual aspects – advantages of double entry system – types of accounts – personal account, real account and nominal account – golden rules of accounting – accounting terms – accounting equation –accounting cycle.

UNIT II   **(11Hours)**

Journal and Ledger: Journal – meaning and definition – format – recording business transactions in journal with narration. Ledger - meaning and definition – format – POsting journal entries in ledger.

UNIT III   **(10Hours)**

Subsidiary Books: Meaning – benefits – types – purchase book, sales book, purchase return book, sales return book, bills receivable book, bills payable book, petty cash book and cash book with single, double and triple columns.

UNIT IV   **(10Hours)**

Trial Balance: Meaning – objectives – methods of preparing trial balance – preparation of trial balance from the balances extracted from the ledger accounts – errors disclosed by trial balance – errors not disclosed by trial balance.

UNIT V   **(10Hours)**

Final accounts: Introduction – preparation of trading account, profit and loss account and balance sheet with simple adjustments – closing stock, outstanding expenses, prepaid expenses, accrued income and income receivedinadvance.

Note: Distribution of Marks: Theory- 40% and Problems- 60%.

TEXT BOOKS:

Author	Title	Publisher	Year of Publication
Reddy.T.S & Murthy A	Financial Accounting	Margham Publication, Chennai	2012
Vinayakam.N, Mani.P.L & Nagarajan.K.L	Principles of Accountancy	S. Chand & Sons, New Delhi, New Delhi	2002

REFERENCE BOOKS:

S.No	Authors	Title	Publishers	Year of Publication
1	Grewal.T.S	Introduction to Accountancy	S.Chand & Sons, New Delhi, New Delhi	2003
2	Gupta. R.L, Gupta, V.K & Shukla M.C	Financial Accounting	S.Chand&Sons, NewDelhi	2009
3	Maheswari.S.K, Reddy.T.S	Advanced Accountancy	Vikas Publishing House, New Delhi.	1996

WEB REFERENCES:

1. https://www.accounting.com/resources/basic-accounting-terms/
2. https://www.youtube.com/watch?v=MSSjmzV-LsU
3. https://www.vedantu.com/revision-notes/cbse-class-11-accountancy-notes
4. https://byjus.com/commerce/class-11-accountancy-chapter-1-introduction-to-accounting/
5. https://images.topperlearning.com/topper/revisionnotes/8011_Topper_21_101_503_550_10598_Basic_Accounting_Terms_up201904301415_1556613905_1714.pdf?v=0.0.1
6. https://www.youtube.com/watch?v=ofDnYCGWjdI
7. file:///C:/Users/Happy/Downloads/338%20-%2011th%20Accountancy%20Textbook%20Volume%201.pdf
   https://samacheerkalvi.guru/samacheer-kalvi-11th-accountancy-solutions-chapter-1/

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
Part – III	Core: XVIII Open Elective	**24CCUOE1**	**E ADVERTISING**	65	3

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	50	50	100

PREAMBLE:

To make the students to understand the concept of e-advertising tools and techniques in media

COURSE OUTCOME:

After completion of the course, the learners will be able to:

COs	CO Statement	Knowledge Level
CO1	spell out the meanings for the different terms used in E-advertising	K1
CO2	explain the various domain concepts in E-advertising	K2
CO3	apply the modern techniques of advertising in media planning, advertising agencies and social advertising	K3
CO4	analyse the role of creativity in advertising, factors influencing media choice, challenges faced by advertisers and distinguish between traditional advertising and E advertising	K4
CO5	evaluate the effectiveness of E-advertising to withstand the products in the market	K5

K1 – Remember; K2 – Understand; K3 – Apply;   K4 – Analyze; K5 – Evaluate; K6 – Create.

CO-PO MAPPING (COURSE ARTICUALTION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	3	3	1	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	1	1
CO5	3	3	3	1	0	1	1
Total Contribution of COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs Contribution to POs	1.84	1.80	1.52	1.28	1.37	0.65	0.84

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

Course Content

Unit - I   **(13hours)**

E-advertising

Meaning – Traditional advertising Vs E- advertising – Facets of E- advertising – Role of E-advertising- Models for E- advertising – Significance and limitations of E- advertising – Constraints in E- advertising.

Unit - II   **(13 hours)**

Creativity in advertising

Role of creativity in advertising - Determining the message theme / major selling idea and Unique Selling Proposition (USP) - Positioning strategies - Persuasion Advertising appeal and

its types – Executional styles of presenting ads- Advertising Copy-meaning, essentials and its elements– headline, sub-headline, body copy, illustration, slogan, signature and logo

Unit - III (13 hours)

Media planning and Decisions

Media Planning-The function of media planning in advertising-Role of media Planner - Challenges in media planning -Media planning process -Major media types – characteristics of media- internet as an advertising media- merits and demerits- Factors influencing media choice- media selection- media scheduling- Advertising through the Internet-media devices.

Unit - IV (13 hours)

Effectiveness of E-advertising

Evaluating communication and sales effects- Pre- and Post-testing techniques- E-advertising agencies – selection, compensation and appraisal of advertising agency

Unit - V (13 hours)

E- Advertising in Indian Scenario

Trends in advertising industry in India – Challenges faced by advertisers in India in the era of globalization- Social Advertising by Indian Government through Directorate of Advertising and Visual Publicity (DAVP)

TEXT BOOKS:

Authors	Title	Publisher	Year of Publication
Jaishree Jethwaney and Shruti Jain,	Advertising Management –	2nd Ed. Oxford University Press	2012
Ronald Lane,W. J. Thomas Russell, Karen Whitehill King	Kleppners Advertising Procedure	16th Ed., Pearson Education India	2008

REFERENCE BOOKS:

S.No	Authors	Title	Publishers	Year of Publication
1.	Belch G. and Belch M.	Advertising and Promotion, An Integrated Marketing Communications Perspective	6th ed., Tata McGraw- Hill Publishing Company Limited, New Delhi, India	2003
2.	Burnett, Wells, and Moriatty	Advertising: Principles and Practice	5th ed. Prentice Hall of India New Delhi	2015
3.	Kazmi S. H. H. and Batra Satish K	Advertising and Sales Promotions	2nd ed., Excel Books, New Delhi,	2004

WEB REFERENCES:
1. https://www.researchgate.net/publication/287509406_The_Effectiveness_of_Online_Advertising_in_Purchase_Decision_Liking_Recall_and_Click
2. https://www.researchgate.net/publication/318429556_IMPACT_OF_ONLINE-ADVERTISING_ON_CONSUMERS
3. https://www.youtube.com/watch?v=OWz8CzLELLQ
4. http://granthaalayah.com/Articles/Vol4Iss3/03_IJRG16_SE03_03.pdf
5. https://www.tandfonline.com/doi/abs/10.1080/00913367.2018.1556138?journalCode=ujoa20
6. https://www.slideshare.net/AhmadYousef/electronic-advertising-2448750
7. https://www.slideshare.net/suhasmallya/online-advertising-an-introduction-and-overview
8. https://slideplayer.com/slide/12507046/

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
Part – III	Core: XVIII Open Elective	**24CPUOE1**	**HUMAN RESOURCES MANAGEMENT**	52	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	50	50	100

PREAMBLE

To make the students to understand the various facets of Human Resource Management and comprehend emerging developments in HRM.

COURSE OUTCOME:

After completion of the course, the learners will be able to

COs	CO Statement	Knowledge Level
CO1	recollect the concepts of Human Resource Management, Human resource planning, Recruitment, selection and placement, job analysis, training, performance appraisal, promotion, motivation	K1
CO2	illustrate the role of human resource manager, benefits of human resource planning, job description and job specification.	K2
CO3	apply the organizational set up of human resource department, methods of selection, job design and performance appraisal	K3
CO4	analyze the problems involved in placement, methods of training-techniques of wage fixation, styles of leadership	K4
CO5	evaluate the implications of human resource planning, need for training, measurements, motivation and leadership	K5

K1- Remember; K2 - Understand; K3: Apply; K4: Analyze; K5 - Evaluate; K6 – Create.

CO-PO MAPPING (COURSE ARTICUALTION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	3	3	1	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	1	1
CO5	3	3	3	1	0	1	1
Total Contribution of COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs Contribution to POs	2.24	2.19	1.79	1.59	1.63	0.92	0.85

Level of Correlation: 0-No Correlation; 1-Low Correlation; 3-Medium Correlation; 9-High Correlation between COs and POs.

Course Content

UNIT I   **(10 Hours)**

Human Resource Management

Meaning of HRM- importance of HRM- objectives - Role of human resource manager- duties and responsibilities of human resource manager- typical organizational setup of human resource department.   .

UNIT II   **(10 Hours)**

Human Resources Planning

Meaning and importance of human resources planning- benefits of human resource planning- process of human resource planning- Recruitment- Selection- testing interview- Placement.

UNIT III   (10 Hours)

Job Analysis

Concept and uses of job analysis- Process and methods of job analysis- Job description and job specification- Role analysis -Concept of job design- approach and methods of job design- Training and induction-meaning- Objectives and purpose of induction-need for training-benefits of training-methods of training

UNIT IV   (12 Hours)

Performance Appraisal, Compensation and Promotion

Meaning of performance appraisal- Objectives of performance appraisal- methods of performance appraisal and limitations- job evaluation- Principles and techniques of wage fixation - Objectives of Compensation.

UNIT V   (10 Hours)

Motivation and Leadership

Motivation-meaning-importance-factors influencing motivation and theories of motivation-Maslow's theory of motivation-Herzberg two factors hygiene theory of motivation-X,Y and Z theories

Leadership

Leadership: Meaning- Qualities and styles of leadership.

BOOKS FOR REFERENCE:

S.No	Authors	Title	Publishers	Year of Publication
1	Aswathappa K	Human Resource management	McGraw Hill Education; Eighth edition, New Delhi.	2017
2	Dessler, Gary	Human Resource management	Prentice Hill, New Delhi.	2014
3	Prasad L.M.	Human Resource Management	Sultan Chand & Sons, New Delhi	2007
4	Rao, S.	Personnel and human resource management	Himalaya publishing house, Bangalore	2014
5	Reddy &Appanniah	Human Resource management	Himalaya publishing house, New Delhi	
6	Tripathi P.C.	Human Resource Management	Sultan Chand & Sons, New Delhi	2010

WEB REFERENCES:

1) https://www.hrdconnect.com/2019/05/22/what-is-hr-management-in-an-organisation/
2) https://www.economicsdiscussion.net/human-resource-management/human-resource-planning-definition-importance-objectives-process-prerequisites/31575
3) https://www.economicsdiscussion.net/human-resource-management/job-analysis-meaning-concept-purposes-contents-process-and-methods/31576
4) https://www.economicsdiscussion.net/performance-appraisal/performance-appraisal-in-hrm/31873
5) https://www.toolbox.com/hr/talent-management/articles/what-is-talent-management/
6) https://www.businessmanagementideas.com/human-resources-management/work-life-balance-in-hrm/20853
7) https://www.slideshare.net/timadams2323/balanced-scorecard-presentation-1068670
    https://www.slideshare.net/jithindas05/competency-mapping-ppt-15741755?next_slideshow=1

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART - III	Core: XVIII Open Elective	24BAUOE1	**START-UP BUSINESS**	48	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE:

The course is designed to understand the practices and technology to start a business.

COURSE OUTCOME:

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

COs	CO Statement	Knowledge Level
CO1	Find out the start-up activities of a business.	K1
CO2	Demonstrate the trends and supporting agencies for starting a business.	K2
CO3	Build the importance of start-up ideas and map the strategies to start a business with different stages of business.	K3
CO4	Categories the application of start up business activities	K4
CO5	Evaluate the ideologies of start-up business in real time scenario	K5

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	0	0
CO2	9	9	9	3	3	1	1
CO3	9	9	3	3	0	3	1
CO4	9	3	3	1	3	0	3
CO5	3	3	3	1	1	3	0
Total Contribution of COs to POs	**39**	**33**	**27**	**17**	**10**	**7**	**5**
Weighted Percentage of COs Contribution to POs	**2.23**	**2.26**	**2.29**	**1.71**	**1.22**	**1.22**	**0.81**

Level of correlation: 0 – No correlation; 1- Low correlation; 3 – Medium correlation; 9 – High correlation between COs and POs

COURSE CONTENT

UNIT- I INTRODUCTION TO START-UP (10 Hours)

Start-up: Meaning- Difference between start-up idea and opportunity-Need for start-up-Qualities required for a start-up-Factors influencing start-up-Problems for start-up- Startup scenario in India.

UNIT -II MENTORING AND FUNDING FOR START-UP (10 Hours)

Ownership structure for start-up -Selection of mentors-Importance of start-up mentors Bootstrapping-Funding for start-up.

UNIT- III START-UP IDEAS AND MINDMAPPING (10 Hours)

Start-up ideas: Market-Focus Groups-Brainstorming-Gordon Method-Collective notebook method and Big dream approach-Mind mapping.

UNIT- IV LIFE CYCLE STAGES OF START-UP (10 Hours)

Life cycle stages of start-up's – Activities during each stage-Interaction with a start-up entrepreneur.

UNIT- V START-UP REGISTRATION & PRACTICAL TRAINING (8 Hours)

Student start-up's-Role of TBI in promoting start-up- Start-up registration process -overview of start-up marketing ideas.

Book for Reference:

S. no	Authors	Title	Publishers	Year of publication
1.	Vijayakumar Ivaturi, Meena Ganesh	The manual for Indian start-ups	Penguin Random House India	2018

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE - XIX ELECTIVE - I	**24MAU18A**	**OPERATIONS RESEARCH-I**	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	**V**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn decision making problems based on deterministic and probabilistic models.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	outline the meaning, purpose and tools of Linear programming, Transportation, Assignment and Replacement models.	K_1
CO2	explain the procedures for Linear programming, Transportation, Assignment and Replacement Theory.	K_2
CO3	illustrate the methodologies to get the optimal solution and the period of replacement.	K_3
CO4	measure the mathematical background of Linear programming, minimum Transportation cost, Assignment techniques and the mechanism behind the sudden failure of systems.	K_4
CO5	evaluate different situations after the solution of Linear programming, Transportation, Assignment and Replacement models.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	3	3	3
CO4	9	9	3	3	1	1	1
CO5	9	3	3	1	0	0	0
Total Contribution of COs to POs	45	39	33	31	22	22	22
Weighted Percentage of COs contribution to POs	2.58	2.45	2.23	2.27	2.59	2.89	3.22

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   **LINEAR PROGRAMMING PROBLEM**   **(12 Hours)**

Introduction-Linear Programming Problem - Mathematical formulation of the problem–Illustrations on Mathematical formulation of LPP's-Graphical method.

UNIT - II SIMPLEX METHOD AND ARTIFICIAL VARIABLE TECHNIQUE (12 Hours)

Principles of Simplex method-Use of Artificial Variables-Two phase method-Big M method

UNIT - III   **TRANSPORTATION PROBLEM**   **(12 Hours)**

Solution of a Transportation problem-Finding an IBFS-Test for Optimality-MODI Method-Some Exceptional Cases.

UNIT - IV   **ASSIGNMENT PROBLEM**   **(12 Hours)**

Introduction-Mathematical Formulation of the Problem-Solution methods of Assignment Problem-Special Cases in Assignment Problem.

UNIT – V   **REPLACEMENT**   **(12 Hours)**

Introduction - Replacement of equipment / assets that deteriorates gradually - Replacement of equipment that fails suddenly and problems.

Industry 4.0 – *Solving optimization Problems using R.*

1. Write a R program to solve the following LPP

	Customer 1	Customer 2	Customer 3	Customer 4	Supply
Supplier 1	10	2	20	11	15
Supplier 2	12	7	9	20	25
Supplier m	4	14	16	18	10
Demand	5	15	15	15	

2. Consider a nutrition chart with cost and calories. Write a program in R to find the minimum –cost diet.

3. There are three plants A, B, and C with capacities of 120, 80 and 200 units. They supply to four warehouses P, Q, R, and S with demand of 60, 50, 140 & 50 units. Find IFS by VAM. Also write coding in R. Transportation unit cost matrix is given below:

Warehouse / Plant	P	Q	R	S
A	3	5	2	5
B	3	8	4	8
C	7	4	7	4

4. Write a programming in R to solve the following assignment problem

	Required Time per Task (Hours)				
Temporary Employee	Word Processing	Graphics	Packets	Registrations	Hourly Wage
Ann	35	41	27	40	$14
Ian	47	45	32	51	12
Joan	39	56	36	43	13
Sean	32	51	25	46	15

Text Book:

Kantiswarup, P. K. Gupta, Man Mohan (2017) –" Operations Research", 18th Revised edition, S. Chand & Sons Education Publications, New Delhi.

UNIT	CHAPTER	PAGE
I	2 3 4	39-46 65-78 99-105
II	4	106-114
III	10	252-281
IV	11	295-311
V	18	477-495

REFERENCE BOOKS

1. DharaniVenkata Krishnan .S – " Operations Research Principles and Problems" Keerthi publishing house PVT Ltd.

2. Prem Kumar Gupta D. S. Hira – "Operations Research " , S. Chand & Company Ltd, Ram Nagar, New Delhi.

WEB REFERENCES:

https://www.youtube.com/watch?v=Hw2CP_4iK4U

https://www.youtube.com/watch?v=vKVkOpNDZ2s

https://www.slideshare.net/mplad/two-phase-method-linear-programming

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE - XIX ELECTIVE - I	**24MAU18B**	**APPLIED ALGEBRA - I**	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	**V**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn and gain knowledge about the mathematical logic and algebraic structures, Lattices and Boolean Algebra.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic concepts of logical operations, relations and functions, graphs, lattices and Boolean functions.	K_1
CO2	illustrate the properties of logical operations, relations and functions, graphs, lattices and Boolean functions.	K_2
CO3	apply the various formulae to solve the rules of tautology, rules of inference, properties of functions, groups and Boolean algebra.	K_3
CO4	examine the relation between tautology and contradiction, Subgroup and normal Subgroup.	K_4
CO5	evaluate the problems based on logical expressions, relations, functions and Boolean algebra.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	3	3	3
CO4	9	9	3	3	1	1	1
CO5	9	3	3	1	0	0	0
Total Contribution of COs to POs	45	39	33	31	22	22	22
Weighted Percentage of COs contribution to POs	2.58	2.45	2.23	2.27	2.59	2.89	3.22

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;

9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   **MATHEMATICAL LOGIC**   **(12 Hours)**

Connections well formed formulas – Tautology - Equivalence of Formulas - Tautological implications - Duality law - Normal forms.

UNIT – II   **THEORY OF INFERENCE**   **(12 Hours)**

Theory of inference - predicate calculus - Variables – Quantifiers - Free and bound Variables - Theory of inference of predicate calculus.

UNIT - III   **RELATIONS AND FUNCTIONS**   **(12 Hours)**

Composition of relations - Composition of functions - Inverse functions - Hashing functions - Permutation function.

UNIT - IV   **ALGEBRA STRUCTURES**   **(12 Hours)**

Semi groups - Free semi groups – Monoids – Groups - Cosets - Sets - Normal subgroups - Homomorphism.

UNIT - V   **LATTICES AND BOOLEAN ALGEBRA**   **(12 Hours)**

Partial ordering - Poset – Lattices - Boolean algebra - Boolean functions - Theorems - Minimisation of Boolean functions.

TEXT BOOK

Veerarajan.T(2114) - " Discrete Mathematics with Graph theory and Coimbinatorics", McGraw Hill Education(India) Pvt. Ltd, New Delhi.

UNIT	CHAPTER	PAGE NUMBER
I	1	1-24
II	1	27-45
III	2, 4	66-68, 182-210,217
IV	5	232-242, 261-268
V	2	96-109, 114-117, 121-137

REFERENCE BOOK:

J.P Tremblay and R.P Manohar (1975)-"Discrete Mathematical Structures with applications to computer science", Mc.Graw Hill.

WEB REFERENCES:

1. https://youtu.be/UM_i1Cs1Vzw

2. https://youtu.be/fzd0Viu6Qx8

3. https://www.slideshare.net/rupalirana07/ch-2-lattice-boolean-algebra

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART - IV	SKILL ENHANCEMENT: II	24SEMAU02	**WEB PROGRAMMING – HTML AND PHP - PRACTICAL**	36	2

Contact hours per week: 3

Year	Semester	Internal Marks	External Marks	Total Marks
III	**V**	**50**	**-**	**50**

PREAMBLE:

Explore fundamental concepts in web development through hands-on exercises. Learn HTML for content structure, formatting, and image integration. Develop PHP skills for dynamic content manipulation, form handling and data processing tasks.

COURSE OUTCOME:

After completion of the course, the learners will be able to:

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Recall the fundamental concepts of basic structure of HTML including <body>, <pre>, text formatting tags, all types of list tags and their applications in web development.	K_1
CO2	Understand the basics of HTML and PHP programs.	K_2
CO3	Able to implement PHP scripts to redirect users to different pages based on conditions or actions.	K_3
CO4	Competent in using <img> tag for image embedding and <a> tag for hyperlinks and writing PHP programs to swap values of two variables efficiently.	K_4
CO5	Creating image maps for interactive image navigation and functionality and HTML forms and handling user input using PHP echo statements.	K_5

K_1 – Remember; K_2 – Understand; K_3 – Apply; K_4 – Analyze; K_5 – Evaluate; K_6 – Create.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	9	9	9
CO4	9	9	9	9	3	5	3
CO5	9	9	9	9	3	3	1
Total Contribution of COs to POs	45	45	45	45	33	35	31
Weighted Percentage of COs contribution to POs	2.58	2.83	3.04	3.29	3.88	4.61	4.54

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

LIST OF PROGRAMS

All the following listed programs have to be executed and recorded

HTML

1. A Program to illustrate body, pre tags, text formatting tags

2. A Program to illustrate text Font tag, comment, h1….h6, and div tag

3. A Program to illustrate all types of list tag

4. A Program to illustrate img tag, Hyper Link tag (Anchor tag)

5. A Program to illustrate image map

PHP

1. Create a simple HTML form and accept the user name and display the name through PHP echo statement

2. Write a PHP script, which changes the color of the I character of a word

3. Write a PHP script to redirect a user to a different page

4. Write a PHP program to swap two variables

5. Write a PHP program to remove duplicates from a sorted list

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART V	PROFICIENCY ENHANCEMENT	**24PEMAU01**	**NUMERICAL APTITUDE (SELF STUDY)**	-	2

Contact hours per week: -

Year	Semester	Internal Marks	External Marks	Total Marks
III	**V**	-	**100**	**100**

PREAMBLE:

To enable the students to learn about the concepts of aptitude.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the formulae in numerical aptitude	K_1
CO2	explain the procedure for solving the problems numerically.	K_2
CO3	apply various formulae to obtain the numerical solutions.	K_3
CO4	analyze the problems based on Ages and percentage.	K_4
CO5	evaluate the solutions of simple problems on numbers , ages and percentage.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	3
CO2	9	9	9	9	3	9	3
CO3	9	9	9	9	1	3	3
CO4	9	9	9	9	1	3	3
CO5	9	9	9	9	0	3	3
Total Contribution of COs to POs	45	45	45	45	8	27	15
Weighted Percentage of COs contribution to POs	2.58	2.83	3.04	3.29	0.94	3.55	2.20

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation; 9- High Correlation between COs and POs

COURSE CONTENT:

UNIT I

Numbers-H.C.F and L.C.M of Numbers-Simplification

UNIT II

Square roots and Cube roots.

UNIT III

Problem on Numbers.

UNIT IV

Problem on Ages.

UNIT V

Percentage- Concept of percentage.

TEXT BOOK:

Aggarwal R.S. (2012 Edition), Quantitative Aptitude for Competitive Examinations, S. Chand & Company Ltd, New Delhi

REFERENCE BOOKS:

 1. Sijwali B. S.(2007), Quantitative Aptitude,Arihand Publications (India) PVT LTD.

2. AbhijitGuha(2006), Quantitative Aptitude for Competitive Examinations, McGraw Hill

Companies.

SEMESTER – VI

Category	Course Type	Course Code	Course Title	Contact Hours	Credit
PART III	CORE – XX	**24MAU19**	**LINEAR ALGEBRA**	72	5

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	25	75	100

PREAMBLE:

To enable the students to learn and gain knowledge about linear algebra and linear transformations.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the definitions and preliminaries in Vector space, Basis, Dual spaces, Inner product spaces.	K_1
CO2	explain the basic concepts of Linear Algebra	K_2
CO3	apply conceptual ideas of Linear Algebra in simple problems.	K_3
CO4	analyze the theorems and inequalities on linear functions and linear functional .	K_4
CO5	evaluate the characterization of linear vectors, linear transformations and linear functional.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COS-POS MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	3	3	3
CO3	9	9	9	9	3	3	3
CO4	9	9	9	9	1	1	1
CO5	9	9	3	3	1	1	1
Total Contribution of COs to POs	45	45	39	39	17	17	17
Weighted Percentage of COs contribution to POs	2.58	2.83	2.63	2.85	2.00	2.24	2.49

**Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs**

COURSE CONTENT:

UNIT - I VECTOR SPACES AND SUBSPACES **(15 Hours)**

Group-Field-External and Internal compositions-Linear Algebra-Definition-Subspaces-Linear Combination-Linear Span-Linear Sum-Internal Direct Sum- Complementary Subspaces-Disjoint Spaces-External Direct Sum-Quotient Space-Elementary Properties-Theorems related to vector spaces, Subspaces and Linear Span

UNIT - II LINEAR DEPENDENCE OF VECTORS AND BASIS **(15 Hours)**

Vector-Zero vector -Operation on vector –Vectors in C^n and R^n-Linearly dependent and Linearly independent-Basic theorems regarding linear dependent of vectors-Cauchy Schwarz's inequality-Minkowski's inequality.

Basis–Finitely generated spaces-Dimension co-ordinates-Existence theorem–Replacement theorem-Invarience of number of elements in a basis-Extension theorem-Theorems related to basis and dimension.

Dimensionality Reduction for IoT Data Compression 5.0.

UNIT - III LINEAR TRASFORMATIONS **(15 Hours)**

Trasformations-Onto and into maps-One –one and many-one maps-Products of functions-Linear transformation-Isomorphisms-Kernal and range space of a linear map-Nulity and rank-Singular and non-singular transformation-linear operator-Invertible operator-Some theorems.

UNIT – IV LINEAR FUCTIONALS AND THE DUAL SPACE **(15 Hours)**

Linear functional and its examples-Dual space- Dual basis-Reflexivity-Annihilator-Transpose of a linear map-Theorems.

UNIT - V INNER PRODUCT SPACES **(12 Hours)**

Inner product-Norm-orthogonality-orthogonal and orthonormal sets-Angle between two vetors-Adjoint operator-Complete orthonormal set-Symmetric operator-T-invariant-Theorem and solved examples-Bessel's inequality-Grahm Schmidt orthogonalization process.

Industry 4.0 – Foundations for Data Science Machine Learning.

1. https://youtu.be/5qj8krSCezw
2. https://youtu.be/wyoS89J3ap4

TEXT BOOK

Gupta.K. P.(1988) "Linear algebra", Pragathi Prakashan Publishers , Meerut India limited.

UNIT	CHAPTER	PAGE NUMBER
I	**2**	**6-26**
II	**3,4**	**48-57 , 73-91**
III	**5**	**111-136**
IV	**7**	**207- 232**
V	**10**	**273-296**

REFERENCE BOOKS

1. Herstein.I.N(2014)—"Topics in Algebra", II Edition, John Wiley & Sons, New York.
2. Sharama S. D - "Linear algebra" Kedarnath ramnath Publishers, Meerut.
3. Vasishtha A. R(1994 – 95)—"Modern Algebra", Krishna Prakashan Mandir, Meerut.

WEB REFERENCES:

1. https://youtu.be/t5ckUuSsWe4
2. https://www.youtube.com/watch?v=ozwodzD5bJM
3. https://www.youtube.com/watch?v=j3YpNG1oBMo

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE – XXI	**24MAU20**	**REAL ANALYSIS - II**	72	5

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
III	**VI**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn and gain knowledge about Continuity, Derivatives and Functions of Bounded variation.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Recall the definitions of continuous functions, uniform continuous functions, connectedness, derivatives and monotonic functions.	K_1
CO2	explain the concepts of continuous functions, uniform continuous functions, connectedness, derivatives and monotonic functions.	K_2
CO3	Apply the concepts of monotonic functions for the functions of bounded variations, total variations, Continuity and inverse images of open or closed sets.	K_3
CO4	Analyze the concepts of continuity, uniform continuity, bounded variations, total variations.	K_4
CO5	Evaluate the problems based on Chain Rule, Rolles Theorem, Mean Value Theorem and Fixed Point Theorem.	K_5

K_1 - **Remember;** K_2 – **Understand;** K_3 - **Apply;** K_4 - **Analyze;** K_5 – **Evaluate.**

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	1	3	3	3	3
CO2	9	9	1	3	3	3	3
CO3	9	9	9	9	3	9	3
CO4	9	9	9	9	9	9	9
CO5	9	9	9	9	9	9	9
Total Contribution of COs to POs	45	45	29	33	27	33	27
Weighted Percentage of COs contribution to POs	2.58	2.83	1.96	2.41	3.17	4.34	3.95

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   **CONTINUITY**   **(15 Hours)**

Continuous functions –Continuity of composite functions– Examples of continuous functions - Continuity and inverse images of open or closed sets – Functions continuous on compact sets.

UNIT - II   **CONTINUITY**   **(12 Hours)**

Connectedness –Components of a metric space – Uniform continuity : Uniform continuity and compact sets –Fixed point theorem for contractions – Monotonic functions.

UNIT - III   **DERIVATIVES**   **(15 Hours)**

Introduction - Definition of derivative –Derivatives and continuity –Algebra of derivatives – the chain rule ––Rolle's theorem –The mean value theorem for derivatives – Intermediate value theorem for derivatives - Taylor's formula with remainder.

UNIT - IV   **FUNCTIONS OF BOUNDED VARIATION**   **(15 Hours)**

Introduction -Properties of monotonic functions –Functions of bounded variation –Total Variation –Additive properties of total variation - Total variation on [a, x] as a function of x – Functions of bounded variation expressed as the difference of increasing functions.

UNIT - V   **RIEMANN – STIELTJES INTEGRAL**   **(15 Hours)**

The Riemann - Stieltjes integral : Introduction –Notation –The definition of Riemann –Stieltjes integral –Linear properties –Integration by parts –Change of variable in a Riemann –Stieltjes integral –Reduction to a Riemann integral.

TEXTBOOK

Apostol T.M – (2002) "Mathematical Analysis", 2nd edition, 20th Reprint., Addison-Wisely, Narosa Publishing Company, Chennai.

UNIT	CHAPTER	SECTION
I	**4**	**4.8 - 4.9, 4.11 - 4.13**
II	**4**	**4.16, 4.17, 4.19 - 4.21, 4.23.**
III	**5**	**5.1 - 5.5, 5.9 - 5.12.**
IV	**6**	**6.1- 6.7.**
V	**7**	**7.1 - 7.7**

REFERENCE BOOKS

1. Goldberg.R.R –(1990), "Methods of Real Analysis", NY, John Wiley, New York.

2. Simmons.G.F – (1963), "Introduction to Topology and Modern Analysis", McGraw – Hill, New York.

WEB REFERENCES:

1. http://assets.press.princeton.edu

2. https://mathcs.org/analysis/reals

3. https://bookstore.ams.org

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE – XXII	**24MAU21**	**COMPLEX ANALYSIS – II**	72	5

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
III	**VI**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn the immediate consequence of Cauchy's theorem, analytic and meromorphic functions and contour integration.

COURSE OUTCOME:

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

CO'S	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the results of Cauchy's theorem, Taylor's and Laurent's series, singularities, residues and meromorphic function.	K_1
CO2	describe the results based on Cauchy's theorem, singularities, residues and meromorphic function.	K_2
CO3	examine the singularities, poles and residues of complex function, types of real definite integrals.	K_3
CO4	analyze the Taylor's and Laurent's expansion, behavior of a function at an isolated singularity and zeros and poles of meromorphic function.	K_4
CO5	evaluate the series expansion and roots of analytic functions and the real definite integrals.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	9	3	3	1
CO3	9	9	9	9	3	3	1
CO4	9	9	9	3	1	1	1
CO5	9	9	9	3	1	0	0
Total Contribution of COs to POs	45	45	45	33	11	10	4
Weighted Percentage of COs contribution to POs	2.58	2.83	3.04	2.41	1.29	1.32	0.59

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   RESULTS BASED ON CAUCHY'S THEOREM (I)   (15 Hours)

Zeros of a function -Cauchy's Inequality – Lioville's theorem –Fundamental theorem of algebra –Maximum modulus theorem –Gauss mean value theorem –Gauss mean value theorem for a harmonic function on a circle.

UNIT - II   RESULTS BASED ON CAUCHY'S THEOREM (II)   (15 Hours)

Taylor's series – Laurent's series.

UNIT – III   SINGULARITIES AND RESIDUES   (15 Hours)

Singular point - Isolated singularities (Removable Singularity, pole and essential singularity) –Residues –Residue theorem.

UNIT – IV   REAL DEFINITE INTEGRALS   (15 Hours)

Evaluation using the calculus of residues – Integration on the unit circle –Integral with $-\infty$ and $+\infty$ as lower and upper limits with the following integrals:

v) P(x) /Q(x) where the degree of Q(x) exceeds that of P(x) at least by 2.

vi) (sin ax).f(x), (cos ax).f(x), where a>0 and f(z) →0 as z→∞ and f(z) does not have a pole on the real axis.

vii) f(x) where f(z) has a finite number of poles on the real axis.

Integral of the type $\int_{x}^{a-1} \frac{x}{1+x} dx$; 0< a <1;

UNIT – V   MEROMORPHIC FUNCTIONS   (12 Hours)

Theorem on number of zeros minus number of poles –Principle of argument: Rouche's theorem – Theorem that a function which is meromorphic in the extended plane is a rational function.

TEXT BOOK:

Duraipandian.P and Kayalal Pachaiyappa(2114), "Complex Analysis", S.Chand and Company pvt.ltd, New Delhi.

UNIT	CHAPTER	SECTION
I	8	8.10, 8.11
II	9	9.1 to 9.3, 9.13.
III	9 10	9.5 to 9.12, 9.13. 10.1, 10.2 and 10.4.
IV	10	10.3 and 10.4.
V	11	11.1 to 11.3 (Omit theorems 11.5 and 11.6)

REFERENCE BOOKS:

1. Pillai.T.K.M. & Narayanan.S (1997) " Complex Analysis ", S.Viswanathan pvt ltd – Chennai.
2. Sharma.J.N. (2116),"Complex Analysis", Krishan Prakashan Media – Meerut.

WEB REFERENCES:

https://nptel.ac.in/courses/111/103/111103070/

https://nptel.ac.in/courses/111/106/111106094/

https://nptel.ac.in/courses/122/103/122103012/

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE – XXIII ELECTIVE - II	**24MAU22A**	**OPERATIONS RESEARCH-II**	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	**VI**	**25**	**75**	**100**

PREAMBLE:

To enable the students to understand various mathematical applications in industries-Decision making for real time environment.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic concepts, models and statements of Integer programming, Sequencing, Dynamic Programming, level of information and NLPP	K_1
CO2	express the procedures and steps for Integer programming, Sequencing, Dynamic Programming, Information theory and NLPP	K_2
CO3	examine the pure integer values, order of jobs, optimal solution and the level of information transmission	K_3
CO4	inspect the Kuhn-Tucker conditions, optimality and the time to complete the jobs	K_4
CO5	measure the mathematical arguments in a logical manner, Dynamic programming model and its applications in industry	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	3	3	3
CO4	9	9	3	3	1	1	1
CO5	9	3	3	1	0	0	0
Total Contribution of COs to POs	45	39	33	31	22	22	22
Weighted Percentage of COs contribution to POs	2.58	2.45	2.23	2.27	2.59	2.89	3.22

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT-I   INTEGER PROGRAMMING PROBLEM   (14 Hours)

Introduction –pure and mixed IPP – Gomory's all IPP method – Fractional cutmethod – All integer LPP- Mixd integer LPP.

UNIT-II   SEQUENCING PROBLEMS   (12 Hours)

Introduction-Problem of sequencing - Basic terms used in sequencing- Processing n-jobs through 2 machines - Processing n –jobs through k machines - Processing 2 jobs through k machines (Problems only).

UNIT-III   DYNAMIC PROGRAMMING PROBLEM   (10 Hours)

Dynamic Programming Problem – Recursive equation approach – D.P.P Algorithm – Solution of L.P.P by D.P.P.

UNIT-IV   NON-LINEAR PROGRAMMING PROBLEMS   (12 Hours)

Formulating Non-linear Programming Problems – General NLPP – Lagrange multiplier – Hessian bordered Matrix – Kuhn Tucker Condition – Problems.

UNIT-V   INFORMATION THEORY   (12 Hours)

Introduction – A measure of information – Entropy – the expected information – some properties of entropy functions – Joint and conditional entropies.

TEXT BOOK:

Kandiswarup, P. K. Gupta, Man Mohan (2017) –" Operations Research",18th Revised edition, S. Chand & Sons Education Publications, New Delhi.

UNIT	CHAPTER	PAGE
I	7	177 – 188
II	12	327-341
III	13	347-353
IV	27	823-840 894 & 895 901 - 903
V	30	885 – 890

REFERENCE BOOKS:

1. DharaniVenkata Krishnan .S – "Operations Research Principles and Problems" Keerthi publishing house PVT Ltd.

2. Prem Kumar Gupta D. S. Hira – "Operations Research ", S. Chand & Company Ltd, Ram Nagar, New Delhi.

WEB REFERENCES:

https://www.youtube.com/watch?v=5_Xyp7NZVxU

https://www.youtube.com/watch?v=EwcjyxuwUkI

https://www.slideshare.net/hakeemrehman/integer-programming-68158750

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE – XXIII ELECTIVE - II	**24MAU22B**	**APPLIED ALGEBRA -II**	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	**VI**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn and gain knowledge about the Formal languages Automata Theory and Graph Theory.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic definitions of grammars, operations, languages, graphs and trees.	K_1
CO2	explain the concepts of grammars, operations, languages, graphs and trees.	K_2
CO3	identify the different types of grammar in formal languages and graphs.	K_3
CO4	analyze the problems based on directed and undirected graphs, formal languages and context free languages.	K_4
CO5	evaluate the problems on regular expression, closure operations, context free languages, graphs and trees.	K_5

K_1 - **Remember;** K_2 – **Understand;** K_3 - **Apply;** K_4 - **Analyze;** K_5 – **Evaluate.**

COS-POS MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	3	3	3
CO4	9	9	3	3	1	1	1
CO5	9	3	3	1	0	0	0
Total Contribution of COs to POs	45	39	33	31	22	22	22
Weighted Percentage of COs contribution to POs	2.58	2.45	2.23	2.27	2.59	2.89	3.22

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT-I **FORMAL LANGUAGES AND AUTOMATA** **(15 Hours)**

Formal languages and Automata: Regular expressions - Types of grammar - Regular Grammar - Context free and sensitive grammars - Finite state automata.

UNIT-II **CLOSURE OPERATIONS** **(10 Hours)**

Closure operations

UNIT – III **CONTEXT FREE LANGUAGES** **(9 Hours)**

Context free languages

UNIT – IV **GRAPH THEORY** **(13 Hours)**

Graph Theory: Directed and undirected graphs - Paths - Reachability – Connectedness - Matric representation - Eular paths - Hamiltonean paths - Warshall's Algorithm.

UNIT – V **TREES** **(13 Hours)**

Trees - Binary trees simple theorems and applications.

TEXT BOOK

1.Veerarajan.T(2114) - "Discrete Mathematics with Graph theory and Coimbinatorics", McGraw Hill Education(India) Pvt. Ltd, New Delhi.

2.Rani Sironmoney(1984)-"Formal Languages and Automata",The Christian Literature Society, Madras 600 003.

BOOK	UNIT	CHAPTER	PAGE
1	I	8	448-460, 462-469
2	II	3	21-28
2	III	4	29-52
1	IV	7	366-394, 396-398
1	V	7	415-416, 418-426

REFERENCE BOOKS:

1. P. Tremblay and R.P Manohar (1975) -"Discrete Mathematical Structures with applications to computer science", Mc.Graw Hill.

2. J.K. Sharma (2105) - "Discrete Mathematics", II Edition, Macmillan India Ltd.

WEB REFERENCES:

1. https://youtu.be/APRPT4KrzMA

2. https://youtu.be/sWsXBY19o8I

3. https://youtu.be/zeeDbFNFEEg

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE – XXIV ELECTIVE - III	**24MAU23A**	**GRAPH THEORY**	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	**VI**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn and gain knowledge about Graph Theory.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall fundamentals of Graph Theory	K_1
CO2	demonstrate the concepts of graph theory	K_2
CO3	apply algorithms and procedures to solve the problems.	K_3
CO4	analyze the contexts in simple, directed, bipartite , planar, Eulerian and Hamiltonian graphs	K_4
CO5	evaluate the characterization of the graphs	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COs-POs MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	3	3
CO3	9	9	9	9	3	3	3
CO4	9	9	9	9	1	1	1
CO5	9	9	3	3	0	0	0
Total Contribution of COs to POs	45	45	39	39	10	10	10
Weighted Percentage of COs contribution to POs	2.58	2.83	2.63	2.85	1.18	1.32	1.46

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I   **BASICS OF GRAPHS**   **(10 Hours)**

Graphs –Sub graphs – Degree of a vertex walks, paths and cycles in a Graphs – connectedness- cut vertex and cut edge.

UNIT - II   **EULERIAN, HAMILTONION AND BIPARTITE GRAPHS**   **(10 Hours)**

Euler and Hamiltonion Graphs – Algorithm for Eulerian circuits –Weighed graphs- Bipartite Graphs –Trees.

UNIT- III   **MATRICES AND VECTOR SPACES ASSOCIATED WITH GRAPHS**   **(10 Hours)**

Matrix representation of a graph – Vector spaces associated with a graph – Cycle spaces and cut set space.

UNIT- IV   **PLANAR GRAPHS**   **(9 Hours)**

Planar graphs – Euler's theorem on planar graphs – Characterization of planar graphs (no proof) of the difficult part of the characterization.

UNIT – V   **DIRECTED GRAPHS**   **(9 Hours)**

Directed graphs – Connectivity – Eulerion Digraphs – Tournaments.

TEXT BOOK

Choudum.S. A.(1987) "A I Course in Graph Theory", Macmillan Publishers India limited.

UNIT	CHAPTER	SECTIONS
I	**1**	**1.1- .7**
II	**2,3**	**2.1-2.4, 3.1&3.3**
III	**4**	**4.1- 4.4**
IV	**5**	**5.1, 5.2 & 5.5**
V	**7**	**7.1, 7.2, 7.4& 7.5**

REFERENCE BOOKS

1. Narasingh Deo,(1995) -"Graph Theory", Prentice Hall of India.
2. Harary(1988) -"Graph Theory", Narosa Publishing HQCK.

WEB REFERENCES:

1. https://www.tutorialspoint.com/graph_theory/graph_theory_fundamentals.htm
2. https://www.tutorialspoint.com/graph_theory/graph_theory_traversability.htm
3. https://en.wikipedia.org/wiki/Planar_graph

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART III	CORE – XXIV ELECTIVE - III	**24MAU23B**	**FUZZY MATHEMATICS**	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	**VI**	**25**	**75**	**100**

PREAMBLE:

To enable the students to learn the fuzzy set theory, fundamentals of fuzzy algebra.

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic concepts of fuzzy algebra.	K_1
CO2	Interpret the theoretical ideas of fuzzy algebra.	K_2
CO3	apply the concepts of fuzzy subsets, fuzzy mappings, fuzzy relations, fuzzy logic, fuzzy groups, fuzzy rings on simple problems.	K_3
CO4	analyze fuzzy subgroup and Preimage of subgroupiod.	K_4
CO5	evaluate the features of fuzzy subsets, fuzzy mappings, fuzzy relations, fuzzy logic, fuzzy groups, fuzzy rings.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COS-POS MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	3	3
CO3	9	9	9	9	3	3	3
CO4	9	9	9	9	1	1	1
CO5	9	9	3	3	0	0	0
Total Contribution of COs to POs	45	45	39	39	10	10	10
Weighted Percentage of COs contribution to POs	2.58	2.83	2.63	2.85	1.18	1.32	1.46

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs

COURSE CONTENT:

UNIT - I **(10 Hours)**

Introduction – Fuzzy subsets – Lattices and Boolean algebras – L fuzzy sets – operations on fuzzy – α level sets – properties of fuzzy subsets.

UNIT - II **(10 Hours)**

Algebraic product and sum of two fuzzy subsets – properties satisfied by Addition and product – Cartesian product of fuzzy subsets.

UNIT - III **(10 Hours)**

Introduction – Algebra of fuzzy relations – logic – connectives.

UNIT - IV **(9 Hours)**

Some more connectives – Introduction – fuzzy subgroup – homomorphic image and preimage of subgroupoid.

UNIT - V **(9 Hours)**

Fuzzy invariant subgroups - fuzzy subrings.

TEXTBOOK

S. Nanda and N.R. Das Fuzzy Mathematical Concepts, Narosa Publishing House, New Delhi, 2010.

UNIT	CHAPTER	PAGE NUMBER
Unit - I	Chapter 1	Section: 1.1, 1.2, 1.4, 1.5, 1.7, 1.9, 1.10.
Unit – II	Chapter 1	Section : 1.11 – 1.13
Unit - III	Chapter 2	Section : 2.1 – 2.4
Unit - IV	Chapter 2 & 3	Section : 2.5 & 3.1 – 3.3
Unit - V	Chapter 3	Section : 3.4, 3.5

REFERENCE BOOK

1. M.Ganesh, Introduction to Fuzzy sets & Fuzzy logic, Prentice Hall of India Pvt. Ltd.,

2. John N. Mordeson and Premchand S. Nair, Fuzzy Mathematics, Spring verlong, 2001.

WEB REFERENCES:

1. https://youtu.be/LUz-FbwPh3Q

2. https://youtu.be/IZWTduVCrf8

3. https://en.wikipedia.org/wiki/Fuzzy_mathematics

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART IV	**SKILL ENHANCEMENT - III**	**23SEMAU03**	**LATEX - PRACTICAL**	**36**	**2**

Contact hours per week: 3

Year	Semester	Internal Marks	External Marks	Total Marks
III	**VI**	**50**	**-**	**50**

PREAMBLE:

To enable the students to get experienced about Typesetting Latex

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Memorize the commands and environments provided in Latex	K_1
CO2	Express the mathematical formulae, equations and tables	K_2
CO3	Demonstrate various environments	K_3
CO4	Analyze different document types	K_4
CO5	Construct different types of documents and latex beamer presentation	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COS-POS MAPPING (COURSE ARTICULATION MATRIX)

COS/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	9	9	9
CO4	9	9	9	9	3	5	3
CO5	9	9	9	9	3	3	1
Total Contribution of COs to POs	45	45	45	45	33	35	31
Weighted Percentage of COs contribution to POs	2.58	2.83	3.04	3.29	3.88	4.61	4.54

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation; 9- High Correlation between COs and POs

LIST OF PRACTICAL

1. Using Latex, type a document in different ways (Left, Right, Center, Justify)

2. Using Latex environment, type the following text

(a) Numbering 1

- Bullet 1

- Bullet 2

(b) Numbering 2

i. Type 3

3. Using Latex environment, type the following text

    1 Modern Algebra

        1.1   Group

            1.1.1 Subgroup

        1.2   Ring

            1.2.1 Homomorphism

4. Using Latex, type your own Curriculum Vitae.

5. Create the following table using LATEX:

S.No.	Register Number	Name of the Student	Percentage of Marks	Rank
1	XXXXXX	XXXXXX	XXXXX	XXXX
2	XXXXXX	XXXXXXX	XXXX	XXXX
3	XXXXXX	XXXXXX	XXXX	XXXXX

6. Using Latex, generate the following formula:

$$a_0 + \cfrac{1}{a_1 + \cfrac{1}{a_2 + \cfrac{1}{a_3 + \cfrac{1}{a_4}}}} + \begin{pmatrix} a & b \\ c & d \end{pmatrix} + \sum_{\alpha=0}^{\infty} (\beta^{\alpha} + \Gamma^{\alpha})$$

7. Using Latex, type the following Case Statements.

(a) $x_{\lambda} = \begin{cases} x & \text{if } \lambda \text{ is an eigen value;} \\ -x & \text{if } -\lambda \text{ is an eigen value;} \\ 0 & \text{otherwise.} \end{cases}$

(b) $|x| = \begin{cases} x & \text{if } x \geq 0; \\ -x & \text{if } x < 0; \\ 0 & \text{otherwise.} \end{cases}$

8. Using Latex, type the following Matrices

(a) $\begin{pmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{m1} & \cdots & a_{mn} \end{pmatrix}$

(b) $B = \begin{array}{c} s_1 \\ s_2 \\ s_3 \\ s_4 \\ s_5 \end{array} \begin{pmatrix} (0.6,0.2) & (0.6,0.2) & (0.3,0.4) \\ (0.3,0.5) & (0.2,0.6) & (0.7,0.2) \\ (0.1,0.8) & (0.2,0.7) & (0.7,0.2) \\ (0.4,0.5) & (0.7,0.2) & (0.3,0.4) \\ (0.1,0.7) & (0.1,0.8) & (0.2,0.7) \end{pmatrix}$

with columns $d_1 \quad d_2 \quad d_3$

9. Using Latex, type the following complicated mathematical structures.

(a) $\int\limits_0^{\infty} e^{-\rho}\, \rho^{2l} \left[L_{n+l}^{2l+1}(\rho) \right]^2 \rho^2 \, d\rho = \dfrac{2n\left[(n+l)!\right]^3}{(n-l-1)!}$

(b) $\sqrt{\sqrt{n! + \sqrt{45}}} + \int\limits_0^x \int\limits_{\sqrt{\sqrt{16}}}^x \sqrt{\sqrt{e^x}}\, dx + \dfrac{d^2 y}{dx^2}$

10. Create a frame environment with title Latex Beamer presentation and include author name, institute, current date and footnote.

11. Include few figures in documents.

12. Create reference using bibliography environment and cite the references in a document.

WEB REFERENCES:

1. https://www.overleaf.com/

2. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwi76srznJfzAhUMb30KHbe-DmEQFnoECFIQAQ&url=https%3A%2F%2Fen.wikibooks.org%2Fwiki%2FLaTeX&usg=AOvVaw2ArcMcGRJVL_9QatNg6A1h

3. http://www.docs.is.ed.ac.uk/skills/documents/3722/3722-2014.pdf

SYLLABUS FOR VALUE ADDED COURSES OFFERED BY DEPARTMENT OF MATHEMATICS

NO.	CLASS	NAME OF THE COURSE
1	I – B.SC MATHEMATICS	FUNDAMENTAL MATHEMATICS AND COMMUNICATION SKILLS
2	II – B.SC MATHEMATICS	NUMBER ANALOGIES AND COMPREHENSIVE EVALUATION
3	III – B.SC MATHEMATICS	SPATIAL ABILITY

Category	Course Code	Title Of The Course	Contact Hours	Class
VALUE ADDED COURSE		FUNDAMENTAL MATHEMATICS AND COMMUNICATION SKILLS	**60**	**I – B. Sc MATHEMATICS**

COURSE CONTENT

UNIT - I   **Numbers**   **(12 Hours)**

Number system- HCF- LCM- HCF & LCM of Fraction Numbers - HCF & LCM of Decimal Numbers - Least 4 & 5 digit - Greatest 4 & 5 digit- Least & Greatest numbers - Unit digit - Divisibility Rule - Word Problems 1- Word Problems 2

UNIT - II   **Ratios and Proportions**   **(12 Hours)**

Introduction- Finding Ratio's 1- Finding Ratio's 2- Based on numbers- Dividing into Parts 1- Dividing into Parts 2- Problems on Boys & Girls 1- Problems on Boys & Girls 2- Income and Expenditure- Coins- Problems on Ages

UNIT - III   **Basic Grammar 1**   **(12 Hours)**

Parts of Speech - Tenses - Verbs - Sentence Formation

UNIT - IV   **Basic Grammar 2**   **(12 Hours)**

Articles - Prepositions - Communication (based on General Topics)

UNIT - V   **Identifying Yourself**   **(12 Hours)**

Introduction - Self Introduction (Writing Practice) - Self Introduction (Communication Practice)

RULES AND REGULATION:

The value-added course follows a non-semester pattern, with assessment conducted at the end of the year by the Training and Placement cell, totaling 100 marks. A minimum attendance of 70% is required to be eligible for the examination. The evaluation criteria for the course are as follows:

Split up for 100 Marks

Aptitude	25
Self Introduction	25
Grammar	25
Speaking skill	25

Category	Course Code	Title Of The Course	Contact Hours	Class
VALUE ADDED COURSE		NUMBER ANALOGIES AND COMPREHENSIVE EVALUATION	**75**	**II – B. Sc MATHEMATICS**

COURSE CONTENT

UNIT - I **Time & Work and Blood Relations** **(15 Hours)**
Problems based on Single person - Pipes & Cisterns - Chain Rule- Division of Wages- Efficiency Problems- Problems based on Different Group of People- Word Problems - Blood Relation Introduction - Blood Relation Type 1 Problems- Blood Relation Type 2 Problems- Blood Relation Type 3 Problems

UNIT - II **Averages and Percentages** **(15 Hours)**
Average Basics- Basic Word Problems- Questions based on Equations- True/False Average Questions- Replacing a Person- Including & Excluding Problems- Average Speed Word Problems- Percentage Introduction- Percentage Difference- Percentage Word Problems

UNIT - III **Writing and Interpersonal Skills 1** **(15 Hours)**
Resume Writing- Voices and Speech- Body Language and Professionalism- Sentence Correction- Team Building- Debate

UNIT - IV **Writing and Interpersonal Skills 2** **(15 Hours)**
Letter Writing- Synonyms- Antonyms- Time Management- Idioms and Phrases- Analogy- Presentation Skills 1(Board Presentation)

UNIT - V **Deliberation Skills** **(15 Hours)**
HR Interview Questions- Group Discussion Introduction- Group Discussion Practice

RULES AND REGULATION:
The value-added course follows a non-semester pattern, with assessment conducted at the end of the year by the Training and Placement cell, totaling 100 marks. A minimum attendance of 70% is required to be eligible for the examination. The evaluation criteria for the course are as follows:

Split up for 100 Marks

Aptitude	25
Resume Writing	25
Verbal & Presentation Skill 1	25
Self Introduction & Group Discussion	25

Category	Course Code	Title Of The Course	Contact Hours	Class
VALUE ADDED COURSE		SPATIAL ABILITY	**75**	**III – B. Sc MATHEMATICS**

COURSE CONTENT

UNIT - I **Time, Speed & Distance and Direction Sense** **(15 Hours)**
Basics & Introduction- Formulas & Unit Conversion- Problems Based on Trains (Single Object questions)- Problems Based on Trains (Double Object questions)- Direction Sense Type 1 & 2- Direction Sense Type 3 & 4- Direction Sense Type 5 & 6- Direction Sense Type 7 & 8

UNIT - II **Permutation, Combination & Probability** **(15 Hours)**
Permutation Introduction- Vowels always comes together questions- Vowels never comes together questions- Consonant always comes together questions- Consonant never comes together questions- No two vowels comes together questions- Some Letter comes together questions- 3/4/5 digit number questions- Problems Based on Numbers- Combination Basic Questions- Combination Types & Problems- Probability- Coins, Dice, Cards

UNIT - III **Interview Skills 1** **(15 Hours)**
Email Writing- Stress Interview Questions- Reading Comprehension- Communication (based on Current Affairs & Technology)

UNIT - IV **Interview Skills 2** **(15 Hours)**
Report Writing- Role Play- Presentation Skills 2(PPT presentation)

UNIT - V **Interview Practice** **(15 Hours)**
Group Discussion Mock - Personal Interview Mock

RULES AND REGULATION:
The value-added course follows a non-semester pattern, with assessment conducted at the end of the year by the Training and Placement cell, totaling 100 marks. A minimum attendance of 70% is required to be eligible for the examination. The evaluation criteria for the course are as follows:

Split up for 100 Marks

Aptitude	25
Writing & Presentation Skill 2	25
Self Introduction & Group Discussion	25
Personal Interview	25

SYLLABUS FOR CERTIFICATE COURSE OFFERED BY DEPARTMENT OF MATHEMATICS

NO.	CLASS	NAME OF THE COURSE
1.	II – B. Sc MATHEMATICS	MATLAB

Category	Course Code	Title Of The Course	Contact Hours	Class
CERTIFICATE COURSE		**MATLAB**	**12**	**II – B. Sc MATHEMATICS**

COURSE CONTENT

UNIT-I

Introduction-Basics of MATLAB-Input-Output-File types-Platform dependence-General commands

UNIT-II

Interactive computation-Matrices and Vertices-Matrix array operations

UNIT-III

Programming in MATLAB-Scripts and functions-Script files-Function files-Language specific features-Advanced Data objects

UNIT-IV

Plotting-Two-dimensional plots- Three dimensional plots

UNIT-V

Applications-Linear algebra- Solving a linear system-Finding Eigen values and Eigen vectors-Matrix Factorizations

TEXT BOOK: "Getting Started with MATLAB 7" Rudra Pratap, I Indian edition 2006.

REFERENCE BOOK:

"An introduction to MATLAB" David.F.Griffiths, March 2015

SYLLABUS FOR ADVANCED LEARNERS

CO'S	NAME OF THE COURSE
1	NUMERICAL TECHNIQUES
2	MATRIX THEORY
3	GROUP THEORY
4	VEDIC MATHEMATICS

Category	Course Code	Title Of The Course	Credits
EXTRA CREDIT		**NUMERICAL TECHNIQUES**	**4**

PREAMBLE:

To enable the students to learn and gain knowledge about simultaneous linear algebraic equations **,** interpolation ,numerical differentiation and integration .

COURSE OUTCOME:

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

CO'S	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic definitions of simultaneous linear algebraic equations **,** interpolation , numerical differentiation and integration.	K_1
CO2	explain the concepts of simultaneous linear algebraic equations **,** interpolation , numerical differentiation and integration.	K_2
CO3	apply different formulae to solve the problems on simultaneous linear algebraic equations **,** interpolation , numerical differentiation and integration.	K_3
CO4	analyze simultaneous equations and interpolation.	K_4
CO5	evaluate the problems based on Gauss Elimination Method ,Gauss Jordan Method, interpolation , numerical differentiation and integration.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COURSE CONTENT

UNIT - I   SIMULTANEOUS LINEAR ALGEBRAIC EQUATIONS

Introduction – Gauss Elimination Method – Gauss Jordan Method – Inversion of a matrix using Gauss Elimination method

UNIT - II   SIMULTANEOUS LINEAR ALGEBRAIC EQUATIONS(cont…)

Method of Triangularisation method - Crout's method.

UNIT - III   CENTRAL DIFFERENCE INTERPOLATION FORMULAE

Central Difference table – Gauss's forward interpolation formula - Gauss's backward interpolation formula

UNIT - IV   NUMERICAL DIFFERENTIATION

Introduction – Newton's forward difference formula to compute the derivatives - Newton's backward difference formula to compute the derivatives – Problems

UNIT - V   NUMERICAL INTEGRATION

Numerical Integration – The Trapezoidal Rule – SimPO1n's 1/3rd and SimPO1n's 3/8th Rules.

TEXT BOOK:

1. Dr.P.Kandasamy,Dr.K.Thilagavathi,Dr.K.Gunavathi(2005)-"Numerical Methods", S.Chand & Company LTD, New Delhi-110055.

UNIT	CHAPTER	PAGE NUMBER
I	IV	112-126
II	IV	126-141
III	VII	231-240
IV	IX	281-283,286,287
V	IX	299-305,308-313

REFERENCE BOOKS:

1. Dr.Venkataraman.M.K. (2013) – "Numerical Methods in Science and Technology", the National Publishing Company, Chennai.

Category	Course Code	Title Of The Course	Credits
EXTRA CREDIT		**MATRIX THEORY**	**4**

PREAMBLE:

To enable the students to gain the knowledge about matrix theory.

COURSE OUTCOME:

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

CO'S	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the notions and definitions of matrices, determinants, adjoint matrix, ranks, eigen values and eigen vectors	K_1
CO2	explain the concepts of matrices, determinants, adjoint matrix, ranks, eigen values and eigen vectors	K_2
CO3	apply matrix theory to numerical problems	K_3
CO4	examine ranks , orthogonality, eigen values , eigen vectors , Jordan canonical form, real quadratic form and the solution of system of simultaneous linear equations	K_4
CO5	evaluate inverse matrix**,** ranks , orthogonality, eigen values , eigen vectors , Jordan canonical form, real quadratic form and the solution of system of simultaneous linear equations	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COURSE CONTENT:

UNIT – I **Matrix Types and operations**

Types of Matrices- Matrix operations- Matrix equations

UNIT – II **Determinants**

Minor, cofactor, Algebraic complement- Laplace's expansion – multiplication of determinants-Jacobi's theorems.

UNIT - III **Solution to System of linear equations**

Adjoint or adjugate of a matrix – Cramer's rule- Inverse of a matrix

UNIT – IV **Rank and orthogonality**

Orthogonal and unilateral matrices- Rank of a matrix- Congruent matrix

UNIT - V **Eigen values and Eigen vectors**

Cayley-Hamilton theorem- Minimal polynomial- Similarity of matrices – Diagonalization – Jordan canonical form – Real quadratic form

TEXT BOOK

Dipak Chatterjee (2009) II edition-"Abstract Algebra",PHI Learning pvt. Ltd, New Delhi

Unit	Section	Page
I	**8.1-8.3**	**245-256**
II	**8.4**	**257-268**
III	**8.5-8.7**	**268-276**
IV	**8.8-8.10**	**277-292**
V	**8.11**	**293-315**

Category	Course Code	Title Of The Course	Credit
EXTRA CREDIT		GROUP THEORY	**4**

PREAMBLE:

To enable the students to learn and gain knowledge about types of Groups and some functions on groups.

COURSE OUTCOME:

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

CO'S	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recollect the definitions and fundamental ideas of various Groups and some functions on groups.	K_1
CO2	Illustrate the basic concepts on types of Groups.	K_2
CO3	apply theoretical ideas of set theory and group theory for solving the simple problems .	K_4
CO4	analyze the various theorems and lemmas for groups.	K_3
CO5	evaluate the simple problems of Group theory.	K_5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

COURSE CONTENT:

UNIT - I   GROUP

Binary operations-Groups: Definitions and Examples – Basic properties.

UNIT - II   SUB GROUPS

Abelian group, Symmetric group, permutation groups, alternating groups, Quaternion group

UNIT – III   SOME SPECIAL GROUPS AND   SUB GROUPS

Klein's Group Subgroups – Group of isometries- Symmetric group -I_sDihedral Group- Automorphism of group-Cyclic subgroup - Index of a group – Order of an element – Lagrange's theorem .

UNIT - IV   SUB GROUPS AND HOMOMORPHISMS

Normal Subgroups –centralizer –normalizer- commutator-Quotient Groups - Homomorphism theorem.

UNIT - V   REPRESENTATION THEOREMS

Cayley's theorem -Cauchy's theorem – Sylow's theorem

TEXT BOOK

Dipak Chaterjee (2009)—"Topics in Algebra", 2nd edition, PHI Learning PVT ltd,New Delhi

UNIT	CHAPTER	SECTION
I	**2**	**2.1 - 2.2**
II	**2**	**2.3.1 - 2.3.3**
III	**2**	**2.3.4 - 2.4.3**
IV	**2**	**2.4.4 - 2.5**
V	**2**	**2.6 - 2.8**

REFERENCE BOOKS

1. Fraleigh John .B (1986) - "An I course in Abstract Algebra",Narosa Publishing House ,New Delhi Madras Bombay Calcutta.
2. Arumugam and Issac A.T (2003) - "Scitech Publishing (India) Pvt Ltd.
3. Vasishtha A.R (1994 – 95) - "Modern Algebra", Krishna Prakashan Mandir, Meerut.

Category	Course Code	Title Of The Course	Credit
EXTRA CREDIT		**VEDIC MATHEMATICS**	**4**

PREAMBLE:

To enable the students to learn and gain knowledge about Vedic Mathematics

COURSE OUTCOME:

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

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic concepts of Vedic Mathematics	K_1
CO2	explain the concept of Vedic Mathematics in subtraction, multiplication, addition, division, square and cube .	K_2
CO3	apply the Sutras of Vedic Mathematics to compute subtraction, multiplication, addition, division, square, cubic and Linear Equations.	K_3
CO4	analyze the traditional method and Vedic method.	K_4
CO5	evaluate the problems on Vedic Mathematics in subtraction, multiplication, addition, division, square , cube and Linear Equations.	K_5

K_1 **- Remember;** K_2 **– Understand;** K_3 **- Apply;** K_4 **- Analyze;** K_5 **– Evaluate.**

COURSE CONTENT

UNIT - I

Introduction – Sutras of Vedic Mathematics – Advantages of using Vedic Mathematics – Applications of Vedic Mathematics in the Modern World- Simplification by Traditional Method versus Vedic method – Comparision between Traditional Method and Vedic method-. Sutra for finding Square of a number-Conversion of Vulgar Fraction into Decimal.

UNIT - II   **ADDITION AND MULTIPLICATION**

Addition-Multiplication-Subtraction of a number from an aadhar — Multiplication of two numbers close to an aadhar (base)Method– Cases : I , II and III- Division by 9-All from 9 and the last from 10 (Subtraction) – Cases : I , II and III.

UNIT - III   **MULTIPLICATION AND DIVISION**

Two – digit Multiplication without carry - Two – digit Multiplication with carry over – Three – digit Multiplication- Division-When the remainder is positive and negative-Multiplication by 12-Divisibility by 4-Multiplication-Division-"Antyayordasakepi" sutra.

UNIT - IV   **LINEAR EQUATION**

Linear Equation – "Shunyan Samyasamuchaye" sutra- Solving Simultaneous Linear Equations (Anurupye Shunyamanyat & Sankalana Vyavkalanabhyam).- Roots of a Quadratic Eqation-Roots of Cubic Equations-Roots of a Quadratic Equation.

UNIT - V   **SQUARE AND CUBE**

Square of a number –Cube of a number-Rational Expression-Square root-Cube root.

TEXT BOOK:

Sumita Bose -2017 "Vedic Mathematics"– V&S Publishers, New Delhi.

Unit - I	Page: 19-28
Unit – II	Page: 62-65,29-36
Unit –III	Page: 37-45,68-71,79-86,102-104
Unit –IV	Page: 46-61
Unit – V	Page: 98-101, 105-107, 118-125

REFERENCE BOOK:

1. H.K. Gupta -2014 "Vedic Mathematics"– BPI Publishers, New Delhi.