SARASWATHI NARAYANAN COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

(Reaccredited with Grade 'B' by NAAC)

MADURAI – 625 022.

DEPARTMENT OF MATHEMATICS

Choice Based Credit System (CBCS)
Learning Outcomes-based Curriculum Framework (LOCF)

B.Sc. Mathematics Programme (Aided and SF)

(For those who join in June 2022)

PRINCIPAL

Dr. M. Kannan , M.A., M.Phil., PGDTE.,Ph.D.

DEPARTMENT OF MATHEMATICS

1. **Dr. K.Muthukumaran , M.Sc., M.Phil., Ph.D.,**
   - Associate Professor & Head
2. **Dr.P.Veerammal , M.Sc., M.Phil., Ph.D.,**
   - Assistant Professor
3. **Dr.A.Wilson Baskar , M.Sc., M.Phil., Ph.D.,**
   - Assistant Professor
4. **Dr.S.V.Padmavathi , M.Sc., M.Phil., Ph.D.,**
   - Assistant Professor
5. **Dr.M.Kalanithi , M.Sc., M.Phil., Ph.D.,**
   - Assistant Professor
6. **Dr.A.Meena , M.Sc., M.Phil., Ph.D.,**
   - Assistant Professor
7. **Dr.K.Angaleeswari , M.Sc., M.Phil., Ph.D.,**
   - Assistant Professor
8. **Dr.N.Deena , M.Sc., M.Phil., Ph.D.,**
   - Assistant Professor

PROFILE OF THE COLLEGE

Thiru. L.Narayanan Chettiar, a renowned philanthropist founded Saraswathi Narayanan College at Perungudi near Madurai Airport in the year 1966. The college is a prestigious academic powerhouse catering to the educational needs of students hailing from economically weaker and socially oppressed section of our society. It imparts education of the highest quality to students irrespective of caste, creed and religion. The guiding principles of our college are duty, devotion and distinction. The institution has proved an innovative leader and a catalyst in the best educational, cultural and economic interests of students. It is committed to make the students morally upright, intellectually resourceful, socially advantaged and globally competent. It is devoted to teaching, research and extension activities with equal importance.

The college set off its academic journey with Pre-University Courses in the year 1966-67. The Institution started offering UG programmes from the academic year 1968-69. It was upgraded as Post-Graduate Institution in 1979-80 and as Research Institution in 1984-85. The Co-educational system was introduced for M.Phil programmes in the academic year 2001-02 and for PG programmes in the year 2002-03 with the noble objective of promoting higher education among girls in rural areas. Girls have been enrolled in UG programmes also since the academic year 2010-11.

The green campus of 66 acres has a built-up area of 1,70,059 sq.ft. A new library housed at Silver Jubilee building at the cost of Rs.25,00,000/- and it was inaugurated by his excellency Dr.M.Chenna Reddy, the then Governor of Tamilnadu on 04.04.1994. The library was dedicated to the memory of Achi. The major donor of this building was Tmt. Saraswathi Narayanan, the better half of the Founder President Thiru. L. Narayanan Chettiar. Sri Vidhya Ganapathi Temple was built and consecrated on 27.08.2015.

The Departments of Botany, Mathematics, Commerce, English, Economics and Chemistry have been upgraded as university recognized research centres to carry out M.Phil . and Ph.D research programmes in the college. NAAC accredited the college with grade B+ in the year 2005. UGC accorded the Status of Autonomy of our institution in the year 2007. NAAC re-accredited the college with grade B (CGPA of 2.78) in the year 2016. UGC extended the Status of Autonomy to the institution for another period of five years from the academic year 2016-17.

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B. Sc [Mathematics] – Course Structure

Part	Course Type	Course Code	Title of the paper	Hours	Credits	Exam Hours	Marks		Total (100)
							Int.	Ext.	
I SEMESTER									
I	LC-T1	LUP1TA11	பழந்தமிழ் இலக்கியமும் உரைநடையும்	6	3	3	25	75	100
II	LC-E1	LUP2EN11	English Language Proficiency - I	6	3	3	25	75	100
III	CC1	LUMSCT11	Calculus	5	4	3	25	75	100
	CC2	LUMSCT12	Theory of Equations and Trigonometry	5	4	3	25	75	100
	GEC1	LUPHGE11	Mechanics, Properties of Matter and Sound	4	4	3	25	75	100
	GEC2	LUPHGL21	Allied Physics Practical – I	2	-	-	-	-	-
IV	AEC-1	LUP4ES11	Environmental Studies	2	2	2	25	75	100
II SEMESTER									
I	LC-T2	LUP1TA21	காப்பிய இலக்கியமும் நாடகமும்	6	3	3	25	75	100
II	LC-E2	LUP2EN21	English Language Proficiency - II	6	3	3	25	75	100
III	CC3	LUMSCT21	Analytical Geometry of Three Dimensions and Vector Calculus	5	4	3	25	75	100
	CC4	LUMSCT22	Statistics	5	5	3	25	75	100
	GEC-3	LUPHGE21	Thermal Physics	4	4	3	25	75	100
	GEC-	LUPHGL21	Allied Physics Practical – I	2	2	3	40	60	100
IV	AEC-2	LUP4VE21	Value Education	1	1	2	25	75	100
	AEC-3	LUP4YA21	Yoga	1	1	2	25	75	100

V	AEC-4	LUP5NC21	NCC –Practical	-	1	2	40	60	100
		LUP5NS21 LUP5PE21 LUP5LS21	NSS Physical Education Library Science	-	-	-	25	75	100
Ad. Cr. CO	SLC-1	LUMSSC21	Set Theory and Functions	-	2	2	-	50	100
		LUMSSC22	Foundation Course in Mathematics						
III SEMESTER									
I	LC-T3	LUP1TA31	இடைக்கால இலக்கியமும் புதினமும்	6	3	3	25	75	100
II	LC-E3	LUP2EN31	English Language Proficiency - III	6	3	3	25	75	100
III	CC5	LUMSCT31	Differential Equations and Laplace Transforms	5	4	3	25	75	100
	CC6	LUMSCT32	Sequences and Series	5	4	3	25	75	100
	GEC-4	LUPHGE31	Electricity and Electronics	4	4	3	25	75	100
	GEC-5	LUPHGL41	Allied Physics Practical – II	2	-	-	-	-	-
IV	SEC-1	LUMSSE31	Mathematical Logic and Lattice Theory	2	2	2	25	50 (75)	100
		LUMSSE32	Mathematical Modelling						
Ad. Cr. CO	SLC-2	LUMSSC31	An Introduction to Geometry	-	2	2	-	50	100
		LUMSSC32	Fibonacci Numbers and the Golden Ratio						
Ad. Cr.c	MOOC								
IV SEMESTER									
I	LC-T4	LUP1TA41	Gid fij ,yf;fpaKk; rpWfijAk;	6	3	3	25	75	100
II	LC-E4	LUP2EN41	English Language Proficiency - IV	6	3	3	25	75	100
III	CC7	LUMSCT41	Modern Algebra	5	4	3	25	75	100
	CC8	LUMSCT42	Statics	5	4	3	25	75	100
	GEC-6	LUPHGE41	Optics, Spectroscopy and Modern Physics	4	4	3	25	75	100
	GEC-5	LUPHGL41	Allied Physics Practical-II	2	2	3	40	60	100
IV	SEC-2	LUMSSE41	Fourier Series and Fourier Transforms	2	2	2	25	50 (75)	100

		LUMSSE42	Pure Geometry						
Ad. Cr. CO	SLC-3	LUMSSC41	Magic of Numbers	-	2	2	-	50	100
		LUMSSC42	Mathematics for Real Life Problems						
Ad. Cr.c	MOOC								
V SEMESTER									
III	CC9	LUMSCT51	Real Analysis	5	5	3	25	75	100
	CC10	LUMSCT52	Linear Algebra	5	5	3	25	75	100
	CC11	LUMSCT53	Dynamics	5	5	3	25	75	100
	CC12	LUMSCT54	Numerical Analysis	5	4	3	25	75	100
	DSE-1	LUMSDS51	Programming in Python	4	3	3	25	75	100
		LUMSDL51	Practical in Python	2	1	3	40	60	100
	DSE52	LUMSDS52	Programming in C	4	3	3	25	75	100
		LUMSDL52	Practical in Programming in C	2	1	3	40	60	100
IV	SEC-3	LUMSSE51	Vedic Mathematics	2	2	2	25	50 (75)	100
		LUMSSE52	Combinatorics						
	GEC-7	LUMSNM51	Non – Major Elective - I	2	2	2	25	75	100
Ad. Cr.c	SLC-4	LUMSSC51	History of Mathematics	-	2	2	-	50	100
		LUMSSC52	Indian Mathematics						
Ad. Cr.c	MOOC								
VI SEMESTER									
III	CC13	LUMSCT61	Complex Analysis	5	4	3	25	75	100
	CC14	LUMSCT62	Graph Theory	5	4	3	25	75	100
	CC15	LUMSPJ63	Project	5	4				
	DSE-3	LUMSDS61	Operations Research	4	4	3	25	75	100
		LUMSDS62	Automata Theory & Formal Languages						
	DSE-4	LUMSDS63	Applied Statistics	4	4	3	25	75	100
		LUMSDS64	Bio Statistics						

	DSE-5	LUMSDS65	Arithmetic and Mental Ability for Competitive Examinations	3	3	3	25	75	100
		LUMSDS66	Business Statistics						
IV	SEC-4	LUMSSE61	Fuzzy Mathematics	2	2	2	25	50 (75)	100
		LUMSSE62	Applications of Differential Equations						
	GEC- 8	LUMSNM61	Non – Major Elective - II	2	2	2	25	75	100

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DEPARTMENT OF TAMIL – UG – CBCS
PART I- TAMIL
(For those who join in June 2022)

Title of The Course: பழந்தமிழ் இலக்கியமும் உரைநடையும்		**Semester : I**
Course Code : LUPITA11	**Contact Hours : 6hrs/w**	**Credit: 3**

பாடத் திட்டத்தைக் கற்றுக் கொண்ட பின்பு மாணவர்கள் பெறும் பயன்கள் :

1. சங்க நூல்களைப் படிப்பதன் மூலம் மாணவர்கள் வாழ்வியல் செய்திகளை அறிந்து கொள்ள முடிகிறது.
2. மாணவர்கள் ஒழுக்கத்தினை அற இலக்கியங்கள் வாயிலாகக் கற்றுக் கொள்கின்றனர்
3. உரை நடைக் கட்டுரைகளை வாசிக்கும் போது மாணவர்கள் சமூகக் கருத்துக்களைத் தெரிந்து கொள்கின்றனர்.
4. அக, புற, இலக்கணங்கள் மாணவர்கள் வாழ்வில் செம்மையுற உதவுகின்றன.
5. தமிழ் இலக்கிய வரலாற்றினைப் படிப்பதனால் மாணவர்கள் அறிவுத்திறன் மேம்படுத்தப்பட்டு போட்டித் தேர்வுக்குத் தயார்படுத்தப்படுகிறார்கள்.

பாடத்திட்டத்திற்குத் தேவையான முன் அறிவு :

- ❖ சங்கத் தமிழரின் வாழ்வியல் முறைகளை அறிந்து கொள்ளல்
- ❖ நீதி இலக்கியங்களைக் கற்றல்
- ❖ மாணவர்கள் வாசிப்புத் திறனை வளர்த்துக் கொள்ளல்

கூறு I: செய்யுள்

1. பத்துப்பாட்டு

நெடுநல்வாடை முழுவதும்

எட்டுத் தொகை

2. நற்றிணை -5 பாடல்கள் - 1, 115, 216, 305, 388
3. குறுந்தொகை - 5 பாடல்கள் 2, 4, 43, 67, 157
4. பதிற்றுப்பத்து -4 பாடல்கள் 62 (வென்றிச் சிறப்பு)
5. புறநானூறு -5 பாடல்கள் 74, 112, 204, 257, 312
6. அகநானூறு -5 பாடல்கள் 2, 10, 35, 36, 54

கூறு II: அற இலக்கியம்

1. திருக்குறள் - விருந்தோம்பல், வினைத்திட்பம், ஒழுக்கமுடைமை
2. நான்மணிக்கடிகை - முதல் 10 பாடல்கள்
3. இனியவை நாற்பது - முதல் 10 பாடல்கள்
4. மூதுரை - முதல் 10 பாடல்கள்

கூறு III: உரைநடைக் கட்டுரைத் தொகுப்பு

1. அறநெறி அண்ணல் - இரா.ராஜராஜேஸ்வரி
2. கல்வி - திரு.வி.கலியாணசுந்தரனார்
3. சூழலியல் ஒரு அறிமுகம் - ஏ.சிங்கராயர்
4. பாதை பெரிது, பயணம் தொடங்கு - கு.வெ.பாலசுப்பிரமணியன்
5. தனித்திரு, விழித்திரு பசித்திரு - பெ.பழனிராஜன்
6. நாட்டார் சிந்து கதைப்பாடல்கள் ஓர் அறிமுகம் - பா.சுபாஷ்போஸ்
7. சிறகு முளைத்த பின்பும் - ஜே.ஆர். இலட்சுமி டார்வின்

கூறு IV: இலக்கணம்

1. அகத்திணைகள் - கைக்கிளை, நடுவண் ஐந்திணை, பெருந்திணை (முதல், கரு, உரிப்பொருள்)
2. புறப்பொருள் திணைகள் - வெட்சி, வஞ்சி, காஞ்சி, உழிஞை, தும்பை, வாகை, பாடாண்

கூறு V: இலக்கிய வரலாறு

1. சங்க இலக்கிய வளர்ச்சி
2. அற இலக்கிய வளர்ச்சி
3. உரைநடை வரலாறு

பரிந்துரைக்கப்பட்ட நூல்கள்:

1. சரசுவதி (செய்யுள் தொகுப்பு)
   சரசுவதி நாராயணன் கல்லூரி
   நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்.அம்பத்தூர்,
   சென்னை – 600050

2. பார்வை நூல்கள் :

- சங்க இலக்கியம் - பத்துப்பாட்டு- ச.வெ.சுப்பிரமணியன் உரை
- சங்க இலக்கியக் குறுந்தொகை- தமிழண்ணல் உரை
- சங்க இலக்கிய புறநானூறு - இரா.இளங்குமரன் உரை
- திருக்குறள் - இராமசாமி உரை
- தமிழ்க்காதல் - வா.சுப.மாணிக்கம்
- சங்க இலக்கியத்தில் கைக்கிளை - மு.மணிவேல்
- உரைநடையின் தோற்றமும் வளர்ச்சியும்- இ.சிவத்தம்பி
- நற்றிமிழ் இலக்கணம் - தொ.பரமசிவம்
- நன்னூல் - வெள்ளை வாரணனார் உரை

3.இணைய ஆதாரங்கள் :

சங்க இலக்கியம்

https://ta.vikaspedia.in/education/ba4baebbfbb4bcdba8bc2bb2bcdb95bb3bcd/%E0%AE%9A%E0%AE%99%E0%AF%8D%E0%AE%95%E0%AE%87%E0%AE%B2%E0%AE%95%E0%AF%8D%E0%AE%95%E0%AE%BF%E0%AE%AF%E0%AE% AE%E0%AF%8D-%E0%AE%93%E0%AE%B0%E0%AF%8D%E0%AE%85%E0%AE%B1%E0%AE%BF%E0%AE%AE%E0%AF%81%E0%AE%95%E0%AE%AE%E0%AF%8D

அற இலக்கியம்

http://neelamegan.blogspot.com/2020/01/blog-post_5.html?m=1

உரைநடை

https://ta.m.wikipedia.org/wiki/%E0%AE%89%E0%AE%B0%E0%AF%88%E0%AE%A8%E0%AE%9F%E0%AF%88

பொருள் இலக்கணம்

அகம், புறம்

https://ninaivukurgatamil.blogspot.com/2021/09/porul-tamil-illakkanam.html?m=1

இலக்கிய வரலாறு

https://ta.m.wikipedia.org/wiki/%E0%AE%A4%E0%AE%AE%E0%AE%BF%E0%AE%B4%E0%AF%8D_%E0%AE%87%E0%AE%B2%E0%AE%95%E0%AF%8D%E0%AE%95%E0%AE%BF%E0%AE%AF%E0%AE%AE%E0%AF%8D

DEPARTMENT OF ENGLISH – UG – CBCS-LOCF

Title of the Course: English Language Proficiency – I	**Semester: I**
Course Code: LUP2EN11 Contact hours: 6hrs/w	**Credits: 3**

Course Learning Outcomes:

On completion of the course, the students are able to

- recognize their own ability to improve their own competence in using the language
- comprehend spoken form
- understand the importance of vocabulary in academic life
- write simple sentences without committing errors of spelling and grammar
- comprehend texts using the techniques such as skimming and scanning

Pre-required Knowledge:

- Skills of reading comprehension and interpretation
- Functional vocabulary
- Functional grammar

Unit I: Prose

1.Dand Miller Sadaker and Myra Pollack Sadaker **:**Multiple Intelligence and Emotional Intelligence

2. Swami Vivekananda : India's Message to the World

3. Robert Lynd : The Pleasures of Ignorance

4. Leo Tolstoy : The Three Questions

Unit II : Poetry

1. Rabindranath Tagore : Upagupta
2. Chinua Achebe : Refugee Mother and Child
3. D.H Lawrence : Don'ts
4. Seamus Heaney : Digging

Unit III : Short Stories

1. Ruskin Bond : The Eyes are not Here
2. H.G. Wells : The Empire of Ants
3. A.A Milne : Getting Married

Unit IV : Grammar

Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction, Interjection, Articles

Unit V : Conversation and Writing Skills

1. Every Day English Part – I
2. Paragraph Writing

Suggested Topics for Presentation:

- Importance of English in the wake of globalization
- Use of English in real life situations
- Objectives of reading short stories
- Presentation of memorable events in life
- Why should we read Prose text?
- Importance of grammar in the use of English
- Demonstration of situational conversation

Suggested Readings:

i)Text Book:

1. *Wealth of English* .Ed. Department of English, Saraswathi Narayanan College, Madurai. Harrows Publications, Madurai, 2022.

ii)Reference Books:

1. Radhakrisnapillai, G. *English Grammar and Composition*. Chennai: Emerald Publishers, 2002.

2. Murphy, Raymond. *Intermediate English Grammar*. New Delhi: Foundation Books, 2005.
3. Bose,M.N.K. Ed. *Better Communication in Writing*. Madras: New Century Book House (P) Ltd, 2004.

iii) Web Sources:

http://www.indiabix.com/verbal-ability/questionand-answers/

http://www.waylink-english.co.uk/?

https://www.englishclub.com/vocabulary/

https://biblonia.com/2019/12/28/reading-and-interpretation/

DEPARTMENT OF MATHEMATICS – UG-CBCS-LOCF

Title of the Course: Calculus **Semester: I**

Course Code: LUMSCT11 Contact Hours: 5hrs/w Credits: 4

Course Learning Outcomes:

On completion of the course, the students are able to

- recall the basic concepts of differentiation, partial differentiation and integration,
- develop problem solving skills using derivatives and partial derivatives,
- find the geometric nature of a curve
- solve problems in double and triple integrals using transformation of one coordinate system to another
- analyze the properties of Beta and Gamma functions.

Pre Required Knowledge:

- ✓ basics of differentiation and integration
- ✓ derivative of algebraic functions, logarithmic function, exponential function, circular functions
- ✓ definition of hyperbolic functions and its derivatives.

Unit I: Differentiation and Partial Differentiation

Successive Differentiation –Leibnitz Formula – Maxima and Minima of functions of two variables and related problems.

Unit II: Curvature of Curves

Envelopes – Curvature – Circle, radius and centre of curvature – Evolute.

Unit III : Polar Co-ordinates and Pedal equation

Radius of curvature in Polar co-ordinates – Pedal equation of curves.

Unit IV: Integration

Definite integrals and their properties- Reduction formulae for $x^n e^{ax}$, $x^n \cos ax$, $\sin^n x$, $\cos^n x$, $\tan^n x$, $\sin^m x \cos^n x$- Bernouli's formula.

Unit V: Beta and Gamma functions

Multiple Integrals- Properties of Beta and Gamma functions, Relation between Beta and Gamma functions.

Suggested Topics for Group Discussion/ Presentations:

1. Problems using Leibnitz Formula
2. Evolute.
3. Polar and pedal equations
4. Reduction formula
5. Beta and Gamma functions

Suggested Readings:

(i) Text Books:

1. T.K.Manicavasagam Pillay &S.Narayanan Publications: S.Visvanathan, 2015 Calculus, Volume 1.
2. T.K.Manicavasagam Pillay &S.Narayanan Publications: S.Visvanathan, 2015. Calculus, Volume 2.

Volume I

Unit I : Chapter 3 Sections 1.1 to 1.6, 2.1,2.2 Chapter8 : Section 4.

Unit II : Chapter 10 Sections 1.1 to 1.3, 2.1 to2.5.

Unit III : Chapter 10 Sections 2.6,2.7.

Volume II

Unit IV : Chapter 1 Sections 11,12,13.1 to 13.6,13.9,15.1.

Unit V : Chapter 5 Sections 2.1, 2.2, 4.1. Chapter 7 Sections 2.1 to 2.3,3,4,5.

(ii) Reference Books:

1. Arumugam and Thangapandi Isaac, Calculus, New Gamma publishing House, 2001.
2. Vittal. P.R. and Malini. V., Calculus, Third Edition, Margham Publications, Chennai, 2012.
3. Tom M. Apostal, Calculus – Vol. II –Wiley Student publication, New Delhi, 2007.
4. Shanti Narayan, Integral Calculus, 9th Edition,S. Chand and Company Ltd., New Delhi, 2002.
5. Shanti Narayan, Differential Calculus, 14th Edition, S. Chand and Company Ltd., New Delhi, 2002.

(iii) Web Resources:

1.https://math24.net/topics-calculus.html

2.https://calculusmadeeasy.org/

Title of the Course: Theory of Equations and Trigonometry **Semester: I**

Course Code: LUMSCT12 **Contact Hours: 5hrs/w** **Credits: 4**

Course Learning Outcome:

On completion of the course, the students are able to

- find the sum of the series by applying Binomial, Exponential and Logarithmic Series.
- find the sum of the powers of the roots of equations using Cardon's method
- apply transformations of equations and solve the equations.
- recall expressions for trigonometric functions.
- relate circular trigonometric functions and hyperbolic functions.

Pre Required Knowledge:

- ✓ Fundamental concepts of Binomial, Exponential and Logarithmic Series.
- ✓ Basic concepts of power series.
- ✓ Fundamental knowledge of trigonometric functions and hyperbolic functions.

Unit I: Relations between the roots and coefficients

Theory of Equations – Imaginary roots – Relations between the roots and coefficients – Symmetric functions of the roots.

Unit II: Transformation of equations

Sum of the powers of the roots of equations – Newton's Theorem – Transformation of equations – Roots multiplied by a given number - Reciprocal roots – Reciprocal equations – standard forms - To increase or decrease the roots of a given equation by a given quantity.

Unit III: Methods for finding roots

Removal of terms – Descarte's rule of sign-Rolle's Theorem – Multiple roots – Strum's Theorem –– Cardon's method

Unit IV: Summation Series

Application of Binomial theorem, Exponential and Logarithmic series to sum up series (Problems to find infinite number of terms).

Unit V: Trigonometric and Hyperbolic functions

Expansions of sin nx, cos nx, tannx,$\sin^n x$, $\cos^n x$ - Simple problems - Hyperbolic functions – Inverse Hyperbolic functions.

Suggested Topics for Group Discussion/ Presentation

1. Relations between the roots and coefficients.
2. Transformation of equations.
3. Applications of Strum's Theorem.
4. Applications of Sum up series.
5. Simple problems on Hyperbolic functions.

Suggested Readings:

(i) Text Books:

1. T.K.M. Pillay and Narayanan, Algebra Vol. I, S.Viswanathan Publication, 11th Edition, Reprint 2006.
2. T.K.M. Pillay and Narayanan, Trigonometry, S.Viswanathan Publication,11th Edition, Reprint 2006.

Text book 1:

Unit 1: Chapter 6 (sections 1 to 12)

Unit 2: Chapter 6 (sections 13 to 17)

Unit 3: Chapter 6 (sections 19, 24 to 27, 34)

Unit 4: Chapter 3 (sections 10)

Chapter 4 (sections 3 and 9)

Text book 2:

Unit 5: Chapter III (sections 1,2 ,4 and 5) and Chapter IV(full)

(ii) Reference Books:

1. S. Arumugam and Thangapandi Isaac, Theory of Equations and Trigonometry, New Gamma Publications, 2012.
2. Rawat, K.S., Trigonometry, First Edition, Sarup Book Publishers Pvt. Ltd., New Delhi, 2008.
3. Kandasamy, P and K. Thilagavathi – Mathematics for B.Sc. Vol I and Vol IV, S. Chand and Co., New Delhi, 2004.
4. Arumugam S and ThangapandiIssac A, Trigonometry, New Gamma Publishing House, 2017.

(iii) Web Resources:

1. https://math.stackexchange.com/questions/88917/relation-betwen-coefficients-and-roots-of-a-polynomial
2. https://brilliant.org/wiki/descartes-rule-of-signs/
3. https://proofwiki.org/wiki/Descartes%27_Rule_of_Signs

4. https://www.slideshare.net/indupsthakur/series-expansion-of-exponential-and-logarithmic-functions-13287442
5. https://byjus.com/inverse-hyperbolic-functions-formula/
6. https://encyclopediaofmath.org/wiki/Inverse_hyperbolic_functions

DEPARTMENT OF PHYSICS – UG – CBCS – LOCF
(ALLIED PHYSICS FOR B.Sc. MATHEMATICS & B.Sc. CHEMISTRY MAJOR)

Title of the Course: Mechanics, Properties of Matter and Sound **Semester: I / III**

Course Code: LUPMGE11/LUPHGE31 Contact Hours: 4hrs/w Credits:3

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the fundamental concepts of force, work and energy
- describe the kinetic energy of a rotating body and its dynamical parameters
- understand the Physics of gravitation and its impact
- identify the materials suitable for construction of buildings, based on the moduli of elasticity
- discuss the theories used in building acoustics

Pre-Required Knowledge

- Fundamental force in nature and laws that governs the forces.
- Types of motions in nature and its behavior.
- The role of gravitation on rocket / space craft launching.
- Physics behind the production of sound waves and its applications in nowadays world.

Unit I: Force, work, power and energy

Forces in nature – Central forces – Gravitational and electromagnetic – Conservative and Non-conservative forces – Examples – Nuclear force – Friction – Angle of friction – Motion of bodies along an inclined plane – Work done by a force – Work done by a varying force – Expression for kinetic energy – Expression for potential energy – power.

Unit II: Rotational motion

Angular velocity – Normal acceleration (no derivation) – Centrifugal and Centripetal forces – Torque and angular acceleration – Work and power in rotational motion – Angular momentum – K.E. of rotation – Moment of inertia – Laws of parallel and perpendicular axes theorems – M.I. of circular ring, Circular disc, solid sphere.

Unit III: Gravitation

Kepler's laws of planetary motion – Law of gravitation – Boy's method for G. Compound pendulum – Expression for period of oscillation- Determination of "g" with compound pendulum – Variation of g with latitude, altitude and depth – Artificial satellites.

Unit IV: Elasticity

Elastic moduli – Poisson's ratio – Bending of Beams – Expression for bending moment – Determination of Young's modulus by uniform and non-uniform bending – I Section girders, Torsion – Expression for couple per unit twist – work done in twisting – Torsional pendulum.

Unit V: Sound

Simple harmonic vibrations – Progressive waves – Properties –Composition of two S.H.M and beats – Stationary waves – properties – Melde's experiments for the frequency of electrically maintained tuning fork – Transverse and Longitudinal modes – Acoustics – Ultrasonics – Properties and Applications.

Suggested Topics for Group Discussion/Presentation

- Forces in nature
- Centrifugal and Centripetal forces
- Kepler's laws of planetary motion
- Elastic moduli
- Progressive waves

Suggested Readings:

i) Text Book:

Murugeshan.R, Mechanics, Properties of Matter and Sound, Annai Print Park, Madurai (2016).

ii) Reference Books:

1. Brijilal& Subramanyam N, Properties of Matter, Eurasia Publishing house (1993).
2. Brijilal & N.Subramanyam, A Text Book of Sound, S.Chand& Co (2002).

iii) Web Sources:

1. http://hyperphysics.phy-astr.gsu.edu › hbase › flobi
2. http://soft-matter.seas.harvard.edu
3. https://www.microsonic.de

PART IV – ENVIRONMENTAL STUDIES – UG – CBCS – LOCF

Title of the Paper: Environmental Studies	**Semester: I**
Course Code: LUP4ES11 Contact hours: 2hrs/w	**Credit: 2**

Learning Objectives:

- ❖ To study the basic concepts of environmental science.
- ❖ To study plant succession, methods of vegetation analysis, structure and functions of ecosystems.
- ❖ To understand the causes and consequences of various pollutions and gives an idea to the control measures.

- ❖ To understand the importance of biodiversity and conservation

Unit I:

Environment - Definition - Components of environment and types. Ecosystem and its types.

Unit II:

Global warming - Causes and consequences of global warming - global warming in Indian Context - Earth summit. Green house of uses and its effects, ozone depletion.

Unit III:

Deforestation: causes and impacts - Tree saving movement in India - Chipko movement - Apico movement - Sunderlal Bohuguna – Methapatkar, Afforestation.

Unit IV:

Radioactive pollution - Hiroshima & Nagasaki, 1945 - Chernobyl episode of 1986. Effects and control measures of Air pollution - Bhopal gas tragedy 1984. Acid rain and its impacts.

Unit V:

Water and Noise Pollution-causes, effects & control measures. Water scarcity and solutions to overcome. Road safety – Rules, Traffic Signals, Conduct of road safety awareness programme. Role of academic institutions and academicians and students in village adoption.

Learning Outcomes:

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

- ➢ acquire knowledge on ecological factors and their interactions with ecosystem; types of soil erosion and methods of conservation.
- ➢ understand the series of events in the process of plant succession in wet and dry lands;
- ➢ recognize their significance of value of biodiversity and its conservation.

Text Book:

1. Thangamani.I & Shymala - Thangamani, Environmental studies - Pranor Syndicate, Sivakasi, 2003.

Reference Books:

1. Subramanyam, N.S. and Sambamuthy, A.V.S.S. Ecology, Narosa Publishing House, New Delhi, 2000.
2. Krishnamoorthy, K.V. An advanced text book on Biodiversity. Oxford and IBH Publishing company Pvt, Ltd., New Delhi, 2004.
3. Rana, S.V.S. Essentials of Ecology and Environmental Science, Prentice Hall of India Pvt., Ltd., New Delhi, 2004.

DEPARTMENT OF TAMIL – UG – CBCS
PART I- TAMIL

Title Of The Course: காப்பிய இலக்கியமும் நாடகமும் Semester : II
Course Code : LUPITA21 Contact Hours : 6hrs/w Credit: 3

பாடத் திட்டத்தைக் கற்றுக் கொண்ட பின்பு மாணவர்கள் பெறும் பயன்கள்:-

1. காப்பிய இலக்கியம் படிக்கும்போது மாணவர்கள் தமிழப் பண்பாட்டைப் பற்றியும்,தமிழரின் வாழ்க்கை முறை பற்றியும் தெரிந்து கொள்கின்றனர்.
2. சமயம் பற்றிப் படிக்கும்போது ஆன்மீக ஈடுபாடும் ஆன்மீக அறிவும் வளர்கிறது.
3. நாடக நூல்களைப் படிப்பதனால் மாணவர்கள் பிரச்சனைகளை எதிர்கொள்ளும் திறனைப் பெறுகின்றனர்
4. மாணவர்கள் சொற்களை உருவாக்கி சிறந்த வாக்கியங்களைப் படைக்க இலக்கணம் துணை நிற்கின்றது.
5. இலக்கிய வரலாறு படிப்பதனால் மாணவர்கள் பாடத் திட்டத்தின் முழுமையான செய்திகளை அறிந்து கொள்ள உதவுகிறது.

பாடத்திட்டத்திற்குத் தேவையான முன் அறிவு:

- புராணம் மற்றும் காப்பியங்களின் தோற்றமும் வளர்ச்சியும் பற்றி அறிதல்
- நாடக இயலைப் பற்றி அறிந்து கொள்ளல்

- அடிப்படைத் தமிழ் இலக்கணத்தை அறிதல்

கூறு I: காப்பியம்

1. சிலப்பதிகாரம் - வழக்குரை காதை
2. மணிமேகலை - ஆபுத்திரன் திறன் அறிவித்த காதை
3. சீவகசிந்தாமணி- சுரமஞ்சரியார் இலம்பகம்

கூறு II: சமயக்காப்பியம்

1. பெரிய புராணம் - மெய்ப்பொருள் நாயனார்
2. கம்ப ராமாயணம் - வாலி வதைப் படலம்
3. இயேசு காவியம் - சீடர்களை அனுப்புகிறார், உவமை வழிச் செய்தி (கவியரசு கண்ணதாசன்)
4. சீறாப்புராணம் - நபி அவதாரப் படலம் (உமறுப்புலவர்)

கூறு III: நாடகம்

1. அழுக்குப் படாத அழகு - மா.கமலவேலன்

கூறு IV: இலக்கணம்

1. அணி - 10 வகைகள் உவமை அணி, உருவக அணி, உயர்வுநவிற்சி அணி, வேற்றுமை அணி, தற்குறிப்பேற்ற அணி,வஞ்சப் புகழ்ச்சி அணி, தீவக அணி, பாவிக அணி, இல்பொருள் உவமை அணி, எடுத்துக்காட்டு உவமை அணி,
2. பாவகைகள் - வெண்பா, ஆசிரியப்பா.

கூறு V: இலக்கிய வரலாறு

1. காப்பிய இலக்கிய வளர்ச்சி
2. சமயக்காப்பிய வளர்ச்சி
3. நாடக இலக்கிய வளர்ச்சி

1. பரிந்துரைக்கப்பட்ட நூல்கள்:

சரசுவதி (செய்யுள் தொகுப்பு)
சரசுவதி நாராயணன் கல்லூரி
நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்.அம்பத்தூர்
சென்னை - 600050
அழக்குப் படாத அழகு (செய்யுள் நாடகம்)

2. பார்வை நூல்கள் :

- சிலப்பதிகாரம் - அடியார்க்கு நல்லார் உரை
- சீவகசிந்தாமணி - நா.மாணிக்காவாசகன் உரை
- நற்றமிழ் - தொ.பரமசிவம்

- இரட்டை காப்பியங்கள் - வா.சுப.மாணிக்கம்
- பெரியபுராணம் - பி.ரா.நடராசன் உரை
- மணிமேகலை - புலியூர்க் கேசிகன் உரை
- நன்னூல் - வெள்ளை வாரணனார் உரை
- தமிழ் இலக்கிய வரலாறு - மு.வரதராசனார்
- தமிழ்இலக்கிய வரலாறு - சிற்பி, நீலபத்மநாபன்

3. இணைய ஆதாரங்கள்:

காப்பியம்

https://www.tamilvu.org/ta/courses-degree-a011-a0114-html-A0114111-5742

சமயக்காப்பியம்

http://www.tamilvu.org/courses/degree/a041/a0411/html/a04114l4.htm

அழுக்குப்படாத அழகு (செய்யுள் நாடகம்)

https://www.noolulagam.com/tamil-book/1496/alukku-padaatha-alagu-naadagam-book-type-iyalisai-nadakam-by-maa-kamalavelan/

இலக்கிய வரலாறு (நாடக வளர்ச்சி)

https://podhutamizh.blogspot.com/2017/09/normal-0-false-false-false-en-in-x-none.html?m=1

DEPARTMENT OF ENGLISH - UG – CBCS-LOCF

Title of the Course: English Language Proficiency - II Semester: II
Course Code: LUP2EN21 Contact Hours:6hrs/w Credits: 3

Course Learning Outcomes:

On completion to the course the students are able to

- read and understand texts of different genres
- summarise a piece of prose and poetry
- achieve conversational skills through the study of plays
- cultivate creative skill in writing
- use language for speaking and writing with confidence in an intelligible and acceptable manner.

Pre-required Knowledge:

- ✓ Comprehend reading text and respond to tasks.
- ✓ Formation of new words.
- ✓ Functional Grammar

Unit: I-Prose

IssacBashevis Singer	-	Menasch's Dream
Mohandas K. Gandhi	-	What is Swaraj
Jesse Owens	-	My Greatest Olympic Prize
C.P. Snow	-	Hardy and Ramanujan

Unit: II-Poetry

Rudyard Kipling	-	If
DilipChitre	-	Father Returning Home
Robert Frost	-	Road not Taken
P.B. Shelley	-	Ozymandias

Unit: III-One Act Play and Excerpt from Play

Anton Chekhov	-	A Marriage Proposal
Eugene O'Neill	-	Before Break Fast
Shakespeare	-	The Trial scene from, The Merchant of Venice

Unit: IV-Grammar

Word Formation

Tenses

Question tags

Unit: V -Conversational and Writing Skills

Every day English Part - II

Report Writing

Letter Writing (Formal)

Suggested Topics for Presentation:

- ✓ Situational uses of present perfect tense
- ✓ Demonstrate conversations in official situations
- ✓ English for survival

- ✓ Importance of English speaking skill in everyday life
- ✓ Advantages of studying poetry

Suggested Readings:

i)Text Book:

1. Wealth of English..Ed. Department of English, Saraswathi Narayanan College. Harrows Publications, Madurai, 2022.

ii)Reference Books:

1. Kirshnamurthy C.N. &Ashwini Raman. *Advanced Grammar and Composition*. New Century Book House (P) Ltd, 2010.
2. BaskaranV.H.. *English Composition Made Easy*. Shakespeare Publication, 2013.
3. Raymond, Murphy.*Intermediate English Grammar*. New Delhi: Foundation Books, 2005

iii) Web Sources:

1.https://www.englishgrammar.org/word-formation-exercise/

2.Https://byjus.com/govt-exam/tenses-exercise-question-answers/

3.https://www.englishgrammar.org/question-tag-exercise-4/

4.https://www.learncbse.in/report-writing-class-12/

5.https://digiandme.com/formal-letter-writing-topics/

DEPARTMENT OF MATHEMATICS – UG-CBCS-LOCF

Title of the Course: Analytical Geometry of Three Dimensions and Vector Calculus **Semester: II**

Course Code :LUMSCT21 Contact Hours:5hrs/w Credit: 4

Course Learning Outcomes:

On completion of the course, the students are able to

- ➢ recall plane concepts in three dimension,
- ➢ solve the problems related to lines and planes,
- ➢ demonstrate the sphere concepts and relate their properties,

- extend the concepts of differentiation in vector algebrademonstrate Line integrals, surface integrals and apply Stokes theorem, Gauss divergence theorem and Green's theorem.

Pre Required Knowledge:

- ✓ Co-ordinate systems
- ✓ Direction cosines
- ✓ Direction ratios.

Unit I: Planes

Equation of a plane –angle between two planes - Angle bisectors of two planes.

Unit II: Straight lines

Straight lines – Equation of a straight line – A plane and a line.

Unit III: Sphere

Equation of a Sphere – Tangent line and tangent plane - Section of a sphere.

Unit IV: Vector Differentiation

Vector Differentiation –Vector algebra – differentiation of vectors - Gradient - Divergence and curl- Related theorems- Problems.

Unit V: Vector integration

Vector integration-line integrals –surface integrals-theorems of Green, Gauss and Stokes(only statements without proof)-simple problems.

Suggested Topics for Group Discussion/ Presentations:

1. Planes
2. Straight lines
3. Sphere
4. Vector Differentiation
5. Vector Integration

Suggested Readings:

(i) Text Book:

S.Arumugam and ThangapandiIssac,Analytical Geometry of three dimension and vector calculus New Gamma Publishing House,2003.

Unit I Chapter 2 Page 2.1 – 2.24

Unit II Chapter 3 Page 3.1 – 3.31

Unit III Chapter 4 Page 4.1 - 4.23

Unit IV Chapter 5 Page 5.1 – 5.30

Unit V Chapter 7 Page 7.1 – 7.30

(ii) Reference Books:

1. S. Narayanan and T. K. Manickavasagampillai, Analytical geometry of three dimension [partII] S. Viswanathan (Printers & Publishers) Pvt. Ltd, 1999.
2. S. Narayanan and T. K. Manickavasagam Pillai, Vector Calculus, S. Viswanathan (Printers & Publishers) Pvt. Ltd, 1999.
3. S.C.Mittal and S.K.Mittal, Analytical Geometry 3D, KK.Mittal for pragatiprakashan, 2007

(iii) Web Resources:

1. https://nptel.ac.in/courses/111/105/111105122/
2. https://www.maths.ox.ac.uk/study-here/undergraduate-study/practice-problems
3. http://www.freebookcentre.net/SpecialCat/Free-Mathematics-Books-Download.html

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Title of the Course: Statistics **Semester: II**

Course Code:LUMSCT22 Contact Hours : 5hrs/w Credit: 5

Course Learning Outcome:

On completion of the course, the students are able to

- improve data handling skills and summarize statistical computations.

- determine the relationship between quantitative variables and extend regression analysis.
- recall and apply a comprehensive set of Probability ideas in generating expectations.
- find correlation, rank correlation and the equation of lines of regression for the given data.
- solve and prove results in probability theory.

Pre Required Knowledge:

- ✓ Fundamental concepts of measures of central tendencies and dispersion.
- ✓ Basic concepts of random variables.
- ✓ Fundamental knowledge of probability ideas.

Unit I: Correlation-Regression

Correlation-Regression

Unit II: Random variables

Random variables – Distribution function – Discrete and Continuous random variables - Probability density function – Mathematical Expectation (one dimension and two dimension)

Unit III: Some special distributions

Moment generating function – Cumulant – Theoretical distribution – Binomial - Poisson – Normal distribution.

Unit IV: Test of significance of large samples

Test of significance of large samples

Unit V: Test of significance of small samples

Test of significance of small samples - t, F and chi-square distributions

Suggested Topics for Group Discussion/ Presentation

1. Problems on Correlation
2. Problems on Regression
3. M.G.F of Binomial distribution
4. Problems on equal variance
5. Problems on t-test

Suggested Readings:

(i) Text Book:

S. Arumugam and A. ThangapandiIsac, Statistics, New Gamma Publications - 2006.

Unit I : Chapter 6.

Unit II : Chapter 12.

Unit III : Chapter 13.

Unit IV : Chapter 14.

Unit V : Chapter 15.

(ii) Reference Books:

1. S.C .Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and sons, Eleventh thoroughly revised edition, 2004.
2. Kandasamy, P.,K.Thilagavathi and K. Gunavathi, Probability, Statistics and Queuing theory – (2007) S.Chand and Co., New Delhi.
3. Gupta.S.C.& V.K. Kapoor – Fundamentals of Mathematical statistics – 2002 Sultan Chand & Sons, New Delhi – Eleventh thoroughly revised edition.
4. Arumugam and Issac-Statistics, New Ga*mma Publishing House, 2016.
5. Veerarajan T. Fundamentals of Mathematical Statistics, Yesdee Publishing Private Ltd. 2017.

(iii) Web Resources:

1. https://www.investopedia.com/ask/answers/032515/what-does-it-mean-if-correlation-coefficient-positive-negative-or-zero.asp
2. https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11-correlation-and-regression
3. https://www.stat.pitt.edu/stoffer/tsa4/intro_prob.pdf
4. https://www.healthknowledge.org.uk/public-health-textbook/research-methods/1b-statistical-methods/statistical-distributions

5. http://makemeanalyst.com/normal-distribution-binomial-distribution-poisson-distribution/
6. https://www.lkouniv.ac.in/site/writereaddata/siteContent/20200403224023542 0anoop_singh_Test_of_Significance_for_Large_and_Small_Samples.pdf
7. https://www.itl.nist.gov/div898/handbook/eda/section3/eda35f.htm
8. https://saylordotorg.github.io/text_introductory-statistics/s15-chi-square-tests-and-f-tests.html

Title of the Course: Set Theory and Functions	**Semester: II**
Course Code:LUMSSC21	**Credits: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- acquire knowledge of sets
- apply operations on sets.
- solve mathematics problems on sets effectively.
- acquire knowledge on relations
- interpret, analyze and evaluate results from numerical computations.

UNIT I: Sets and Subsets

Sets — Notations – Finite and Infinite sets – Equality of sets – Null set- Subsets – Proper subsets – Comparability – Sets of sets - Universal Sets – Power set – Disjoint sets – Venn- Euler Diagrams – Line Diagrams

UNIT II: Basic set operations

Set Operations—Unions – Intersection - Complement— Differences – Operations on Comparable sets

UNIT III: Sets of Numbers

Sets of Numbers – Real Numbers – Integers – Rational Numbers – Natural Numbers – Irrational Numbers – Decimals and Real Numbers – Inequalities – Absolute value – Intervals – Properties of intervals – Infinite intervals – Bounded and unbounded sets.

UNIT IV: Functions

Definition – Mappings, Operators, Transformations – Range – One-one Functions – Onto Functions – Identity Function – Constant Functions – Product Function – Associativity of products of functions – Inverse of a function – Inverse function – Theorems on the inverse function

UNIT V: Product Sets and Graphs of Functions

Ordered pairs – Product set – Coordinate diagrams – Graph of a function – Graphs and coordinate diagrams – Functions as sets of ordered pairs – Product sets in general

Suggested Readings

(i) Text Book

Set Theory and Related Topics by Seymour Lipschutz, Schaum's Outline Series, McGra Hill Book Company 1964

Unit 1: Chapter 1

Unit 2: Chapter 2

Unit 3: Chapter 3

Unit 4: Chapter 4

Unit 5: Chapter 5

(ii) Reference books:

1. Dr.S.Arumugam and A.T.Issac, Modern Algebra,Scitech Publications Pvt limited
2. I.N.Herstein, Topics in Algebra, Second Edition, John Wiley and sons, 1999.
3. Vijay K Khanna and S.K. Bhambri, A course in Abstract Algebra, Vikas Publishing House Pvt. Ltd., New Delhi, 2015.

(iii) Web Resources:

1. https://letstalkscience.ca/educational-resources/backgrounders/venn-and-euler-diagrams
2. https://testbook.com/learn/maths-sets/
3. https://www.math-only-math.com/ordered-pair.html

Title of the Course: Foundation Course in Mathematics	Semester: II
Course Code :LUMSSC22	Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- acquire Computational Skills
- practice speed in doing
- develop self-confidence to appear for competitive examinations
- develop critical thinking.
- efficiency in solving problems.

UNIT I:H.C.F and L.C.M of numbers

H.C.F and L.C.M of numbers – decimal fractions

UNIT II:Square roots and cube roots

Square roots and cube roots

UNIT III:Simplification

Simplification- profit and loss

UNIT IV:Area

Area - volume and surface area

UNIT V: Diagrams

Bar graphs- pie charts- line graphs

Suggested Readings

(i) Text Book

Aggarwal R. S, (2011). Quantitative Aptitude, New Delhi: S. Chand and company Ltd, Print.

(ii) Reference books:

1. Wolfred D, The Students ' Companion. New Delhi: Harper Collins, Print.
2. Sanchcti D. C. V-K. Business Mathematics New Sultan Sons, 2002.

3. Eugene D. Jane, (1996). GMAT (Graduates Management Admission Test), New Delhi — 2: Galgotia Publication Pvt. Ltd, Print.

(iii) Web Resources:

1. https://www.mathsisfun.com/square-root.html
2. https://testbook.com/learn/maths-profit-and-loss/
3. https://www.austincc.edu/pintutor/pin_mh/_source/Handouts/Geometry_Formulas/Geometry_Formulas_2D_3D_Perimeter_Area_Volume.pdf

DEPARTMENT OF PHYSICS – UG – CBCS-LOCF

(ALLIED PHYSICS FOR B.Sc. MATHEMATICS & B.Sc. CHEMISTRY MAJOR)

Title of the Course: Thermal Physics **Semester: II/IV**

Course Code: LUPMGE21/LUPHGE41 Contact hours: 4hrs/w Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- discuss the isothermal and adiabatic processes of gases and their specific heat capacities and the thermal expansion of solids.
- conceptualize various methods of heat transfer in solids, liquid and gases
- have an idea of molecular aspects that dictate transport properties of gases
- understand the implications of air pollution and greenhouse effect.
- know the second law of thermodynamics and its application to heat engine.

Pre-Required Knowledge:

- Heat capacity, specific heat capacity, molar specific heat capacity of solids, liquids and gases.
- Thermodynamics variables such as pressure, temperature, volume, entropy.

- Molecular concepts of constituents of matter.

Unit I: Thermal expansion

Expansion of Crystals – Determination of 'α' by air wedge method – Expansion of anisotropic solids – Solids of low expansivity and their uses – Anomalous expansion of water – Thermostats, Isothermal and Adiabatic changes – two specific heat capacities of gas – definitions- Difference between two specific heat capacities– Determination of C_p by Regnaults method.

Unit II: Conduction and convection

Thermal conductivity - Lee's disc method for conductivity of bad conductor – Analogy between heat flow and electric current, Wiedmann – Franz law – Thermal conductivity of air - Lee's disc method – Cardboard - Air - Convection in atmosphere – Lapse rate – Stability of atmosphere – Greenhouse effect – Atmosphere pollution.

Unit III: Radiation

Stefan's law – Determination of Stefan's constant by filament heating method – Solar constant – measurement of water flow Pyroheliometer – Temperature of the sun – Solar spectrum – Energy distribution in Black body spectrum – Planck's law (No Derivation) – Derivation of Wien's and Rayleigh Jeans laws from Planck's law.

Unit IV: Kinetic theory of gases

Postulates – Kinetic theory of gases – expression pressure of a gas - Mean free path – Transport phenomena – Diffusion, Viscosity and Thermal conductivity – Maxwell's law of distribution of molecular speed – Experimental verification – Degree of freedom – Boltzman's law of equipartition of energy – Calculation of C_p for mono atomic and diatomic gases.

Unit V: Thermodynamics

Carnot's theorem – Derivation of efficiency – Second law for thermodynamics – Entropy – Changes of entropy in carnot's cycle – Change of entropy in conversion of ice into steam – Joule – Kelvin Effect – Simple theory of Porous Plug experiment.

Suggested Topics for Group Discussion/Presentation

- Determination of linear expansion of solids, Regnaults method of determination of specific capacity gases.
- Determination of conductivity of insulator, Greenhouse gas effect and air pollution.
- Conduction, convection and radiation of heat energy
- Derivation of transport properties of gases using kinetic theory
- Carnot engine, refrigerator and entropy

Suggested Readings:

i) Text Book:

Murugeshan.R, Thermal Physics, Annai Print Park, Madurai, (2012).

ii) Reference Books:

1. Brijlal &Subramaniyam, N., Heat and Thermodynamics, S.Chand & Co., New Delhi, (2002).
2. Mathur, D.S., Heat and Thermodynamics, S.Chand & Co., New Delhi, (1997).

iii) Web Sources:

1. https://nptel.ac.in/courses/127/106/127106135/
2. https://www.youtube.com/watch?v=mb8LqNlHeLY
3. https://ocw.mit.edu/courses/chemistry/5-60-thermodynamics-kinetics-spring-2008/video-lectures/
4. https://ocw.mit.edu/courses/chemistry/5-60-thermodynamics-kinetics-spring-2008/video-lectures/lecture-1-state-of-a-system-0th-law-equation-of-state/
5. https://ocw.mit.edu/courses/chemistry/5-60-thermodynamics-kinetics-spring-2008/video-lectures/lecture-2-work-heat-first-law/

DEPARTMENT OF PHYSICS - UG – CBCS – LOCF

(ALLIED PHYSICS FOR B.Sc. MATHEMATICS & B.Sc. CHEMISTRY MAJOR)

Title of the Course: Allied Physics Practical – I Semester: I & II/ III & IV

Course Code: LUPHGL41 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- determine the Young's Modulus of the given material
- find refractive index of a prism
- calculate the value of co- efficient of viscosity of the given liquid
- determine the unknown resistance of a given wire
- calibrate ammeter and voltmeter

List of Experiments

1. Determine the Young's Modulus of the material by Pin and Microscope method (uniform bending)
2. Determine the Young's Modulus of the material by Optic lever and telescope method (non-uniform bending)
3. Determine the Young's Modulus of the material by Optic lever and telescope method (uniform bending)
4. Determine the Young's Modulus of the material by Pin and Microscope method (non- uniform bending)
5. Determine the acceleration due to gravity and radius of gyration using Compound pendulum.
6. Determine the moment of inertia and rigidity modulus of the thin wire using Torsion pendulum.
7. Calibrate a given low range Voltmeter using potentiometer.
8. Calibrate a given Ammeter using potentiometer.
9. Measure the Resistance and resistivity of the given wire using potentiometer.

10. Measure the Resistance & Resistivity of a wire using Carey Foster's Bridge.
11. Determine the refractive index of the material of a given prism using spectrometer.
12. Verify the laws of transverse vibrations of a stretched string using sonometer.
13. Measure the Co-efficient of viscosity of the liquid using Stoke's method.
14. Find the frequency of electrically maintained tuning fork using Melde's String method.

Suggested Readings:

i) Reference Book:

Ouseph C.C, Rao U.J and Vijayendran V, Practical Physics and Electronics, Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai (2014).

ii) Web Sources:

1. https://youtu.be/rkiMpF4r2Jk
2. https://youtu.be/3uZ_Boyt_AI
3. https://youtu.be/P-eJIXZimmQ
4. https://youtu.be/cDlzrrsfs3E
5. https://www.youtube.com/watch?v=QJd_OI7_UgM

PART IV – VALUE EDUCATION – UG – CBCS - LOCF

Title of the Course: Value Education		**Semester: II**
Subject Code: LUP4VE21	**Contact Hours: 2hrs/w**	**Credit: 2**

Unit I: Education Theories

1. Gandhi
2. Tagore
3. Aristotle

Unit II: Values of Religion and Society

1. Religious Values and ideologies
2. Religious Values and Social functions

3. Impact of Religious values

Unit III: Professional Values and role of Social institutions in value formation

1. Meaning of Professional value
2. Basic concept of Values
3. Value formation through social institutions

Unit IV: Constitutional values and Fundamental Rights

1. Objectives of Constitution value
2. Significance of fundamental rights
3. Characteristics of Fundamental rights

Unit V: Directive Principles of State Policy and Fundamental Duties

1. Features and Directive Principles of State Policy
2. Classification of Directive Principles
3. Importance of Fundamental duties

Learning Outcomes:

On completion of this course, Students will be able to

- know the educational theories of Gandhi, Tagore and Nehru.
- interpret the religious values
- understand the Professional values
- discuss the value of fundamental rights.
- explain the directions of constitution to state government.

Suggested Topics:

1. Religious Values
2. Gandaian Principles
3. Professional Values
4. Constitutional Values
5. Directive Principles of State Policy

Text Books:

1. Subramanyan.K, Value Education, Ram Publication, Madurai (selected chapters) 1990.
2. Kapur. A,Cand Misra K.K, Select Constitutions, S. Chand and Co., New Delhi,1975.

Reference Books:

1. K.G.S. Ramanan, Value Education, New Century Book House, Chennai, 2016.
2. R.C.Agarwal, Constitutional Development and National Movement of India.
3. M. Laxmikanth, Indian Polity, Tata Mc Graw Hill, New Delhi, 2011.

Web Sources:

1. https://www.iberdrola.com
2. https://www.edb.gov.hk
3. ttps://www.index.com

DEPARTMENT OF NSS – PART - V

Title of Course: NSS – Ideals and Approaches Semester: II
Course Code : LUP5NS21 Contact Hours: 1hrs/w Credits: 1

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the community in which they live.
- be confident of executing responsibilities for the betterment of the community.
- acquire leadership qualities and democratic attitude.
- develop capacity to meet emergencies and disasters.
- understand historical, geographical, and social significance of adopted village.

Pre-required Knowledge

- ✓ History and Growth of NSS
- ✓ Objective and role of NSS volunteers

- ✓ Social issues
- ✓ Disaster management

Unit I: Basic concepts of NSS

1. Aims and Objectives of NSS
2. History and Philosophy of NSS
3. Motto, Symbol, NSS song and Badge of NSS
4. Gandhian Principles.

Unit II: Administrative Structure of NSS and Volunteerism

1. Organizational structure of NSS at National Level, State Level
2. University Level, Institution Level and Unit Level
3. Enrolment of NSS Volunteers – Programme Officers
4. Role of NSS Volunteers in Swatch Bharat Abhiyan and Digital India

Unit III: Programmes and Regular Activities

1. Awareness programmes on AIDS/HIV, Legal awareness, First-aid, Career guidance, Cyber Crime and Anti-Ragging.
2. Concept of Regular Activities, Traffic regulation, Working with Police Commissioner's Office, Working with Corporation of Madurai, Working with Health Department, Blind assistance & Blood Donation
3. Personality Development (Leadership, Communication Skill, Interpersonal Relations, Cultural Performance)
4. Morality values and patriotism the citizen should possess

Unit IV: Community Development and Addressing the Social Issues

1. Women Empowerment, Human Right Education – Communal Harmony
2. Entrepreneurship development - Entrepreneurial skills- government self-employment schemes

3. Rainwater harvesting – Issues with plastics and Preserve natural resources
4. National Integration and RTI

Unit V: Village Adoption & Disasters Management

1. Planning and Preparation of Camping Activities, Conducting Survey
2. Medical and Veterinary Camp, Literacy Camp, Plantation and Immunisation
3. Introduction to Disasters Management, classification of Disasters
4. Role of Volunteers in Disasters Management

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATION

1. History and Growth of NSS
2. Role of NSS Volunteers
3. Blood Donation
4. RTI
5. Classification of Disasters

Suggested Readings:

i) Text Book

Training of Trainers in National Service Scheme Book, Dr. P. Ramachandra Rao and R.D. Sampath Kumar.

ii) Reference Books:

1. Department of Youth affairs and Sports, Indian youth in perspective, Govt. of India, New Delhi.
2. NSS – Manuals and Reports.

iii) Web Sources:

1. http://nss.nic.in/speccamp.asp
2. ^ National Service Scheme—NIT Calicut Chapter Retrieved 2012-08-01.
3. ^ National Service Scheme — P.G.D.A.V College, University of Delhi NSS P.G.D.A.V College, University of Delhi,

4. http://www.thebetterindia.com/140national-service-scheme-nss/

DEPARTMENT OF PHYSICAL EDUCATION– UG – CBCS-LOCF

PART - V

Title of the Paper: Physical Education	**Semester: II**
Course Code : LUP5PE21	**Credit : 1**

Course learning out comes:

On completion of the course, the students are able to:

- Value the knowledge to preserve community health and well being
- Compare the relationship between general education and physical education
- Lay -out and mark the dimensions of the play court
- Will develop skills to establish daily caloric requirement and to design the balance diet plan
- Understand and prepare weight management plans

Pre-Required knowledge:

- ✓ Basic rules of cricket game
- ✓ Definition and proper steps of Suriya Namaskar
- ✓ Health Awareness concept of present scenario

Unit 1: Physical Education-Meaning and Definition, Basic Rules of Games- Football- Kabaddi – Volleyball

Unit II: Organization and Administration of Intramurals-Tournament- Sports meet-Olympics

Unit III: Yoga- Asanas- Pranayama- Meditation- Relaxation Techniques

Unit IV: Food and Nutrition, Drug addiction, Alcoholism, Smoking- Cleanliness, Personal Hygiene.

Unit V: First Aid, Life Style Disorders- Obesity, Diabetes, Body Mass Index

Suggested topics for Group Discussion / Presentation

1. Physical Education is Health Education
2. Recent inclusions in Olympics'
3. Yoga for Mental healthiness
4. Synthetic Protein supplements
5. RICE method of injuries

Text Books:

1. Dr.T..Krishnammal, Physical and Health Education.
2. Dr. K. Chandrasekar, Sound Health through Yoga.

Reference Books:

1. C. Sathiyanesan, Hand book of Physical Education.
2. R.G. Goel, Encyclopedia of sports and games.
3. Dr. T.Ravichandran, Practical Yoga.

Web Sources:

www.swayamprabha.gov.in

www.e-yantra.org

www.vlabs.co.in

www.fossee.in

DEPARTMENT OF PHYSICAL EDUCATION– UG – CBCS-LOCF

PART IV

Title of the paper: YOGA **Semester: II**

Course Code : LUP4YA21 **Contact Hours: 1hrs/w** **Credits : 1**

Course Learning Outcomes:

On completion of the course, the students are able to

- ✓ spread the message of positive health as taught in Yoga to people in asystematic and scientific manner.
- ✓ Provide a proper perspective and insight into various aspects of Yoga education to the trainees.

Pre-Required Knowledge:

1. Foundations of Yoga: History, Evolution of Yoga and Schools of Yoga
2. Basic Yoga Texts: Principal Upanishads Bhagavad Gita, Yoga Vasishtha
3. Patanjala Yoga Sutra
4. Applications of Yoga

Unit-I: NEEDSOF YOGA

Yoga -need of the hour, concept of Yoga, Definition of Yoga, Basics of Yoga, Stress & yoga, yoga for emotion culture, the science of happiness. Yoga in education, Yoga & personality

UNIT:II YOGA AND HEALTH

Yoga and Health (Definition of Health, Guidelines for Health in Yoga) – Health Related Fitness and Yoga – Yoga and Aging - Yoga for Handicapped people – Yoga as a remedy for addictions – Yoga and Social problems

UNIT III: NUTRITION AND DIETETICS

Introduction to Nutrition and Dietetics – Diet and Digestion – Balanced Diet : Carbohydrates, fats, proteins, vitamins, and minerals. Yogic Diet :Sattvik, Rajasik, Tamasik. Diet and Diseases : Hypertension, Diabetes, Arthritis, Ulcerative, Colitis, Peptic Ulcer, Constipation, and Obesity.

Unit – IV: ASANAS

1. Ardha-Padmasana [virasana] 2. Ardha-Halasana 3. Pavana-Muktasana 4. Naukasana 5. Ardha-shalabhasana 6. Shalabhasana 7. Makarasana 8. Bhujangasana 9. Dhanurasana10.Vakrasana 11.Chakrasana 12.Paschimottanasana 13.Ugrasana 14.Gomukhasana 15.Padmasana 16.Siddhasana 17.Bhadrasana 18.Swastikkasana 19.Vajrasana 20.Supta-Vajrasana 21.Yoga-Mudra.

Unit – V: MUDRAS, PRANAYAMAS AND MEDITATION

(i) MUDRA

1.Brahma-Mudra 2.Simha-Mudra 3.Shanmugi Mudra 4. Viparithakarani-Mudra 5. Ashwsini-Mudra 6. Suriyanamaskar

(ii) PRANAYAMAS

1.Nadi-Shuddhi 2.Nadi-Shodhana 3.Suryabhadana 4. Ujjayi 5. Bhastrika Pranayama 6. Bhramari Pranayama 7. Sitkari 8. Sitali

(iii) MEDITATION 1. Silent Meditation 2. Mantra Meditation

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

Concept of Yoga

Yoga and Health

Introduction to Nutrition and Dietetics

Ardha-Padmasana [virasana],.Ardha-Halasana

Viparithakarani-Mudra

Suggested Readings:

Text Books:

1. Yoga Practice I - The World Community Service Centre - Vethathiri Publications, Erode, 1st Ed - 2009, 4 th Edition 2012
2. Mind, Vethathiri maharishi, Vethathiri publication, Erode, 1st Ed – 1999
3. Simplified Physical Exercises - Vethathiri Maharishi, 1st Edition, 1977, 44th Edition,2015, Vethathiri Publications.
4. Yoga for Modern Age - Vethathiri Maharishi, 1st Edition 1972, 19th Edition Oct. 2015 – Vethathiri Publications.
5. Body, Life - force and Mind :Vethathiri Maharishi - Ist Edition 2006, 2nd Edition May 2006 – Vethathiri publications.

References Books:

1. Asanas - Swami Kuvalayananda. Kaivalyadhama. Lonavla
2. Pranayama - Swami Kuvalayan and a Kaivalyadhama. Lonavla
3. Abstracts And Bibliography Of Articles On Yoga - Edited By
4. Dr.M.V.Bhole, From Kaivalyadhama Kaivalyadhama. Lonavla
5. Suiyanamaskar - By Dr. P. Mariayyah, Jaya Publishing House,
6. Perunthurai, Erode.
7. Sound Health Through Yoga – By Dr. K. Chandrasekaran , Prem
8. Kalyan Publications, Sedapatti, 1999.

Web Sources:

1. https://www.youtube.com/watch?v=RJ44oIxWiYI
2. https://www.youtube.com/watch?v=149Iac5fmoE
3. https://www.youtube.com/watch?v=149Iac5fmoE
4. https://www.youtube.com/watch?v=7ixtTgiVYzw
5. https://www.youtube.com/watch?v=IgzsuYggK5c
6. https://www.youtube.com/watch?v=nHnjxzMCMGg

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE

PART – V

Title of the paper: Basics of Library and Information Science **Semester: II**

Course code: LUP5LS21 **Contact Hours: 1hrs/w** **Credit: 1**

Course Learning Outcomes:

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

- Trace the History of Libraries.
- Classify information Sources.

- Follow the modern trends in the field of library science.
- Appreciate the value of books and other reading materials.
- Understand the importance of libraries in the modern society.

Pre required knowledge:

- Interest Reading.
- Basic computer knowledge to access internet.
- Basic ideas of Purushartha

Unit I – Evolution of Libraries

Evolution of writing – (Cuneiform – Hieroglyphics – Indus scripts – Tamil scripts (Tamil- Grantham – Vatteluthu)) – Evolution of writing materials – (Stones – Clay Tablets – Papyrus – Birch bark – Palm leaves – Paper) – Evolution of Libraries - Ashurbanipal library (Clay Tablets) – Library of Alexandria (Papyrus) – Government oriental manuscript library, Chennai.

Unit II – Modern Library System:

Public Libraries Academic Libraries, (School, College, University) –Research Libraries – Information Sources (Primary, Secondary and Tertiary).

Unit III – Knowledge Organisation :

Traditional Indian – Purushartha (Dharma, Artha, Kama and Moksha) – Modern Western – Dewey's Decimal classification – Modern Indian – Ranganathan's colon classification - Need for cataloging – OPAC.

Unit IV – Modern Trends:

Open Access – National Digital Library of India (NDL) – Open Library – Project Gutenberg – World Digital Library – Project Madurai – Google Books – Chennai Noolagam – Tamil Digital Library – DOAJ.

Unit V – Library and Society:

Library and Education (Formal and Non Formal) – Library legislation (Tamil Nadu Library act, Delivery of Books act) – Library and Democracy (Informed Citizens) – Connemara Public Library, Chennai - Saraswathi Mahal Library, Thanjavur.

Suggested Topic for Group Discussion and Presentation:

- Deciphering ancient scripts.
- Importance of School Libraries.
- Web – OPACs.
- Digitalizingrare Tamil Books.
- Impact of Social medias on reading habit.

Text book:

Ranganathan, S.R,Library manual, Asia Publishing house, New Delhi, 1964.

References Books:

1. Krishnakumar, Reference service, Vani educational books, New Delhi, 1978.
2. Krishnakumar, Theory of Classification, Vikas Publishing house, New Delhi, 1993

Websites and e-Learning Sources:

- IGNOU – CLIS –Study materials.

  http://www.ignouhelp.in/ignou-clis-study-material
- Manomaniam Sundaram University – CLIS – Study Materials.

  https://www.msuniv.ac.in/Download/pdf/4e55f868a24b4a7
- Wikipedia.
- Encyclopaedia Britannica.

DEPARTMENT OF NCC – UG - CBCS - LOCF
PART V

Title of the paper: NCC – PRACTICAL	**Semester: II**
Course code: LUP5NC21	**Credits: 1**

On completion of the course, the students are able to

- perform food and arms drill
- recognize the type of rifle.
- utilize map for movements
- interpret distance and signals for mobility
- apply the skills for self defense

Pre-required Knowledge

- ✓ Drill and Weapon Training.
- ✓ Map reading and Judging distance.
- ✓ Self defense.

Unit – I Drill

Drill–Open drill and Close drill – Uses of drill words of command, Arms drill, Foot Drill

Unit – II Weapon Training

0.22 Rifle – Introduction, specification, ammunition and handling - 5.66 mm INSA Rifle: Specification, stripping, assembling and cleaning. 7.62 mm Rifle: Specification, ammunition.

Unit – III Map Reading

Map Reading – Finding own Position, Ground to Map and Map to Ground

Unit – IV Judging Distance

Judging Distance – methods, under or over estimation – (Short – Medium – Long Distance). Field Signal – methods, hand Signals, signals with weapons, signals with whistle.

Unit –V Self Defence

Self defence – meaning, types, uses, Principles, unarmed combat, vulnerable parts of the body; Types of attacks – Types of holds – Types of basic throws – Precautions in self defence.

Suggested Topics / Practical Exercises

- varies Drill operations
- handling stripping and assembling of .22 riffle
- methods of finding own position
- calculation of judging distance using appropriate method.
- finding any one self defence in a critical situation.

SUGGESTED READINGS:

i) Text Books:

1. Asthana A K, Brigadier (2015).Kamptee, Commandant, Precis.
2. Major Ramasamy.R. (2010). NCC Guide – Army Wing, Karur, Priya Publications.
3. Cadets hand book (2018). Kamptee, Common subjects for SD/SW, OTA Training Materials.

ii) Reference Books:

1. Specialized Subject Army (2018).New Delhi, Govt. Of India Press.
2. Precis, (2009). Kamptee, Published by Officer Training School.
3. Cadet's diary. (2000).Chennai, Published by cadets' center.
4. Gupta.R. (2015) Ramesh Publishing House, NCC: Handbook of NCC cadets.
5. Lt. Saravanamoorthy. S.N. (2015). A hand book of NCC-Army wing. Jayalakshmi publications.

iii) Web sources:

1. https://indiancc.nic.in/

2.https://play.google.com/store/apps/details?id=com.chl.ncc&hl=en_IN&gl=US

3. https://joinindianarmy.nic.in/default.aspx
4. https://www.joinindiannavy.gov.in/
5. https://indianairforce.nic.in/

DEPARTMENT OF TAMIL – UG – CBCS
PART I- TAMIL

Title of The Course: இடைக்கால இலக்கியமும் புதினமும் **Semester : III**
Course Code : LUPITA31 Contact Hours : 6hrs/w **Credit : 3**

பாடத் திட்டத்தைக் கற்றுக் கொண்ட பின்பு மாணவர்கள் பெறும் பயன்கள்: -

1. மாணவர்களைப் பண்படுத்துவதற்கு பக்தி நூல்கள் துணை செய்கின்றன.
2. மாணவர்கள் இயற்கை வளம் பற்றியும் தமிழின் பெருமை பற்றியும் அறிந்து கொள்ள நூல்கள் வழி வகுக்கின்றன.
3. புதினம் படிப்பதன் வாயிலாக மாணவர்கள் போட்டித் தேர்வுகளுக்கு தங்களைத் தயார்படுத்திக் கொள்ள முடிகிறது.
4. அரசுப் போட்டித் தேர்வுகளுக்கு மாணவர்களைத் தயார்படுத்த இலக்கணம் துணை புரிகின்றன.
5. படைப்பாற்றலை வளர்த்து கொள்ளும்விதத்தில் இலக்கிய வரலாறு மாணவர்களுக்கு அமைந்திருக்கிறது.

பாடத்திட்டத்திற்குத் தேவையான முன் அறிவு:

- அறுவகைச் சமயங்கள் பற்றி அறிந்து கொள்ளல்
- போட்டித் தேர்வில் வெற்றி பெறுவதற்கான உத்திகளைத் தெரிந்து கொள்ளல்
- படைப்பாற்றலை வளர்த்துக் கொள்ளல்

கூறு I: பக்தி இலக்கியங்கள்

1. திருஞானசம்பந்தர்- திருஆலவாய்ப் பதிகம் (முதல் 5 பாடல்கள்)
2. திருநாவுக்கரசர்-நமச்சிவாயப் பதிகம் (முதல்5 பாடல்கள்)
3. சுந்தரமூர்த்தி நாயனார்- திருப்புனவாயில் பதிகம் (முதல் 5 பாடல்கள்)
4. மாணிக்கவாசகர்-திருவெம்பாவை (முதல் 5 பாடல்கள்)
5. குலசேகர ஆழ்வார்-பெருமாள் திருமொழி (முதல்10 பாடல்கள்)

6. ஆண்டாள் - நாச்சியார் திருமொழி (திருப்பாவை முதல் 10 பாடல்கள்)

7. சித்தர் பாடல்கள்

(அ) திருமூலர் - மலமில்லை, மாசில்லை, பார்ப்பான் அகத்திலே, அன்பும், சிவமும்

(ஆ) பட்டினத்தார் - ஐயிரண்டு திங்களாய், ஓடாமல் பாழுக்கு, முதல் சங்கு அமுதூட்டும்

(இ) சிவவாக்கியார் - எங்குமுள்ள, ஓசையுள்ள, ஓடி ஓடி ஓடி ஓடி உட்கலந்த

கூறு II: சிற்றிலக்கியங்கள்

1. திருக்குற்றாலக் குறவஞ்சி- மலைவளம்
2. முக்கூடற் பள்ளு - நகர்வளம்
3. தமிழ் விடு தூது - சீர்கொண்டகூடற் சிவராசதானி முதல் - கல்லாதார் சிவலிங்கம் வரை 15 கண்ணிகள்

4. சேக்கிழார் பிள்ளைத்தமிழ் - அம்புலிப் பருவம் : முதல் 5 பாடல் பாடுமதியோன் - எம்மை இனிது ஆள்பவன்

கூறு III: புதினம்

1. திக்கற்ற பயணம் - ராமன் மதி

கூறு IV: இலக்கணம்

1. முதல் எழுத்து, சார்பெழுத்து
2. மொழி முதல், இறுதி எழுத்துக்கள்
3. வலி மிகும், வலிமிகா இடங்கள்
4. ஓர் எழுத்து ஒரு மொழி
5. மரபுப் பிழை நீக்கம்

கூறு V: இலக்கிய வரலாறு

1. பக்தி இலக்கிய வளர்ச்சி
2. சிற்றிலக்கிய வளர்ச்சி
3. புதின இலக்கிய வளர்ச்சி

II. எழுத்துப் பயிற்சி :

1. கட்டுரை எழுதுதல் (இலக்கியம், சமூகம், அறிவியல்)
2. விளம்பரம் (உபயோகப் பொருள், இயந்திர விளம்பரம்)
3. நூல் விமர்சனம் (புதினம்)
4. குறும்படம் அல்லது திரைப்பட விமர்சனம்

1. பரிந்துரைக்கப்பட்ட நூல்கள்:

சரசுவதி (செய்யுள் தொகுப்பு)
சரசுவதி நாராயணன் கல்லூரி
நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்.அம்பத்தூர்
சென்னை - 600050
திக்கற்ற பயணம் (புதினம்)
சரசுவதி நாராயணன் கல்லூரி
நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்.அம்பத்தூர்,
சென்னை – 600050

2. பார்வை நூல்:

- இந்திய தத்துவ ஞானம் - சி.லெட்சுமணன்
- திருமந்திரம் - நா.மாணிக்கவாசகன் உரை
- நாலாயிர திவ்யப் பிரபந்தம் - கமலக்கண்ணன்
- தமிழ் இலக்கிய வரலாறு - தமிழண்ணல்
- இலக்கிய வரலாறு - மு.அருணாச்சலம்
- சிற்றிலக்கிய வளர்ச்சி - நிர்மலா மோகன்
- நற்றிமிழ் இலக்கணம் - தொ.பரமசிவம்
- நன்னூல் - வெள்ளை வாரணனார் உரை

3. இணைய ஆதாரங்கள் :

தமிழ்விடு தூது

https://www.tamilvu.org/ta/courses-degree-p103-p1033-html-p103331-26009

முக்கூடற்பள்ளு

https://www.tamilvu.org/ta/courses-degree-c012-c0124-html-c01243l3-15342

குற்றாலக்குறவஞ்சி

https://www.tamilvu.org/ta/courses-degree-c012-c0123-html-c01233l2-15036

DEPARTMENT OF ENGLISH – UG – CBCS-LOCF

Title of the Course: English Language Proficiency –III	Semester: III
Course Code: LUP2EN31 Contact hours: 6hrs/w	Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- use English confidently for communication in day to day life.
- speak and write in academic English intelligibly.
- read and analyze texts in English.
- achieve the skill of writing creatively.
- acquire practical command of English in speaking, reading, and writing.

Pre-required Knowledge:

- ✓ Usage of Tense
- ✓ Active Vocabulary in frequent use
- ✓ Language and style of poetry

UNIT I-PROSE

O'Henry -The Gift of the Magi

Robert Lynd -On Forgetting

C.V.Raman -Water, The Elixir of Life

A.P.J.AbdulKalam -My Early Days from "Wings of Fire"

UNIT II -POETRY

Rabindranath Tagore -Leave This Chanting

LalDed -LalDed'sVakhs

William Wordsworth -The World is too much With Us

Walt Whitman -O Captain! My Captain!

UNIT III -NOVEL

Charles Dickens - Oliver Twist

UNIT IV- GRAMMAR

Voices

Transformation of Sentences

Idioms and Phrases

UNIT V COMPOSITION

Curriculum Vitae

Memoranda, Notices, Agenda & Minutes

E-Mail Writing

Suggested Topics for Presentation:

- ✓ Importance of English as an International Language.
- ✓ The pleasure of reading poetry
- ✓ Functional uses of Grammar
- ✓ Organizing data in CV
- ✓ Dickens as a social realist

Suggested Readings:

i)Text Book:

1. *Wealth of English.* Ed. Department of English, Saraswathi Narayanan College, Harrows Publications, Madurai, 2022.

ii)Reference Books:

1. Raman. C.V.A *Creative Mind Par Excellence*. *Hindustan Times*, 8th July 2014.
2. Sinha, Sasadhar.*Social Thinking of Rabindranath Tagore.*London,1962.

iii)Web Sources:

1.https://english.washington.edu

2.https://www.lavc.edu>writingcentre.

3.https://poligo.com>articles>writing

4.https://www.athena.edu>book-review

5.https://poemanalysis.com>ocaptain

DEPARTMENT OF MATHEMATICS – UG – LOCF

Title of the paper: Differential Equations and Laplace Transform	**Semester: III**
Course code: LUMSCT31 Contact Hours: 5hrs/w	**Credits: 4**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the concepts of Differential equations and Laplace transforms.
- develop strong background on finding solutions to linear differential equations with constant and variable coefficients.
- solve second order ordinary differential equations using method of variation of parameters.
- understand the concepts of Laplace transform and partial differential equations.
- solve linear and non-linear partial differential equations with different methods.

Pre Required Knowledge:

- ✓ Basic knowledge of differential calculus and integral calculus.
- ✓ Know the difference between ODE and PDE.
- ✓ Understanding the usual notations in ODE and PDE.

UNIT I: Equations of the first order but of higher degree

Differential equations – Definition and examples – order and degree of differential equations – Types of differential equations – Linear and Non-linear differential equations – Equations of the first order but of higher degree: Equations solvable for y – Equations solvable for x and p-Clairaut's form – Equation homogeneous in x and y – Exact differential equation.

Unit II: Linear equation with Constant Coefficients and simultaneous equations

Linear equation with Constant Coefficients: Linear equation with variable coefficients – Equations reducible to the linear equations - Simultaneous linear differential equations.

Unit III: Linear equation of the second order and total differential equations

Linear equation of the second order: Complete solution given a known integral-Reduction to the normal form (or) Removing the first derivative method-Variation of parameters- Total differential equation- Rules for integrating Pdx + Qdy + Rdz =0

Unit IV: Laplace Transform

Laplace Transform-Theorems –Problems –Evaluation of integrals – Inverse Laplace transforms –Results –Problems. Solving ordinary differential equation with constant coefficient and variable coefficients – Simultaneous linear equations using Laplace transforms.

Unit V: Partial differential equations of the first order

Partial differential equations of the first Order-Classification of integrals – Definitions and examples - Largrange's method of solving the linear Equation-Standard forms- Equations reducible to the standard forms.

Suggested Topics for Group Discussion/ Presentation

1. First order differential equations
2. Second order differential equations
3. Removing first derivatives
4. Laplace transform
5. Eliminating arbitrary functions and constants.

Suggested Readings

(i) Text Books:

S. Narayanan & T.K. Manickavasagam Pillai, Differential Equations and its applications S.V. Publication, 2015.

Unit I : Chapters IV and Chapter VII;

Unit II : Chapter V-Sec 5.1 to 5.6 and Chapter VI;

Unit III : Chapter VIII- Sec 8.1 to 8.4, Chapter XI.

Unit IV: Chapter IX;

Unit V: Chapter XII-Sec 12.1-12.5.

(ii) Reference Books:

1. Arumugam et al, Differential equations and applications, New Gamma Publishing House, 2003.
2. P. Kandasamy and K. Thilagavathi, Mathematics for B.Sc., S. Chand and Co., New Delhi,2004.
3. M. K. Venkataraman and Mrs. Manorama Sridhar, Differential Equations and Laplace Transforms, The National Publishing Company, 2004.

(iii)Web Resources:

1. http://eqworld.ipmnet.ru/en/solutions/ode.htm
2. https://www.khanacademy.org/math/differential-equations
3. https://mathinsight.org/ordinary_differential_equation_introduction
4. https://tutorial.math.lamar.edu/Classes/DE/DE.aspx
5. https://www.emathhelp.net/calculators/differential-equations/differential-equation-calculator/
6. https://www.wolframalpha.com/examples/mathematics/differential-equations/

Title of the paper: Sequences and Series **Semester: III**

Course code: LUMSCT32 Contact Hours: 5hrs/w Credits: 4

Course Learning Outcomes:

On completion of the course, the students are able to

- determine whether or not a sequence converges we can look at what happens to the general term as n gets infinitely large.

- recognize when a sequence is increasing, decreasing, bounded, or monotone and Recognize example of geometric sequences and determine whether they converge or diverge.
- recognize when a geometric series converges and be able to compute its sum in that case (conceptual +Procedural).
- knowledge of some simple techniques for testing the convergence of sequences.
- understand, how comparison test, ratio test, kummer's test for testing the convergence or divergence of the given series.

Pre Required Knowledge:

- ✓ Fundamental of numerical systems
- ✓ Sets, function, domain, co-domain, range and etc.
- ✓ Basic knowledge of arithmetic series, geometric series and harmonic series.

Unit I: Sequences

Sequences: Sequences-Bounded, Convergent, Divergent and Oscillating sequences – Algebra of limits – Behaviour of monotonic sequences.

Unit II: Theory of Limits

Cauchy's first limit theorem – Cauchy's second limit theorem – Subsequences – Cauchy sequences –The Upper & Lower limits of sequences.

Unit III: Series of positive terms

Series of positive terms: Infinite series – Tests of convergence of series of positive terms – Comparison test – Kummer's test – Root test and condensation test – Integral test.

Unit IV: Series of arbitrary terms

Series of arbitrary terms: Alternating series – Absolute convergence – Tests For convergence of series of arbitrary terms.

Unit V: Rearrangement of series and power series

Rearrangement of series – Multiplication of series – Power series.

Suggested Topics for Group Discussion/ Presentation

1. Convergent and divergent problems
2. Application of cauchy's first limit theorem
3. Application of comparison test, kummers test
4. Test for convergence of series of arbitrary terms
5. Power series

Suggested Readings:

(i) Text Books:

Dr. S. Arumugam and A. Thangapandi Isaac, Sequences and Series, New Gamma Publishing House, 2014.

Unit I : Chapter 3-Sec 3.1 to 3.7

Unit II : Chapter 3-Sec 3.8 to 3.12

Unit III : Chapter 4-Sec 4.1-4.5

Unit IV : Chapter 5 –Sec 5.1-5.3

Unit V: Chapter 5 –Sec 5.4-5.6

(ii) Reference Books:

1. S. L. Gupta Nisha Rani, Fundamental real analysis 4th Revised Edition, Vikas Publishing House Pvt. Ltd, 2005.
2. Sequence and Series by M.K. Venkatraman and Manorama Sridhar, The National Publishing Company, 2002.
3. Malik S.C and SavithaArora (1991) – Mathematical Analysis, Wiley Eastern Limited New Delhi.
4. ViswanathNaik, K.- Real Analysis, Emerald Publishers, Chennai.

(iii)Web Resources:

1. https://youtu.be/lfZGtjSWcQs
2. http://amsi.org.au/ESA_senior_years/PDF/sequences1d.pdf
3. http://www.vedantu.com/iit-jee/jee-main-sequences-and-series-revision-notes
4. http://www.bath.k12.ky.us/userfiles/100/classes/4629/sequences%20520series%20lecture%20notes.pdf

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Title of the Course: Mathematical Logic and Lattice Theory **Semester: III**

Course Code: LUMSSE31 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- familiarize with the concept of Functional Operations
- find Tautologies and Contradictions.
- understand the Logical Implication and Equivalence.
- define and analyse partially ordered sets.
- apply Boolean algebra in Automata theory.

Pre Required Knowledge:

- ✓ Basic knowledge in statement forms.
- ✓ Basic concepts of Tautologies and Contradictions
- ✓ Modular lattices.

Unit I: Algebra of Propositions I

Truth – Functional Operations, Connectives, Statement Forms

Unit II: Algebra of Propositions II

Parentheses, Truth Tables, Tautologies and Contradictions

Unit III: Algebra of Propositions III

Logical Implication and Equivalence, Disjunctive Normal Form, Adequate Systems of Connectives.

Unit IV: Posets and Lattices

Introduction, Partially ordered Sets, Lattices

Unit V: Types of Lattices

Distributive Lattices, Modular Lattices, Boolean Algebras.

Suggested Topics for Group Discussion/ Presentation

1. Connectives
2. Tautologies
3. Disjunctive Normal Form
4. Lattices
5. Modular Lattices

Suggested Readings:

(i) Text Books:

1. Elliott Mendelson, Boolean Algebra & and Switching Circuits, Tata McGraw – Hill Publishing company Limited, 1961.

   Unit I: 1.1, 1.2, 1.3

   Unit II: 1.4., 1.5, 1.6

   Unit III: 1.7., 1.8, 1.9

2. Modern Algebra, Dr. S. Arumugam& A Thangapandi Isaac, Scitech Publications (India) Pvt. Ltd., Chennai, Reprint, 2011.

   Unit IV: 9.0, 9.1, 9.2

   Unit V: 9.3, 9.4, 9.5

(ii) Reference Books

1. Set Theory and Related Topics by Seymour Lipschutz, Schaum's Outline Series, McGra Hill Book Company, 1964.
2. J.P.Tremblay and R. Manohar, Discrete Mathematical Structures with Applications, McGraw Hill Edition, First Edition, 2017.
3. Kenneth H.Rosen, Discrete Mathematics & its Applications, McGraw Hill, 8th Edition, 2019

(iii)Web Resources:

1. https://www.brainkart.com/article/Mathematical-Logic--Logical-Connectives-and-their-Truth-Tables_41289/
2. http://web.stanford.edu/class/archive/cs/cs103/cs103.1152/lectures/07/Small07.pdf
3. https://www.digimat.in/nptel/courses/video/113104014/L12.html
4. https://study.com/academy/lesson/partially-ordered-sets-lattices-in-discrete-mathematics.html

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Title of the Course: Mathematical Modelling **Semester: III**

Course Code:LUMSSE32 Contact Hours: 2hrs/w **Credits: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- classify the differential equations with respect to their order and linearity.
- find solution of higher order linear differential equations with variable coefficients.
- have a working knowledge of basic application problems described by second order linear differential equations.
- understand the basic properties of difference equations.
- apply partial derivative equation techniques to predict the behavior of certain phenomena.

Pre Required Knowledge:

- ✓ Fundamental concepts of Differential Equations.
- ✓ Basic concepts of Linear and Non-linear.
- ✓ Fundamental knowledge of Transforms.

Unit I: Mathematical Modelling through systems of ordinary differential equations of the first order

Mathematical modelling of through systems of ordinary differential equations of the first order-Mathematical

modelling in population dynamics-Epidemics through systems of ODE of first order-Compartment models through systems of ODE.

Unit II: Mathematical Modelling through difference equations

Mathematical modelling through difference equations - The need for mathematical modelling through difference equations some simple models-Basic theory of linear difference equations with constant coefficients.

Unit III: Mathematical Modelling through partial differential equations

Mathematical modelling through PDE-Situation giving rise to PDE models-Mass-balance equations first method of getting PDE models-Momentum balance equations the second method of obtaining PDE models.

Unit IV: Mathematical Modelling through functional integral, delay differential and differential-difference equations

Mathematical modelling through functional integral, delay differential and differential-difference equations-Functional equations-integral equations.

Unit V:Mathematical modelling through calculus of variations and dynamic programming

Mathematical modelling through calculus of variations and dynamic programming-optimization principles and techniques-Calculus of variations.

Suggested Topics for Group Discussion/ Presentation

1. Compartment models through systems of ODE
2. Basic theory of linear difference equations with constant coefficients.
3. Situation giving rise to PDE models
4. Functional equations
5. Calculus of variations

Suggested Readings:

(i) Text Book:

1. J.N. Kapur-Mathematical modelling, New age International Publishers, 2005 (Reprint).

Unit 1 : chapter 3 (sections 3.1-3.3).

Unit 2 : chapter 5 (sections 5.1, 5.2).

Unit 3 : chapter 6 (sections 6.1-6.3).

Unit 4 : chapter 8 (sections 8.1, 8.2).

Unit 5 : chapter 9 (sections 9.1, 9.2).

(ii) Reference Books:

1. C.SeanBohun, Mathematical modelling, AMS, 2015.
2. J.N. Kapur, Treatment as in "Mathematical modelling",New Age International publishers,2004.
3. Singh, Mathematical modelling, International book house,2003.

(iii) Web Resources:

1. https://people.maths.bris.ac.uk/~madjl/course_text.pdf
2. https://pages.pomona.edu/~ajr04747/Spring2012/Math183/Notes/Math183Spring2012Notes.pdf
3. https://onlinecourses.nptel.ac.in/noc22_ma20/preview

Title of the Course: An Introduction to Geometry	**Semester: III**
Course Code:LUMSSC31	**Credits: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- Learn the definition of basic geometry terms.
- Explore translation in the coordinate plane.
- Predict the result of apply the sequence of transformation to a given figure.
- Write equations of parallel and perpendicular lines.
- Find missing figures of sides and angles using trigonometric ratios.

UNIT I:Angles at a point

Angles at a Point-Rectilinear Figures-Congruent Triangles.

UNIT II:Inequalities

Inequalities-properties of Parallelograms-Areas.

UNIT III: Geometrical illustrations

Geometrical illustrations of algebraic identities-Pythagoras Theorem and its extension.

UNIT IV: Circles

Circles-Angles in Circles- Tangency.

UNIT V: Ratio, Proportion and similarity

Ratio, Proportion and similarity.

Suggested Readings

(i) Text Book

Sushil K. Gupta, (1966),A new approach to Geometry, S. Chand and company

Ltd. Print, New Delhi.

(ii) Reference Books:

1. R. Lachlan, An Elementary Treatise on Modern Pure Geometry, 2015.

2. Patrick D. Barry , Geometry with Trigonometry , Second Edition , 2015.

3. D.M.Y. Sommeville, Introduction to the Geometry of N Dimensions, Dover Publication, Inc. Mineola, Newyork. 2019.

(iii) Web Resources:

1. https://www.onlinemathlearning.com/prove-triangles-congruent.html
2. https://www.mathsisfun.com/pythagoras.html
3. https://testbook.com/learn/maths-ratio-and-proportion/

Title of the Course: Fibonacci Numbers and the Golden Ratio	Semester : III
Course Code :LUMSSC32	Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- Acquire the knowledge of Fibonacci sequence
- construct a golden rectangle
- know the application of Fibonacci numbers
- show that Fibonacci spiral converges to golden spiral
- construct a sequence of rational numbers that converges to a target irrational number.

UNIT I:Fibonacci

Fibonacci sequence – Golden ratio

UNIT II: Identities, Sums and Rectangles

Sum of Fibonacci numbers-the Golden rectangle

UNIT III:The Most Irrational Number I

The golden spiral-the Fibonacci spiral

UNIT IV: The Most Irrational Number II

Fibonacci numbers in nature-the golden angle

UNIT V: The Most Irrational Number III

The growth of a sunflower-continued fractions.

Suggested Readings:

(i) Text Book

Jeffrey R.ChasnovFibonacci numbers and the Golden ratio, Lecture notes,2016.

Unit 1: Chapter 1.1 to 1.3

Unit 2 : Chapter 2.9 to 2.11

Unit 3: Chapter 3.13 to 3.15

Unit 4: Chapter 3.16 to 3.18

Unit 5 : Chapter 3.19

(ii) Reference Books

1. Robert D. Friedman ,M.D.MathewK.Cross, Hoshin Media, 2013.
2. Sarah C.Campbell, Growing Patterns:Fibonacci numbers in Nature, Astra Publishing House, 2010.
3. Gary B.Meisner, The Golden ratio, Race point, 2018.

(iii)Web Resources

1. https://www.mathsisfun.com/numbers/fibonacci-sequence.html
2. https://www.mathsisfun.com/numbers/golden-ratio.html
3. https://mathworld.wolfram.com/ContinuedFraction.html

DEPARTMENT OF PHYSICS – UG – CBSC – LOCF

Title of the Course: Electricity and Electronics **Semester: III/V**

Course Code: LUPMGE31/LUPHGE51 Contact Hours: 4hrs/w Credits: 4

Course Learning Outcomes:

On completion of the course, the students are able to

- discuss electrical circuits using Kirchoff's laws.
- apply and analyze the behavior AC circuits based on L, C and R.
- understand various uses of capacitor, various electrical units.
- explain the concept of Faraday's law of electromagnetic induction
- know about the working principle of transformer

Pre-Required Knowledge:

- various uses of capacitor, various electrical units.
- the uses of various electrical meters.

- measure various electrical quantities.

Unit I: Electrostatics

Coulomb's law - Electric field-due to point charge-electric flux - Gauss law - Proof Applications of Gauss's law - Electric Potential-Relation between potential and field-Capacitors Capacitance of Parallel plate. Spherical (Outer sphere earthed) and Cylindrical capacitors - Energy of charged capacitor.

Unit II: Current electricity

Kirchoff's laws -Application of Wheatstone's network - Sensitivity of bridge-Carey Foster Bridge - Measurement of Resistance and temperature co-efficient of resistance - Principle of potentiometer - Calibration of Ammeter and Voltmeter - Low and high range-Measurement of resistance using potentiometer.

Unit III: Magnetic field of electric current & alternating current.

Force on a current carrying conductor in magnetic field Torque on a current loop Moving coil galvanometer Mirror galvanometer - Current and voltage sensitivities - Ballistic galvanometer - Damping correction-measurement of charge sensitiveness. Generation of Alternating current - Root Mean Square value and mean square value.LCR circuit - Impedance-Series resonance circuit.

Unit IV: Semiconductor devices

Junction diodes - Forward and Reverse bias Diode Characteristics-Types of diodes - (LED and Zener) - Bridge rectifier using junction diodes-II Filter-Transistors - Characteristics (CE Mode only) - Bissing of a transistor (CE) amplifier - Frequency response.

Unit V: Logic Gates

Binary number system Reason for using binary numbers Binary to decimal and decimal to binary conversions Addition and subtraction of binary number - Logic Circuits: Boolean - De Morgan's theorem - OR, AND, NOT, NOR and

NAND gates - NOR and NAND gates as universal building blocks - XOR gates

Suggested Topics for Group Discussion/Presentation

- Gauss's law and its applications
- Kirchoff's laws and its explanations
- Current and voltage sensitivities in Voltmeter and Ammeter
- Frequency response of electronic circuits
- Logic Circuits: Boolean - De Morgan's theorem and its digital electronic applications

Suggested Readings:

i)Text Book:

Murugesan R, Electricity and Electronics (BSc Ancillary Physics), Annai Print Madurai (2014).

ii) Reference Books:

1. Theraja B.L, Basic Electronics (Solid state), S.Chand Ltd. Park (2007).

2. Electricity and Magnetism - Brijlal& N Subramaniyam and R.S.Sedha. A Text book of Applied Electronics, S.Chand (2008).

iii) Web Sources:

1. https://www.youtube.com/watch?v=ukxRD2SShoc
2. https://www.allaboutcircuits.com/video-lectures/
3. https://www.youtube.com/watch?v=djbJm-xWo2w

DEPARTMENT OF TAMIL – UG – CBCS
PART I- TAMIL

Title Of The Course: புனை கதை இலக்கியமும் சிறுகதையும் **Semester : IV**
Course Code : LUPITA41 Contact Hours : 6hrs/w **Credit: 3**

பாடத் திட்டத்தைக் கற்றுக் கொண்ட பின்பு மாணவர்கள் பெறும் பயன்கள்: -

1. மாணவர்கள் சிறந்த கவிஞர்கள் ஆவதற்கும், எழுத்தாளராக உருவாவதற்கும், இந்த பாடநூல்கள் வகை செய்கிறது.
2. நாட்டில் நடக்கும் அன்றாட நிகழ்வுகளை, சமூகச் செய்திகளைச் சுருங்கச் சொல்லி மாணவர்களுக்கு விளக்குவதாக ஹைக்கூ கவிதைகள் அமைகின்றன.
3. சமூகத்தில் நடக்கும் அவலங்களை மாணவர்களுக்கு எடுத்துக் காட்டுவனவாக இப்பாட நூல்கள் இருக்கின்றன.
4. தமிழில் சொற்கள் எவ்வாறு தோன்றுகின்றன என்பதை மாணவர்கள் இலக்கணம் வாயிலாக அறிய முடிகிறது.
5. மாணவர்கள் மரபுக் கவிதை பற்றியும் , புதுக் கவிதை பற்றியும் தெரிந்து கொள்ள இலக்கிய வரலாறு உதவுகின்றன.

பாடத்திட்டத்திற்கு தேவையான முன் அறிவு :

❖கவிதை படைப்பதை அறிந்து கொள்ளல்

❖உரைநடையின் தோற்றம், ஆசிரியர்கள் பற்றி தெரிந்து கொள்ளல்

❖படைப்பாற்றலை மேம்படுத்துதல்

கூறு I: கவிதை

1. பாரதியார் - நல்லதோர் வீணை செய்தே
2. பாரதிதாசன் - நீங்களே சொல்லுங்கள்
3. கவிமணி தேசியவிநாயகம் பிள்ளை - ஆசிய ஜோதி
4. முடியரசன் - கடவுளர் விரும்பும் மொழி
5. கண்ணதாசன் - கமலப்பூவே
6. வாலி - இலக்கிய நாயகன் இராமன்
7. அப்துல்ரகுமான் - உழவர்களைப் பாடுவோம்
8. மு.மேத்தா - தேசப்பிதாவுக்கு ஒரு தெருப்பாடகனின்அஞ்சலி
9. வைரமுத்து - இருபது கட்டளைகள்
10. நாட்டுப்புறப்பாடல் - உழவர்பாட்டு நா.வானமாமலை
11. மீரா - போலிகளை நம்புகிறாய்

12. சண்முகம் சரவணன் - துறவியின் இசைக் குறிப்புகள்

கூறு II: ஹைக்கூ கவிதைகள்

1. 40 கவிதைகள்

கூறு III: சிறுகதை

1. புதுமைப்பித்தன் - காலனும், கிழவியும்
2. கு.ப.ராஜகோபாலன் - விடியுமா?
3. ஜெயகாந்தன் - சுமைதாங்கி
4. நிர்மலா பெருமாள் - நிரந்தரமற்ற நிழல்
5. ராஜநாராயணன் - கதவு
6. பி.எஸ்.ராமையா - நட்சத்திரக் குழந்தைகள்
7. பிரபஞ்சன் - பிரும்மம்

கூறு IV: இலக்கணம்

1. நால்வகைச் சொற்கள் - பெயர், வினை, இடை, உரி

கூறு V: இலக்கிய வரலாறு

1. மரபுக் கவிதை, புதுக் கவிதை , ஹைக்கூ கவிதை, - தோற்றமும் வளர்ச்சியும்
2. சிறுகதையின் தோற்றமும் வளர்ச்சியும்

II. எழுத்துப் பயிற்சி :

1. கடிதம் எழுதுதல்
2. கவிதை எழுதுதல்
3. சிறுகதை எழுதுதல்
4. தன் விவரக் குறிப்பு எழுதுதல்

1. பரிந்துரைக்கப்பட்ட நூல் :

சரசுவதி (செய்யுள் தொகுப்பு)
சரசுவதி நாராயணன் கல்லூரி
நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்.அம்பத்தூர் ,
சென்னை - 600050

2. பார்வை நூல் :

- தமிழ் இலக்கிய வரலாறு - மு.வரதராசன்
  வகைமை நோக்கில்
- தமிழ் இலக்கிய வரலாறு - பாக்கிய மேரி
- நற்றமிழ் இலக்கணம் - தொ.பரமசிவம்
- வகைமை நோக்கில்
- தமிழ் இலக்கிய வரலாறு - ஈஸ்வரன்

- தாய் வழி இலக்கணம் - மீ.முத்துராணி
- நன்னூல் - வெள்ளை வாரணனார் உரை
- நவீன இலக்கியப் போக்குகள் - முருகேசப் பாண்டியன்
- தமிழில் சிறுகதை பிறக்கிறது - சி.சு.செல்லப்பா
- படைப்பாக்க உத்திகள் - சவரிமுத்து

3. இணைய ஆதாரங்கள்:

சிறுகதைகளின் தோற்றமும் வளர்ச்சியும்

https://podhutamizh.blogspot.com/2017/09/blog-post_42.html?m=1

புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்

http://www.tamilvu.org/library/nationalized/pdf/81-vallikannan/111-puthukkavithaiyinthottramumvalarchchiyum.pdf

மரபுக் கவிதையின் தோற்றமும் வளர்ச்சியும்

http://neelamegan.blogspot.com/2015/09/blog-post.html?m=1

DEPARTMENT OF ENGLISH – UG – CBCS-LOCF

Title of the Course: English Language Proficiency-IV		**Semester: IV**
Course Code:LUP2EN41	**Contact hours: 6hrs/w**	**Credits:3**

Course Learning Outcomes:

On Completion of the Course the students are able to

- speak and write clearly in fair English.
- listen and read carefully the various viewpoints of different writers and engage with them.
- understand the world with the help of English language.
- develop an awareness of the linguistic –cultural richness of India.
- practise language skills for successful communication

Pre-required Knowledge:

- ✓ Comfortability on language skills
- ✓ Functional Grammar competence

- ✓ Active vocabulary package

UNIT-I-PROSE

Martin Luther King : I Have a Dream
A.K.Ramanujan : Arts of Money
SunitiNamjoshi : Duty Distance
R.K.Lakshman :The Gold Frame

UNIT-II-POETRY

Alfred Lord Tennyson :The Brook
Henry Derozio :The Harp of India
William Blake : The Little Black Boy
D.H.Lawrence :Money Madness

UNIT-III-DRAMA

William Shakespeare : As You Like it

UNIT-IV-GRAMMAR

Direct and Indirect speech
Degrees of Comparison
One word substitution

UNIT-V-COMPOSITION

Interview Skills
Group Discussion
Meeting, Seminars and Conferences

Suggested Topics for Presentation:

- ✓ Martin Luther King and civil rights movement.
- ✓ A.K.Ramanujan's writing style.
- ✓ Money is a madness-How?
- ✓ Shakespeare and his major comedies.
- ✓ Grammar and Language competence

Suggested Readings:

i)Text Book:

1.*Wealth of English*. Ed. Department of English, Saraswathi Narayanan College. Harrows Publications, Madurai, 2022.

ii)Reference Books:

1.Plumge : Communication skills in English: Orient & Black Swan, 2021.

2.Glimpses of Infinity: Orient & Black Swan, 2021.

3.Literary Adventures: Orient & Black Swan, 2021.

iii)Web Sources:

1.https://www.inc.com

2.https://www.litbullseye.com

3.https://studentscantwait.edtrust.org/wpcontent/uploads/sites/2/2017/06/EnglishLanguageProficiency-1-1.pdf

DEPARTMENT OF MATHEMATICS – UG-CBCS-LOCF

Title of the Course: Modern Algebra Semester: IV
CourseCode:LUMSCT41 ContactHours:5hrs/w Credit:4

Course Learning Outcomes:

On completion of the course, the students are able to

- infer the knowledge in algebraic structures,
- summarize and relate the properties of Groups, Rings and Fields
- identify the structure preserve mapping in algebraic structure
- extend the properties of real numbers
- classify algebraic structures in various disciplines.

Pre-required Knowledge:

- ✓ Set theory
- ✓ Relation and Functions
- ✓ Equivalence relation and equivalence classes

Unit I:Groups

Binary operations- Definition and examples -Groups – Definition and Examples – Elementary properties of a group – Permutation groups

Unit II:Subgroups and cyclic groups

Subgroup – Definition and examples – properties – centre of a group, normalizer of a group – Cyclic groups – order of an element.

Unit III :Normal subgroups

Cosets and their properties - Lagrange's theorem and its consequences - Euler's theorem – Fermat's theorem – Normal subgroups and Quotient groups.

Unit IV: Group Homomorphisms

Homomorphism –Types of homomorphism – kernel of a homomorphism- Isomorphism –Cayley's Theorem - Fundamental theorem of homomorphism.

Unit V: Ring Theory

Rings –definition and examples – Elementary properties –Types of rings-Fields –Zero divisors in a ring – Integral domain –Cancellation laws- Characteristic of a ring – Field of quotients of an integral domain.

Suggested Topics for Group Discussion/ Presentations:

Permutation group

Cyclic groups

Lagrange's theorem and its consequence

Homomorphism

Rings

Suggested Readings:

(i) Text Book:

Dr.S.Arumugam and A.Thangapandi Isaac, Modern Algebra,Scitech Publications (India) Pvt. Ltd., Reprint, 2011.

Unit I Chapter 2 Sections2.5, Chapter 3 Sections 3.1, 3.2, 3.4

Unit II Chapter 3 Sections 3.5 to 3.7

Unit III Chapter 3 Sections 3.8 to 3.9

Unit IVChapter 3 Sections 3.10 to 3.11

Unit V Chapter 4 Sections 4.1 to 4.5 and 4.11

(ii) Reference Books:

1. Surjeetsingh and Zameerudin, Modern Algebra,Vikas Publishing House Pvt. Ltd, Seventh Edition, 1990.
2. Herstein. I.N., Topics in Algebra, Wiley India Pvt. Ltd., New Delhi, 2014.
3. Vijay K Khanna and Bhambri. S.K., A course in Abstract Algebra, Vikas Publishing House Pvt. Ltd., New Delhi, 2011.

(iii) Web Resources:

http://homepages.warwick.ac.uk/~masdf/alg2/ln_2011.pdf.

http://www2.math.uu.se/~khf/dachs.pdf

http://www.csun.edu/~asethura/GIAAFILES/GIAAV1.0/GIAAV1.0.pdf

https://www.math.mcgill.ca/goren/Algebra3.2004/CourseNotes.pdf

http://www.freebookcentre.net/Mathematics/Abstract-Algebra-Books.html

Title of the Course: Statics **Semester: IV**

Course Code:LUMSCT42 Contact Hours: 5hrs/w Credits: 4

Course Learning Outcomes:

On completion of the course, the students are able to acquire the knowledge of Statics.

understand the concepts of Parallel forces

understand the equilibrium of multiple forces acting on a rigid body.

understand the concepts of forces and friction.

understand the equilibrium of object under action of external forces.

Pre Required Knowledge:

Basic knowledge of force and multiple forces.

Basic definition of harmonic motion.

Basic concept of Cartesian and polar co-ordinates in dimension.

Unit I:Forces acting at a point

Forces acting at a point – Parellogram of forces – Analytics expression – Problems – Triangle of forces – The Polygon of forces – Lami's theorem – Problems – An extended from – Problems – Resolution of a Force – Theorem on resolved parts – Resultant of any number of forces – Resultant of any number of coplanar forces – Problems.

Unit II: Parallel forces and moments

Parallel forces and moments – Like and unlike forces – Conditions of equilibrium of three coplanar parallel forces – Problems – Moment of a force – Varigon's theorem – Problems (Couples except miscellaneous problems) – Equilibrium of two couples – Equivalents of two couples – Couples in parallel planes – Resultant of coplanar couples – Resultant of a couple and a force – Problems.

Unit III:Equilibrium of Three forces Acting on a rigid body

Equilibrium of Three forces Acting on a rigid body – Rigid body subjected to any three forces – Three coplanar forces – Two trigonometrical theorems – Problems.

Unit IV: Friction

Friction -Statics,Dynamical and limiting friction – Laws of friction – Coefficient of friction – Angle of friction – Core of friction theorems – Problems.

Unit V:Equilibrium of Strings

Equilibrium of Strings-Equation of the common category - Definitions – Formulae – Problems.

Suggested Topics for Group Discussion/ Presentation

1. Lame's theorem
2.Varigon's theorem
3. Rigid body subjected to any number of forces
4. Friction
5.Equilibrium of strings

Suggested Readings:

(i) Text Book:

M. K. Venkataraman, Statics,12th Edition, Agasthiarpublication,Trichy, 2013.

Unit I: Chapter 2

Unit II: Chapter 3 and 4

Unit III: Chapter 5

Unit IV:Chapter 7

Unit V: Chapter 11

(ii) Reference Books:

1. N.P.Bali, Golden Statics, Lakshmi Publication, 2004.
2. M.K.ViswanathaNaik, M.S.Kasi, Statics,Emerald Publishers
3. P.Durai Pandian, Lakshmi Duraipandian and MuthamizhJayapragasm, Mechanics, S.Chand& Co, 2003

(iii) Web Resources:

1. http://people.tamu.edu/~mhaque/COSC321HAQUE/PDF_A2.pdf
2. http://emweb.unl.edu/NEGAHBAN/EM223/Intro.htm
3. https://studylib.net/doc/8561991/statics-notes
4. http://civilengineering-notes.weebly.com/vector-mechanics-for-engineers-statics---lecture-notesj-walt-oler-texas-tech-university.html

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Title of the Course: Fourier Series and Fourier Transforms **Semester: IV**

Course Code: LUMSSE41 **Contact Hours: 2hrs/w** **Credit: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- familiarize themselves with the concept of Fourier series

- apply Fourier Transform in day to day life problems
- understand the properties of Fourier Series
- represent periodic functions using Fourier series
- gain the knowledge about applications of transform techniques.

Pre Required Knowledge:

Fundamental concept of Fourier series.

Basic concepts of integration by parts.

Fundamental knowledge of differentiation and integral.

Unit I: Fourier Series and Change of interval

Fourier Series – Convergence of Fourier series – Change of interval – Examples.

Unit II: Odd and Even Functions

Even and odd functions – Properties – Fourier series for even and odd functions – Examples.

Unit III: Half Range Expansions

Half range expansions – Fourier Sine series – cosine series – Examples.

Unit IV: Fourier Transform

Fourier Transform – The Infinite Fourier transform – Examples.

Unit V: Convolution Theorem

Convolution theorem – Problems related to integral equations.

Suggested Topics for Group Discussion/ Presentation

1. Fourier Series
2. Even and odd functions
3. Half range expansions
4. Infinite Fourier transform
5. Integral equations

Suggested Readings:

(i) Text Books:

1. M.K Venkataraman, Engineering mathematics, Third year Part-B, The National Publishing Co., Madras,1983.
2. Goyal and Gupta, Integral Transforms, PragatiPrakashan, 1977.

   Unit I: Chapter 1, section 1.1 to 1.7(Book 1)

   Unit II : chapter1 section 1.8 to 1.10 (Book 1)

   Unit III: chapter 1 section 1.11 to 1.13(Book 1)

   Unit IV: chapter 2 Part 1- section 1.1, 1.2, 1.3 (Book 2)

   Unit V: chapter 2 Part 1-theorm -9, examples. (Book 2)

(ii) Reference Books:

Vashista and Gupta, Integral Transforms, Krishna PrakashanMandir, 1975

GeorgiP.Tolstov, Fourier Series, Dover Publications, Newyork,1962

Eric W.Hansen, Fourier Transforms Principles and Applications, Wiley Publications.

(iii) Web Resources:

1. https://byjus.com/maths/fourier-series/
2. https://www.youtube.com/watch?v=r6sGWTCMz2k&vl=en
3. https://www.youtube.com/watch?v=spUNpyF58BY&vl=en
4. https://www.sathyabama.ac.in/sites/default/files/course-material/2020-10/UNIT-3_5.pdf
5. https://www.youtube.com/watch?v=GtXmS5YH7XM
6. https://www.youtube.com/watch?v=W1EJH7a1oEQ

Title of the Course: Pure Geometry **Semester: IV**

Course Code:LUMSSE42 Contact Hours: 2hrs/w Credit: 2

Course Learning Outcomes:

On completion of the course, the students are able to

understand the basic properties of a triangle.

understand the concepts of cross ratio

know the properties of circles.

find inverse points.

gain knowledge about the properties of quadrilaterals.

Pre Required Knowledge:

Fundamental concept of properties of a triangle.

Basic concepts of properties of circles.

Fundamental knowledge of quadrangles.

Unit I: Properties of a triangle

Logici - Theorems 1, 2 (Appolonius circles) - Basic properties of a triangle.

Unit II: Harmonic Ranges and pencils

Harmonic Ranges and pencils - definitions - cross ratio - Harmonic range - theorems 1, 2, 3, 4, 5.

Unit III: Properties of circles

Properties of circles - Orthogonal circles - theorems 1, 2 - Inverse points - theorem 3.

Unit IV: Properties of circles continued

Properties of circles - Theorems 8, 9, 10 - Coaxial circles - Orthogonal circles of Coaxial systems.

Unit V:Complete quadrangles and quadrilaterals

Complete quadrangles and quadrilaterals - Theorem 1 to 5.

Suggested Topics for Group Discussion/ Presentation

1. Loci's Theorems.
2. Harmonic Ranges.
3. Inverse Points Theorems.

4. Orthogonal Circles of Coaxial Systems.
5. Complete Quadrangles and Quadrilaterals.

Suggested Readings:

(i) Text Book:

Pure Gometry by T.K.Manicavasagam Pillay, The National Publishing Co., Madras – 1, 1970.

Unit I: Chapter 1

Unit II: Chapter 2

Unit III: Chapter 3 (Theorem1 to 7).

Unit IV: Chapter 4 (Theorem 8 to 16)

Unit V: Chapter 4 (Theorem 1 to 5)

(ii) Reference Books:

1. Askwith E.H(Edward Harison), A Course of pure geometry ,1917.
2. Shanti Narayan, M.l.Kochbar , A Text Book of Modern Pure Geometry , 1968.
3. R. Lachlan, An Elementary Treatise on Modern Pure Geometry, 2015.
4. Patrick D. Barry , Geometry with Trigonometry , Second Edition , 2015.
5. D.M.Y. Sommeville, Introduction to the Geometry of N Dimensions, Dover Publication, Inc. Mineola, Newyork. 2019.

(iii) Web Resources:

1.https://www.researchgate.net/publication/221029726_Algebraic_study_of_the__Apollonius_circle_of_three_ellipses

2. https://mathworld.wolfram.com/OrthogonalCircles.html

3. https://www.cuemath.com/geometry/quadrilaterals/

4. https://onlinecourses.nptel.ac.in/noc21_ma77/preview

Title of the Course: Magic of Numbers Semester: IV

Course Code : LUMSSC41 Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the basic concepts of calendars
- gain knowledge in odd ordered magic squares.
- find the sum of numbers in $n \times n$ matrix.
- apply various methods to find prime numbers.
- determine square and cube of numbers using general methods.

UNIT I: Calendars

Basic concepts of Calendars – Abbreviations and code numbers – Finding the day on which a particular date falls – Dates and days of a year – Finding the day of a date by meridian calculation.

UNIT II: Magic Squares

Introduction to Magic Squares – Odd ordered magic squares – Method-I using a set of numbers of one's choice – Method-II using a numbers of only one [only 3×3 magic squares].

UNIT III: More on Magic Squares

Even ordered Magic Squares –Method-I using a set of numbers that follows a pattern – Method-II using date of Calendars – Magic matrices in Calendar – Finding the sum of number in 2×2 matrix – Finding the sum of number in 3×3 matrix.

UNIT IV: Amazing Computations

Prime Numbers –Method of find prime numbers– Square of Numbers.

UNIT V: More Computations

General method to determine square of Numbers – Some Verifications using squares – Cube and cube root – Cube of Numbers.

Suggested Readings

(i)Text Book:

M. Athimoolam, (2012). Magic of Numbers, MJP Publications, New Delhi.

(ii) Reference books:

1. Benedict Gross., Joe Harris, The Magic of Numbers, Pearson Publication, 2003.
2. Bell E. T., The Magic of Numbers, Dover Publications Inc. New Delhi, 1992.
3. Sarah Sophia Boros., The Book of Magic Numbers, Create space, Independent Publication, 2015.

(iii) Web resources:

1. https://www.mathsisfun.com/numbers/fibonacci-sequence.html
2. https://www.mathsisfun.com/numbers/golden-ratio.html
3. https://mathworld.wolfram.com/ContinuedFraction.html

Title of the Course: Mathematics for Real Life Problems **Semester: IV**

Course Code :LUMSSC42 **Credits: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- acquire communicative competence
- develop critical thinking
- prepare effectively in Mathematics tests for competitive examinations.
- acquire computational skills in Mathematics
- develop speed and efficiency in solving problems

UNIT I:Average and Percentage

Average — Percentage.

UNIT II: Surds and indices

Surds and indices — Partnership.

UNIT III:Ratio and Proportion

Ratio and Proportion

UNIT IV:**Profit and Loss**

Profit and Loss

UNIT V:Permutations and combinations

Permutations and combinations

Suggested Readings

(i) Text Book:

Aggarwal R. S, (2011). Quantitative Aptitude, New Delhi: S. Chand and company Ltd, Print.

(ii) Reference books:

1. Wolfred D, The Students ' Companion. New Delhi: Harper Collins, Print.
2. Eugene D. Jane, GMAT (Graduates Management Admission Test), New Delhi-2.Galgotia Publication Pvt. Ltd, Print. 1996.

(iii) Web resources:

1. http://www.mathsmutt.co.uk/files/ind.htm
2. https://www.britannica.com/science/permutation
3. https://ncert.nic.in/textbook/pdf/kemh107.pdf

DEPARTMENT OF PHYSICS – UG – CBCS – LOCF

(ALLIED PHYSICS FOR B.Sc. MATHEMATICS & B.Sc. CHEMISTRY MAJOR)

Title of the Course: Optics, Spectroscopy and Modern Physics **Semester: IV/VI**

Course Code: LUPMGE41/LUPHGE61 Contact hours: 4hrs/w Credits: 4

Course Learning Outcomes:

On completion of the course, the students are able to

- derive equations governing focal length of combinations of lenses and know the concepts of related terms.
- understand derivations of dispersion of white light through the combination of prisms and theory of several types of aberration in lenses and their removal.
- develop skills on the Mathematical derivations of the interference and diffraction of light waves.
- explain the theory of double refraction and the production of polarized light through doubly refracting crystal and the theory of optical fibre communication and its applications.
- know the basics of quantum theory, spectroscopy techniques and Einstein's special theory of relativity.

Pre-Required Knowledge:

- Ray diagram of light, Convex lens, concave lens, Image formation due to lenses, Snell's law, refractive index of the medium, velocity of light in the medium.
- Superposition of light waves, bending of light around the obstacles, polarization of light.
- Electromagnetic spectrum and its uses to determine the characteristics of molecules, molecular vibrations, basics of spectroscopic techniques. Absolute motion

and relative motion, basic postulates of quantum mechanics.

Unit I: Dispersion and aberration

Deviation produced by thin lens – Focal length of two thin lenses in and out of contact – Cardinal points – Refraction through thin prism – Dispersion – Dispersive power – Combination of thin prisms to produce (a) Dispersion without deviation and (b) Deviation without dispersion – Direct vision spectroscope – Chromatic aberration in lenses and its removal – Spherical aberration and its removal.

Unit II: Interference and diffraction

Interference in thin films – Newton's rings (Reflected beam only) – Determination of wavelength – Jamin's interferometer, principle and use. Diffraction: Theory of plane transmission grating (Normal incidence only) – Experiment to determine wavelengths.

Unit III: Polarisation

Double refraction – Nicol prisms, construction, action and uses – QWP and HWP – Optical activity (No theory) – Biot's laws – Specific rotatory power – Half shade polarimeter – Determination of specific rotatory power – Fiber optics – Light propagation in fibers – Fiber optics communication system.

Unit IV: Spectroscopy and Quantum Theory

Infrared and Ultraviolet radiations, discovery, properties sources and uses – Quantum Theory: Planck's quantum theory – Raman effect – experimental study-Wood's apparatus – Applications - Photo electricity: Laws of photo electricity – Einstein's equation Photocells, Photo emissive, Photoconductive and Photovoltaic cells and their uses.

Unit V: Relativity

De Broglie's theory – Electron diffraction – G.P.Thomson's experiment – Michelson-Morley Experiment – Significance of the negative results – Postulates of special theory of relativity – Lorentz transformation equations (No

derivation) – Length contraction – Time dilation – Variation of mass with velocity and Mass-Energy relation (Simple derivation).

Suggested Topics for Group Discussion/Presentation

- Dispersion of light and achromatism in lenses
- Theory of interference fringes, diffraction of light through apertures
- Double refraction, production of elliptically polarized light.
- Planck's quantum theory, Raman effect and Einstein's photo electric equation.
- Concept of matter waves and its experimental demonstration, special theory of relativity

Suggested Readings:

i) Text Book:

Murugesan, R. Optics and Spectroscopy and Modern Physics (B.Sc. Ancillary Physics), Annai Print Park, January (2017).

ii) Reference Books:

1. Subrahmanyam, N., Brijlal & Avadhanulu, M.N. A Textbook of Optics. S. Chand& Co. 23rd revised edition, (2006).
2. Kakani, S.L. & Bhandari, K.C. Text book of Optics, Sulthan Chand & Sons. New Delhi, (2014).
3. Banwell, C.N. & McCash, E.M. Fundamentals of Molecular Spectroscopy. Tata McGraw Hill Publishing Company Ltd, New Delhi, 5th Edition, (2013).

iii) Web Sources:

1. https://ocw.mit.edu/courses/mechanical-engineering/2-71-optics-spring-2009/index.htm
2. https://physics.info/aberration/
3. https://www.space.com/36273-theory-special-relativity.html

4. https://www.youtube.com/watch?v=PuSwic2JI5M&feature=emb_rel_pause
5. https://youtu.be/VOSwCwJ5vBQ
6. https://en.wikipedia.org/wiki/Fiber-optic_communication

DEPARTMENT OF PHYSICS - UG – CBCS – LOCF

(ALLIED PHYSICS FOR B.Sc. MATHEMATICS & B.Sc. CHEMISTRY MAJOR)

Title of the Course: Allied Physics Practical – II Semester: III & IV/ V & VI
Course Code: LUPHGL61 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- determine the thickness of a wire
- determine the dispersive power of prism
- verify the truth table for logic gates
- compare the value of capacitances
- construct OP AMP circuit

List of Experiments

1. Determine the Voltage and current sensitiveness of a mirror galvanometer.
2. Determine the self-inductance and Q factor of the coil using series LCR

   circuit.
3. Determine the thickness of a wire by Air wedge method.
4. Deterrmine the dispersive power of a material of a prism using spectrometer.
5. Determination of radius of curvature of a given convex lens by forming Newton's ring.
6. Construct Bridge rectifier using π section filter.

7. Study the characteristics of Transistor in common emitter mode.
8. Construct AND, OR, NOT gate using discrete Components and verify its Truth Table.
9. Construct NAND, NOR gates using discrete Components and verify its Truth Table.
10. Study the characteristics of Zener diode and determine its Break down voltage.
11. Construct Adder and Subtractor using Op-Amp and study its working.
12. Comparison the given two capacitances using De Sauty's bridge.
13. Determine the resonant frequency and impedance of the circuit at resonance in

    LCR parallel resonance circuit.
14. Determine the wavelength of light for different colours by plane transmission

    grating using Mercury light.

Suggested Readings:

i) Reference Book:

Ouseph C.C, Rao U.J and Vijayendran V, Practical Physics and Electronics, Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai (2014).

ii) Web Sources:

1. http://www.kctgroups.com/downloads/files/Digital-Electronics-Lab%20manual-min.pdf
2. https://youtu.be/AgoplKn11f4
3. https://www.cmi.ac.in/~debangshu/lab1/zener.pdf
4. https://youtu.be/b9FdsgepDD0

Title of the paper: Real Analysis **Semester: V**

Course code: LUMSCT51 **Contact Hours: 5hrs/w** **Credits: 5**

Course Learning Outcomes

On completion of the course, the students are able to

- understand and analy
- ze real – valued functions
- classify the limits in metric spaces
- know the role of open and closed sets in metric spaces and analyze them.
- examine and analyze connected spaces.
- analyze completeness and compactness

Pre-Required Knowledge

- ✓ Set theory
- ✓ Definitions and examples of functions
- ✓ Number System

UNIT I: Functions

Functions- Real-valued functions-Equivalence, countability-Real numbers-Least upper bounds**.**

Unit II: Metric Spaces

Limits and metric spaces – Limit of a function on the real line-Metric spaces- Limits in metric spaces.

Unit III: Continuous & Discontinuous Functions on Metric Spaces

Continuous functions on metric spaces- Functions continuous at a point on the real line- Reformulation-Functions continuous on a metric space – Open sets – Closed sets-Discontinuous functions on R^1

Unit IV: Connectedness and Completeness

Connectedness, Completeness- More about open sets – Connected sets – Bounded sets and totally bounded sets- Complete metric space

Unit V: Compactness

Compactness- Compact Metric space – Continuous function on compact metric space- continuity of the inverse function- uniform continuity

Suggested Topics for Group Discussion/ Presentation

1. Lub and glb
2. Limits in metric spaces
3. Open sets and Closed sets in metric spaces
4. Connected spaces
5. Compact spaces

Suggested Readings:

i) Text Book

Richard R. Goldberg, Methods of Real Analysis, Oxford & IBH Publishing Co.Pvt.

Ltd, New Delhi, 1970.

Unit I : Chapter 1 - Sections 1.3 to 1.7

Unit II : Chapter 4

Unit III : Chapter 5

Unit IV : Chapter 6 - Sections 6.1 to 6.4

Unit V : Chapter 6 Sections 6.5 to 6.8

ii) Reference Books:

1. Arumugam and ThangapandiIsaac,Modern Analysis, New Gamma Publishing House, 2010.
2. Shanthi Narayanan, Elements of Real Analysis,S.Chand& Co, 1992
3. S.C. Malik, Principles of Real Analysis, New Age International publishers,1996

(iii) Web Resources:

1. https://nptel.ac.in/courses/111/106/111106053/
2. http://ramanujan.math.trinity.edu/wtrench/texts/TRENCH_REAL_ANALYSIS.PDF
3. https://youtu.be/ku77kw1CaxM

4. https://www.youtube.com/watch?v=1DghwIIir-U
5. https://www.youtube.com/watch?v=1CYbLCNsTcU

Title of the Course: Linear Algebra **Semester: V**

Course Code:LUMSCT52 Contact Hours: 5hrs/w Credits: 5

Course Learning Outcomes

On completion of the course, the students are able to

- understand vector spaces and linear transformations.
- examine Linear independence and Linear dependence
- know the orthogonalisation process
- apply Cayley – Hamilton theorem
- analyze and examine the bilinear forms and quadratic forms.

Pre-Required Knowledge

- ✓ Basic concepts of Group theory
- ✓ Basic knowledge of matrices
- ✓ Fundamental concepts of simultaneous linear equations.

Unit I: Vector Spaces

Vector spaces - Definition and examples, properties – Subspaces -Linear transformation.

Unit II: Linear Transformations

Span of a set – Linear independence – Linear dependence –Basis and dimension –Rank and nullity-Matrix of a linear transformation.

Unit III: Inner product space

Inner product space - Definition and examples – Orthogonality- Gram-Schmidt orthogonalisation process – Orthogonal complement.

Unit IV: Theory of Matrices

Matrices- Algebra of matrices – Types of matrices- The inverse of a matrix-Rank of a matrix- Simultaneous linear equation – Characteristic equation – Cayley-Hamilton theorem-Eigen values and Eigen vectors.

Unit V: Bilinear forms

Bilinear forms - Quadratic forms.

Suggested Topics for Group Discussion/ Presentation

Subspaces

Linear Dependence

Orthogonality

Rank of a matrix

Quadratic forms

Suggested Readings:

i) Text Book:

Dr. S. Arumugam, and A. Thangapandi Isaac, Modern Algebra, Scitech Publications (India) Pvt. Ltd., 2017.

Unit I Chapter 5 Sections 5.1 to 5.3

Unit II Chapter 5 Sections 5.4 to 5.8

Unit III Chapter 6 Sections 6.1 to 6.3

Unit IV Chapter 7 Sections 7.1 to 7.3 and 7.5 to 7.8

Unit V Chapter 8 Sections 8.1 to 8.2

ii) Reference Books:

1. M.K. Venkataraman, Linear algebra, The National publishing Company, 1999
2. Seymour Lipschutz, Thheory and Problems of Linear Algebra, McGraw- Hill book company,1987
3. P.B.Bhattacharya, S.K.Jain, S.R. Nagpaul, First Course in Linear Algebra, Wiley Eastern Limited, 1983

iii)Web Resources:

1. https://nptel.ac.in/courses/111102011
2. https://www.youtube.com/watch?v=fEXLmsVn0Rw

3. https://www.youtube.com/watch?v=cHNmT1-qurk
4. https://www.youtube.com/watch?v=8D3WViAyJvc
5. https://www.math.ucdavis.edu/~linear/linear-guest.pdf
6. https://www.coursera.org/lecture/linear-algebra-machine-learning/basis-vector-space-and-linear-independence-YRjz5
7. https://mathworld.wolfram.com/VectorSpace.html
8. http://skrgdcwakdp.edu.in/admin/uploads/5644vectorspaces%20material.pdf.

Title of the Course: Dynamics **Semester: V**

Course Code:LUMSCT53 Contact Hours: 5hrs/w Credits: 5

Course Learning Outcomes:

On completion of the course, the students are able to

- analyse the dynamics problems.
- apply Newton's second law in vector form to solve the problems in more than one dimension
- solve problems related to the motion of projectile in the absence of air resistance.
- solve mechanics problems in one dimension that involves one or more of the forces of gravity, friction and air resistance.
- apply the other basic dynamics concepts like the work, energy principle and the coefficient of restitution.

Pre Required Knowledge:

- ✓ Fundamental knowledge of trigonometric concepts.
- ✓ Basic knowledge of velocity, momentum and etc.
- ✓ Fundamental knowledge of energy (kinetic and potential).

Unit I:The Laws of motion

Newton's laws of motion – Motion of a particle on a rough plane – Motion of connected particles – Atwood's Machine – work – Energy – Principle of energy.

Unit II: Projectiles

Projectiles – Path of projectile – Characteristics of the motion of projectile – Range of projectile – Direction of Projectile – Inclined projectile – Projectile on an inclined plane – Enveloping parabola.

Unit III: Collision of Elastic Bodies

Collision of Elastic Bodies – Fundamental laws of impact – Impact of smooth sphere on a fixed smooth plane – Direct impact of two smooth spheres – Oblique impact of two smooth spheres – Impact of a particle on a rough plane.

Unit IV: Simple Harmonic Motion

Simple Harmonic Motion – SHM is a straight line – Composition of two SHM motion of particle suspended is a spring – Simple pendulum – Equivalent simple pendulum.

Unit V: Motion under the action of Central forces

Motion under the action of Central forces – Equation of motion – Motion under central forces – Laws of the inverse Square – Law of the inverse cube.

Suggested Topics for Group Discussion/ Presentation

1. Newton's laws of motion
2. Projectile on inclined plane
3. Concept of Elasticity and inelasticity
4. Harmonic motion
5. Polar equation in central forces

Suggested Readings:

(i)Text Book:

M. K. Venkataraman, Dynamics, Agasthiar publication, Thirteenth Edition, 2013.

Unit I: Chapter 4

Unit II: Chapter 6 upto 6.17

Unit III: Chapter 8

Unit IV :Chapter 10

Unit V : Chapter 11

(ii)Reference Books:

1. N.P.Bali,Golden Dynamics, Lakshmi Publication, 2004.
2. S.Narayanan, Dynamics, S.Chand& Co 16th edition 1986
3. P.Duraipandian and Lakshmi Duraipandian, MuthamizhJayapragasm, Mechanics, S.Chand& Co, 2003

(iii)Web Resources:

1. https://ocw.mit.edu/courses/mechanical-engineering/2-032-dynamics-fall-2004/lecture-notes/
2. https://brown.edu/Departments/Engineering/Courses/En4/Notes/JF_Rigid_Body_Lectures/Lecture3_Jen_RigidBodies.pdf
3. http://www.surendranathcollege.org/new/upload/TUSHAR_KANTI_SAHADynamics%20of%20a%20Particle%20and%20Rigid%20Body2020-05-07Dynamics%20of%20a%20particle%20and%20Rigid%20body.pdf

Title of the Course: Numerical Analysis Semester: V

Course Code: LUMSCT54 Contact Hours :5hrs/w Credit: 4

Course Learning Outcomes:

On completion of the course, the students are able to

- develop the skills in solving algebraic, transcendental, differential and integral equations numerically,
- discuss and demonstrate the concept of interpolation,
- extend the standard numerical techniques as a powerful tool in scientific. computing.
- interpret, analyze and evaluate results from numerical computations,

- choose, formulate and implement appropriate numerical methods for solving science and engineering problems.

Pre Required Knowledge:

- ✓ Basic arithmetic calculation
- ✓ Algebraic expressions
- ✓ Simultaneous algebraic equations.

Unit I :Solution of Numerical Algebraic and Transcendental equations

The solution of Numerical Algebraic and Transcendental equations –Biosection method –Iteration method- Method of false position –Simultaneous linear algebraic equations –Gauss Elimination method –Gauss Jordan method –Computation of the inverse of a matrix using Gauss Elimination method- Method of Triangularisation- Iterative methods- Jacobi method – Gauss Seidel method.

Unit II: Finite Differences

Finite Differences-First differences-Higher differences- Backward differences –Forward differences- Central differences – Properties of the operators- Factorial polynomials- Error Propagation in a difference table- The operator E -Relations – other difference operators- Relation between the operators.

Unit III: Interpolation

Interpolation –Newton's forward and backward formula – Equidistant terms with one or more missing values- Interpolation with unequal intervals- Properties of Divided differences – Newton's interpolation formula for unequal intervals- Lagrange's interpolation formula.

Unit IV: Numerical differentiation

Numerical differentiation – Newton's forward and Backward difference formula for derivatives- Striling's formula- Maxima and minima of a tabulated function.

Unit V: Numerical Integration

Numerical integration- Trapezoidal rule – Romberg's method – Simpson's rule.

Suggested Topics for Group Discussion/ Presentations:

Simultaneous linear algebraic equations

Finite difference operators

Interpolation

Numerical Differentiation

Numerical integration

Suggested Readings:

i) Text Book:

Dr. M.K.Venkataraman, Numerical methods in science and Engineering, The

National Publishing company, Chennai – 600 001.

Unit I Chapter III- Sections 1 to 4, Chapter IV – Sections 1 to 4, 6.

Unit II Chapter V- Sections 1 to 18.

Unit III Chapter VI, Chapter XIII- Sections 1 to 8.

Unit IV Chapter IX- Sections 1 to 6.

Unit V Chapter IX- Sections 7 to 12.

ii) Reference Books:

1. T.K.Manickavasagam Pillai, Numerical analysis Scitech Publications (India) Pvt. Ltd, 2002.
2. Grewal. B.S., Numerical Methods in Engineering & Science, Khanna Publishers, New Delhi, 2015.
3. Arumugam. S., Thangapandi Isaac. A. and Somasundaram. A., Numerical Methods, Second Edition, SciTech Publications (India) Pvt. Ltd., Chennai, 2015.
4. Kandasamy.P.,Thilagavathy. K. and Gunavathy.K., Numerical Methods, 3rd Edition,S. Chand & Company Pvt. Ltd., New Delhi, 2006.

iii)Web Resources:

http://www.freebookcentre.net/Mathematics/Numerical-Analysis-Books.html

https://nptel.ac.in/courses/111/106/111106101/

https://nptel.ac.in/courses/111/107/111107105/

http://www.math.iitb.ac.in/~baskar/book.pdf

Title of the Course: Programming in Python Semester: V

Course code: LUMSDS51 Contact Hours: 4hrs /w Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- explain basic principles of Python Programming Language
- apply operators, mathematical functions in Python.
- construct control statements in Python programs.
- categorize types of arrays and its advantages.
- examine special features of Lists, tuples and functions

Pre required knowledge:

- ✓ Basic knowledge of computer.
- ✓ Knowledge of flow charts.
- ✓ Logical Reasoning and Mathematical Formulae.

Unit I: Introduction to Programming

Introduction – Using Python- Designing a Program- Input , Processing and Output- Displaying output with the print function- Variables – Reading Input from the keyboard- More about Data Output- Named Constants- Introduction to Turtle Graphics.

Unit II: Decision Structures and Boolean Logic

Introduction – The if Statement- The if-else Statement- Comparing Strings- Nested Decision Structures and the if – elif-else Statement- Logical Operators- Boolean Variables- Turtle Graphics: Determining the State of the Turtle.

Unit III: Repetition Structures

Introduction – The While Loop : A condition controlled Loop – The for Loop: A count controlled loop- Calculating a running total- Input Validation loops- Nested Loops- Turtle Graphics: Using Loops to Draw Designs.

Unit IV: Functions

Introduction – Defining and Calling a Void Function- Designing a Program to use functions- Local Variables- Global Variables and constants- Value-Returning Functions- The Math-Module- Storing Functions in Modules.

Unit V: Files and Exceptions

Introduction – File Input and Output- Using Loops to Process Files- Processing Records- Exceptions- Basic String Operations – String Slicing- Manipulating Strings.

Suggested Topics for Group Discussion/ Presentation:

Designing a Program

Logical Operators

Loops to draw designs

Local and Global Variables

String Operations

Suggested Readings:

(i) Text Book:

Tony Gaddis., starting out with >>> PYTHON, Fourth Edition, Pearson Education, New York,2017

Unit I: Chapter 1 : Sections 1.1 to 1.5 , Chapter 2 : Sections 2.1 to 2.10

Unit II: Chapter 3 : Sections 3.1 to 3.7

Unit III: Chapter 4 : Sections 4.1 to 4.8

Unit IV: Chapter 5 : Sections 5.1 to 5.10

Unit V: Chapter 6 : Sections 6.1 to 6.4, Chapter 8: Sections 8.1 to 8.3

(ii) Reference Books:

1. Allen B. Downey, Think Python: How to think like a Computer Scientist, First Edition 2012, O'Reilly.
2. Mark Lutz, Programming Python, Fourth Edition 2010, O'Reilly Media.
3. Wesley J. Chun, Core Python Programming, Second Edition 2010, Pearson Publications.

(iii) Web Resources:

1. https://www.python.org/about/gettingstarted/
2. https://www.programiz.com/python-programming
3. https://www.practicepython.org/

Title of the Course: Practical in Python		**Semester: V**
Course code: LUMSDL51	**Contact Hours: 2 hrs/w**	**Credit: 1**

Course Learning Outcomes:

On completion of the course, the students are able to explain basic principles of Python Programming Language apply operators, mathematical functions in Python. construct control statements in Python programs. categorize types of arrays and its advantages.

- examine special features of Lists, tuples and functions.

List of Problems for Practical

1. A python program to convert numbers from octal, binary and hexadecimal systems into decimal number system.
2. A python program that displays stars in an equilateral triangular form using a single for loop.
3. A python program to generate Fibonacci number series.
4. A python program to evaluate Exponential series.
5. A python program to sort the array elements using bubble sort technique.

6. A python program to perform some mathematical operations on a numpy array
7. A python program to calculate factorial values using recursion
8. A python program to solve Towers of Hanoi problem.
9. A python program to add two matrices and display the sum matrix using lists.
10. A python program to create a line graph to show the profits of a company in various years.

Title of the Course:Programming in C **Semester: V**

Course code:LUMSDS52 Contact Hours: 4hrs /w **Credits: 3**

Course Learning Outcomes:

On completion of the course, the students are able to appreciate Higher level language C. understand the concepts of Input, Output statements and Control statements. solve the problems using these concepts. analyze string handling functions and different types of functions. design programs using Structures and Unions.

Pre required knowledge:

- ✓ Basic knowledge of computer.
- ✓ Knowledge of flow charts.
- ✓ Logical Reasoning and Mathematical Formulae.

Unit I: Constants, Variables, and Data Types

Introduction – Character – C Tokens – Key words and Identifiers – Constants – Variables – Data Types – Declaration of Variables – Declaration of Storage Class – Assigning Values of Variables – Defining Symbolic Constants – Declaring a Variable as Constant – Operations and Expressions: Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions.

Unit II: Managing Input and Output Operations

Introduction – Reading a Character – Writing a Character – Formatted Input – Formatted Input – Decision Making and Branching: Introduction – Decision Making with if Statement – Simple if Statement – The if … else Statement – Nesting of if …else Statements – The Else if Ladder – The Switch Statement – The ?: Operator – The Goto Statement.

Unit III: Decision Making and Looping

Introduction – The While Statement – The do Statement – The for Statement – Jumps in Loops – Arrays: Introduction – One-dimensional Arrays – Declaration of One-dimensional Arrays – Initialization of One-dimensional Arrays - Two-dimensional Array - Initializing Two-dimensional Arrays – Multi-dimensional Arrays.

Unit IV: Character Arrays and Strings

Introduction – Declaring and Initializing String Variables – Reading Strings From Terminal – Writing String to Screen – Arithmetic Operations on Characters – Putting Strings Together – Comparison of Two Strings – String-handing Functions – User-defined Functions: Introduction – Need for User-defined Functions – A Multi-function Program – Elements of User-defined Functions – Definition of Functions – Return Values and their Types – Function Calls – Function Declarations – Category of Functions – No Arguments and No Return Values – Arguments but No Return Values – Arguments with Return Values – No Arguments but Returns a Value.

Unit V: Structures and Unions

Introduction – Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Copying and Comparing Structure – Structures and Functions – Unions – Size of Structures – Bit Fields.

Suggested Topics for Group Discussion/ Presentation:

Programs using

Operators

Decision Making

Arrays

Functions

Structure Variables

Suggested Readings:

(i) Text Book:

Balagurusamy, E., Programming inANSI C, Third Edition, Tata McGraw-Hill

Publishing Company Limited, 2006.

Unit I: Chapters 2 : Sections 2.1 to 2.14 , Chapters 3 : Sections 3.1 to 3.10

Unit II: Chapters 4 : Sections 4.1 to 4.5 , Chapters 5 : Sections 5.1 to 5.9

Unit III: Chapters 6 : Sections 6.1 to 6.5 , Chapters 7 : Sections 7.1 to 7.7

Unit IV: Chapters 8 : Sections 8.1 to 8.8 , Chapters 9 : Sections 9.1 to 9.13

Unit V: Chapters10 : Sections 10.1 to 10.14

(ii) Reference Books:

Brian W Kernighan and Dennis M. Ritchie, The C Programming Language. second edition,Pearson, 1988.

Byron Gottfried, Schaum's Outline of Programming in C, Mc Graw- Hill.

JenenbawnA.M ,YedidyaLangsan , Moshe J. Augustein, Data Structures using C, Sixth Edition , Pearson Education

R.Rajaram, Computer Concepts and C Programming, Scitech Publication.

(iii)Web Resources:

- ✓ https://codeforwin.org/
- ✓ https://www.geeksforgeeks.org/c-programming-language/
- ✓ https://en.cppreference.com/w/c
- ✓ https://learn-c.org/
- ✓ https://www.cprogramming.com

Title of the Course: Practical in Programming in C Semester: V
Course Code:LUMSDL52 Contact Hours: 2hrs/w Credit: 1

Course Learning Outcomes:

On completion of the course, the students are able to

- ➢ read, understand and trace the execution of programs written in C language
- ➢ write C code for given algorithm
- ➢ implement programs with pointers and Arrays
- ➢ perform pointer arithmetic
- ➢ write programs that perform operations using derived data types

List of Problems for Practicals:

Simple interest and compound interest problems.

Salesman's commission problem using if and ternary operator.

A program to generate Fibonacci sequence and to find the sum.

Arranging the numbers in ascending order.

The sum of two matrices.

Finding the roots of the quadratic equation using switch case statements.

The product of two matrices.

Arranging the names in alphabetical order.

Finding the number of words and characters in a given text.

To test a given string is palindrome or not.

Title of the Course: Vedic Mathematics **Semester: V**

Course Code: LUMSSE51 **Contact Hours: 2hrs/w** **Credit: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the concepts of Mathematics by studying simple methods in Vedic mathematics.
- solve the problems using these concepts.
- apply the shortcut methods.
- apply the concept of Factorization and differential calculus.
- apply the concept of Integration by Partial fractions.

Pre Required Knowledge:

- ✓The basic concept of Arithmetic operations.
- ✓The basic concept of integration.
- ✓Fundamentals of calculus.

Unit I: Arithmetical Computations

Arithmetical computations – Multiplications.

Unit II: Nikhilam Method – **Paravartya Method**

Division by the Nikhilam method – division by paravartya method

Unit III: Simultaneous Equations

Simultaneous simple equations – Quadratic equations – Cubic equations.

Unit IV: Factorization and Differential Calculus

Simultaneous quadratic equations – Factorization and differential calculus.

Unit V:Integration by Partial fractions.

Partial fractions – Integration by Partial fractions.

Suggested Topics for Group Discussion\ presentation:

1. Division by the Nikhilam method.
2. Division by paravartya method.
3. Multiplication by Urdhav method.
4. Integration by Partial fractions.
5. Factorization and differential calculus.

Suggested Reading:

(i)Text Book:

Jagadguru Swami Sri BharatiKrsnaTirthaji Maharaja, Vedic Mathematics ,MotilalBanarsidass publishers, madras,1988.

Unit I Chapter II and III

Unit II Chapter IV and V

Unit III Chapter XV, VVII, VVIII

Unit IV Chapter XXI, XXII

Unit V Chapter XXIII, XXIV

(ii) Reference Books:

1. T. S BhanuMuthy, A modern Introduction to Ancient Indian Mathematics, New Age International Publishers, Second Edition, 2009.
2. The Essential s of Vedic Mathematics, Rajesh Kumar Thakur, Rupa Publishers, 2014.
3. MathsSutra , Gaurav Tekriwal, Penguin Books India PVT, Limited ,22015.
4. DhavalBathia, Vedic Mathematics Made Easy, Jaico Publishing House, 2014.
5. Atul Gupta, The Power of VEDIC, Jaico Publishing House, Second Edition, 2004.

(iii) Web Resources:

1. https://www.cuemath.com/learn/vedic-maths-tricks/
2. https://www.youtube.com/watch?v=GTR0c61zT4g

3. https://www.youtube.com/watch?v=AGFew_opMi0

Title of the Course: Combinatorics	**Semester: V**
Course Code: LUMSSE52 Contact Hours: 2hrs/w	**Credit: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- familiarize with the concept of counting principles
- apply Permutations and combinations in real life problems
- understand the properties of The pigeonhole principle
- represent partitions of a positive integer.
- apply recurrence relation in non-homogenous equation

Pre Required Knowledge

Simple problems in permutations.

Basic knowledge in combinations.

Basics of recurrence relations.

Unit I: Fundamental principles of counting

Fundamental principles of counting-The sum rule and product rule - permutations.

Unit II: Permutations and Combinations

Combinations - Permutations and combinations with repetitions - Binomial theorem -Problems.

Unit III: The Principles of Inclusion and Exclusion Problems

The Principles of inclusion–exclusion-problems-The pigeonhole principle.

Unit IV: Generating Functions

Generating functions-partitions of a positive integer-The exponential generating functions-the summation operator –problems.

Unit V:Recurrence Relations

Recurrence relations-the first order linear recurrence relation-the non- homogeneous recurrence relations.

Suggested Readings

(i)Text Book:

C. Vasudev -Theory and problems of combinatorics, New age international Publishers 2005.

Unit I: Chapter 1: Sections 1.1 [Problems 1.1-1.20, 1.25-1.30] and 1.2 [Problems 1.39-1.55]

Unit II: Chapter 1: Sections 1.3 [Problems 1.70-1.80] -1.4 [Problems 1.100-1.111]- 1.4 [Problems 1.181-1.189].

Unit III: Chapter 2: Sections 2.1 [Problems 2.1-2.5]-2.3 [Problems 2.24-2.30].

Unit IV: Chapter 3: Sections 3.1-3.5 [Problems 3.14-3.30].

Unit V: Chapter 4: Sections 4.1 [Problems 4.1-4.5] - 4.3 [Problems[4.19-4.25].

(ii) Reference Books:

- V.K.Balakrishnan – Theory and problems of combinatorics, Schaum's outline series, 1995 McGraw Hill Inc. Singapore.
- R.M.Wilson et.al A Course in Combinatorics, Cambridge University Press, 2007.
- V.Krishnamurthy, Combinatorics Theory and Applications, East-West Press, 2020.

(iii)Web Resources

1.https://ncert.nic.in/pdf/publication/exemplarproblem/classXI/mathematics/keep207.pdf

2.https://assets.pearsonschool.com/asset_mgr/current/201143/upload_precal12_SE.pdf

3. https://www.youtube.com/watch?v=mrCrjeqJv6U

Title of the Course: Communicative English-I Semester: V
Course Code: LUENNM51 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the role of communication in personal and professional success
- have comprehensive application- knowledge of appropriate communication strategies
- apply appropriate communications skills across settings and purposes
- respond effectively to various communicative demands
- build and maintain effective relationship by demonstrating appropriate, professional and ethical behaviour

Pre-required Knowledge:

- Functional grammatical knowledge
- Spoken idioms
- Working knowledge of language skills

Unit I: Listening

Introducing oneself, At a Bank-II, At a Hotel Reception Hall, Helping a friend obtain a Rental Flat-I, At the Restaurant, Visiting a Doctor with One's Parent, Attending an Interview, Visiting a Friend in the Hospital-I, Present water Crisis in Chennai, Attending a career Guidance Fair-I.

Unit II: Speaking I

Greeting, Introducing, Inviting someone, Making requests, Offering help, Seeking permission, Asking for advice, Expressing gratitude, Asking about remembering.

Unit III: Speaking II

Persuading, Complimenting/Congratulating, Expressing Sympathy, Complaining, Apologizing, Making suggestions, Warning someone.

Unit IV: Writing

Writing Paragraphs, Writing Telegrams, Writing Letters, Writing Short Notices and Notes, Précis Writing and Note-making.

Unit V: Career Skills

Preparing Curriculum Vitae and Cover letters, Facing an Interview, Presentation Skills and Persuasion Skills

Suggested Topics for Presentation:

- Introduce yourself in bank and hotel
- Invite your friends for your birthday party.
- Congratulate your sister on her passing IAS exam.
- Ways, means and methods of professional writings.
- Prepare a CV for the post of Teacher in educational institution.
- Mock interview and mock presentation.

Suggested Readings:

i)Text Books:

1. Adair, John. *Effective Communication*. London: Pan Macmillan Ltd., 2003.
2. Balan, Jayashree. Ed. *Spoken English*. Chennai: Vijay Nicole Imprints Pvt.Ltd., 2006.

ii) Reference Books:

1. Bose,M.N.K. Ed. *Better Communication in Writing*. Madras: New Century Book House (P) Ltd, 2004.
2. Pillai G. Radhakrishna and Rajeevan. Ed. *Spoken English For You*. Chennai: Emerald Publishers, 2002.
3. Ramani, S. Ed. Write English without formal grammar.

iii) Web Sources:

1. https://www.careertipstogo.com/career-basics/
2. http://mystarjob.com/articles/story.aspx?file=/2013/6/22/mystarjob_careerguide/13226186&sec=mystarjob_caree

3. https://www.indeed.com/career-advice/interviewing/prepare-for-a-mock- interview

DEPARTMENT OF HISTORY - UG

Course Title: Working of Indian Constitution Semester: V
Course Code: LUHSNM51 Contact Hours: 2hr Credit: 2

Course learning outcomes:

On completion of the course students are able to

Understand the stages of framing of Indian Constitution

- Describe the classification of Constitution.
- Analyse the powers and functions of the Indian President
- Asses the function of Legislature in India
- Evaluate the powers of Judiciary in India.

Unit I : Framing of Indian constitution

Drafting committee – Dr. B.R. Ambedkar- Various stages

Unit II: Basic concepts

Classification of constitution– Forms of Government.

Unit III: Legislature

The Parliament – The LokSabha – The RajyaSabha – Composition and Election procedure

Unit IV: Executive

The President – Qualification – Election procedure – Powers –The Prime Minister and Cabinet.

Unit V: Judiciary

Supreme Court - High Court – Jurisdiction – appointment of Judges – their qualifications.

Suggested topics for group discussion/ presentation

- Dr. B.R. Ambedkar

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- Merits of classification of constitution
- The functions of Legislature
- The structure of Executive
- Judicial review of Supreme court

Suggested Readings.

Text Books:

- PonThangamani, Indian Constitutional History – A.D.1773 to 1950, PonnaiahPathipagam, Chennai, 2001.
- Ebi James, Working of Indian constitution,Tensy Publications,Sivakasi,2018

Reference Books:

- C.N. Joshi,The Constitution of India, Macmillan India Limited, Madras, 1983.
- Acharya Durga Das Basu, Introduction to the Constitution of India, Prentice Hall of India Private Limited, Delhi, 1997.
- Graville Austin, The Indian Constitution, Oxford University Press, Madras, 1966.
- M.V. Pylee, India's Constitution, S. Chand & Company Ltd., Delhi, 2011.
- VidyaDhar Mahajan Select Modern Governments, S.Chand&Co.Pvt Ltd,New Delhi,1975.

Web Sources

https://academic.oup.com

https://blog.ipleaders.in

https://legilative .gov.in

Title of the Paper: Fundamentals of Accounting Semester: V
Course Code: LUCONM51 Contact Hours: 2hrs/w Credit: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the use accounting rules.
- record business transactions in Journal and Ledger.
- prepare Subsidiary books.
- drawing up a trial balance.
- prepare the Final Accounts and Balance Sheet of Sole Traders

Pre required Knowledge:

1. Transactions and Golden Rules of Accounting
2. Book Keeping
3. Final Accounts

Unit- I:Accounting and Book-Keeping

Definition of Accounting and Book – Keeping- Double Entry System - Advantages and disadvantages - Types of Accounts -Rules of Accounting.

Unit-II : **Journal**-Simple and Compound entries (Simple transactions only) -Ledger.

Unit-III: Subsidiary Books

Purchase Book, Purchase Returns Book, Sales Book, Sales Returns Book and Cash Book (Single Column Only – Simple Problems).

Unit- IV: Trial Balance

Meaning – Objectives – Methods – Format - Drawing up a Trial Balance (Simple Problems Only).

Unit- V: Final Accounts

Trading Account – Profit and Loss Account – Balance Sheet - Simple Adjustments (Closing Stock, Depreciation, Bad Debts, Outstanding Expenses and Prepaid Expenses – Simple Problem Only)

Suggested Topics/Practical Exercises:

The Learners are required to

- ✓ classify the types of accounts using golden rules of accounting.
- ✓ prepare Journal with imaginary values.
- ✓ list the various subsidiary books in small organization.
- ✓ draw a Trial Balance with imaginary figures of a sole trader.
- ✓ prepare the financial statements using any three adjustments.

Suggested Readings:

(i) Text Books

1. Dr.Peer Mohammed (2020). Financial Accounting –I. Madurai: PASS Publications.
2. P.C.Tulsian (2018). Financial Accounting. NewDelhi: Pearson Education Publisher.

(ii) Reference Books:

1. Arulanandam.M.A. & Raman K.S. (2018) Advanced Accountancy (Part – I),Mumbai:Himalaya Publishing House.
2. Dr. Maheshwari.S.N. (2019). Advanced Accountancy (Vol–I). New Delhi:Vikas Publishing House Private Limited.
3. Jain.S.Pand Narang.K.L. (2020). Advanced Accountancy. (Vol–I), New Delhi: Kalyani Publishers.
4. Reddy.T.S. & Murthy.A (2020). Financial Accounting. Chennai: Margham Publications.
5. Gupta R.L.& Radhaswamy.M. (2019). Advanced Accountancy. (Vol-I). New Delhi: Sultan Chand & Sons.

(iii) Web-Sources:

1. www.icai.ac.in
2. www.financial accounting.ac.in
3. wwwicwai.ac.in

Note: The questions be asked in the ratio of **70%** for problems and **30%** for theory.

Title of the Course: Fundamentals of Physics – I Semester: V
Course Code: LUPHNM51 Contact Hours: 2hrs/w Credits:2

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the fundamental of SI units
- describe the states of matter in day-to-day life
- identify the various forms of energy in nature
- obtain the knowledge of renewable and non-renewable energy sources and its uses
- understand the concept of reflection and refraction in optics

Pre-Required Knowledge:

- Fundamental knowledge on FPS, CGS, MKS system
- Understand the role of materials in this electronic Era
- Perspectives of green energy for next generation.

Unit I: Units and Measurements

S.I. Units – measurements of length, mass, time and other physical quantities- Dimensional formula for area, volume, density and force – Uses of dimension.

Unit II: States of Matter

Matter- Solid, Liquid, Gas and Plasma – Application of Plasma – application of Plasma – change of state – specific heat Capacity – specific latent heat of ice and stream.

Unit III: Types of Energy

Kind of energy- Mechanical energy, Thermal energy, Optical energy, Sound energy, Electrical energy, Atomic and Nuclear energy (Examples) – Conservation of energy.

Unit IV: Renewable and Non-renewable Energy

Renewable and non- renewable energy – Fossil fuel – coal Oil –Solar – Wind – Biomass – OTEC.

Unit V: Reflection and Refraction

Mirror – Laws of reflection – Image formation (Concave and Convex mirror) - Lens – Law's of refraction – Image formation (Concave and Convex lens) – Defects of eye and rectification.

Suggested Topics for Group Discussion/Presentation

- Units, Dimensions
- Application of Plasma
- Kind of energy
- Solar Energy
- Concave and Convex lens

Suggested Readings:

i) Text Books:

1. Sukhame S.P, Solar Energy – Principles of thermal collection and storage, Tata McGraw- Hil publishing company Ltd (1996).
2. Narayan Rao, B.V. First Year B.Sc. Physics, New Age International (P) Ltd, (1998).

ii) Reference Books:

1. Abbasi and Nasema Abbasi,S.A. Renewable Energy sources and their environmental impact, PHI Learning Pvt. Ltd., New Delhi(2008).
2. Rai G.D, Non-conventional Energy Sources, Khanna publishers, (2010).

iii) Web Sources:

1. https://www.learncbse.in
2. https://www.livescience.com

DEPARTMENT OF CHEMISTRY – UG –CBCS- LOCF

Title of the paper: Chemistry in everyday life **Semester: V**
Course code: LUCHNM51 **Contact Hours: 2hrs/w** **Credits: 2**

Course Learning outcomes

On completion of the course, the students are able to

- know the Basic components of food and their compositions
- understand the Chemistry of vitamins
- learn about types of fuels
- know about chemistry of soaps and detergents
- know the chemistry of chemotherapy

Pre-Required Knowledge

- ✓ Food adulteration and precautions
- ✓ Sources and functions of vitamin
- ✓ Types of fuels

Unit I: FOOD:

Basic components of food - carbohydrates – proteins – fats as energy giving molecules. Biochemical process – effect of cooking on proteins. synthetic and natural foods – food additives – preservatives – greed of man – adulteration – modes of adulteration – detection – effects of adulteration- ill effects of Chunk foods – Milk: Denaturation and pasteurization

Unit II: VITAMINS

Definition, types of vitamins - sources of vitamins - biological functions and theuraptic uses of vitamins - diseasesdue to deficiency.

Unit III: FUELS

Definition - properties of ideal fuels - Types of fuels - Natural and Artificial fuels - composition and uses of coal gas, producr gas, water gas, hydrogen gas, LPG and Natural gas and bio gas. Advantage and disadvantage Introduction – physical of solid, liquid and gaseous fuels .

Unit IV: SOAPS AND DETERGENTS

Raw materials for soap and detergent - making of soap and detergents - classification of detergents - cleansing action of soaps and detergents - Applications of detergents.

Unit V: THERAPEUTIC DRUGS

Introduction – chemotherapy – classification of drugs – antipyretics – antacids - analgesics – antibiotics – transqyilliezers (definition with examples) – treatment of cancer.

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

Milk: Denaturation and pasteurization

Diseasesdue to deficiency of vitamins.

Natural and Artificial fuels.

Making of soap and detergents.

Classification of drugs.

Suggested Readings:

Text Book:

Sumati R. Mudambi and Shalini Rao, Food Science, Wiley Eastern Limited., 1990.

Reference Books:

1. Harry H Sisler and Calvin A. Vanderwerf, Food chemistry, Reinhold Publishing Corporation, New York, 1966.
2. P.L. Soni, H.M.Chawla, 29th Edition, Text book of Organic chemistry, Sultan Chand &Sons, Delhi., 2012.
3. B.K. Sharma, Industrial chemistry Goel Publishing House, Meerut,2011.
4. amboss.com/US/knowledge/vitamins.

Web Sources:

1. https://byjus.com/biology/food-adulteration/
2. https://www.youtube.com/watch?v=vppFkXW7Dt8
3. https://www.youtube.com/watch?v=ub86Dhg67tM

4. https://www.youtube.com/watch?v=OO9wEw5CfNM
5. https://youtu.be/OJhdag89Pq4

DEPARTMENT OF BOTANY – UG-CBCS- LOCF

Title of the Course: Plants for Mankind **Semester: V**
Subject Code:LUBYNM51 Contact hours: 2hrs/w Credits: 2

Course learning outcomes:

On completion of the course, the students are able to

- gather the botanical knowledge and their economic importance on cereals and millets
- understand more information about the nuts and its products to make healthy environment.
- acquire the information of fruits as well as vegetables for commercialization.
- acquire information on need of fibres, latex and oil.
- gain the knowledge about spices, condiments, fumitories and mastigotories.

Pre-required knowledge:

- Cereals
- Fiber yielding plants
- Cash crop

Unit – I - Cereals and Millets (Botanical description morphology of useful parts and applications)

Rice and Wheat,

Sugars and starch: Sugarcane and Tapioca

Unit – II- Legumes (Botanical description morphology of useful partsand applications)

Red gram, Soybean and Black gram;

Nuts: Coconut and Cashew nut.

Unit-III - Vegetables and Fruits (Botanical description morphology of useful parts and applications)

Tomato, Brinjal, Mango, Grapes and Banana

Unit – IV - Fibre, Latex and Oil yielding plants (Botanical description morphology of useful partsand applications)

Cotton, Jute, Rubber and Eucalyptus oil.

Unit – V- Fumitories and Mastigatories (Botanical description morphology of useful parts and applications)

Tobacco and Areca nut.

Spices and Condiments: Cardamom and Pepper

Non-alcoholic beverages: Tea and Coffee.

Suggested Topics for Seminar / Presentation / Group Discussion:

- Cereals and millets
- Legume plants
- Fiber yielding plants
- Latex and Oil yielding plants
- Spices and Condiments

Suggested Readings:

Text Books:

1. Pandey, B.P. (2000). Economic botany. S.Chand and Company Ltd., New Delhi.
2. Hill, A.F. (1952) Economic botany. Mc Graw Hill Book Co., New York.
3. Kochhar, S.L. (1981) Economic Botany in the Tropics. Mc Millan India Limited, New Delhi.
4. Sambamurthy, A.V.S.S. and N.S. Subramaniyam. (1989). A Textbook of Economic Botany. *Wily Eastern Ltd*., New Delhi.

Reference Books:

1. Diego Cunha Zied, Arturo Pardo-GimAcnez. (2017). Edible and Medicinal Mushrooms: Technology and Applications. *John Wiley & Sons*.

2. Kochhar, S.L. (1981). Economic Botany in the Tropics. *McMillan India Ltd*., Madras.
3. Mukharjee, S.K. (1969). Survey of Plants of India. Bull. *Botanical Survey India*, 11(3): 217-223.
4. Albert E Hill and O P Sharma (1996). Economic Botany. *Tata McGraw Hill Co. Ltd*., New Delhi.
5. Anonymous. (1948-1976). The Wealth of India - A Dictionary of Indian Raw Materials and Industrial Products. Vol. I to X. *Publication and Information Directorate, CSIR*, New Delhi.

Web Sources:

1. https://www.scienceinda.in/home/view-artical/5q
2. https://en/wikipedia.org/wiki/uman-uses-of-plants
3. https://indieseducation.com/importance-of-plants/
4. https://www.biologydiscussion.com/plants/9-significant-uses-of-plants-esplantined/5520.

DEPARTMENT OF NCC – UG - CBCS - LOCF
PART IV - NON MAJOR ELECTIVE

Title of the paper: NCC - 1 **Semester: V**

Course code: LUNCNM51 **Contact Hours: 2hrs/w** **Credits : 2**

Course Learning Outcomes

On Completion of this Course, the students are able to

- outline the organizational structure and dynamics of NCC
- elaborate various aspects of National Integration
- admire the braveness of Indian war heroes
- illustrate the functioning of Civil defense
- apply the principles of First Aid during emergencies

Pre–required Knowledge:

- ✓ Understanding aboutNCC organization.
- ✓ Understanding theMilitary History and Civil Defence.
- ✓ Skills in Disaster Management, First Aid and to inculcate Patriotism through national Integration.

Unit – I: NCC-Overview

NCC Organization – Levels (From Company to Directorate), History of NCC Organization, Role of NCC in India, Division of NCC, Motto and Cardinal Points – NCC Song.

Unit – II: National Integration

National Integration – Meaning – Motto – Importance – Components – Factors affecting National Integration - Religion, Culture and Heritage of India – Challenges and threats to National Integration – Contribution of NCC to National Integration.

Unit – III: Military History

Military History – Basic Organization of Indian Armed Forces – Biographies of Renowned Generals (in brief) – Field Marshal K M Cariappa, Field Marshal SHFJ Maneksha, Marshal of the Air Force Arjun Singh – Famous Battles / Wars of India – Indo-Pak war 1971 &Kargil war 1999.

Unit – IV: Civil Defense and Disaster Management

Civil Defense and Disaster Management – Civil defenseOrganization and its duties – Aid to Civil authorities – Organization of Home guard – Types of emergencies / Natural disasters – Fire Services and Firefighting – Traffic Control during disaster under police supervision – Assistance during Natural Calamities: Flood/Cyclone/Earth Quake/Accident etc. – Collection and Distribution of Aid Materials.

Unit –V: First Aid

First Aid – Structure and Functioning of a human body – Hygiene and Sanitation – Physical and Mental health – Infectious, Contagious diseases and its prevention Wounds and Fractures.

Suggested Topics/ Practical Exercises

- knowing higher officials of NCC in National and State level.
- applying knowledge on National Integration in challenges.
- recognise the techniques in wars like Indo-Pakistan war and Kagil war etc.,
- apply the role of NCC in disasters.
- finding the right First Aid treatment in accidents.

Suggested Readings:

i) Text Books:

1. Asthana A K, Brigadier (2015), Commandant, Precis – Kamptee.
2. NCC Guide – Army Wing, (2010). Major R. Ramasamy, Karur, Priya Publications.
3. Cadets hand book (2018) -Common subjects for SD/SW, OTA Training Materials, Kamptee.

ii) Reference Books:

1. Specialized Subject Army (2018). Govt. Of India Press, New Delhi.
2. Precis, (2009). Published by Officer Training School, Kamptee
3. Cadet's diary, Published by cadets' center, Chennai, 2000.
4. NCC: Handbook of NCC cadets,(2015). R. Gupta, Ramesh Publishing House
5. Lt. Saravanamoorthy. S.N,A hand book of NCC-Army wing (2015), Jayalakshmi publications.

iii) Web sources

1. https://indiancc.nic.in/
2. https://play.google.com/store/apps/details?id=com.chl.ncc&hl=en_IN&gl=US
3. https://joinindianarmy.nic.in/default.aspx

4. https://www.joinindiannavy.gov.in/
5. https://indianairforce.nic.in/

DEPARTMENT OF MATHEMATICS – UG-CBCS-LOCF

Title of the Course: History of Mathematics	**Semester : V**
Course Code : LUMSSC51	**Credits: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- Know about famous mathematicians and their contributions.
- understand how the ancient mathematicians worked together as a team to develop mathematical research.
- classify the history of mathematics through the time of its invention.
- identify significant role of mathematician in human development and analyze how the mathematical research was developed over the period of time.
- acquire the knowledge in history of mathematics by great Mathematicians.

UNIT I:From Euler to Legendre I

Leonhard Euler (1707 – 1783) – Jean-le-Rondd'Alembert(1717-1783) – Joseph Louis Lagrange(1736 – 1813)

UNIT II:From Euler to Legendre II

Gaspard Monge (1746 – 1818) – Pierre-Simon Laplace(1749-1827) – Adrien Marie Legendre(1752 -1833)

UNIT III: From Fourier to Cauchy I

Joseph Fourier (1768-1830) – Sophie Germain(1776 – 1831) – Carl Friedrich Gauss (1777-1855)

UNIT IV: From Fourier to Cauchy II

Simeon-Denis Poisson (1781- 1840) – Jean Victor Poncelet(1788 – 1867) – Augustine Cauchy (1789 – 1857)

UNIT V: From Cantor to Hilbert

Georg Cantor (1845 – 1918) – GostaMittagLeffler (1846 – 1927)- Felix Klein(1849 – 1925)

Suggested Readings

(i)Text Book

Ioan James, Remarkable Mathematicians, The Mathematical Association of America,

Cambridge, 2007.

Unit 1: Chapter 1 Section 1.1 to 1.3

Unit 2: Chapter 1 Section 1.4 to 1.6

Unit 3:Chapter 2 Section 2.1 to 2.3

Unit 4: Chapter 2 Section 2.4 to 2.6

Unit 5: Chapter 6 Section 6.1 to 6.3

(ii)Reference books:

1. E.T. Bell, **"Men of Mathematics"**, Published by Simon & Schuster, 1986.
2. Victor J.Katz, A History of Mathematics an Introduction, Pearson Publications, 2017
3. David M.Burton, The History of Mathematics an introduction, Mcgraw Hill Edition, 2011

(iii)Web Resources:

1. https://mathshistory.st-andrews.ac.uk/Biographies/Ramanujan/
2. https://mathshistory.st-andrews.ac.uk/Biographies/Cauchy/
3. https://www.history.com/topics/inventions/albert-einstein

Title of the Course: Indian Mathematics	Semester : V
Course Code:LUMSSC52	Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the concept of divisibility
- get the knowledge of various functions
- obtain the knowledge of square and cube roots using vedic mathematics
- know the concepts of Brahmagupta – Bhaskara Equation
- idea of remarks on π.

UNIT I: Integers

The decimal place value system- Divisibility– Greatest common divisor and least common multiple.

UNIT II: Continuation of Integers

Simple Continued Fractions - The Euler φ function – The Mobius μ function -Congruence's.

UNIT III: Topics in Sri bharathi Krishna Thirtha's Vedic Mathematics

Some questions of Divisibility – Recurring Decimals - Square.

UNIT IV: The Brahmagupta – Bhaskara Equation

Lemmas of Brahmagupta–Examples –Chakravala method of Bhaskara – Historical Remarks.

UNIT V: Continuation ofTheBrahmagupta – Bhaskara Equation

Continued Fraction –Remarks on π–Theorem of Bhaskara.

Suggested Readings

(i)Text Book

T.S. Bhanu Murthy, A modern introduction to Ancient Indian Mathematics, New Age International Publishers, 2009, 2nd Edition, New Delhi

Unit 1: Chapter 1 Sec1.1 to 1.3

Unit 2: Chapter 1 Sec1.4 to 1.7

Unit 3: Chapter 2 Sec2.1 to 2.3

Unit 4: Chapter 3 Sec3.1 to 3.4

Unit 5: Chapter 3 Sec3.5 to 3.7

(ii)Reference books:

1. E.T. Bell, **"Men of Mathematics"**, Published by Simon & Schuster, 1986.
2. G.R.Kaye, Indian Mathematics, Thacker, Spink & Company, 1915
3. Gaurav Tekriwal, Great Indian Mathematics, India Puffin, 2022

(iii)Web Resources:

1. https://www.mathsisfun.com/divisibility-rules.html
2. https://www.amsi.org.au/teacher_modules/Congruence.html
3. https://www.exploratorium.edu/pi/history-of-pi

Title of the Course: Complex Analysis **Semester: VI**

Course code:LUMSCT61 Contact Hours: 5hrs/w Credits: 4

Course Learning Outcomes:

On completion of the course, the students are able to acquire the knowledge of complex analysis.

- understand the concepts ofcomplex numbers and Bilinear transformations.
- equip in complex integration and calculus of Residues.
- find the Taylor and Laurent series expansion for complex functions.
- calculate the complex integrals.

Pre required knowledge:

- ✓ Basic knowledge of complex numbers.
- ✓ Operations in Complex numbers.

- ✓ Square root of Complex numbers.

Unit I: Complex Numbers and Analytic functions

Complex Numbers- Analytic functions – Functions of a complex variable -Limits – Theorems of limit – continuous functions – Differentiability – The Cauchy Riemann equations – Analytic functions – Harmonic functions – Conformal Mapping.

Unit II: Bilinear Transformations

Introduction-Elementary transformations- bilinear transformations- cross ratio- fixed points and invariants points of a bilinear transformations.

Unit III: Complex Integration

Introduction – Definite integral - Cauchy's theorem - Cauchy's integral formula - Higher derivatives.

Unit IV: Series Expansions

Introduction - Taylor's series - Laurent's series - Zeros of an analytic functions – Singularities.

Unit V: Calculus of Residues

Introduction – Residues – Cauchy's residue theorem - Evaluation of Definite integrals – Simple problems.

Suggested Topics for Group Discussion/ Presentation:

Harmonic Functions.

Cross Ratio

Definite Integral

Taylor's series

Evaluation of definite integrals

Suggested Readings:

(i) Text Book:

Arumugam, S., ThangaPandi Isaac and A. Somasundaram,Complex Analysis, Sci. Tech publication, 2002.

Unit-I: Chapter 2

Unit-II: Chapter 3, Sections 3.1 to 3.4.

Unit-III: Chapter 6

Unit-IV: Chapter 7

Unit-V: Chapter 8

(ii) Reference Books:

1. Duraipandian, Lakshmi Duraipandian and Muhilan, Complex Analysis, Emerald Publishers, 2007.
2. Ponnuswamy. S. – "Foundations of Complex Analysis", Narosa, New Delhi, 2005
3. Shanthi Narayanan, Theory of functions of a Complex Variable, seventh edition, S. Chand and Co, 1987.
4. Choudhary, B., The Elements of Complex Analysis, second edition, New Age International (P) Ltd., 1992.

(iii) Web Resources:

- ✓ https://math.libretexts.org/Bookshelves/Analysis/Complex_Variables_with_Applications_(Orloff)/02%3A_Analytic_Functions
- ✓ http://faculty.oxy.edu/ron/math/312/14/
- ✓ https://math.mit.edu/~jorloff/18.04/notes/topic2.pdf

Title of the Course: Graph Theory	**Semester: VI**
Course code:LUMSCT62 Contact Hours: 5hrs/w	**Credits: 4**

Course Learning Outcomes:

On completion of the course, the students are able to

- ❖ acquire the knowledge of Graph Theory.
- ❖ understand the concepts of graphs, isomorphic graphs.
- ❖ enrich knowledge on graphic sequences, connected graphs, Eulerian graphs, Hamiltonian graphs, planar graphs, colouring and directed graphs.
- ❖ develop the proof writing skills.

- ❖ model real world problems using graph theory.

Pre required knowledge:

- ✓ Sets
- ✓ Matrices
- ✓ Functions

Unit I: Graphs and subgraphs

Introduction - Definition and Examples – Degrees-subgraphs- isomorphism-Ramsey numbers-Independent sets and coverings-Intersection graphs and line graphs-Operations on graphs - Degree sequences – Graphic sequences.

Unit II: Connectedness

Introduction – Walks, trails, paths-Connectedness and components- Blocks-Connectivity.

Unit III: Trees

Eulerian graphs- Hamiltonian graphs – Trees – Characterisation of trees- centre of a tree.

Unit IV: Matching

Introduction - Matching in Bipartite graphs-Planarity-Definition and properties-Characterisation of planar graphs

Unit V: Colourability

Introduction - Chromatic number and chromatic index – Five color Theorem – Chromatic Polynomial-Directed graphs - Definition and basic properties

Suggested Topics for Group Discussion/ Presentation:

Types of subgraphs

Walks, Trails and Paths

Properties of trees

Matchings

Basic properties of Digraphs

Suggested Readings:

(i) Text Book:

Arumugam , S., and Ramachandran, S., Invitation to Graph Theory, Scitech

Publication, 2001.

Unit I Chapter 2 and Chapter 3

Unit II Chapter 4

Unit III Chapter 5 and Chapter 6

Unit IV Chapter 7 and Chapter 8

Unit V Chapter 9 and Chapter 10 Section 10.1

(ii) Reference Books:

1. Balakrishnan V.K., Schawm's Outlines Graph Theory, Tenth Reprint, Tata McGraw Hill- 2011.
2. Balakrishnan. R., A text book of Graph Theory, Springer Publication, 2000.
3. John Clark, Derek Allan Holtaon, A first look at Graph Theory, Allied Publishers Limited, First Indian Reprint,1995.
4. Choudam S.A, A first course in Graph Theory, Macmillan, 1987.
5. Murugan M., Introduction to Graph Theory, Muthali Publishing House, Chennai, 2005.

(iii)Web Resources:

1. https://www.gatevidyalay.com/graph-isomorphism/
2. https://calcworkshop.com/trees-graphs/isomorphic-graph/
3. http://www-math.mit.edu/~djk/18.310/Lecture-Notes/MatchingProblem.pdf

Title of the Course :Project		**Semester: VI**
Course Code:LUMSPJ63	**Contact Hours: 5hrs/w**	**Credits: 4**

Course Learning Outcomes:

On completion of the course, the students are able to

i) know how to explore and engage in research in Mathematics

ii) know about research methodology

iii) know about literature survey.

iv) learn to choose research topic of interest

v) develop their course into main research

PROCEDURE

- Projects are to be done by groups of students with a maximum of five students in a group.
- The thesis should be neatly typed in Times New Roman (Font) and 12 (Font Size)
- Repeatation in choosing topic of project is not allowed.
- Project should consist the following sections.

  i) Introduction

  ii) Preliminaries

  iii) Indepth study of Project

  iv) Results and Theorems

  v) Applications (if any)

  vi) Conclusion

  vii) References

During project hours students may visit university departments or any relevant Departments, Institutions related its their projects.

Title of the Course: Operations Research	**Semester: VI**
Subject Code:LUMSDS61 Contact Hours: 4hrs/w	**Credits: 4**

Course Learning Outcome:

On completion of the course, the students are able to

- gain basic concepts of Linear Programming Problem and form mathematical formulation of Linear Programming Problem.
- obtain the optimal solution of LPP graphically for two variables.
- use Simplex method, Big-M method and Two-Phase method for more than two variables and apply Dual Simplex method.

- use various methods to solve transportation problem and find feasible and optimal solution.
- acquire knowledge to find the optimal solution for assignment problem and game theory.

Pre Required Knowledge:

Fundamental knowledge of formulating mathematical problems from theory problems.

Fundamental concepts of solving equations with graphically.

Basic concepts of finding the optimal solution.

Unit I: Linear Programming Problem I

Linear Programming Problem - Mathematical formulation of a Linear Programming Problem - Graphical solution - The Simplex method

Unit II: Linear Programming Problem II

Artificial variable technique - Charner's method of penalties – Two phase method.

Unit III: Duality in Linear Programming

Duality – general primal - dual pair - formulation of a dual problem – primal - dual problem in matrix form - duality theorems and complementary theorems (statements only) - Dual simplex method.

Unit IV: Transportation and Assignment Problem

Transportation Problem - Initial solution by North - West corner method, Vogel's approximation method, Matrix minima method - Solution by Modified distribution method for both Balanced and Unbalanced Problem – Assignment problem.

Unit V: Games and Strategies

Game Theory- Two person zero sum game –some basic terms –The maxima and minima principle (proof of theorems not expected)- saddle points- game with saddle points – solutions of games without saddle points by the following method. 1) Using formulae, 2) Graphical Method, 3) Method of Dominance

Suggested Topics for Group Discussion/ Presentation

1. Graphical solution to LPP
2. Solving LPP using Two phase method.
3. Solving LPP using Dual simplex method.
4. Solving unbalanced assignment problem.
5. Method of Dominance

Suggested Readings:

(i) Text Book:

KanthiSwarup, P.K.Gupta and Mao n Mohan, Operations Research, Sultan Chand & Sons, Sixteenth Edition, 2012.

Unit I : Chapter 2 Section 2.1 to 2.4 and Chapter 3 : Sections 3.1 to 3.3

Unit II: Chapter 4 Sections 4.1 ,4.3 4.4

Unit III: Chapter 5 Sections 5.2 - 5.4 and 5.9

Unit IV : Chapter 10 Sections 10.1to 10.4 and 10.8 to 10.11

Chapter 11 Sections 11.1 - 11.3

Unit V : Chapter 17 Section-17.1 - 17.7

(ii) Reference Books:

1. P.R. Vittal, Introduction to operations Research, MarGham Publications, 2013.
2. Frederick S. Hillier, Gerald J. Lieberman, Introduction to Operations Research, Seventh Edition, The McGraw-Hill Companies, 2003.
3. J.K.Sharma, Operations Research Theory and Applications , Third Edition Macmillan India Limited , Chennai, 2009

(iii) Web Resources:

1. https://www.storyofmathematics.com/linear-programming
2. http://people.brunel.ac.uk/~mastjjb/jeb/or/morelp.html
3. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=4943
4. https://www.youtube.com/watch?v=NRUHTuuX3Us

5. https://www.toppr.com/guides/maths/linear-programming/graphical-method-of-solving-a-linear-programming-problem/
6. https://www.youtube.com/watch?v=ku1KSgBfzs4
7. http://www.math.wsu.edu/students/odykhovychnyi/M201-04/Ch06_1-2_Simplex_Method.pdf

Title of the Course: Automata Theory and Formal Languages **Semester: VI**

Course Code: LUMSDS62 Contact hours: 4hrs/w Credit: 4

Course Learning Outcomes:

On completion of the course, the students are able to

analyze the concepts of Automata theory.

define and analyze finite Automata.

appreciate the theory of regular expressions.

define and Evaluate its properties.

determine and Analyze Applications of context-free grammar.

Pre - Required Knowledge:

1. To acquire the knowledge of Automata Theory and Formal Language.
2. To understand the concepts of Finite Automata.
3. To understand the concepts of Regular Expression.

Unit I: Automata

Introduction to formal proof, Additional forms of proof, Inductive proofs, The central concepts of Automate theory.

Unit II: Finite Automata

An informal picture of finite automate, Deterministic finite automate, Non-deterministic finite automata, An application: Text search, Finite automata with epsilon transitions.

Unit III: Regular expressions and languages

Regular Expressions, Finite automata and regular expressions, Applications of regular expressions, algebraic laws of regular expressions.

Unit IV: Properties of regular languages

Proving languages are not regular, Closure properties of regular languages, Decision properties of regular languages, Equivalence and Minimization of automata.

Unit V: Context – Free Grammars and Languages

Context-free grammars, Pase trees, Applications of context-free grammar, Ambiguity in grammar and languages.

Suggested Topics for Group Discussion/ Presentations:

1. Central concepts of Automate theory
2. Deterministic and Non- Deterministic
3. Applications of regular expressions
4. Equivalence and Minimization of automata
5. Push Down Automata

Suggested Readings:

(i)Text Book:

J.E. Hopcroft, R. Motwani, and J.D. Ullman, Introduction of Automata, Languages and Computation, II Edition Pearson Edition, 2001.

Unit I: Chapter 1: sections 1.1 to 1.5

Unit II: Chapter 2: sections 2.1 to 2.5

Unit III: Chapter 3: sections 3.1 to 3.4

Unit IV: Chapter 4: sections 4.1 to 4.4

Unit V: Chapter 5: sections 5.1 to 5.4.

(ii) Reference Books:

1. Kozen, Dexter.C., Automata and Computability, Springer publications, 2003.
2. BasavarajS.Anami, Karibasappa K.G, Formal Languages and Automata Theory, Wiley Publishers.

3. M.L. Venkatraman, N.Sridharan and N.Chandrasekaran , Discrete Mathematics, National Publishing & Co, 2000.

(iii) Web Resources:

1. https://mrcet.com/downloads/digital_notes/IT/Formal%20Languages%20Automata%20The ry.pdf
2. https://www.vssut.ac.in/lecture_notes/lecture1428551440.pdf
3. https://www.digimat.in/nptel/courses/video/111103016/L01.html

Title of the Course: Applied Statistics **Semester: VI**

Course Code: LUMSDS63 Contact hours: 4hrs /w Credit: 4

Course Learning Outcomes:

On completion of the course, the students are able to

- illustrate the concept of classes frequencies.
- use the frequencies data and apply the independence data.
- understand the chain base index and fixed base index numbers.
- develop the measurement of seasonal variation.
- apply the concept of one and two classifications.

Pre Required Knowledge:

- ✓ The basic concepts of frequencies.
- ✓ Basic knowledge of index numbers.
- ✓ Fundamental of analysis of variance.

Unit I: Theory of Attributes

Introduction – Attributes – Positive class frequencies – Negative class frequencies – Contrary class frequencies – Dichotomisation.

Unit II: Theory of Attributes Continued

Consistency of data – Independence and Association of data – Yule's coefficient.

Unit III: Index Numbers

Index numbers – Consumer price index numbers – Conversion of chain base index numbers into fixed base index numbers and conversely.

Unit IV: Analysis of Time Series

Introduction – Time series – Components of a time series – Measurement of trends.

Unit V: Analysis of Variance

Introduction – One criterion of Classification – Two criteria of Classification – Three criteria of Classification Latin Square.

Suggested Topics for Group Discussion/ Presentation

1. Contrary class frequencies
2. Consistency of data
3. Consumer price index numbers
4. Measurement of trends
5. Three criteria of Classification Latin Square.

Suggested Readings:

(i)Text Book:

S. Arumugam and A.Thangapandi ISAAC, Statistics, New Gamma publishing House, Palayamkottai, 2015.

Unit I : Chapter 8 : Sections 8.1

Unit II : Chapter 8 : Sections 8.2, 8.3

Unit III : Chapter 9 : Sections 9.1 to 9.3

Unit IV : Chapter 10 : Sections 10.1 to 10.3

Unit V : Chapter 17: Sections 17.1 to 17.3

(ii) Reference Books:

1. A. M. Mood, F. A. Gray Bill and D. C. Boes, Introduction to the Theory of Statistics, TataMcGraw-Hill Publication, Third Edition, 2005.
2. John E. Freund, Mathematical Statistics, Prentice-Hall of India, Fifth Edition, 1992.
3. S.C.Gupta and V.K.Kapoor, Fundamentals of Mathematical Statistics, S.Chand& Co,1999

(iii)Web Resources:

1.https://ccelms.ap.gov.in/adminassets/docs/29062020053632-theory_of_attributes.pdf

2.http://www.digimat.in/nptel/courses/video/109104182/L22.html

3.https://nios.ac.in/media/documents/SrSec318NEW/318_Economics_Eng/318_Economics_Eng_Lesson11.pdf

Title of the Course: Bio-Statistics **Semester: VI**

Course Code: LUMSDS64 Contact hours: 4hrs/w Credit: 4

Course Learning Outcomes:

On completion of the course, the students are able to

- analyze the concepts data collections.
- define and analyze Measures of Dispersion.
- appreciate the theory of Probability.
- define and Evaluate Degrees of freedom.
- determine and Analyze Health Statistics.

Pre Required Knowledge:

To acquire the knowledge of Bio statistics.

To understand the concepts of median, mode and probability.

To learn its applications.

Unit I: Measures of Central Tendancy

Collection of data-primary and secondary data - Classification and Tabulation-diagramatic representation - Measures of central tendency, mean, median, mode-geometric mean, harmonic mean - Class history rows,

Unit II: Measure of Dispersion

Measures of dispersion - Range, quartile deviation of combined set - Coefficient of variation - correlation - regression lines and rank correlation.

Unit III: Probability Distributions

Probability-Addition theorem and multiplication Theorem-Binomial distribution-Poisson distribution-Normal distribution-Simple problems.

Unit IV: The Chi – Square Test

Chi-Square Test - Degrees of freedom-Test of goodness of fit-Test of independence.

Unit V: Health Statistics

Applications-Health statistics- Sources of Health statistics- Measurement of Sickness- Classification of Diseases.

Suggested Topics for Group Discussion/ Presentations:

1. Harmonic mean
2. Coefficient of variation
3. Binomial distribution
4. Chi-Square Test
5. Health statistics

Suggested Readings:

(i) Text Books:

1. R.S.N Pillai and V. Bagavathi , Statistics S.Chand Company limited-1994.
2. P.S S SundarRaoJ. Richard, Introduction to Bio-Statistics Research Methods,
3. PrenticeHall of India, New Delhi, 2006.

Book 1

Unit I Chapter 4,6,7,9

Unit II Chapter10,12,13

Unit III Chapter 18 ,19

Unit IV Chapter 21

Book 2

Unit V Chapter 19

(ii) Reference Books:

1. Prarob Kumar Banerjee, Introduction to Biostatistics, S.Chand and company, 2004.
2. Marcello Pagano and Kimberlee Guvreau, Principles of Biostatistics, Brooks/ Cole, 2012
3. B.Burt Gerstman, Basic Biostatistics, Jones & Bartlett Learning, 2015

(iii) Web Resources:

1.https://www.fd.cvut.cz/department/k611/PEDAGOG/THO_A/A_soubory/statistics_firstfive.pdf

2. https://nptel.ac.in/courses/110/107/110107114/

3. https://www.youtube.com/watch?v=Rm-APM83TKc

Title of the Course: Arithmetic and Mental Ability for Competitive Examinations **Semester : VI**

Course Code: LUMSDS65 Contact Hours : 3hrs/w Credit: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- formulate the problem quantitatively
- recall appropriate arithmetical methods to solve the problem.
- demonstrate various principles involved in solving mathematical problems.
- evaluate various real life situations by resorting to analysis of key issues and factors
- develop various mathematical skills to solve the problems

Pre Required Knowledge:

- ✓ Knowing Basic Arithmetic Operations
- ✓ Interest in problem solving
- ✓ Knowing Multiplication Table

Unit I: Problems on Numbers & Calendar

Problems on Numbers - Calendar.

Unit II: Problems on Ages & Clocks

Problems on Ages - Clocks.

Unit III: Ratio and proportions

Ratio and proportions - Partnership.

Unit IV:Time and Distance

Time and Distance – Problems on trains.

Unit V:Profit and Loss

Profit and Loss – Time and Work.

Suggested Topics for Group Discussion/ Presentations:

Problems on Numbers

Problems on Ages

Ratio and proportions

Problems on trains

Profit and Loss

Suggested Readings:

(i) Text Book:

R. S. Agarwal, Quantitative Aptitude for Competitive Examinations, Revised and

Enlarged edition, S. Chand Publications, New Delhi, Reprint 2009

Unit I : Chapters 7 and 27.

Unit II : Chapters 8 and 28.

Unit III : Chapters 12 and 13.

Unit IV : Chapters 17 and 18.

Unit V : Chapter 11 and 15.

(ii) Reference Books:

1. R.Gupta, Quantitative Aptitude, Unique Publishers Pvt. Ltd, 2013
2. Arora. P.N. and Arora. S., Quantitative Aptitude Mathematics, Volume- 1 S Chand &Company Ltd., New Delhi, 2009.
3. Kothari. C.R., Quantitative Techniques,Vikas Publishing House Pvt. Ltd., New Delhi, 1989.
4. Srinivasan. T.M., Perumalswamy. S. and Gopala Krishnan. M.D., Elements of Quantitative Techniques, Emerald Publishers, Chennai, 1985.

(iii) Web Resources:

1. https://mathematician0.weebly.com/
2. https://youtu.be/rHzggZDdtc4
3. https://youtu.be/ZADjT-wsQJw
4. https://youtu.be/ETiRE7N7pEI

Title of the Course: Business Statistics Semester: VI
Course Code:LUMSDS66 Contact hours: 3hrs/w Credit: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- collect, process, analyze and present the statistical data
- apply various statistical tools
- define the measures of central tendency, correlation, regression and index numbers
- interpret statistical analysis tools
- choose a statistical method for solving practical problems

Pre Required Knowledge:

- ✓ Basics of statistics.
- ✓ Arithmetic Calculations
- ✓ Problem Solving

Unit I: Measures of central tendency

Measures of central tendency – Definition- Mean – Median- Mode – Their merits and demerits – Weighted arithmetic mean.

Unit II: Measures of dispersion

Measures of dispersion – Range – Quartile deviation – Standard deviation – Coefficient of variation – Pearson's and Bowley's Coefficient of skewness.

Unit III: Correlation Coefficient

Scatter diagram – Pearson's Coefficient of correlation – Rank correlation.

Unit IV: Index Numbers

Index numbers – Meaning and uses – Methods of construction – Laspeyer's method – Paasche's method – Fisher's Ideal Index – Marshall Edgeworth method – Kelley's method.

Unit V: Analysis of Time Series

Analysis of time series – Estimation of trend – Methods of least squares(Straight line only) – Free

Suggested Topics for Group Discussion/ Presentations:

1. Weighted arithmetic mean
2. Quartile deviation
3.Pearson's Coefficient of correlation
4.Marshall Edgeworth method
5.Analysis of time series

Suggested readings

(i)Text Book:

S.P.Gupta,Elementary Statistical Methods, Sultan Chand & Sons, 18th Edition, 2009.

Unit I Chapter 4

Unit II Chapter 5

Unit III Chapter 7

Unit IV Chapter 9

Unit V Chapter 10

(ii)Reference Books:

1. R.S.N. Pillai and V. Bagavathi, Statistics, S.Chand, 2002.
2. S.Sachdeva Lakshmi, Business statistics, Narainagarwal,2020.
3. S.P.Gupta, M.P.Gupta, Business statistics, Sultan Chand & Sons, 18th Edition, 2009.

(iii)Web Resources:

1. https://nptel.ac.in/courses/110/107/110107114/
2. https://www.ddegjust.ac.in/studymaterial/mcom/mc-106.pdf
3. https://www.academia.edu/35494444/Business_Statistics_Notes_Chapter_1_What_is_statistics

Title of the Course: Fuzzy Mathematics Semester: VI
Course Code:LUMSSE61 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- explain the concept of fuzzy sets and crisp sets in brief
- define operations and relations in fuzzy sets
- demonstrate the operations on fuzzy sets
- analyze the relationship among fuzzy measures
- apply fuzzy theory in Engineering, Management and Medicine

Pre Required Knowledge:

- ✓ Fundamental concept of Set Theory.
- ✓ Basic concepts of relations.
- ✓ Fundamental knowledge of operations.

Unit I: Crisp sets and fuzzy sets

Crisp sets and fuzzy sets: - Introduction – Crisp sets : An Overview – the notion of Fuzzy Sets – Basic concepts of Fuzzy sets.

Unit II: Operation on Fuzzy Sets I

Operation on fuzzy sets –General Discussion –Fuzzy Complement –Fuzzy Union.

Unit III: Operation on Fuzzy Sets II

Operation on fuzzy sets – Fuzzy intersection – combination of operations.

Unit IV: Operation on Fuzzy Sets III

Operation on fuzzy sets – General aggregation operations Fuzzy Relations-Crisp and Fuzzy Relations.

Unit V:Fuzzy Relations

Fuzzy relations – Binary Relations-Binary relations on a single set.

Suggested Topics for Group Discussion/ Presentations:

1. Fuzzy Sets
2. Difference between Crisp sets and Fuzzy Sets
3. Fuzzy Union
4. Fuzzy Intersection
5. Binary Relations

Suggested Readings:

(i)Text Book:

George J. Klir Tina A. Folger, Fuzzy Sets, Uncertainty and Information, Prentice Hall of India Private Limited, New Delhi - 110001, 2005.

Unit I: Chapter - 1, Section – 1.1 to 1.4

Unit II: Chapter – 2, Section – 2.1 to 2.3

Unit III: Chapter - 2, Section – 2.4 and 2.5

Unit IV: Chapter -2, Section – 2. 6 Chapter-3 Section-3.1

Unit V: Chapter -3, Section – 3.2 and 3.3

(ii) Reference Books:

1. Zimmer Man.H.J,Fuzzy sets theory and it's applications ,Kluwar-Nijhoff Bostom 1985.
2. S.K.Pundir,Fuzzy sets and their application, Anu books,2021.
3. George J. Klir and Bo Yuan, Fuzzy Sets and Fuzzy logic Theory and Applications, Prentice Hall of India,2003.

(iii) Web Resources

1. https://www.youtube.com/watch?v=H9SikB7HbSU
2. 2.https://www.digimat.in/nptel/courses/video/108104157/L30.html
3. https://www.youtube.com/watch?v=IZWTduVCrf8

Title of the Course: Applications of Differential Equations **Semester: VI**

Course Code:LUMSSE62 **Contact Hours: 2hrs/w** **Credit: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the growth and decay problems.
- acquire the knowledge of solving problems on falling bodies.
- understand the Brachistochrone problem.
- understand the basics of motion of planets.
- apply Newton's law of Gravitation.

Pre Required Knowledge:

- ✓ Basic concept of simple interest and compound interest.
- ✓ Problem solving skills.
- ✓ Knowledge of reading comprehension.

Unit I:Growth, decay and chemical Reaction

Growth, decay and chemical Reaction and simple Problems.

Unit II: Falling bodies

Falling bodies and simple Problems.

Unit III: Brachistochrone problem

Brachistochrone problem.

Unit IV: Simple electric circuits

Simple electric circuits-dynamical problems with variable mass.

Unit V: Newton's Laws of Gravitation

Newton's Laws of Gravitation and the motion of planets.

Suggested Topics for Group Discussion/ Presentations:

1. Chemical Reaction
2. Falling bodies
3. dynamical problems
4. Gravitation
5. Motion of planets

Suggested Readings

i) Text Book:

S. Narayanan & T.K. Manickavasagam Pillai, Differential Equation and its Applications- S.Viswanathan Publications- Reprint 2005.

Unit I: Chapter 3 Section 1

Unit II: Chapter 3 Section 3

Unit III: Chapter 3 Section 4

Unit IV: Chapter 3 Sections 6 and 7.

Unit V: Chapter 3 Section 8

ii) Reference Books:

1. Richard Browson, Schaum's outlines differential equations, second edition, Tata Mcgraw Hill publishing company, 2004.
2. P. Kandasamy and K. Thilagavathi, Mathematics for B.Sc., S. Chand and Co., New Delhi, 2004.
3. M. K. Venkataraman and Mrs. Manorama Sridhar, Differential Equations and Laplace Transforms, The National Publishing Company, 2004.

iii) Web Resources

1.http://www.mmcmodinagar.ac.in/econtent/physics/Differential Equations And TheirApplications.pdf

https://www.digimat.in/nptel/courses/video/111108081/L01.html

DEPARTMENT OF ENGLISH – UG – CBCS-LOCF

Title of the Course: Communicative English –II **Semester: VI**

Course Code: LUENNM61 **Contact Hours: 2hrs/w** **Credits: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the role of communication in personal and professional success
- have comprehensive application- knowledge of appropriate communication strategies
- apply appropriate communications skills across settings and purposes
- respond effectively to various communicative demands
- build and maintain healthy and effective relations by demonstrating appropriate and professional ethical behavior.

Pre-required Knowledge:

- Fundamental Grammatical Competence
- Working Vocabulary and Spoken idioms
- Different strategies and barriers of effective communication

Unit I: Listening

A Discussion between two friends, Booking accommodation at an outstation Hotel, Enquiring about Flight, Getting an appointment for interview over phone, At the Library, Between a brother and sister, Attending a career guidance Fair – About Medical Transcription, About call Centre, Option in Higher Education.

Unit II: Speaking- I

Asking for information, Asking for someone's opinion, Asking if someone is sure, Asking someone to say something again, Checking that you have understood, Asking whether someone knows, Asking about Starting conversation with a Stanger.

Unit III: Speaking –II

Leaving someone for a short time, Ending a conversation, Asking possibility, Asking about preference , Asking if someone is about to do something , Asking if someone agrees, Asking if you are obliged to do something, Describing something , Some useful expressions.

Unit IV: Writing

Writing Essays, Writing Advertisements and posters, Writing Reports, Summarizing and Outlining, Information Transfer Exercise, Dialogue Writing.

Unit V: Professional Skills

Negotiating, Body Language, Group Discussion, Seminar and Public Speaking.

Suggested Topics for Presentation:

- Difference between acceptable and unacceptable sentences in English.
- Appropriateness, grammaticality and acceptability of the English language.
- To assist the students in learning the concepts of register, style and jargon as well as the various varieties of English.
- Application and use various kinds of jargons and register as per context.
- Preparing situational dialogues

Suggested Readings:

i)Text Books:

1. JayashreeBalan, *Spoken English*.Vijay Nicole Imprints Pvt. Ltd, Chennai , 2006.
2. G.Radhakrishnan Pillai and K. Rajeevan.*Spoken English For You*. Emerald Publishers, Chennai ,2002.

ii)Reference Books:

1. M.N.K.Bose. *Better Communication in Writing,* New Century Book House (P) Ltd, Madras, 2004.

2. T. M. Farhathullah. *Communication Skills for Under Graduates.* R.B.A. Publications, Chennai.

iii)Web Sources:

1. https:// www.nyp.org/blog/2012/11/28/11-great-free-websites-practice-English
2. https:// www.Spoken English practice.com/ learn-english-speaking-online
3. https://global-exam.com/blog/en/general-english-what-are-best-websites-tolearn-english/

DEPARTMENT OF HISTORY - UG

Course Title :Indian National Movement		**Semester: VI**
Course Code: LUHSNM61	**Contact Hours: 2**	**Credits: 2**

Course learning outcomes:

On completion of the course students are able to

Acquire knowledge about the early rebellions

Describe the birth of Congress

Understand the impact of Jallianwallabag tragedy

Asses the causes for the Non-Co-operation movement.

Evaluate the role of Gandhi in freedom movement.

Unit I: Early uprisings

South Indian Rebellion 1800- 1801- Vellore Mutiny of 1806, causes and results - Sepoy Multiny 1857.

Unit II: Indian National Congress

Birth of Congress– Moderates - Surat split 1907 – Extremist Movement.

Unit III: Reunion of Congress

Moderates and Extremists 1916 - Home Rule Movement 1916, Jalianwallabagh tragedy 1919.

Unit IV: Gandian era – phase I

Champron Satyagraha - Non Co-operation Movement - Chauri Chaura incident 1922.

Unit V: Gandian era – phase II

Civil Disobedience Movement - Dandi March 1930 - Gandhi - Irwin pact - Quit India Movement 1942 – Mountbatten Plan – dawn of independence.

Suggested topics for group discussion/ presentation

Causes and results of Sepoy Multiny 1857.

Surat split

Home Rule Movement

Chauri Chaura incident

Suggested Readings.

Text Books:

1. G .Thangavelu, History of India 3 Vols, Govt. of Tamilnadu Publications
2. G.Venkatesan History of Freedom Struggle in India, V C Publications, Rajapalayam

Reference Books:

1. B. R. Tomilinzon, The Indian National Congress and the Raj, (1929 – 1942), The Macmillan, New York, 1976.
2. Tara Chand, History of the Freedom Movement in India Vol.I., Gowardha Kapur and Sons, New Delhi, 1970.
3. B. Shiva Rao, Indian Freedom Movement, Orient Longman Limited., New Delhi, 1972.
4. H. N. Pandit, Fragments of History, Sterling Publishers, New Delhi, 1982.
5. V.D. Mahajain, British Rule in India and After, S. Chand and Co., Ltd., New Delhi, 1972.

Web Sources

https:// www.clearias.com

https:// www.toppr.com

https:// www.mapsofindia.com

Title of the Paper: Practical Banking **Semester: VI**

Course Code: LUCONM61 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students able to

- explain the banking systems in India;
- analyse the different schemes of commercial banks in India;
- illustrate the bank lending procedures;
- evaluate the credit appraisal system and explain the Management of NPA;
- apply the recent trends in Banking system;

Pre-required Knowledge:

- ✓ Origin of Indian banking system in India
- ✓ Negotiable Instruments
- ✓ Latest technology in banking system

Unit- I:Introduction

Banking - Definition – Functions – Reserve Bank of India – Introduction - Functions.

Unit- II: Relationship

Banker and Customer Relationship – General relationship only – Types of customers.

Unit- III: Deposits

Types of Deposit Accounts – Features of deposit accounts – Account opening procedure.

Unit- IV: Cheques

Meaning – Advantages - Crossing – Types of crossing- Endorsement.

Unit- V: Resent Development

Recent Developments in Banking system – ATM – Debit Card - Credit Card –Services available under Core Banking System.

Suggested topics / Practical Exercise:

The learners are required to:

- ✓ critically evaluate the functions of RBI
- ✓ discuss the special relationship between banker and customer
- ✓ show the different methods of crossing of cheque
- ✓ list the t benefits you enjoyed from debit and credit cards.
- ✓ fill cheque, chellan using specimen forms

Suggested Readings:

i) Text Books:

1. Gorden& Natarajan. (2018). Banking theory Law and practice. Bangalore: Himalaya Publishing House.
2. Sundharam& Varshney. (2019). Banking theory, law and practice. New Delhi: Sulthan Chand & Son**s.**

ii) Reference Books:

1. Radhaswamy, M.(2018). A Text Book of Banking. Delhi: S. Chand & Co.
2. Shekar & Lakshmi Shekar. (2019). Banking Law and Practice. UP: Vikas Publishing.
3. Santhanam.B. (2018).Banking and Finance System, Chennai: Margham Publication.

iii) Web-Sources:

1. https://library.um.edu.mo/ebooks/b33294872.pdf
2. http://dspace.gipe.ac.in/xmlui/bitstream/handle/10973/23714/GIPE-008631-Contents.pdf?sequence=2&isAllowed=y
3. https://www.amazon.in/Practical-Banking-India-Gupta-H/dp/8178358999
4. https://www.freebookcentre.net/Business/Banks-and-Banking-Books.html

Title of the Paper: Fundamentals of Physics – II Semester: VI
Course Code:LUPHNM61 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the fundamentals of Ohm's law and Kirchhoff's law in electric circuit
- describe the functions of various cells
- understand about AC power generations
- know about measuring electric power
- understand the concept of RLC circuits

Pre-Required knowledge:

- Fundamental knowledge on electric circuits,
- Applications of various cells in various fields
- Need of power generation for future world.

Unit 1: Electric circuits

Electric current- voltage and resistance- Ohm's law- Kirchhoff's law- Resistances in series and in parallel.

Unit II: DC sources

DC Source – Primary cells – Leclanche and Daniel cell – Secondary cells – Lead Acid Accumulator – DC generator.

Unit III: AC sources

Alternating current generation by hydro, thermal and atomic power stations– RMS value – Peak value (Quantitative) – AC generator – no derivation.

Unit IV: Electric Power

Measurement of Electric power by Wattmeter- simple calculations- Induction coil- Wattless current- Power factor.

Unit V: Rectifiers

Simple electrical circuits – resistor, capacitor and inductor connected to AC source (independently) – Relationship between emf and current in each case. Diode – Bridge Rectifier.

Suggested Topics for Group Discussion/Presentation

- Ohm's law
- DC sources
- AC Sources
- Induction coil
- RLC circuit

Suggested Readings:

i) Text Books:

1. Murugesan. R, Electricity and Magnetism, S. Chand & Co (2004).
2. Mahajan A.S, Electricity and Magnetism, Tata McGraw Hill Publisher, (1988).

ii) Reference Books:

1. Narayan Rao.BV, First Year B.Sc. Physics, New Age International (P) Ltd, (1998).
2. Rai G.D, Non-conventional Energy Sources, Khanna publishers, (2010).

iii) Web Sources:

1. https://courses.lumenlearning.com

2. https://www.electrical4u.com

3. https://www.carritech.com

DEPARTMENT OF CHEMISTRY – UG –CBCS- LOCF

Title of the paper: Chemistry for Competitive Examinations **Semester: VI**

Course code:LUCHNM61 Contact Hours: 2hrs/w Credits: 2

Course Learning outcomes

On completion of the course, the students are able to

- understand basic chemistry involving types of elements and chemical reactions.
- understand the different concepts of acids and bases, water types, various chemical processes.
- study the knowledge on fertilizers, role of fertilizer in plant growth and fertilizer industry
- gain knowledge on Inorganic and organic pesticides, Fungicides and repellants

Pre-Required Knowledge

- ✓ Basic Mathematical Concepts
- ✓ Basic Concepts in Organic Chemistry-EDG, EWG-o, p and m and m directors
- ✓ Periodic Table: Periodic classification of elements

Unit I: Basic Chemistry – I

Elements – atoms and molecules – Chemical formulae and symbols – Important basic terms such as pressure, volume, atomic mass, molecular mass, temperature, atomic number, mass number- Radioactivity and Isotopes- periodic classification of elements – Group and period (elementary idea)- Metals and nonmetal – metaolloid, alloy, ore and minerals.

Unit II: Basic Chemistry – II

State of matter (Solid, liquid, gas and plasma)- ideal and real gases - Important laws of Chemistry (Boyle's law, Charle'slaw,Hess's law, Grahams law of diffusion, Beer's law, Henry's law, Faraday's law, Law of conservation of matter or energy)- Types of chemical reactions (exothermic and

endothermic, Physical and chemical changes, oxidation and reduction)

Unit III: Basic Chemistry – III

Different concepts of Acids and Bases (Arrhenius, Bronsted and Lewis) – pH concept (no calculation) – Water – Hard and soft water - Solutions and their types (True, Colloidal and suspension) – uses of colloidal solution – Buffer solution –Definitions of some important chemical processes (Haber's, Contact's, Ostwald's, Process)

Unit IV: Agricultural Chemistry

Fertilizer: Definition-nutrients for plants-role of various elements in plant growth – natural and chemical fertilizer – Classification of chemical fertilizer – fertilizer industry in India.

Unit V: Insecticides and Pesticide

Definition- classification – Inorganic and organic pesticides (lead arsenate, lime, sulphur, DDT and gammaxane) – Fungicides and repellants

Suggested Readings:

Text books:

1. Sharma B.K. Industrial chemistry, Krishna Prakashan Media (p) Ltd., 2011.
2. Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2004
3. Puri, Sharma and Pathania, Principles of Inorganic Chemistry, Vishal Publishing Co., 2004

Reference Books:

1. A.Bahl and B.S.Bahl, Advanced Organic Chemistry, S.Chand& Company, New Delhi,2012.
2. A.S.Negi and S.C.Anand, A text book of Physical Chemistry, New Age International publishers,3rd Edition,2022.
3. J. D. Lee, Concise Inorganic Chemistry, 5th ed., Blackwell Science, London, 1996.

4. Jain, P. C. and Jain, M. Engineering chemistry, 10th ed.; Dhanpat rai and sons: delhi, 1993

Web Sources:

1. https://careerendeavour.com/net-question-paper/
2. https://ifasonline.com/csir-net-chemical-science/previous-year-question-papers.jsp
3. https://examprep.vpmclasses.com/
4. https://scoop.eduncle.com/csir-net-question-paper-free-download
5. https://career.aglasem.com/csir-ugc-net-question-paper-chemical-science/

DEPARTMENT OF BOTANY – UG – CBCS- LOCF

Title of the Course: Medicinal Botany Semester: VI

Course Code:LUBYNM61 Contact hours: 2hrs/w Credit: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the traditional system of medicine and basic medicinal plants
- basic knowledge of herbal medicine and idea for preparation of herbal medicine.
- learn important techniques of conservation and propagation of medicinal plants.
- study of virusesprocess of harvesting, drying and storage of medicinal herbs.
- the students will gain basic knowledge of ayush
- propose new strategies to enhance growth of medicinal herbs considering the practical issues pertinent to india

Pre-required Knowledge:

- Medicinal Plants
- Knowledge - AYUSH
- Herbal Medicine

Unit I: Traditional Medicine

Historical background of herbal medicine. Scope and importance of herbal medicine. A brief account of Siddha and Ayurveda.

Unit II: Formulation

Methods of preparation of the following herbal formulations:

1.Choornam, 2.Kashayam, 3.Thailam

Unit III: Cultivation and Collection

Cultivation of medicinal garden in India. Collection of crude drugs – Harvesting, Drying, Packing, Storage and Marketing. Drug adulterance.

Unit IV: Systematic position

Study of diagnostic features, systematic position and medicinal values of whole plant and plant parts of following:

Curcuma longa, Ocimum sanctum, Aloe vera, Allium cepa and Andrographis paniculata

Unit V: Systematic position

Study of diagnostic features, systematic position and medicinal values of whole plant and plant parts of following:*Zingiber officinalis, Phyllanthusamarus, Azadirachta indica, Centella asiatica*and*Piper nigrum*

Suggested Topics for Seminar / Presentation / Group Discussion:

1. Siddha
2. Ayurveda
3. Medicinal Plants
4. Medicinal Garden
5. Adultration

Suggested Readings:

Text Books:

1. Sambamoorthy, A.V.S.S. and Subramanyam., N.S. The Text Book of Economic Botany. Wiley Eastern Ltd., Chennai.

2. Bharti Chaudhry, 2018. A hand book of Common medicinal Plants used in Ayurveda.
3. Siva Rami Reddy, E. 2020. Advances in AYUSH (Ayurveda, Yoga, Unani, Siddha and Homeopathy). AkiNik Publications.

Reference Books:

1. Kandasamy, P. 2000. History of Siddha Medicine. Government of Tamil Nadu.
2. Phanda, H. 2007. Herb Cultivation and Medicinal Uses. NIIR Publications, New Delhi.
3. Chopra, R.N. 2010. Indigenous Drugs of India. Academic Publishers, New Delhi.

Web Sources:

1. https://www.nhp.gov.in/ayush_ms
2. https://www.dabur.com/amp/in/en-us/about/science-of-ayurveda/herbal-medicinal-plants
3. https://www.alamy.com/stock-photo/ayurvedic-medicinal-plant.html

DEPARTMENT OF NCC – UG - CBCS - LOCF

PART IV - NON MAJOR ELECTIVE

Title of the paper: NCC - II **Semester: VI**

Course code : LUNCNM61 **Contact Hours: 2hrs/w** **Credits : 2**

Course Learning Outcomes

On Completion of this Course, the students are able to

- demonstrate leadership skills
- analyze their strengths, weakness, opportunities and threats
- explain the basics of map reading
- adapt the techniques on field
- formulate strategies in battle ground

Pre–required Knowledge:

- ✓ Basics of Field Craft and Battle Craft.

- ✓ Skills in Leadership and Personality Development.
- ✓ Basics of Map reading and Grid Reference

Unit – I: Leadership Development

Leadership traits – Indicators of leadership - Types of Leaders - Autocratic and Democratic – Attitude – positive, negative and neutral – Assertiveness and negotiation. Case study of: A.P.J. Abdul Kalam, Ratan Tata and Kiran Mazumdar Shaw.

Unit – II: Personality Development

Definition and Factors influencing personality – SWOT analysis-Inter-personal relationship-Soft skills.

Unit – III: Map reading

Introduction –Service protractor- Conventional Signs – Prismatic compass- the Grid system and Grid reference.

Unit – IV: Field Craft

– Introduction – Description of Grounds – Observation – and Concealment Judging distance – Methods – under or over estimation – Description and Indication of targets – Methods.

Unit –V: Battle Craft

Field Signal – Section Formation – Fire Control orders – Types and Conduct of Patrols.

Suggested Topics/Practical Exercises

- ➢ finding the leadership quality of leaders A.P.J Abdul Kalam, Raten TATA and Kiran Mazumdar
- ➢ recognise our own SWOT Analysis
- ➢ finding the role of Conventional Signs in Map reading.
- ➢ identify types of grounds and Targets.
- ➢ apply the knowledge on Section Formation in a battle.

Suggested Readings:

i) Text books:

1. Asthana A K. Brigadier (2015), Commandant, Precis – Kamptee.

2. NCC Guide – Army Wing, (2010). Major R. Ramasamy, Karur, Priya Publications.
3. Cadets Hand Book (2018). Common subjects for SD/SW, OTA Training Materials, Kamptee.

ii) Reference books:

1. Specialized Subject Army (2018), Govt. Of India Press, New Delhi.
2. Precis, (2009). Published by Officer Training School, Kamptee,
3. Cadet's diary, Published by cadets' center, Chennai, 2000.
4. NCC: Handbook of NCC cadets,(2015), R. Gupta, Ramesh Publishing House,
5. Lt. Saravanamoorthy,S. N. A Hand Book of NCC-Army Wing (2015), Jayalakshmi publications.

iii) Web sources

1. https://indiancc.nic.in/
2. https://play.google.com/store/apps/details?id=com.chl.ncc&hl=en_IN&gl=US
3. https://joinindianarmy.nic.in/default.aspx
4. https://www.joinindiannavy.gov.in/
5. https://indianairforce.nic.in/

DEPARTMENT OF MATHEMATICS – UG-CBCS

ADD-ON COURSE

Certificate Course for I B.Sc. (Mathematics)

Title of the Course: Number Theory

Course Code: EADCMS **Contact Hours: 40**

Learning Objectives:

To enable the students to

- learn the concept of divisibility and its applications.
- study the fundamental theorem of arithmetic
- study the concept of congruences.

Unit I:

Divisibility – Associates – Division Algorithm – Greatest common divisor – Euclidean algorithm – least common multiple.

Unit II:

Coprimes - sieve of Eratosthenes – Euclid's Theorem – Unique factorization – Fundamental theorem of Arithmetic – Positional representation of integer.

Unit III:

Number of divisors – sum of divisors – symbol d(n), σ(n) – Arithmetic functions – perfect numbers – Euclid's theorem on perfect numbers – Amicable numbers.

Unit IV:

Euler function Φ(n)- greatest integer function

Unit V:

Congruences.

Learning Outcomes:

On the completion of the course the student will be able to

- demonstrate and apply division algorithm in integers and define factorization using primes.
- define and illustrate arithmetic functions and also analyze their properties,
- classify and Solve the problems using congruences,
- determine number of divisors.
- recall prime factorization.

Text Book:

1. Kumaravelu and Susheela Kumaravelu, Elements of Number Theory, 2002

   Unit I: Chapter 3

   Unit II: Chapter 4, 77 to 92

   Unit III: Chapter 4, 93 to 99,102

   Unit IV: Chapter 4, 104,105, problem 1, 109,110,

   Unit V: Chapter 6, 155 to 168

Reference Book:

1. Tom M. Apostal, Introduction to Number Theory, Narosa Publishing House, 1998.

Title of the Course: Astronomy – I **Semester: III**

Course Code: EADDMS1 **Contact Hours: 40**

Learning Objectives:

To enable the students to

- ❖ understand the application of geometry in studying space objects.
- ❖ learn the relation between spherical and rectangular co-ordinates
- ❖ understand the concept of Meridian system.

Unit I:

Definition of a sphere and related theorem - Great circles and small circles- Axis and poles of a circle - Distance between two points on a sphere – angle between two circle – secondaries-Angular radius or spherical radius – Related theorems(without proof) - Definition- spherical figures - spherical triangle - polar triangle – Related theorems(without proof)- properties of spherical triangles(without proof)- colunar and antipodal triangles – Relevant worked example problems.

Unit II:

Relation between the sides and angles of a spherical triangle - Five parts formula-Functions of half an angle– functions of half a side - Delambre's analogies and Napier's analogies - Right angles spherical triangle(without proof) - Relevant worked example problems.

Unit III:

Napier's rules- spherical co-ordinates- Relation between spherical and rectangular co-ordinates(without proof)- General proof of the cosine formula- small variations-

Formulae in plane trigonometry - Relevant worked example problems.

Unit IV:

Celestial sphere – Diurnal motion, Celestial axis and equator – cardinal points – First point of Aries and First point of Libra - Equinoxes and solstices - Colures – Celestial Co-ordinates - Horizontal system - equatorial system – Relevant worked example problems.

Unit V:

Meridian system – Ecliptic system – Different systems of co-ordinate in the same figure – Conversion of Co-ordinates(without proof) – The relation between Right Ascension and longitude of the sun - Trace the changes in the sun in the course of a year- The Longitude of the sun on the day – Relevant worked example problems.

Learning Outcomes:

On the completion of the course the student will be able to

- define and analyse the concepts on a sphere.
- distinguish between the sides and angles of a spherical triangle.
- apply Napier's rules.
- discuss Celestial sphere.
- analyse Ecliptic system.

Text Book:

S. Kumaravelu & Susheela Kumaravelu , Astronomy, 1996 Reprint 2006

Unit I - Chapter 1: Sections 1 to 19, (10,11,17 with out proof).

Unit II - Chapter 1: Sections 20 to 31 (31 with out proof).

Unit III - Chapter 1 : Sections 32 to 38 (34 with out proof).

Unit IV - Chapter 2 : Sections 39 to 61

Unit V - Chapter 2 : Sections 62 to 68 (65 with out proof).

Reference Book:

M. L Khanna, Spherical Astronomy, Prakash printers, 1973.

DEPARTMENT OF MATHEMATICS – UG-CBCS

(For those who join in June 2020 and after)

Diploma Course for II B.Sc. Mathematics

Title of the Course: Astronomy – II	**Semester: IV**
Course Code: EADDMS2	**Contact hours: 40**

Learning Objectives:

To enable the students to

- ❖ understand the application of geometry in studying space objects.
- ❖ learn the relation between spherical and rectangular co-ordinates
- ❖ understand the concept of Meridian system.

Unit I:

Sidereal time – West hour angle of a body expressed in time units and related theorem – Latitude of a place and related theorems – Relevant worked example problems.

Unit II:

Right Ascension and Declination of a body – The hour angle of a body at rising or setting – The duration of day time – The azimuth of a star at rising - Trace the changes in the azimuth of a star in the course of a day - Relevant worked example problems.

Unit III:

Morning and evening stars- Circumpolar stars – The condition that a star is circumpolar and related theorem – The sidereal time of sunrise when the longitude of the sun – The daily retardation in the sidereal time of sunrise - Relevant worked example problems.

Unit IV:

The zones of earth – Trace the variations in the durations of day and night during the year at different stations – The duration of perpetual day in a place of latitude –

analytically the conditions for perpetual day and night – Relevant worked example problems.

Unit V:

Dip of Horizon – Find an expression for Dip – The distance between two mountains – The acceleration in the time of rising of a star due to dip – Relevant worked example problems.

Learning Outcomes:

On the completion of the course the student will be able to

- define and analyse the concepts of Sidereal time.
- explain the Right Ascension and Declination of a body.
- work problems on sidereal time of sunrise.
- describe the concept of zones of earth.
- analyse the expression for Dip.

Text Book:

S. Kumaravelu & Susheela Kumaravelu , Astronomy, 1996 Reprint 2006

Unit I - Chapter 2 : Sections 69 to 74.

Unit II - Chapter 2 : Sections 75 to 79.

Unit III - Chapter 2 : Sections 80 to 85.

Unit IV - Chapter 3 : Sections 87 to 90.

Unit V - Chapter 3 : Sections 106 to 110.

Reference Book:

M. L Khanna, Spherical Astronomy, Prakash printers, 1973.

DEPARTMENT OF PHYSICAL EDUCATION – UG – CBCS ADD-ON COURSES

DIPLOMA COURSE IN HOLISTIC HEALTH

Title of the paper: Yoga, Meditation and Holistic Health-Practical **Semester: V& VI**

Course Code: EADDPE2 **Total Contact Hours: 40**

1. Physical exercises for whole body
2. Productive and creative manual work (cleaning, kitchen, garden, art work etc.)
2. Breathing exercises (10 type)
3. Relaxation techniques (4 types)
4. Music and movement therapy
5. Basic Yogasanas (20 types)
6. Mutras (10 types - energy)
7. Physical exercises (5 types)
8. Meditation skills (5 types)
9. Healing techniques (5 types)
10. Field visit, to understand human
11. Body, visit to Government Medical College Hospital
12. Visit to a reputed Yoga Centre (Encounter with Yoga experts)

RULES AND REGULATIONS FOR THE PROJECT / DISSERTATION WORK (UG, PG AND M.PHIL)

- Research supervisors will be allotted to the students / scholars by the respective Department.
- Research topic shall be chosen by the student / scholar in consultation with his/ her research supervisor.
- Every department has to maintain the year-wise list of project works carried out by the students. Research works done by the students / scholars of the previous batches should not be repeated by the students / scholars of the current academic year.

- The general structure of the project report is given below.

  Title page with college emblem
  Research supervisor's certificate
  Student's declaration counter signed by
  Research Supervisor
  and the HOD
  Student's Acknowledgement
  Contents
  List of Tables if any
  Introduction
  Review of Literature
  Materials and Methods
  Results and Discussion
  Summary of Findings and Conclusion
  Bibliography
  Annexure

  - Four copies of the project repot should be submitted, typed in A4 Paper in Times New Roman with the font size of 12 and 1.5 line spacing.

SARASWATHI NARAYANAN COLLEGE

(Autonomous Institution – Affiliated to Madurai Kamaraj University)

(Reaccredited with $B^{(2.78)}$ Grade by NAAC in the second cycle)

MADURAI -22

EVALUATION METHOD UNDER CBCS- LOCF

CONTINUOUS INTERNAL ASSESSMENT (CIA)

Internal assessment is based on the continuous evaluation of performance of the students in each semester. Internal mark is awarded to each course in accordance with the following guidelines.

UNDER GRADUATE, POST GRADUATE AND M.PHIL:

1. Internal test will be conducted for the maximum of 60 marks and converted to 15 marks.
2. Two internal tests will be conducted and the average of marks secured in the two tests will be taken as the Final Internal Test mark.
3. The distribution of Internal Assessment marks is given below.

	THEORY		**PRACTICAL**	
Test -	15	Record Note	-	10
Seminar -	5	CIA	-	15
Quiz -	5	Model Exam	-	15
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Internal Maximum -	25	Internal Maximum -		40

1. There is no Cumulative Internal Assessment (CIA) for Self Learning Courses, Add on Certificate / Diploma Programmes and Part-1 subjects other than Tamil.

2. Internal marks for those UG, PG and M.Phil. students who have to Repeat the Semester (RS) for want of attendance should be marked “AA” in the foil card.
3. There is no minimum mark for Internal assessments marks for all the UG, PG and M.Phil. Programmes.
4. Internal test for improvement of marks is not allowed under any circumstances
5. Special Internal Assessment tests for the absentees may be conducted on genuine reasons with the prior approval of HOD, Dean and Principal. Such tests may be conducted before the commencement of the Summative Examinations.

SUMMATIVE EXAMINATIONS (SE)

1. Summative Examinations for all the UG, PG and M.Phil. Programmes are conducted in November and April for the Odd and the Even semesters respectively.
2. Question paper setting along with the scheme of valuation is purely external for all the UG, PG and M.Phil. Programmes.
3. The office of the CEO is conferred with the right of choosing the Question Paper Setters and the External Examiners from the Panels suggested by the Boards of Studies of Programmes offered by the respective Department and approved by the Academic Council of the College. The question papers set for the Summative Examinations will be finalised by the Scrutiny Committee constituted by the office of the COE.
4. Practical Examinations will be conducted by the External Examiner and the course teacher, who will act as the Internal Examiner. In the absence of course teacher / External Examiner, HOD will act as the Internal Examiner / External Examiner.
5. The marks scored by the students in the External Examinations in Self Learning Courses and Add – on Courses will be converted to 100 for each course.
6. The theses submitted by the M.Phil. scholars after the conduct of Awards Committee meeting can be valued and the Viva-Voce Examinations can be conducted. The Principal is empowered to declare the results and it can be ratified in the next Awards Committee meeting.

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S. No	Level	Parameter Description	Description
1	K1	Remembering	Remembering It is the ability to remember the previously learned
2	K2	Understanding	The learner explains ideas or Concepts
3	K3	Applying	The learner uses information in a new way
4	K4	Analysing	The learner distinguishes among different parts
5	K5	Evaluating	The learner justifies a stand or decision
6	K6	Creating	The learner creates a new product or point of view

WEIGHTAGE OF K–LEVELS IN QUESTION PAPER

K-LEVELS (Cognitive Level)						Total
	K1	K2	K3	K4	K5/ K6	
summative examinations– 75 marks pattern	21	30	18	18	13	100
summative examinations–50 marks pattern	24.5	24.5	17	17	17	100
continuous internal assessment(cia)	24	26	14	25	11	100

QUESTION PATTERN FOR SUMMATIVE EXAMINATIONS For those who join in June 2022 UG and PG (Language Courses, Core Courses, Discipline Specific Electives, Generic Elective Courses, Non-Major Electives (PG))	
	TOTAL MARKS **75**
SECTION–A (Answer all questions) **I. Choose the correct answer (FIVE questions –ONE question from each unit) (5 x 1 = 5)** (Q.No.1-5) - All questions are at K2 level **II. Fill in the blanks (FIVE questions - ONE question from each unit) (5x1=5)** (Q.No.6-10)-All questions are at K1 level	**10**
SECTION-B **Answer all questions not exceeding 50 words each.** **ONE set of questions from each unit** **Q. No. : 11 to 15 (5x2=10)** K2 level – 2 Questions K3 level – 1 Question K4 level –1 Question K5/K6 level – 1 Question	**10**
SECTION-C-Either/or type **Answer all questions not exceeding 200 words each.** **ONE set of questions from each unit.** **Q. No. : 16 to 20 (5 x5=25)** K1 level – 1 Question K2 level – 2 Questions K3 level – 1 Question K4 level – 1 Question	**25**
SECTION-D-Answer any THREE questions not exceeding 400 words each. **ONE question from each unit.** **Q. No. : 21 to 25 (3 x 10 =30)** K1 level – 1 Question K2 level – 1 Questions K3 level – 1 Question K4 level – 1 Question K5/K6 level – 1 Question	**30**
Total	**75**

QUESTION PATTERN FOR SUMMATIVE EXAMINATIONS For those who join in June 2022 UG and PG (Skill Enhancement Courses, Self Learning Courses, Non Major Electives (UG)and Part V Courses (except NCC))	
	TOTAL MARKS 50
SECTION–A(Answer all questions) **I. Choose the correct answer (FIVE questions–ONE question from each unit)** (Q.No.1-5) - All questions are at K2 level **II. Fill in the blanks (FIVE questions – ONE question from each unit) (5x1=5)** (Q.No.6-10) - All questions are at K1 level	**10**
SECTION-B **Answer all questions not exceeding 50 words each.** **ONE set of question from each unit** **Q. No. : 11 to 15 (5x2=10)** K1 level – 1 Question K2 level – 1 Question K3 level – 1 Question K4 level – 1 Question K5/K6 level – 1 Question	**10**
SECTION-C **Answer any THREE questions not exceeding 400 words each.** **ONE question from each unit** **Q. No. : 16 to 20 (3x10=30)** K1 level – 1 Question K2 level – 1 Question K3 level – 1 Question K4 level – 1 Question K5/K6 level – 1 Question	**30**
Total	**50**

QUESTION PATTERN FOR INTERNAL ASSESSMENT (CIA) For those who join in June 2022 UG and PG	
	TOTAL MARKS 60
SECTION–A(Answer all questions) **I. Choose the correct answer** (5 x 1 = 5) (Q.No.1-5)-All questions are at K2 level **II. Fill in the blanks (5x1=5)** (Q.No.6-10)-All questions are at K1 level	**10**
SECTION-B **Answer all questions not exceeding 50 words each.** **ONE set of question from each unit** (4 x 2 = 8) Q.No. 11 – K2 level Q.No. 12 – K3 level Q.No. 13 – K3 level Q.No. 14 – K5/ K6 level	**8**
SECTION-C-Either/or type (**Answer all questions not exceeding 200 words each**. (3 x 6 = 18) Q.No. 15 – K3 level Q.No. 16 – K4 level Q.No. 17 – K5/K6 level	**18**
SECTION-D **Answer any TWO questions not exceeding 400 words each. (2 x 12 = 24)** Q.No. 18 – K1 level Q.No. 19 – K2 level Q.No. 20 – K4 level	**24**
Total	**60**

QUESTION PATTERN FOR SUMMATIVE EXAMINATIONS

For those who join in June 2022

UG and PG

(Language Courses, Core Courses, Discipline Specific Electives, Generic Elective Courses, Non-Major Electives(PG))

DURATION:3HRS			**MAXMARKS:75**			
K-LEVELS / SECTIONS	**K1**	**K2**	**K3**	**K4**	**K5/K6**	**TOTAL MARKS**
SECTION A (Answer all questions, each question carries One Mark)	5	5				**10**
SECTION B (Answer all questions, each question carries TWO Marks, ONE question from Each unit)		4	2	2	2	**10**
SECTION C (Answer all questions-Either/or type-ONE Question from each unit)	5	10	5	5		**25**
SECTION D (Answer any THREE questions, ONE question from each unit, each question carries TEN Marks)	10	10	10	10	10	**30**
TOTAL	20	29	17	17	12	**75**

QUESTION PATTERN FOR SUMMATIVE EXAMINATIONS For those who join in June 2022 UG and PG (Skill Enhancement Courses, Self Learning Courses, Non Major Electives (UG) and Part V Courses (except NCC))						
DURATION:2HRS			**MAX MARKS:50**			
K-LEVELS SECTIONS	**K1**	**K2**	**K3**	**K4**	**K5/ K6**	**TOTAL MARKS**
SECTION A (Answer all questions, each question carries One Mark)	5	5				**10**
SECTION B (Answer all questions, each question carries TWO Marks, ONE question from Each unit)	2	2	2	2	2	**10**
SECTION C (Answer any THREE questions, ONE question from each unit, each question carries TEN Marks)	10	10	10	10	10	**30**
TOTAL	17	17	12	12	12	**50**

BLUE PRINT OF QUESTION PAPER FOR INTERNAL ASSESSMENT (CIA)						
DURATION:2HRS			**MAX MARKS:60**			
K-LEVELS / SECTIONS	**K1**	**K2**	**K3**	**K4**	**K5/K6**	**TOTAL MARKS**
SECTION A (Answer all question. Each question Carries **ONE** Mark)	5	5				**10**
SECTION B (Answer all questions. Each question carries **TWO** Marks)		2	4		2	**8**
SECTION C (Answer all questions- Either/or type -Each question carries **SIX** Marks)			6	6	6	**18**
SECTION D (Answer any TWO questions. Each question carries **TWELVE** Marks)	12	12		12		**24**
TOTAL	17	19	10	18	8	**60**

QUESTION PATTERN

FOR PART IV ENVIRONMENTAL STUDIES, VALUE EDUCATION YOGA and Course for Competitive Examinations – UG

(For those who joined in June 2022)

Blue print for External

Max. Marks: 75

I. Answer All Questions

Choose the Correct answer (Objective type pattern)

ADD-ON PROGRAMMES

- Add on Programmes have been in practice for all the UG students since the academic year 2014-2015. Each department has to conduct one Certificate Programme in the Second Semester with the duration of 40 hrs and a Diploma Programme in the Third and the Fourth Semesters with the duration of 40 hrs each.
- The certificate Programme consists of only one course (theory / practical) while the Diploma Programme consists of two courses (theory / practical).
- There is no Continuous Internal Assessment (CIA) for Add-on Programmes. Only Summative Examinations will be conducted and the valuation will be done only by External Examiners.
- Summative Examinations for the Add-On Certificate and Diploma Programmes will be conducted at the end of every semester for UG Arts and Mathematics Programmes. Whereas the same will be conducted at the end of the respective academic year for the science UG Programmes in science subjects except Mathematics.

COMMON QUESTION PATTERN FOR ADD – ON PROGRAMMES

(for those who joined in June 2020 and afterwards)

Blue print for External

Max. Marks: 50 **Duration: 2 hrs**

SECTION – A

1. Answer All Questions (No Choice) 10 x 1 = 10 Marks

Choose the correct answer (Objective patter)

(Two Questions from each unit)

SECTION – B

2. Short type questions 5 x 4 = 20 Marks

Answer any Five questions (5/8)

(Choosing atleast one question from each unit and not exceeding two questions)

SECTION - C

3. Essay type questions 2 x 10 = 20 Marks

Answer any Five questions (2/5)

(One question from each unit)

QUESTION PAPER PATTERN FOR M.Phil. COURSES

SECTION A

Answer All Questions

1. Either or Pattern (one set from each unit) 5 x 6 = 30 Marks

SECTION B

Answer any three questions out of 5 questions

1. One question from each unit3 x 15 = 45 Marks

QUESTION PATTERN FOR M.Phil. CHEMISTRY FOR ONLY INDEPTH PAPER
(Course Code No. DMPCHE11)

Answer any Five Questions out of Eight Questions

One question from each published literature.

(Each answer should not exceed five pages)

VALUATION

1. Central valuation system is adopted.
2. Single Valuation system is followed for UG, PG and M.Phil. theory examinations. The valuation is done by the external examiners only.
3. UG and PG Practical Examinations are valued by both Internal and External Examiners.
4. Any discrepancy in the question paper should be brought to the notice of the Controller of Examinations by the respective Course Teacher through the Head of the Department within five days from the date of examination.

DECLARATION OF RESULTS

1. The total credit should not exceed 140 for UG Programmes and 90 for PG Programmes, excluding the credits earned for additional credit courses. This is applicable to the students migrating from other colleges also.
2. The students migrating from other colleges have to appear for the Summative Examinations conducted by the college for non-equivalent theory and practical courses. Mark scored by such a student in the Summative Examinations conducted by the previous college shall be converted to 100 if it is less than 100 for any equivalent course.
3. The students who repeat the semester have to appear not only for Summative Examinations but also for internal tests. The Internal marks scored by such students in their previous attempts shall stand invalid.

4. Results will be published within 20 days from the date of completion of all the Examinations.
5. Results will be declared as per the norms given in the following table in consultation with the Awards Committee.

Maximum and Passing Minimum Marks

Course	External Exam (SE)		Aggregate Marks (CIA + SE)	
	Passing Minimum	**Maximum Mark**	**Passing Minimum**	**Maximum Mark**
UG (Theory)	27	75	40	100
UG – NME / SEC / Part V (except NCC)	18	50 (converted to 75 marks)	40	100
UG – SLC	20	50	40	100
UG (Practicals)	21	60	40	100
UG Project	18	50	40	100
PG (Theory)	34	75	50	100
PG (Practicals)	27	60	50	100
PG (Project)	23	50	50	100
M.Phil. (Theory)	34	75	50	100
M.Phil. Project				
1. Dissertation	50	**100** (Internal 50 + External 50)	-	-
2. Viva – Voce	50	**100** (Internal 50 + External 50)	-	-

REVALUATION AND SUPPLEMENTARY EXAMINATIONS

1. Students can apply for Revaluation within 10 days from the date of the publication of the results.
2. Final year students of UG and PG Programmes can appear for Supplementary Examinations for the arrear papers of only the V and VI Semesters of UG Programmes and III and IV Semesters of PG Programmes. Students having the maximum of three arrear papers alone are eligible for Supplementary Examinations.
3. Absentees in the Summative Examinations are not eligible to apply for the Supplementary Examinations.
4. Supplementary Examinations will be conducted every year in the month of July.

ATTENDANCE

1. Students with the minimum of 75% of attendance (68 days out of 90 days) in a semester are permitted to appear for the summative examinations.
2. Students who do not have the minimum attendance should go for condonation.
3. Students who do not have the minimum attendance of 20 hrs for Certificate Programme and the minimum attendance of 20 hrs for each course in Diploma Programme will not be permitted to appear for the summative examinations.

The following are the regulations for grant of condonation.

Attendance	Condonation Fee	Authority to Consider	Nature of Penalty
65% - 74% (59-67 days)	Rs.500/-	Head of the Department	As decided by the HOD
50% - 64% (58-45 days)	Rs.1000/-	Principal and the Examination Committee	Application for exemption to be made on prescribed form with the specified remarks of the Principal
< 50% (Below 45 days)	To repeat the whole semester	-----	-----

EXAMINATION RULES AND REGULATIONS

1. Students without hall ticket and identity card are not permitted to appear for the examinations.
2. Possession of materials in any form for copying is strictly prohibited in the examination hall.
3. Students indulging in any form of malpractices in the examination are liable for severe punishment.
4. Students are not allowed into the examination hall after 30 minutes of the commencement of the examination.
5. Students should not write their names or any other identification marking except their register number in the answer scripts.
6. Students who have discontinued the Degree Programme are not permitted to write the summative examinations.
7. Students who have not completed the theory and practical courses during the Programme of their study are allowed to appear for the Summative Examinations in the same

syllabi up to a period of three years from the year of the completion of Programme. However, after the completion of three years, they have to appear for the summative examinations for the equivalent course in the current syllabi only. The equivalence of a course is to be decided by the respective HOD, Dean, the Controller of Examinations and the Principal. This is also applicable to those students who repeat the semester.

PENAL ACTIONS FOR VARIOUS FORMS OF MALPRACTICES IN THE SUMMATIVE EXAMINATIONS

Sl. No.	Malpractice	Penal Action
1	In Possession of Materials relevant to the examination concerned	Cancellation of that particular paper.
2	Copied from materials in his/her possession	Cancellation of all papers of that semester
3	Copied from neighbours	Cancellation of all papers including arrear papers of that semester Cancellation of that particular paper of the candidate who helped for copying
4	Copied by exchanging answer script between neighbours	Cancellation of all papers of the candidates who exchanged their answer scripts

5	Misbehaviour in the examination hall	Cancellation of that particular paper
6	Copying and Misbehaviour in the examination hall	Cancellation of all papers of that semester and debarring the candidate from appearing for the next semester examination.
7	Insertion of answer sheets which were previously stolen and written	Cancellation of all papers of that semester and debarring the candidate from appearing for the next semester examination.
8	Impersonation in the examination	Cancellation of all papers of that semester and recommending dismissal from the college.