

SARASWATHI NARAYANAN COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

(Reaccredited with Grade 'B' by NAAC)

MADURAI – 625 022.



**DEPARTMENT OF CHEMISTRY
Choice Based Credit System (CBCS)
Learning Outcomes-based Curriculum
Framework (LOCF)**

**B.Sc. Chemistry Programme (Aided and SF)
(For those who join in June 2022)**

PRINCIPAL

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

DEPARTMENT OF CHEMISTRY

1. Dr. K.K.Mothilal , M.Sc., M.Phil., PGDCA.,Ph.D.,
- Associate Professor & Head
2. Dr. P.Mohandass , M.Sc., M.Phil., Ph.D.,
- Associate Professor
3. Dr. A.Gubendran , M.Sc., M.Phil., Ph.D.,
- Associate Professor
4. Dr.S.V.Ganesan , M.Sc., M.Phil., Ph.D.,
- Assistant Professor
5. Dr.S.Perumal , M.Sc., M.Phil., Ph.D.,
- Assistant Professor
6. Dr.R.Dhanalakshmi, M.Sc.,M.Sc(Yoga),M.Phil., Ph.D.,
- Assistant Professor
7. Dr.A.Manivel , M.Sc., M.Phil., PGDCA., Ph.D.,
- Assistant Professor
8. Dr.N.Muniyappan , M.Sc., Ph.D.,
- Assistant Professor
9. Dr.M.Saravanakumar , M.Sc., Ph.D.,
- Assistant Professor
10. Dr.S.Jeya Sheela , M.Sc., M.Phil., Ph.D.,
- Assistant Professor
11. Dr.N.Arunkumar , M.Sc., 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.

B.Sc Chemistry – Course Structure for the Academic year 2022-23

SEMESTER I									
Part	Course type	Title of the course	Course Code	Hrs/ Week	Credit	Exam Hrs.	Int.	Ext.	Total
I	LC-T1	Tamil-I	LUP1TA11	6	3	3	25	75	100
II	LC-E1	English-I	LUP2EN11	6	3	3	25	75	100
III	CC-1	General Chemistry-I	LUCHCT11	4	4	3	25	75	100
III	CC-2	Physical Chemistry-I	LUCHCT12	4	4	3	25	75	100
III	CC-3	Qualitative Analysis	LUCHCL21	2	-	-	-	-	
III	GEC-1	Allied Zoology-I	LUZOG11	4	4	3	25	75	100
III	GEC-2	Allied Zoology Practical – I	LUZOGL21	2	-	-	-	-	
III	GEC-1	Allied Mathematics – I	LUMSGE11	6	5	3	25	75	100
IV	AEC	EVS	LUP4ES11	2	2	3	25	75	100
				30	20				
SEMESTER II									
Part	Course type	Title of the course	Course Code	Hrs/ Week	Credit	Exam Hrs.	Int.	Ext.	Total
I	LC	Tamil-II	LUP1TA21	6	3	3	25	75	100
II	LC	English-II	LUP2EN21	6	3	3	25	75	100
III	CC-4	Organic Chemistry-I	LUCHCT21	4	4	3	25	75	100
III	CC-3	Qualitative Analysis	LUCHCL21	2	2	3	40	60	100
III	GEC-3	Allied Zoology-II	LUZOG21	4	4	3	25	75	100
III	GEC-2	Allied Zoology Practical – I	LUZOGL21	2	2	3	40	60	100
III	GEC-3	Allied Mathematics – II	LUMSGE21	6	5	3	25	75	100
IV	SEC 1	Agricultural Chemistry	LUCHSE21	2	2	3	25	50	100
		Oils and Fats	LUCHSE23						
IV	SEC 2	Computer Applications in Chemistry	LUCHSE22	2	2	3	25	50	100
		Dairy Chemistry	LUCHSE24						
IV	AEC2	VE	LUP4VE21	1	1	3	25	75	100
IV	AEC3	YOGA	LUP4YA21	1	1	3	-	50	100
V	AEC4	NSS/NCC/LE/PE	LUP5NC21	-	1	2	40	60	100
			LUP5NS21	-	1	2	25	75	100
			LUP5LS21 LUP5PE21						
	SLC	Analysis of Soil, Air, Water	LUCHSC21	-	-	-	-	50	100
		Fuel Chemistry	LUCHSC22						
				30	25				

SEMESTER III									
Part	Course type	Title of the course	Course Code	Hrs/Week	Credit	Exam Hrs.	Int.	Ext.	Total
I	LC	Tamil-III	LUP1TA31	6	3	3	25	75	100
II	LC	English-III	LUP2EN31	6	3	3	25	75	100
III	CC-5	Inorganic Chemistry -I	LUCHCT31	4	4	3	25	75	100
III	CC-6	Volumetric Analysis	LUCHCL41	2	-	-	-	-	
III	GEC4	Allied Zoology-III	LUZOG31	4	4	3	25	75	100
III	GEC5	Allied Zoology Practical – II	LUZOGL41	2	-				
III	GEC4	Allied Mathematics – III	LUMSGE31	6	5	3	25	75	100
III	GEC6	Allied Physics-I Mechanics, Properties of Matter and Sound	LUPHGE31	4	4	3	25	75	100
III	GEC7	Allied Physics Practical – I (Sem 3 & 4)	LUPHGL41	2	-	-	-	-	-
	SLC2	Food Chemistry	LUCHSC31	-	-	-	-	50	100
		Green Chemistry	LUCHSC32						
	MOOC	MOOC-1							
				30	18				
SEMESTER IV									
Part	Course type	Title of the course	Course Code	Hrs/Week	Credit	Exam Hrs.	Int.	Ext.	Total
I	LC	Tamil-IV	LUP1TA41	6	3	3	25	75	100
II	LC	English-IV	LUP2EN41	6	3	3	25	75	100
III	CC-7	Organic Spectroscopy	LUCHCT41	4	4	3	25	75	100
III	CC-6	Volumetric Analysis	LUCHCL41	2	2	3	40	60	100
III	GEC8	Allied Zoology-IV	LUZOG41	4	4	3	25	75	100
III	GEC5	Allied Zoology Practical – II	LUZOGL41	2	2	3	40	60	100
III	GEC8	Allied Mathematics – IV	LUMSGE41	6	5	3	25	75	100
III	GEC9	Allied Physics-II	LUPHGE41	4	4	3	25	75	100
III	GEC7	Allied Physics Practical – I (Sem 3 & 4)	LUPHGL41	2	2	3	40	60	100
	SLC3	Forensic Chemistry	LUCHSC41	-	-	-	-	50	100
		Good Laboratory Practice	LUCHSC42						
	MOOC	MOOC-2							
				30	24				

SEMESTER V									
Part	Course type	Title of the course	Course Code	Hrs/ Week	Credit	Exam Hrs.	Int.	Ext.	TOTAL
III	CC8	Organic Chemistry – II	LUCHCT51	3	3	3	25	75	100
III	CC9	Inorganic Chemistry - II	LUCHCT52	3	3	3	25	75	100
III	CC10	Physical Chemistry – II	LUCHCT53	3	3	3	25	75	100
III	CC11	Organic Estimation	LUCHCL51	3	3	3	40	60	100
III	CC12	Gravimetric Analysis & Organic Preparation	LUCHCL52	5	3	6	40	60	100
III	GEC10	Allied Physics-III	LUPHGE51	4	3	3	25	75	100
III	GEC11	Allied Physics Practical – II (Sem 5 & 6)	LUPHGL61	2	-	-	-	-	
III	DSE1	Electrochemistry	LUCHDS51	3	3	3	25	75	100
		Polymer Chemistry	LUCHDS52						
IV	SEC3	Analytical Chemistry	LUCHSE51	2	2	2	25	50	100
		Nano Chemistry	LUCHSE52						
IV	GEC12	Non Major Elective- I	LUCHGE51	2	2	2	25	50	100
	SLC4	Mushroom Culture Technology	LUCHSC51	-	-	-	-	50	100
		Environment Impact Analysis	LUCHSC52						
	MOOC	MOOC-3							
				30	25				
SEMESTER VI									
Part	Course type	Title of the course	Course Code	Hrs/ Week	Credit	Exam Hrs.	Int.	Ext.	TOTAL
III	CC13	Organic Chemistry – III	LUCHCT61	3	3	3	25	75	100
III	CC14	Inorganic Chemistry – III	LUCHCT62	3	3	3	25	75	100
III	CC15	Physical Chemistry – III	LUCHCT63	4	3	3	25	75	100
III	CC16	Physical Chemistry Experiments	LUCHCL61	4	4	6	40	60	100
III	CC17	PROJECT	LUCHPJ61	3	3		50	50	100
III	GEC13	Allied Physics-IV	LUPHGE61	4	3	3	25	75	100
III	GEC11	Allied Physics Practical – II (Sem 5 & 6)	LUPHGL61	2	2	3	40	60	100
III	DSE2	Chemistry for Competitive Exam.(JAM)	LUCHDS61	3	3	3	25	75	100
		Pharmaceutical Chemistry	LUCHDS62						
IV	SEC4	Applied chemistry	LUCHSE61	2	2	2	25	50	100
		Clinical and Medicinal chemistry	LUCHSE62						
IV	GEC14	Non Major Elective - II	LUCHGE61	2	2	2	25	50	100
				30	28				

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DEPARTMENT OF TAMIL – UG – CBCS

PART I- TAMIL

(For those who joined in 2022)

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Title of The Course: பழந்தமிழ் இலக்கியமும் உரைநடையும் Semester : I
Course Code : LUPITA11 Contact Hours : 6hrs/w Credit: 3
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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 தமிழின் 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, வினைத்திட்டம், 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/?](http://www.waylink-english.co.uk/)

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

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

DEPARTMENT OF CHEMISTRY – UG – CBCS - LOCF

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Title of the paper: General Chemistry Semester: I
Course code: LUCHCT11 Contact Hours: 4 hrs./w Credits: 4
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Course Learning outcomes

- On completion of the course, the students are able to
- understand the quantum theory and wave mechanical concept
- learn the periodic properties of elements and its classifications.
- understand the nature of covalent and ionic bonds.
- understand the principles and theories of chemical bonding.
- learn the IUPAC nomenclature of organic compounds

Pre-Required Knowledge

- ✓ Electronic configuration of s,p, d and f block elements
- ✓ Formation and properties of covalent and ionic compounds
- ✓ Homologous series and functional groups of aliphatic organic compounds

Unit I: ATOMIC STRUCTURE AND WAVE MECHANICS

Planck's quantum theory-Photoelectric effect, Compton effect, Bohr's model of hydrogen atom (no derivation) - Eigen function and Eigen value -Postulates of Quantum mechanics-wave nature of electron – de Broglie equation – Heisenberg's uncertainty principle – significances - Atomic orbitals - Quantum numbers-Principal, Azimuthal, Magnetic and Spin quantum numbers and their significance - principles governing the occupancy of electrons in various quantum levels - Pauli's exclusion principle – Hund's rule- Aufbau Principle, (n+l) rule -Stability of half - filled and completely filled orbitals – inertpair effect.

Unit II: PERIODIC TABLE AND PERIODIC PROPERTIES

Modern Periodic Table – classification of elements as s,p,d and f-block elements–Definitions and periodic variation (group and period) of atomic volume – atomic and ionic radii–ionization potential –electron affinity, electronegativity and metallic characters – Factors affecting the periodic properties–Pauling and Mulliken’s scales of electronegativity.

Unit III: CHEMICAL BONDING

Ionic bond –factors favoring the formation of ionic compounds – Lattice energy – Born - Haber Cycle —Covalent character of ionic compounds -Fajan’s rules - Polarizing power and Polarizability – ionic character in covalent compounds - Partial ionic character from electronegativity.– Covalent bond – valence bond theory (Pauling Slater theory) - structure and bonding of homo and hetero nuclear molecules – Inter molecular forces – London forces, Vander Waals forces, ion - dipole and dipole - dipole interactions. VSEPR Theory and Hybridization concepts -Shapes of simple inorganic molecules using VSEPR and Hybridisation (BeCl₂, BF₃, SiCl₄, PCl₅, SF₆, IF₇, H₂O, NH₃, XeF₆) – MO Theory – Bonding and anti-bonding orbitals – Applications of MO theory to N₂, O₂, HF and CO molecules – Comparison of VB and MO Theories.

Unit IV: BONDING IN ORGANIC MOLECULES

Hybridization and geometry -bond angle, bond length, bond strength of C - H and C - C bonds - hydrogen bonding - its nature, types, effect on properties - Inter & Intra molecular forces and their effects on physical properties - Electronic effects - inductive effect, resonance effect - conditions for resonance -hyper conjugation, electromeric effect, steric effect. Dissociation of bonds -homolysis and heterolysis - radicals, carbocations, carbanions - electrophiles and nucleophiles - Influence of electronic effects - dipole moment on relative strength of acids and bases - stability of olefins - stability of radicals, carbocations and carbanions.

Unit V: CLASSIFICATION AND NOMENCLATURE OF ORGANIC COMPOUNDS

Classification of organic compounds-homologues series -based on the nature of carbon skeleton and functional groups -classification of C and H atoms of organic compounds (primary/secondary/tertiary) -IUPAC system of nomenclature of common organic compounds (up to C-10) -alkanes, alkenes, alkynes, cycloalkanes-Naming of organic compounds with one functional group -halogen compounds, alcohols, aldehydes, ketones, carboxylic acids and its derivatives, cyano compounds, amines, nitro compounds - Naming of compounds with two functional groups -naming of compounds with more than one carbon chain - types of organic reactions.

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

- * Quantum numbers and their significances.
- * Importance of Fajan's rule.
- * MO diagram of O_2 and its O_2^- , O_2^+ and O_2^{2-}
- * Concepts of resonance
- * Factors affecting the stability of Carbonium and carbanion.

Suggested Readings:

Text Books:

1. B.R. Puri, L.R. Sharma, K.K.Kalia, Principles of Inorganic Chemistry, 23 edn., New Delhi, Shoban Lal Nagin Chand & Co., 2022.
2. B.R. Puri, L.R. Sharma and M.S. Parthenia, Principles of Physical chemistry, 48 edn, Vishal Publishing Co., 2022.
3. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, First edition, Vishal Publishing Co., 2022.
4. Arun Bahl and B.S. Bahl, A Text Book of Organic Chemistry, 22nd edition S. Chand Company, 2016.

References Books:

1. R.T. Morrison, R.N.Boyd and S.K.Bhattacharjee, Organic chemistry, 7edn, Pearson Education Asia, 2010.
2. I.L.Finar, Organic Chemistry Vol - 1 & 2, 6 edn, Pearson Education Asia, 2004.
3. R.D.Madan, Modern Inorganic Chemistry, 3 edn, S.Chand& Company Ltd.,Reprint, 2014.
4. N.Kundu and S.K.Jain, Physical Chemistry, S.Chand& Company Ltd. 2000.
5. R.D Madan, Modern Inorganic Chemistry, Sultan Chand & Company Ltd., 2002
6. A.S Negi and S.C Anand, A Text book of Physical Chemistry, Wiley Eastern Ltd., 1994.
7. Satya Prakash et al., Advanced Inorganic chemistry, S. Chands & Co, Pvt.Ltd.,New Delhi 2016.

Web Sources:

1. <http://nptel.ac.in>
2. Mooc.org
3. <http://swayam.gov.in>
4. https://www.google.com/search?q=atomic+structure+and+quantum+mechanics+ppt&rlz=1C1DFOC_enIN709IN713&ei=tjBIYd_yH96Q4-EP0ZCC-AY&oq=atomic+structure+and+wave+mechanics-ppt&gs_lcp=Cgdnd3Mtd2l6EAEYADIGCAAQFhAeOgcIABBHELAD0ggIIRAWEB0QHjoHCCEQChCgAUoECEEYAFcZCjibEGDIHWgBcAJ4AIABswGIAfYDkgEDMS4zmAEAoAEBYAEIwAEB&sclient=gws-wiz
5. <https://ncert.nic.in/ncerts/l/kech103.pdf>
6. <https://www.youtube.com/watch?v=CbroKaLFoL8>
7. <https://www.youtube.com/watch?v=-jCWL5v-rHs>
8. <https://www.slideshare.net/ganeshmote1/classification-nomenclature-and-structural-isomerism-of-organic-compound>
9. <https://www.youtube.com/watch?v=hdAW3ng8gx0>
10. <https://slideplayer.com/slide/4490759/>

Course Course Learning outcomes:

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

- ❖ gain clear knowledge on kinetic theory of gases
- ❖ learn the physical properties of matter and structure of liquid crystal
- ❖ understand the applications of XRD, semiconductors and properties of solids.
- ❖ gain knowledge on concept of First law of Thermodynamics and its application.
- ❖ Pre-Required Knowledge:
- ❖ Colloidal state of matter and its classification
- ❖ Law of corresponding states
- ❖ Basic teams of thermodynamics

Unit I: GASEOUS STATE

Postulates of kinetic theory of gases – derivation of kinetic gas equation - ideal gas laws – deviation from ideal behavior – Vander Waal's equation – derivation – critical phenomena – definition and derivation – liquefaction of gases – Joule Thomson effect – inversion temperature of gases – Maxwell – Boltzmann's law of distribution of velocities (derivation not necessary) – graphical representation – expression for most probable velocity and root mean square velocity – collision diameter – collision frequency – mean free path – principles of equipartition energy

Unit II: COLLOIDAL CHEMISTRY

Colloidal state of matter – Sols – kinetic, electrical, optical properties – stability – protective action – Flocculation values – Hardy Schultz law – gold number and Hofmeister series – Emulsion – types – emulsifier with examples – Gels – classification – properties- thixotropy –syneresis and imbibition – Donnan membrane equilibrium – application of colloids

Unit III: PHYSICAL PROPERTIES OF LIQUIDS AND LIQUID CRYSTALS

Liquid state: physical properties - surface tension – Surface energy, Effect of temperature on surface tension, Interfacial tension and surface-active agents Refraction – Refractive index, Specific and molar refraction- Viscosity – effect of temperature on Viscosity – molar viscosity and Rheochor – Liquid crystals – Definition – classification: Smectic, Nematic, cholesteric, discotic and polymer liquid crystals and applications

Unit IV: SOLID STATE

Isotropy and anisotropy-symmetry in crystal systems-point groups-space lattice-unit cell-Bravais lattice-seven crystal systems- laws of crystallography - miller indices-symmetry elements in a crystal-calculations of unit cell parameters in crystal systems- X-ray diffraction - Types of crystals-ionic, molecular, covalent and metallic crystals– Characteristic structure of NaCl and CsCl - diamond and graphite-metallic bonds in metals- Conductors, insulators and semiconductors.

Unit V: FIRST LAW OF THERMODYNAMICS AND THERMOCHEMISTRY

Terminology of Thermodynamics- extensive and intensive properties –state functions and path functions – exact and inexact differentials-thermodynamic processes – reversible and irreversible processes-work, heat and energy. Zeroth law of thermodynamics- First Law-Statement - mathematical formulation -internal energy – relationship between c_p and c_v –Isothermal process- Calculations of w , q , ΔE and ΔH for the reversible expansion of ideal and real gases under isothermal and adiabatic conditions - relation between T , V and P of an ideal gas undergoing adiabatic and reversible process Exothermic and endothermic reactions – - enthalpy or heat content - heat changes at constant volume and at constant pressure and its relation – definition of various enthalpies – Kirchhoff's equation – Hess's law of constant heat of summation - bond energy and its calculation

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

- * Postulates of kinetic theory of gases
- * Classification and properties of gels
- * Liquid state: physical properties - surface tension
- * Types of crystals - ionic, molecular, covalent and metallic crystals
- * Calculation of enthalpy of combustion and formation

Suggested Readings:

Text Books:

1. B.R. Puri, L.R.Sharma and M.S.Pathania, Principles of Physical chemistry. 47 edn, Vishal Publishing Co., 2017.
2. P.L. Soni, Textbook of Physical Chemistry, Sultan Chand and Sons, 2016 reprint.
3. A.S Negi and S.C Anand, A Text book of Physical Chemistry, Wiley Eastern Ltd., 2012.

References Books:

1. N.Kundu and S.K.Jain, Physical Chemistry, S.Chand& Company Ltd. 2000.
2. Anthony R. West, Solid State Chemistry and its Applications, 2nd Edition, Student Edition.,2014.
3. K.L. Kapoor, Text book Physical Chemistry, Mac Milan India Ltd., Delhi, 1986.

WebSources:

1. <http://nptel.ac.in>
2. Mooc.org
3. <http://swayam.gov.in>
4. [https://chem.libretexts.org/Bookshelves/General_Chemistry/Book%3A_ChemPRIME_\(Moore_et_al.\)/09%3A_Gases/9.13%3A_Kinetic_Theory_of_Gases-Postulates_of_the_Kinetic_Theory](https://chem.libretexts.org/Bookshelves/General_Chemistry/Book%3A_ChemPRIME_(Moore_et_al.)/09%3A_Gases/9.13%3A_Kinetic_Theory_of_Gases-Postulates_of_the_Kinetic_Theory)
5. <https://www.youtube.com/watch?v=MhSfQio8mp0>
6. <https://www.slideshare.net/venkideshvenks/surface-and-interfacial-tension-and-its-measurement>
7. <https://www.slideshare.net/deepikajonnes/solid-state-class-12-cbse>

DEPARTMENT OF MATHEMATICS – UG – CBCS - LOCF

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Title of the Course: Allied Mathematics – I Semester: I
Course Code: LUMSGE11 Contact hours: 6hrs/w Credit: 5

Course Learning Outcomes:

- On completion of the course, the students are able to
- enable the student to acquire basic knowledge in algebra
 - apply the concept of reciprocal equation.
 - explain the concept of Calculus, Definite integrals
 - apply the Trigonometry and Complex number on problems.
 - apply the Hyperbolic inverse function on problems.

Pre Required Knowledge:

- ✓ Apply the mathematical tricks in solving problems on differentiation and integration.
- ✓ Basic knowledge of differential calculus and integral calculus.
- ✓ Basic formulas of differentiation and integration

Unit I: Theory of equations

Algebra - Theory of equations – An n^{th} degree equation has exactly n roots – Relation between the roots and Coefficients.

Unit II: Reciprocal Equations

Reciprocal Equations - and Simple Problems.

Unit III: Differential Calculus

Calculus-Radius of Curvature, Centre of curvature of Plane curves-polar forms and p-r equation.

Unit IV: Integral Calculus

Definite integrals, Reduction formula for $\sin^n x$, $\cos^n x$, $\sec^n x$, $\cot^n x$, $\csc^n x$, $\sin^m x \cdot \cos^n x$ and simple problems.

Unit V: Trigonometry

Trigonometry - Expansions, Hyperbolic functions, Hyperbolic inverse functions, Logarithms of complex numbers.

Suggested Topics for Group Discussion/ Presentation:

- ✓ Theory of equations
- ✓ Reciprocal Equations.
- ✓ Radius of Curvature.
- ✓ Hyperbolic functions, Hyperbolic inverse functions
- ✓ Logarithms of complex numbers.

Suggested Readings:

(i) Text book:

S. Arumugam, Ancillary Mathematics, New Gamma Publishing House, Reprint 2014.

Unit 1: Chapter 1- Sections 1.0,1.1,1.2 (part 1)

Unit 2: Chapter 1 -Section 1.3(part 1)

Unit 3: Chapter 2(part 2)

Unit 4: Chapter 3- Section 3.3 ,3.5 (part 2).

Unit 5: Chapter 1,2,3 (part 3).

(ii) Reference Books:

1. Algebra Volume 1 by T.K.Manicavachagom Pillay, T.Natarajan and K.S.Ganapathy, S.Viswanathan Publishers Private Limited 2004
2. Calculus Volume 1 by S.Narayanan and T.K.Manicavachagom Pillay, S.Viswanathan Publishers Private Limited 2004.

- Ancillary Mathematics Volume 1 and 2, P. Balasubramanian and K.G. Subramanian
- Ancillary Mathematics Volume i and ii, P. Kandasamy and K. Thilgavathi, S. Chand and Co., New Delhi, 2004.

(iii) Web Resources:

- <https://math.stackexchange.com/questions/88917/relationship-between-coefficients-and-roots-of-a-polynomial>
- <https://www.youtube.com/watch?v=-EPAhIIQRNo>
- <https://math24.net/curvature-radius.html>
- <https://www.egyankosh.ac.in/bitstream/123456789/1956/1/Unit-3.pdf>
- <https://www2.slac.stanford.edu/comp/winnt/software/scientificworkplace/manuals/domath/chapter4-5.pdf>

DEPARTMENT OF ZOOLOGY – UG – CBCS- LOCF

Title of the Course: Allied Zoology -I Semester: I
Course Code: LUZOG11 Contact Hours: 4hrs / w Credits: 4

Course Learning outcomes:

On completion of the course, the students are able to

- recall the general characters and outline classification of an animal kingdom
- apply the Knowledge to identify the invertebrate and chordates fauna based on their unique character
- analyse the importance and adaptation of invertebrates and chordates in their habitat
- evaluate the role of invertebrates and chordates in biological communities, ecological interactions and environmental challenges.
- explore the biological importance of Pearl culture Apiculture, Pisciculture, Dairy farming.

Pre- required knowledge

1. Systematic position of various organisms
2. Taxonomical and characteristics of invertebrates and chordates
3. Morphological and anatomical features of selected non chordates
4. Harmful parasites and their economic importance of non chordates

Unit I: Outline classification of Invertebrates, Protozoa, Porifera and Coelenterata

Outline classification and general characters of Invertebrate with examples.

1. General characters of Phylum **Protozoa** with examples & **Plasmodium**: Life history, transmission, prevention and control.
2. General characters of Phylum **Porifera** and Canal system in Sponges.
3. General characters of Phylum **Coelenterata** with examples &
4. **Corals**: Types, Ecological and Economic importance.

Unit II: Platyhelminthes and Nematehelminthes, Annelida and Arthropoda:

1. General characters of Phylum **Platyhelminthes** with examples.
2. **Liver Fluke– Fasciola hepatica**–Digestive and Excretory system.
3. General characters of Phylum **Nematehelminthes** with examples.
4. **Filarial Worm (Wuchereria bancrofti)** - Life history, transmission, Prevention & control.
5. General characters of phylum **Annelida** and Vermiculture.

6. General characters of phylum **Arthropoda** with examples.
7. **Arthropoda vector borne diseases** - Chikungunya and Dengue

Unit III: Mollusca and Echinodermata, Chordata and Pisces

1. General characters of phylum **Mollusca** and **Echinodermata** with examples **Oyster culture**: Types of oyster culture in india and its food value.
2. General characters of phylum **Echinodermata** with examples **Star Fish**- Water vascular system.
3. General characters of Phylum Chordata and classification up to classes with examples
4. General characters of Pisces with examples
5. Identification features of local fresh water fishes - *Catla*, *Clarius* and *Ophiocephalus*

Unit IV: Amphibia, Reptilia, Aves and Mammals

1. General characters of Amphibia with examples and Parental care in Amphibia.
2. General characters of Reptilia and Identification of poisonous, non- poisonous snakes, biting mechanism, first-aid and treatment for snake bite.
3. General characters of Aves with examples. Migration of birds and Flight adaptation in birds
4. General characters of Mammals with examples & Adaptations of aquatic mammals.

Unit V: Economic importance of invertebrates and vertebrates

1. Pearl culture: Formation of pearl - types of Pearl culture in india.

2. Apiculture: Honey Bees Cast system, Newton's bee hive, Honey, Bee wax and Beevenom
3. Pisciculture (freshwater): Breeding and feeding techniques with reference to carps.
4. Dairy farming: Common breeds of India, nutritive value of milk – milk products.

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATION

1. Classification of phylum Invertebrates
2. Filarial Worm
3. Coral reefs and their role in ecosystem generation
4. Migration of birds
5. Dairy farming

Suggested Readings:

i) Text Books:

1. Nair N.C, Thangamani A, Leelavathy S, Prasanakumar S, Soundara Pandian N, Murugan T, Narayanan I. M and Arumugam N, 2017. *Animal diversity(Invertebrata & Chordata)*, Saras Publication, Nagercoil.
2. Kotpal, R.L., 2017. Modern text book of Zoology- *Invertebrates*. RastogiPublications, Meerut
3. Arumugam N, 2019. *Animal Diversity- Chordata*, Volume – 2, Saras Publication

ii) Reference Books:

1. **Ekambaranatha Iyer, M and Anandhakrishnan, T.N. Vol.1. 1994.** A manual of Zoology. S.Viswanathan Pvt., Ltd., Chennai.
2. **Jordan, E.L. and Verma, P.S., 1995.** Invertebrate Zoology. S. Chand & Co., NewDelhi.

3. **Kotpal, R.L., 1995.** Modern text book of Zoology- Invertebrates. RastogiPublications, Meerut.
4. **Ramakrishna Iyer, T.V., 1992.**Hand book of Economic Entomology for South India, Narendra Publishing House.

iii) Web sources:

1. <https://swayam.gov.in/courses/animal-diversity>
2. <https://epgp.inflibnet.ac.in/ahl.php?csm>
3. Animal Diversity (<https://swayam.gov.in/courses/5686-animal-diversity>)
4. Advances in Animal Diversity, Systematics and Evolution(<https://swayam.gov.in/courses/5300-zoology>)
5. <https://www.khanacademy.org/science/biology/crash-course-bio-ecology/crash-coursebiologyscience/v/crash-course-biology-123>

PART IV – ENVIRONMENTAL STUDIES – UG – CBCS - LOCF

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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

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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 தமிழ்ப் பண்பாட்டைப் பற்றியும், தமிழின் 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

சூறு 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. அழகுக்குப் படாத அழகு - மா.கமலவேலன்

கூறு IV: இலக்கணம்

1. அணி - 10 வகைகள் உவமை அணி, உருவக அணி, உயர்வநவிற்சி அணி, வேற்றுமை அணி, தற்குறிப்பேற்ற அணி, வஞ்சப் புகழ்ச்சி அணி, தீவக அணி, பாவிச 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
அழகுக்குப் 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 - சிந்பி, 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/a0411414.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

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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*. Shakespere 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://digjandme.com/formal-letter-writing-topics/>

DEPARTMENT OF CHEMISTRY – UG – CBCS – LOCF

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Title of the paper: Qualitative Analysis Semester: I & II
Course code: LUCHCL21 Contact Hours: 2 hrs/w Credits: 2

Course Learning outcomes

On completion of the course, the students are able to

- ❖ know the chemistry of anions and cations.
- ❖ analyze inorganic salts qualitatively and systematically eliminate interfering radicals

- ❖ identify elements in a given inorganic mixture by semi-micro qualitative analysis.

Qualitative semimicro analysis of mixtures containing two anions and two cations. Analysis of a mixture containing two familiar cations with two known anions of which one is interfering anions. Emphasis should be given on understanding of the chemistry of different reactions. Following radicals may be analyzed:

Anions: CO_3^{2-} , SO_4^{2-} , NO_3^- , F^- , PO_4^{3-} , $\text{C}_2\text{O}_4^{2-}$, BO_3^{3-}

Cations: Pb^{2+} , Cu^{2+} , Bi^{2+} , Cd^{2+} , Sb^{2+} , Mn^{2+} , Co^{2+} , Ni^{2+} , Zn^{2+} , Ba^{2+} , Ca^{2+} , Sr^{2+} , Mg^{2+} , NH_4^+ .

Spot analysis/tests should be done whenever possible.

Suggested Readings:

Text Books:

1. Vogel's Qualitative Inorganic Analysis, Revised by G. Svehla. Pearson Education, 2002.
2. Basic Principles of Practical Chemistry, V. Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu, Sultan Chand & Sons, New Delhi, 2nd Ed., 2004.

Reference Book:

Practical Chemistry by A.O. Thomas, Scientific Book Centre, Cannanore, 2003.

Web Sources:

<https://www.youtube.com/watch?v=cEOvj6jkdDw>

<https://www.youtube.com/watch?v=Z-VjE4j7Mi8>

Title of the paper: Organic Chemistry I	Semester: II
Course code: LUCHCT21	Contact Hours: 4hrs/w
	Credits: 4

Course Learning Outcomes

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

- ❖ gain knowledge on the preparation, properties and uses of alcoholic and halogen derivatives of aliphatic and aromatic hydrocarbons.

- ❖ learn in detail the preparation and reactions with mechanism of aliphatic and aromatic carbonyl compounds.
- ❖ describe the preparation, chemical properties and importance of alkane, alkene and alkyne
- ❖ gain knowledge in mechanism of substitution reactions in benzene

Pre-Required Knowledge:

- ✓ Nomenclature of aliphatic and aromatic compounds
- ✓ Nucleophilic substitution reaction
- ✓ Power alcohol and rectified spirit

Unit I: ALIPHATIC HYDROCARBONS

Alkanes –preparations and properties- free radical mechanism for substitution reaction - cracking - Alkenes: Preparation from alcohol, haloalkane, dihalo alkanes and alkynes - properties of alkenes -mechanisms involved in addition of hydrogen, halogen, hydrogen halide, water, hydroboration, hydroxylation and ozonolysis - Markownikoff's rule and peroxide effect - allylic substitution, oxidation by KMnO_4 and polymerization - Application in the synthesis of following molecules - cis and trans-2-butene, propanal. Alkynes: preparation, reactions - addition of hydrogen, halogen, hydrogen halide, water, HCN, CH_3COOH and hydroboration –acidityof terminal alkynes.

Unit II: AROMATIC HYDROCARBONS

Introduction & Nomenclature – Aromaticity and Huckel's rule – structure and stability of benzene – mechanism of electrophilic substitution reactions (halogenation, nitration, sulphonation and Friedel-crafts reaction) – Effect of substituents on reactivity (based on electronic effect) – classification of substituents – orientation and reactivity of mono substituted benzene - preparation, properties and uses of toluene and xylene

Unit III: HALOGEN DERIVATIVE OF ALIPHATIC & AROMATIC HYDROCARBON

Classification of alkyl halides - Preparation, properties and uses of ethyl iodide, chloroform, iodoform and carbon tetrachloride. Mechanism of nucleophilic substitution (S_N1 and S_N2) with energy profile diagrams - Saytzeff's rule - reaction with metals -Wurtz reaction and formation of Grignard reagent - Methods of formation of aryl halides – nucleophilic substitution reactions of aryl halides – illustration with suitable examples – mechanism of elimination reaction ($E1$ & $E2$) of alkyl halide.Ullmann reaction – Wurtz-Fittig reaction - Relative reactivities of alkyl, allyl, vinyl and aryl halides.

Halogen derivatives of unsaturated hydrocarbons: vinyl chloride and allyl chloride-preparation and reactivity-polymerization of vinyl chloride.

Unit IV: ALIPHATIC AND AROMATIC ALCOHOLS AND ETHERS

Alcohols: Preparation by hydroboration, hydration, oxymercuration, reduction of carbonyl compounds, acids and esters, by using Grignard reagents. Reaction with metals, esterification with mechanism, oxidation, reactivity towards HX, dehydration – rearrangement. Rectified spirit - absolute alcohol, power alcohol, methylated spirit (elementary idea) - estimation of number of hydroxyl groups.

Phenols: Acidity of phenols - effect of substituent on the acidity of the phenol - Kolbe's reaction, Reimer-Tiemann reaction, Test for phenol –preparation of dihydric and trihydric phenols Ethers: Mechanism of Williamson's synthesis, mechanism of cleavage by HX - estimation of methoxy group by Zeisel's method - uses of diethyl ether and anisole

Unit V: ALIPHATIC AND AROMATIC CARBONYL COMPOUNDS

Aliphatic carbonyl compounds: Electronic structure of carbonyl group. Preparation of aldehydes from cleavage of vicinal diols and by using lithium dialkylcuperate. Stephen's reduction - Gattermann-Koch and Etard reactions. Synthesis

of ketones from nitriles, dialkylcadmium, alkyl lithium and Friedel Crafts and Hoesch reactions. Relative reactivities of aldehyde and ketones. Mechanism of nucleophilic addition to carbonyl compounds; reaction with HCN and ammonia derivatives, alcohols, thiols, sodium bisulfite, Grignard reagents and Aldol, Wittig reaction, Mannich reaction, Reformasky reaction, hemiacetal and acetal formation, hydride transfer – LiAlH_4 , NaBH_4 reduction, α -halogenation – iodoform reaction.

Aromatic carbonyl compounds: Benzaldehyde – mechanism of Cannizzaro, Perkins, Claisen, Knoevenagel reaction and Benzoin condensation. Preparation and properties of cinnamaldehyde and vanillin. Preparation and properties of acetophenone and benzophenone.

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

Mechanism of nucleophilic substitution ($\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}2$)

Mechanism of Cannizzaro, Perkins, Claisen, Knoevenagel reaction

Mechanism of Williamson's synthesis

Aromaticity and Huckel's Rule

Hydroboration and Hydroxylation

Suggested Readings:

Text Books:

1. M.K. Jain and S.C.Sharma, Modern Organic Chemistry, First edition, Vishal Publishing Co., 2009.
2. Arun Bahl and B.S.Bahl, A Text Book of Organic Chemistry, 22nd edition S. Chand & Company, 2016.

References Books:

1. K.S.Tewari and N.K.Vishnoi, A Text Book of Organic Chemistry, 4th edition, Vikas Publishing House Pvt Ltd, 2017.
2. I.L.Finar, Organic Chemistry Vol - 1 & 2, 6 edn, Pearson Education Asia, 2004

3. N.Tewari, Advanced Organic Reaction Mechanism, 3rd Edition, Books & Allied (P) Ltd, 2011.
4. P.L.Soni, Text book of Organic chemistry, Sultan chand& Sons, 2006
5. R.T.Morrison, R.N.Boyd and S.K.Bhattacharjee, Organic chemistry, 7edn, Education Asia, 2010.

Web Sources:

1. <http://nptel.ac.in>
2. <http://swayam.gov.in>
3. <https://youtu.be/UzDskLeOOpA>
4. <https://youtu.be/iJN7afZnjnw>
5. <https://youtu.be/U8ltC2Kz3Mk>
6. https://youtu.be/EN_PCR4Ndfg
7. <https://youtu.be/RkZHcQQAwhs>
8. <https://youtu.be/jy2RL4mWF0k>
9. <https://youtu.be/-BlD3AtzBkw>

Title of the paper: Analysis of Soil, Air and Water Semester: II

Course Code: LUCHSC21

Credits: 2

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ know the basics regarding, soil, soil pollutants and soil testing
- ❖ know the types and characteristics of water and their analysis.
- ❖ understand the important parameters for measuring water quality.
- ❖ understand the air quality and standards.

Pre-Required Knowledge

- ✓ Introduction to Soil
- ✓ Types of Water and soil
- ✓ Air pollutants

UNIT I-SOIL ANALYSIS-I

Introduction to Soil analysis, Types of soil-Texture- Soil pollutants-Role of soil testing for environment-Uses of soil analysis.

UNIT II-SOIL ANALYSIS-II

Determination of soil pH, Determination of nutrient contents – Nitrogen, Phosphorous and Potassium (NPK)-Determination of salinity– Determination of micronutrient content of soil.

UNIT III- WATER ANALYSIS-I

Introduction to Water analysis–Types of Water– Characteristics of water–Water quality parameters– Water pollutants, role of water testing for environment, Uses of water analysis.

UNIT IV- WATER ANALYSIS-II

Determination of hardness-Permanent hardness-temporary hardness-pH measurement– alkalinity measurement-Total Suspended Solids (TSS)–Total dissolved salt (TDS)– Measurement of Biological oxygen demand (BOD) – chemical oxygen demand (COD)– Determination of electrical conductivity of water.

UNIT V- AIR ANALYSIS

Air quality and standards–Monitoring of Organic gas– Inorganic gas –dust – radioactive materials and microbial substances in air – Analysis of Hydrocarbons and photochemical smog - oxides of nitrogen (NO_x)– hydrocarbon in exhaust gasses-Analysis of Sulphur di-oxide- Analysis of Acid rain particulates.

Suggested Readings:

Text Books:

1. B.K. Sharma, Industrial chemistry, Goel publishing house, Meerut, 2000.
2. Sadhana Chaurasia and Anand Dev Gupta, Hand Book of Water, Air and Soil Analysis, International E-Publication, Indore, India 2014.

Reference Books:

1. Principles of Soil Chemistry (2Wed.) Marcel Dekker Inc., New York.
2. Soil Sampling, Preparation and analysis, Marcell Dekker, Inc, New York.
3. Introduction to soil laboratory manual -J.J.Harsett stipes.
4. Anjaneyulu, D., "Air Pollution and Control Technologies", Allied Publishers, Mumbai, 2002.

WebSources:

1. https://www.env.go.jp/earth/coop/coop/document/apctm_e/01-apctme-09.pdf
2. <https://www.mpcb.gov.in/sites/default/files/water-quality/reports/LSD-NEERI-%20Water%20Quality%20Analysis.pdf>
3. https://www.pseau.org/outils/ouvrages/cawst_introduction_to_drinking_water_quality_testing_2013.pdf

Title of the paper: Fuel Chemistry

Semester: II

Course code: LUCHSC22

Credits: 2

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ understand both conventional petroleum-based fuels, and alternative & renewable fuels, including gaseous fuels.
- ❖ learn the chemistry that underpins petroleum fuel technology and will understand the refining processes used to produce fuels and
- ❖ know the origin of petroleum, crude oil, composition, different refining processes employed industrially to obtain different fractions of petroleum.
- ❖ understand fuel product specifications, various test methods used to qualify different types of fuels as well characterization methods.

Pre-Required Knowledge

- ✓ Types of energy sources
- ✓ Characteristics of coal
- ✓ Application of petroleum products.
- ✓ Petrochemicals vinyl acetate, Propylene oxide,

Unit I: INTRODUCTION TO ENERGY SOURCES

Review of energy sources (renewable and non-renewable). Classification of fuels and their calorific value-Determination of calorific value by Bomb calorimeter and Junker's calorimeter.

Unit II: COAL

Coal: Analysis of coal, Proximate and ultimate Analysis, Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of coal. Coal gas, producer gas and water gas composition and uses. Fractionation of coal tar, uses of coal tar based chemicals, requisites of a good metallurgical coke, Coal gasification (Hydrogasification and Catalytic gasification), Coal liquefaction and Solvent Refining.

Unit III: PETROLEUM FUELS

Petroleum and Petrochemical Industry: Composition of crude petroleum, Refining and different types of petroleum products and their applications.

Unit IV: PETROLEUM REFINERY

Fractional Distillation (Principle and process), Cracking (Thermal and catalytic cracking), Reforming Petroleum and non-petroleum fuels (LPG, CNG, LNG, bio-gas, fuels derived from biomass), fuel from waste, synthetic fuels (gaseous and liquids), clean fuels.

Unit V: PETROCHEMICALS AND LUBRICANTS

Petrochemicals: Vinyl acetate, Propylene oxide, Isoprene, Butadiene, Toluene and Xylene. Lubricants: Classification of lubricants, lubricating oils (conducting and non-conducting) Solid and semisolid lubricants, synthetic lubricants. Properties of lubricants (viscosity index, cloud point, pore point and aniline Point) and their determination.

Suggested Readings:

Text book:

B.K. Sharma, Industrial chemistry, Goel publishing house, Meerut, 2000.

Reference Books:

1. E.Stocchi, Industrial Chemistry, Vol -I, Ellis Horwood Ltd. UK..1990.
2. P.C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi,2016.

WebSources:

1. https://en.wikipedia.org/wiki/Synthetic_fuel
2. [https://hithaldia.in/faculty/sas_faculty/Dr_Gora_Das/Class%20Notes%20\(CH-101%20&CH-201\)%20Module-5%20\(Industrial%20Chemistry\).pdf](https://hithaldia.in/faculty/sas_faculty/Dr_Gora_Das/Class%20Notes%20(CH-101%20&CH-201)%20Module-5%20(Industrial%20Chemistry).pdf)
3. <https://nptel.ac.in/content/storage2/courses/103103029/pdf/mod3.pdf>
4. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=993>
5. <https://personal.ems.psu.edu/~radovic/Chapter7.pdf>
6. <https://www.vedantu.com/chemistry/coal>
7. https://www.edubeans.com/Class_VIII_Science_Coal-and-Petroleum.php

Title of the paper: Agricultural Chemistry **Semester: II**
Course code: LUCHSE21 **Contact Hours: 2hrs/w** **Credits: 2**

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ understand physical and chemical components of soils.
- ❖ study properties of soils & properties and types of water.
- ❖ know about fertilizers and their application.
- ❖ know about classification, application and mode of action of Insecticides, fungicides, nematicides and herbicides

Pre-Required Knowledge

- ❖ Definition of soil
- ❖ Source of water
- ❖ DO, TDS, BOD and COD experiments
- ❖ Introduction to Fertilizer

Unit I: CHEMISTRY OF SOIL

Classification of soils. Physical and Chemical components - soil structure and soil organic matter.

Unit II: SOIL PROPERTIES AND ANALYSIS

Soil reactions – Soil pH, acidity, alkalinity, buffering of solids and its effects on availability of N, P, K, Ca, Mg, I, Mn and C-N ratio.

Unit III: WATER SOURCES AND IRRIGATION

Types of water (Hard and Soft) - acidity, alkalinity and pH values – Definition and formula of calculating Dissolved Oxygen (DO), TDS, BOD and COD (No determination) – type of irrigation.

Unit IV: FERTILIZERS

Definition – Nutrients for plants – role of various elements in plant growth – chemical fertilizers – classification of chemical fertilizers – Urea, Super phosphate and Potassium nitrate, mixed fertilizers – fertilizer industry in India. Organic fertilizer-definition, types and their importance.

Unit V: PESTICIDES

Classification – Insecticides, fungicides, nematicides and herbicides - General methods of preparation – application, mode of action and toxicity. Insect attractants and repellants – fluorides compounds-boron compounds-arsenic compounds-organo mercuric compounds, DDT, BHC & Pyridine compounds.

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS:

- Soil pH role in plant growth
- Micronutrient's role
- Insect repellents
- Sprinkler irrigation
- Soil organic matter

Suggested readings:

Text Books

1. Buckman, H.O., Brandy, Nature and properties of soil, internet Archive Book Reader, 1969.
2. Elements of Agricultural Chemistry, by Thomas Anderson, Adam and Charles Black publisher 1860.

Reference Books

1. Hand Book of Agro Chemical Industries (Insecticides & Pesticides), EIRI Books.
2. S. Bhaskar Mukund Joshi and T.K. Prabhakarasetty, Sustainability through organic Farming, Kalyani Publishers, 2011
3. Yagodin, B.A. (Ed), Agricultural Chemistry, 2 volumes, Mir Publishers, Moscow, 1976.

WebSources:

1. <https://nptel.ac.in/courses/126/105/126105016/>
2. <https://www.gutenberg.org/cache/epub/24931/pg24931-images.html>
3. https://drive.google.com/file/d/1epajf9hKwEH_7IbCRbElvPcfIVdJh5sW/view
4. https://drive.google.com/file/d/1sJ-Y1diVwJozGpC7hsLPxQD3KuzL2g_E/view
5. <https://www.dcr.virginia.gov/soil-and-water/document/nmagscbosc.pdf>

Course Learning Outcomes

On completion of the course, the students are able to

- economic importance and classification of oils and fats
- physical properties of fats and oils and their determination
- structure and composition of fats and oils
- synthesis and classification of enzymes
- determination of % free fatty acids and Detection of adulteration of various food products

Pre-Required Knowledge:

- ✓ Importance of oils and fats
- ✓ Physical properties of fats and oils
- ✓ Chemical properties of fats and oils
- ✓ Metabolism in plants and animals

Unit I: INTRODUCTION TO OILS AND FATS

History – economic importance of oils and fats – fatty acids – nomenclature of fatty acids – classification of fats and oils – lipids – role of oils and fats in plants, animals and human beings.

Unit II: PHYSICAL PROPERTIES

Physical properties of fats and oils – oiliness and viscosity – surface tension – density –refractive index – specific heat and heat of fusion – smoke, fire and flash points – solubility and miscibility – determination of refractive index, specific gravity, viscosity – Engler's apparatus.

Unit III: CHEMISTRY OF OILS AND FATS

Structure and composition of fats and oils – triglyceride composition of natural fat –hydrolysis – saponification – rancidity – types of rancidity – hydrogenation – halogenation –chemical oxidation – epoxidation – polymerization.

Unit IV: METABOLICAL ASPECTS

Synthesis and metabolism in plants and animals – fat metabolism – biosynthesis of fat – ketosis – Krebs's cycle – enzymes – classification of enzymes – coenzymes.

Unit V: CHARACTERISTIC TESTS

Determination of % free fatty acids, acetyl value, saponification value, Iodine Value, Reichert-Meissl value and Polenske value.

Detection of adulteration – Baudouin test for sesame oil – Halphen test and Bechi test for cotton seed oil – Ammonium molybdate test for castor oil, valenta test – Bellier turbidity temperature test – Letting test for soyabean oil.

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATION

Classification of fats and oils

Engler's apparatus

Structure and composition of fats and oils

Krebs's cycle

Letting test for soyabean oil.

Suggested Readings:

Text Book:

C.Paquot, Standard Methods for the Analysis of Oils, Fats and Derivatives, 6th edition, Pergamon Press, 1979.

Reference Books:

1. F.D. Gunstone, An Introduction to the Chemistry and Biochemistry of Fatty Acids and their Glycerides, Chapman and Hall Ltd., 1967.
2. SBP Board of Consultants and Engineers, Fatty Acids and Products, Small Business Publications, 1970.
3. E.A. Weiss, Oilseed Crops, Longman Group Limited, London, 1983.

WebSources:

1. <https://www.youtube.com/watch?v=LX7BreJOctU>
2. <https://www.youtube.com/watch?v=kLH94B0BG3k>
3. <https://www.youtube.com/watch?v=pvKThvnyVDg>

.....
Title of the paper: Computer Applications in Semester: II
Chemistry

Course Code: LUCHSE23 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ Know the concepts of internet and e-mail
- ❖ Know the importance of C programming
- ❖ Know the decision making and looping statements in C programming
- ❖ Know the C programming of different chemistry related problems

Pre-Required Knowledge:

- ✓ Introduction to Computers- Components of computers- Hardware-Software
- ✓ Input Devices-Output devices
- ✓ Programming- Flowchart-Algorithm- low level and high level languages.

UNIT I: INTERNET AND ITS APPLICATIONS IN CHEMISTRY

Internet-History of Internet–E-mail–creating, receiving and sending e-mails-e-mail ethics-advantages and disadvantages- downloading and attaching files-software in chemistry-popular websites in chemistry- .Computer software like Scilab, Excel, etc to solve some of the plotting or calculation problems.

UNIT II: C PROGRAMMING I

History of C language –Basic structure of C programming – Execution of C program – Character set– keywords – variables – assigning values to variables – Constants-types of constants-Defining symbolic constants-data types.

UNIT III: C PROGRAMMING II

Operators – arithmetic, relational, logical, assignment and conditional operators- Formatted input and output data- scanf() and printf() functions in C programs.

UNIT IV: C PROGRAMMING III

Decision making and branching statements- Unconditional GOTO statements - Decision making with IF statement–simple IF statement – IF...ELSE statement – Nested IF...Else statements – The ELSE...IF ladder – Looping statements- while loop – do.....while statements-for loop statement.

UNIT V: C PROGRAMMING IN CHEMISTRY

Applications of C programming in chemistry – Computerization of some simple problems in chemistry such as 1.Half life period, 2.Different types of velocities 3. Lambert Beer's law, 4. Normality and molarity of a solution 5. Temperature conversion from Celsius to Kelvin and vice versa 6.Rate constant of 1st order reaction, 7. Calculation of pH, 8. Calculation of Cell constant.

SUGGESTED TOPICS FOR GROUP DISCUSSIONS / PRESENTATIONS

- ✓ Internet concepts and ethics
- ✓ Advantages of C language
- ✓ Arrays and pointers
- ✓ C-program of other unique chemistry applications.

Suggested Readings:

Text Books:

1. Ramesh Kumari, Computers and their Applications to Chemistry, Narosa Publishing House, 2nd edition, New Delhi, 2005.
2. K V Raman, Computers in Chemistry, Tata-McGraw Hill Publishing Company, 1993, New Delhi.

Reference Books:

1. E. Balagurusamy - ANSI C (Computer Programming), Tata McGraw-Hill Education 2004.
2. Barbara Kasser, Using the Internet, 4th Edition, EE Edition, New Delhi, 1998.

WebSources:

1. <https://www.programiz.com/c-programming>
2. <http://www.nou.ac.in/Online%20Resourses/17-5/Internet%20and%20Web%20Technology.pdf>
3. https://www.chemistryviews.org/details/education/10015921/Chemistry_Databases.html
4. <https://www.chemistryguide.org/index.php?p=h>
5. <https://www.javatpoint.com/c-programming-language-tutorial>

Title of the paper: Dairy Chemistry **Semester:II**
Course code: LUCHSE24 **Contact Hours: 2hrs/w** **Credits: 2**

Course Learning Outcomes

On completion of the course, the students are able to

- describe Composition and characteristics of milk
- know about Milk and their dairy products
- learn about chemistry of creaming process and properties of Butter
- know about process of making ice cream and milk powder

Pre-Required Knowledge

- ✓ General composition of milk
- ✓ Determination of specific gravity of milk using lactometer
- ✓ Major constituents for Milk products

Unit I: COMPOSITION AND CHARACTERISTICS OF MILK

Milk: Definition – constituents of milk – lipids, proteins, carbohydrates, vitamins and minerals – factors influencing the composition of milk – properties of milk – colour, odour, acidity, specific gravity, freezing point, boiling point and viscosity – effect of heat on milk.

Unit II: MILK AND DAIRY PRODUCTS

Milk and dairy products as food – food requirements – water – carbohydrates – fat – proteins - minerals and ash – food accessories, vitamins – requirements of a suitable food – economy of milk as a food – milk as a source of protein - milk as a source of energy – relation of richness of milk to food value – pasteurization – effect on nutritive value – food value of other dairy products – butter – cheese – ice cream – skim milk.

Unit III: ANALYSIS OF MILK

Analysis of milk – organoleptic test - determination of pH of milk – ash content in milk – estimation of fat by gravimetric method – specific gravity of milk using lactometer – detection of preservatives in milk .

Unit IV: BUTTER

Milk Products: Cream - definition, chemistry of creaming process, Butter - definition, composition, theory of churning, desibutter, salted butter. Ghee - major constituents, common adulterants and their detection.

Unit V: ICE CREAM

Fermented milk products - fermentation of milk - definition and conditions. ICE creams - definition, composition, types, manufacture of ice - cream, stabilizers, emulsifiers, and their role, milk powder - definition, process of making milk powder.

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATION

Pasteurization process
Common adulteration methods
Diary industry
Natural and artificial milk
Preservation of milk

Suggested Readings:

Text Book:

Robert Jenness and Stuart Patton, Principles of dairy chemistry, Wiley Eastern Private Ltd., Publishers, New Delhi, 1969.

Reference Books:

K.S.Rangappa and K.T.Acharya, Indian Dairy Products, Asia Publishing House, Bombay, 1974.

Clarence Henry Eckles, Willes Barnes Combs and Harold Macy, Milk and Milkproducts, Tata McGraw – Hill Publishing Company Ltd., New Delhi, 1988.

1. 3.P.L.Soni and H.M.Chawla, Textbook of Organic Chemistry, Sultan Chand & Sons, 2007.

WebSources:

1. MOOC, SWAYAM, NPTEL
2. <https://dairyprocessinghandbook.tetrapak.com/chapter/chemistry-milk>
3. <http://www.fao.org/dairy-production-products/resources/publications/en/>
4. <http://www.fao.org/3/CB5332EN/Dairy.pdf>
5. https://onlinecourses.nptel.ac.in/noc21_ag02/preview
6. <https://nptel.ac.in/courses/126/105/126105015/>

DEPARTMENT OF MATHEMATICS – UG – CBCS – LOCF

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Title of the Course: Allied Mathematics – II Semester: II

Course Code: LUMSGE21 Contact hours: 6hrs/w Credit: 5

Course Learning Outcomes:

- On completion of the course, the students are able to
- acquire the knowledge in Analytical Geometry and Equation of a plane - Equation of straight lines.
 - understand the concepts of Vector calculus, Interpolation.
 - understand the concept of Fourier series.
 - find the Even and odd functions of Fourier series.
 - explain the Half-range series

Pre Required Knowledge:

- ✓ Apply simplest tricks in solving problems on differentiation and integration.
- ✓ Basic knowledge of differential calculus and integral calculus.
- ✓ Basic formulas of differentiation and integration

Unit I: Analytical geometry of three dimensions

Analytical geometry of three dimensions-Direction cosines, Direction ratios of a line- Angle between two straight lines - Equation of a plane - Equation of straight lines.

Unit II: Plane and Differentiation

Angle between a plane and a line – co-planar lines-shortest distances - Vector differentiation –Velocity - acceleration,

Unit III:Vector calculus

Vector calculus - Vector differential operators, Gradient, Divergence, curl and their simple properties - Directional derivatives-Solenoidal - Irrotational vectors.

Unit IV: Fourier series

Fourier Series-Fourier series for Even and odd functions- Examples.

Unit V:Fourier series continued

Half-range-sine-cosine-fourier-series

Suggested Topics for Group Discussion/ Presentation:

1. Direction cosines, Direction ratios of a line.
2. Angle between a plane and a line.
3. Vector differential operators, Gradient, Divergence, curl.
4. Fourier series.
5. Half rangeof sine, cosine series

Suggested reading:

(i) Text Books:

1. S. Arumugam, Ancillary Mathematics, Paper I, New Gamma Publications 2014.
Unit1: Chapter 1, 2, 3 to 3.1 (part IV)
Unit2: Chapter 3-section 3.2 (part IV)
2. S. Arumugam, Ancillary Mathematics, Paper II, New Gamma publications 2011. Publications
Unit 2: Chapter1
Unit 3: Chapter1
Unit 4: Chapter4
Unit 5: Chapter 4

(ii) Reference Books:

1. Ancillary Mathematics, T.K.Manicavachagam Pillay and S.Narayanan, S.Viswanathan Publishers Private Limited 2006
2. Calculus Volume III by S.Narayanan and T.K.Manicavachagam Pillay, S.Viswanathan Publishers Private Limited 2004
3. Ancillary Mathematics Volume 1 and 2, P.Balasubramnian and K.G. Subramanian
4. Ancillary Mathematics Volume i and ii, P. Kandasamy and K.Thilgavathi , S.Chand and Co., NewDelhi , 2004.

(iii) Web Resources:

1. <https://www.toppr.com/guides/maths/three-dimensional-geometry/direction-cosines-and-direction-ratios-of-a-line/>
2. <https://www.youtube.com/watch?v=zWMTTRJ0I4w>
3. <https://www.youtube.com/watch?v=7G07dPSIWbY>

4. <https://web.iitd.ac.in/~pmvs/courses/mcl704/BVC.pdf>
5. [https://math.libretexts.org/Bookshelves/Differential_Equations/Book%3A_Partial_Differential_Equations_\(Walet\)/04%3A_Fourier_Series/4.06%3A_Fourier_series_for_even_and_odd_functions](https://math.libretexts.org/Bookshelves/Differential_Equations/Book%3A_Partial_Differential_Equations_(Walet)/04%3A_Fourier_Series/4.06%3A_Fourier_series_for_even_and_odd_functions)
6. <https://www.slideshare.net/hardik6034off/half-range-sine-cosine-fourier-series>

DEPARTMENT OF ZOOLOGY – UG – CBCS- LOCF

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Title of the Course : Allied Zoology -II Semester: II

Course Code: LUZOG21 Contact Hours: 4hrs / w Credits: 4

Course Learning Outcomes:

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

- gain knowledge on foodstuff groups and its function.
- understand the role of food and nutrients in health and disease.
- provide culturally competent nutrition services for diverse individuals.
- implement strategies for food access, procurement, preparation, and safety that are relevant for the culture, age, and socio-economic status of clients and groups.
- perform food system management and leadership functions that consider sustainability in business, healthcare, community, and institutional arenas.

Pre- required knowledge

- ✓ Basic definitions related to nutrition Functions of foodand dietary nutrients

- ✓ Sources of Macro & Micro Nutrients Relationship between Nutrition and Health Scope of Nutrition
- ✓ Cold Preservation and freezers
- ✓ Health problems related to nutrition

Unit 1: Nutrition and dietary nutrients

1. Classification of foods– sources of energy yielding, body building and protective foods
2. Vegetables & Fruits - Classification, composition, nutritive value
3. Cow Milk & Chick Egg - Composition, nutritive value
4. Beverages - Classification, milk based beverages & its economic importance

UNIT II :Macro nutrients and micronutrients

1. Carbohydrates, Proteins, Fats and their dietary source and role.
2. Fat-soluble vitamins- A, D, E and K and their sources and importance
3. Water soluble vitamins– riboflavin, vitamin B12 and Vitamin C, their sources and importance
4. Minerals- Iron, Calcium, Phosphorus, Iodine, Selenium and Zinc: their biological functions.

UNIT III: Malnutrition and nutrient deficiency diseases

1. Balanced diet – Nutritional requirements of different age groups – Pre schoolers-schoolers – Adolescents – Pregnant, lactating women and aged people.
2. Protein Malnutrition– causes and prevention and dietary management of malnutrition
Kwashiorkor and Marasmus and obesity.
3. Iodine Deficiency Disorders (IDD). Causes, symptoms, treatment and prevention

- 4 Protein Energy Malnutrition(PEM) Causes, symptoms, treatment and prevention

UNIT IV- Food and Water-borne infections

(Transmission, causative agent, sources of infection, symptoms and prevention).

1. Bacterial diseases. typhoid fever.
2. Viral diseases: Hepatitis and Protozoan diseases: amoebiasis.
3. Common food allergies, test for allergy.
4. Medical Nutrition Therapy (MNT) and dietary counselling in Metabolic Stress

UNIT V: Food Science and Certification

1. Food Preservation - Definition, General Principles and Methods
2. Food Fermentation - Process in production of cheese making, bread making
3. Microbial products – Primary and secondary metabolites, Vitamin B12, Citric Acid, Penicillin & alcohol
4. Role of Bureau of Indian Standards (BIS), AGMARK, Food Safety and Standards Authority of India (FSSAI)

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATION

1. Classification of foods
2. Fat-soluble vitamins
3. Protein Malnutrition
4. Medical Nutrition Therapy (MNT)
5. Bureau of Indian Standards (BIS),

Suggested Readings:

i) Text Books

1. Potter, N. and Hotchkiss, J.H (1998) Food Science, 5th Ed., CBS Publications and Distributors, Daryaganji, New Delhi.

2. Srilakshmi (2017) Nutrition science, New age international (P) limited, New Delhi
3. Swaminathan, M (1974). Essentials of Foods and Nutrition, Vols-1 and II. Ganesh and Co. Madras.
4. K. Park, (2013) Park's Textbook of preventive and social medicine

ii) Reference Books

1. Antia FP (1987) Clinical Dietetics and Nutrition, Oxford University Press, New Delhi
2. Manay, M.S. and Shadaksharaswamy, M. (1998). Food-Facts and Principles; New Age International (P) Ltd.
3. Gibney, M.J. et al. (2004). Public Health Nutrition; Blackwell Publishing.
4. Robinson. C.H. Lawler, M.R. Chenoweth, W. L., and Garwick, A. E. (1986): Normal and Therapeutic Nutrition. 17th edition, MacMillan Publishing Co.
5. Bamrart George J, (1987) Basic food Microbiology, CBS Publication, New Delhi.

iii) WebSources

1. WHO Non-communicable diseases and risk factors. <http://www.who.int/ncds/en/>
2. National Nutrition Mission – ICDS. icds-wcd.nic.in
3. Ministry of Health & Family Welfare, www.mohfw.nic.in National Institute of Science Communication and Information Resources (NISCAIR) (<http://www.niscair.res.in/>)
4. National Science Digital Library (NSDL) (www.nsdli.niscair.res.in).
5. National Digital Library of India (NDL India; <https://ndl.iitkgp.ac.in/>).

DEPARTMENT OF ZOOLOGY – UG –CBCS – LOCF

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Title of the Course: Allied Zoology Practical-I Semester: I &II
Course Code: LUZOGL21 Contact Hours:4hrs/ w Credits: 2
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Course Learning Outcomes

On completion of the practical, the students are able to

- identify with salient features and classify the specimens which are present the departmental museum.
- understand Chart- diagram of different systems of invertebrate and chordate animals such as cockroaches, Earthworm, Shark.
- perform food system management sustainability in business, healthcare, community.

I - List of spotters (morphological observations):

Invertebrata:

1. Protozoa: *Amoeba*
2. Porifera: *Olyntes*
3. Coelenterata: *Obelia* – Colony
4. Platyhelminthes: Tape worm
5. Nematoda: *Ascaris* – Male and Female
6. Annelida: Leech
7. Arthropoda:
 - a) Honey bee – (i) Queen (ii) Drone (iii) Worker
 - b) Insect pest of coconut (*Oryctes rhinoceros*)
8. Mollusca: Pearl oyster
9. Echinodermata: Starfish

Anatomical observations (through diagram)

1. **Earthworm:** Digestive system
2. **Cockroach:** Digestive system and Nervous system

II. Chordata:

1. **Prochordata:** Amphioxus
2. **Pisces:** Carp fish - Catla, Cat fish- Clarius
3. **Amphibia:** Salamander
4. **Reptilia:** Cobra
5. **Aves:** Barn Owl
6. **Mammals:** Bat

Anatomical observations (through diagram)

1. Pisces

- a) Shark : Mounting of Placoid scale
 - b) Shark : Brain (Dorsal and Ventral view)
2. **Mammals:** Rabbit : Reproductive system (Male and Female)

III. List of spotters (morphological observations)

1. *Callosobruchus maculatus*
2. BMR
3. Diet for anaemia
4. RDA Table
5. Gram's staining
6. Lactometer
7. HACCP
8. Determining adulterants in various foods
 - a) Coffee
 - b) Turmeric
 - c) Ghee
 - d) Tea leavesand e) Turmeric.
9. Estimation of Lactose in milk.
10. Preparation of yoghurt
11. Preparation of buttermilk
12. Preparation of pickles

III) Field Visit: Evaluation of fauna in and around the college campus.

Web Sources:

1. Cockroach dissection- www.ento.vt.edu
2. Mammalian Physiology– www.biopac.com
3. National Nutrition Mission – ICDS. icds-wcd.nic.in

PART IV – VALUE EDUCATION – UG – CBCS – LOCF

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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. Gandhian 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. [tps://www.index.com](https://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.swyamprabha.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
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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: NEEDS OF 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-Halāsana 3. Pavana-Muktāsana 4. Naukasana 5. Ardha-shalabhasana 6. Shalabhasana 7. Makarasana 8. Bhujangāsana 9. Dhanurasana 10. Vakrasana 11. Chakrasana 12. Paschimottanasana 13. Ugrāsana 14. Gomukhasana 15. Padmasana 16. Siddhasana 17. Bhadrasana 18. Swastikkāsana 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-Halāsana

Viparithakarani-Mudra

Suggested Readings:

Text Books:

1. Yoga Practice I - The World Community Service Centre - Vethathiri Publications, Erode, 1st Ed - 2009, 4th 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 - 1st 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=RJ44olxWiYI>
2. <https://www.youtube.com/watch?v=149lac5fmoE>
3. <https://www.youtube.com/watch?v=149lac5fmoE>
4. <https://www.youtube.com/watch?v=7ixtTqiVYzw>
5. <https://www.youtube.com/watch?v=lqzsuYggK5c>
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 raffle
- 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

சூறு I: பக்தி இலக்கியங்கள்

1. திருஞானசம்பந்தர்- திருஆலவாய்ப் பதிகம் (முதல் 5 பாடல்கள்)
2. திருநாவுக்கரசர்-நமச்சிவாய்ப் பதிகம் (முதல்5 பாடல்கள்)
3. சுந்தரமூர்த்தி நாயனார்- திருப்புவாயில் பதிகம் (முதல் 5 பாடல்கள்)

4. மாணிக்கவாசகர்-திருவெம்பாவை (முதல் 5 பாடல்கள்)
5. குலசேகர ஆழ்வார்-பெருமாள் திருமொழி (முதல் 10 பாடல்கள்)
6. ஆண்டாள் - நாச்சியார் திருமொழி (திருப்பாவை முதல் 10 பாடல்கள்)
7. சித்தர் பாடல்கள்
 - (அ) திருமுல்லை - மலமில்லை, மாசில்லை, பார்ப்பான் அகத்திலே, அன்பும், சிவமும்
 - (ஆ) பட்டினத்தார் - ஐயிரண்டு திங்களாய், ஓடாமல் பாழுக்கு, முதல் சங்கு அமுதாட்டும்
 - (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-c0124313-15342>

குற்றாலக்குறவஞ்சி

<https://www.tamilvu.org/ta/courses-degree-c012-c0123-html-c0123312-15036>

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
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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 CHEMISTRY – UG – CBCS - LOCF

Title of the paper: Inorganic Chemistry –I Semester: III
Course code: LUCHCT31 Contact Hours: 4hrs/w Credits: 3

Course Learning Outcomes

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

- ✓ know the various steps involved in metallurgy.
- ✓ analyze the relationship among same group elements and with other group elements
- ✓ solve the conceptual questions using the knowledge gained by studying the concepts of acids and bases
- ✓ draw the structures of peracids and correlate with their chemical properties
- ✓ understand the preparation and uses of important inorganic compounds

Pre-Required Knowledge:

- ✓ Basic processes in metal extraction
- ✓ Types of silicates and silicones
- ✓ Applications of HSAB concepts

Unit I: METALLURGY

Minerals and ores – various steps involved in metal extraction – grinding, pulverizing, ore-dressing, calcination and roasting – extraction of metal – reduction and smelting – flux – purification or refining methods.

Extraction of tungsten from its ores – properties – alloys and uses – extraction of platinum – various forms of platinum – preparation and uses.

Preparation, properties and uses of the following compounds: Verdigris – Blue vitriol – Bordeaux mixture – Epsom salt – gypsum salt – plaster of paris – green vitriol – potassium ferricyanide – sodium nitroprusside – white vitriol.

Unit II: THE ELEMENTS OF GROUP I AND II

Elements of group IA- General discussion - Diagonal relationship of Li with Mg- Anomalous behaviour of Lithium- Extraction of lithium-properties of lithium-Analytical reaction

Elements of group IB- General discussion – Resemblance among Cu, Ag, Au-Gradation in their properties-resemblance between coinage metals and the VIII group elements.

Elements of group IIA- General discussion - Diagonal relationship of Be with Al- Comparison of group IA and group IIA

Unit III: THE ELEMENTS OF GROUP III, IV AND V

General discussion of group III – Diagonal relationship between B and Si – Borane – preparation and structure.

General discussion of group IV elements-comparison between carbon and silicon- silicates-

Types of silicates and silicones - lead monoxide-red lead-white lead
General discussion of group V elements-active nitrogen-preparation and properties of hydrazine, hydrazoic acid and hydroxylamine-test for arsenic.

Unit IV: PERACIDS OF SULPHUR, NITROGEN AND IMPORTANT OXIDES

Peracids and their salts-definition-peracids of carbon-permono and perdicarbonic acid-pernitrous and pernitric acid-peroximono and peroxidiphosphoric acids-peracids of sulphur-permono and perdisulphuric acids.

Preparation properties and uses of some important compounds-titanium oxide, thorium oxide, ammonium molybdate-vanadium pentoxide, sodiumcobalti nitrate, chloroplatinic acid.

Unit V: ACIDS AND BASES

Acids and Bases – Arrhenius concept – Lowry - Bronsted concepts – conjugate acid –base pairs – relative strength of acid and bases – Lux-Flood concept – Limitations – Lewis concept – Levelling effect – Hard and soft acid and bases (elementary idea) – HSAB principle and applications.

SUGGESTED TOPICS FOR GROUP DISCUSSION/PRESENTATIONS

- ✓ Group discussion of Group I and Group II
- ✓ Hard and soft acid and bases.
- ✓ Lewis concept

- ✓ Peracids and their salts
- ✓ Resemblance among Cu, Ag, Au

Suggested Readings:

Text Books:

1. P L. Soni. Text book of Inorganic Chemistry, Sultan Chand & Sons, Reprint 2005
2. B.R. Puri, L.R. Sharma, K.C. Kalia, Principles of Inorganic Chemistry, Vishal Publishing CO.. 2003.
3. R.D. Madan. Modern Inorganic Chemistry. S. Chand&Company Ltd .2002

Reference Books:

1. Concise Inorganic Chemistry: Fifth Edition by J.D. Lee 2008
2. Gary L Miessler and Donald A Tarr, Inorganic Chemistry, 3rd edition, Pearson Education, 2009

WebSources:

1. <https://www.youtube.com/watch?v=M469Wc1gAqE>
2. <http://ww2.chemistry.gatech.edu/class/1310/baron/spring2004/OFB-Chapter-8-lecture-notes.pdf>
3. <https://www.askiitians.com/revision-notes/chemistry/s-block-elements/>

DEPARTMENT OF CHEMISTRY – UG-CBCS-LOCF

Title of the paper: Food Chemistry

Semester: III

Course code: LUCHSC31

Credits: 2

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ understand and classify food components, dietary/supplements and food sources of nutrients
- ❖ understand the role of food additives and preservatives
- ❖ know the importance of spices
- ❖ analyse food adulteration and demerits of adulteration
- ❖ discuss about the food processing and quality control

Pre-Required Knowledge

- ✓ Definition of Food
- ✓ Nutrition values of food
- ✓ Advantage and disadvantage of Food additives and preservatives
- ✓ Laboratory procedure for food adulterations

UNIT - I CONSTITUTION OF FOOD

Food-classification of food - energy requirements of individuals - source, classification and function of carbohydrates, proteins, lipids, vitamins, minerals, natural food pigments, browning reactions in food and enzymes - calorific values of food - rice, wheat, milk, fish, vegetables, fruits and cereals.

UNIT - II FOOD ADDITIVES AND PRESERVATIVES

Food additives: Definition - permitted food additives, characteristics and their role: antioxidants, stabilizers, flavours, sweeteners, emulsifiers, thickeners, synthetic and natural colorants, permitted and banned colours, . Preservatives: Definition – Principles and methods of food preservation - heat, cold, deep-freezing, radiation. Food Standards : ISI, Agmark, FPO, MPO, PFA, FSSAI.

UNIT - III: SPICES

Introduction to spices – classification of spices – health benefits of Indian spices – role of spices in cookery – Ajwain (omum), – Aniseed (Somfu) – black pepper – cardamon – ginger – turmeric – garlic – onion – cumin – chillies – fennel – dill – nutmeg.

Unit IV: FOOD ADULTERATIONS

Definition - adulterant, adulteration - types of adulterants - common adulterants and their determination in milk, oils, ghee, honey, chilly powder, coriander powder, turmeric powder, coffee powder, tea dust, asafoetida - food poisoning and its prevention – Prevention of Food Adulteration Act- food laboratories and their functions.

Unit V: FOOD PROCESSING AND QUALITY CONTROL

Fruits and vegetables drying /dehydration - techniques – advantages of dehydration over sun drying. Freezing – of fruits and vegetables - methods of freezing - sharp freezing – Quick freezing - cryogenic freezing – dehydro – freezing - dehydro freezing- freeze drying. Quality control in Food processing Industry - F.P.O specification – storage life - permissible limits of preservatives - food toxins.

Suggested Readings:

Text books:

1. Sivasankar B, Food Processing and Preservation, Prentice Hall of India Pvt. Ltd, New Delhi, 2002.
2. Swaminathan M. Textbook on Food Chemistry, Printing and Publishing Co, Ltd, Bangalore, 1993.
3. Srilakshmi, B. *Food Science*, 3rd Ed., New Age International (P) Limited, Publishers, 2002.

Reference books:

1. N. S. Gnanaprakasam, G. Ramamurthy, Organic Chemistry, Lab Manual, S. Viswanathan Printers and Publishers Ltd.
2. Food Science – III Edition – B. Sri Lakshmi, New Age International Publisher, 2005.
3. Fundamentals of Foods and Nutrition – Mudambi. R. Sumathi, and Rajagopal, M.V. Willey Eastern Ltd, Madras.
4. B. K. Sharma, Industrial Chemistry, Goel Publishing and Co., (1995).
5. L. H. Meyer, Food Chemistry, CBS Publications & Distributors, 2004.
6. H.K.Chopra, P.S.Panesar, Food Chemistry, Narosa Publishing House Pvt Ltd, 2010.
7. Subalakshmi, G and Udipi, SA (2006):Food processing and preservation, 1st Ed. New Age International (P) Ltd.
8. DeMan J M, (2005). Principles of Food Chemistry. AVI Publisher. Chapter 6 and 10.

Web Sources:

1. <https://www.indianspices.com/#>
2. <https://www.finedininglovers.com/article/how-preserve-food-methods-and-techniques>
3. <https://www.highspeedtraining.co.uk/hub/food-preservation-methods/>
4. <https://www.ift.org/news-and-publications/food-technology-magazine>

DEPARTMENT OF CHEMISTRY – UG-CBCS-LOCF

Title of the paper: Green Chemistry **Semester: III****Course code: LUCHSC32** **Credits: 2**

Course Learning Outcomes**On completion of this course, the students are able to**

- ❖ apply Green chemistry techniques and its principles.
- ❖ utilize Green synthesis and its reactions.
- ❖ use Green chemistry for sustainable solutions.
- ❖ atom economy and design of chemical reactions using the principle.
- ❖ thrive in order to overcome limitations in Green Chemistry

Pre-Required Knowledge

- ✓ Use of green chemistry in designing new laboratory experiments.
- ✓ Use of principle of atom economy and design experiments using the principle.
- ✓ Use of green chemistry in combinatorial chemistry and biomimetic catalyst.

Unit I: INTRODUCTION TO GREEN CHEMISTRY

Basic introduction and explaining goals of Green Chemistry. Need for Green chemistry. Scope for Green chemistry - Limitations/Obstacles in the pursuit of the goals of Green Chemistry.

Unit II: PRINCIPLES OF GREEN CHEMISTRY AND DESIGNING A CHEMICAL SYNTHESIS

Twelve principles of Green Chemistry with their explanations and examples and special emphasis on Designing a Green Synthesis using these principles (Prevention of Waste/ byproducts; maximum incorporation of the materials used in the process into the final products, Atom Economy, calculation of atom economy of the rearrangement, addition, substitution and elimination reactions).

Unit III: GREEN SYNTHESIS / REACTIONS - I

a) Green Synthesis of adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis). b)

Microwave assisted reactions in water: (Hofmann Elimination, methyl benzoate to benzoic acid, oxidation of toluene and alcohols) and reactions in organic solvents (Diels-Alder reaction and Decarboxylation reaction). c)

Ultrasound assisted reactions: sonochemical Simmons-Smith Reaction (Ultrasonic alternative to Iodine)

Unit IV: GREEN SYNTHESIS / REACTIONS - II

a) Surfactants for carbon dioxide – replacing smog producing and ozone depleting solvents with CO₂ for precision cleaning and dry cleaning of garments.

b) Designing of Environmentally safe marine antifoulant.

c) An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn.

d) Healthier Fats and oil by Green Chemistry: Enzymatic Inter esterification for production of no Trans-Fats and Oils.

Unit V: HORIZONS OF GREEN CHEMISTRY

Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions; co crystal controlled solid state synthesis (C2S3); Green chemistry in sustainable development.

Suggested Readings:

Text-books:

1. Ahluwalia, V.K., Kidwai, M.R. *New Trends in Green Chemistry*, Anamalaya Publishers 2005.
2. Anastas, P.T. & Warner, J.K, *Green Chemistry- Theory and Practical*, Oxford University Press 1998.
3. Matlack, A.S. *Introduction to Green Chemistry*, Marcel Dekker 2001.

Reference books:

1. Cann, M.C.andConnely, M.E. *Real-World cases in Green Chemistry*, ACS (2000).
2. Ryan, M.A. and Tinneland, M. *Introduction to Green Chemistry*, American Chemical Society, 2002.
3. Lancaster, M. *Green Chemistry: An Introductory Text* RSC Publishing, Second Edition, 2010.

Web Sources:

1. <http://www.gdcboysang.ac.in/About/droid/uploads/GreenChem5thSem.pdf>
2. <https://www.asdlib.org/onlineArticles/ecourseware/Mahan/GreenChem-2.pdf>
3. <https://www.acs.org/content/dam/acsorg/greenchemistry/education/summerschool/Kirchhoff%20Green%20Chemistry%20Principles%20and%20Practice2.pdf>

DEPARTMENT OF MATHEMATICS – UG – CBCS -LOCF

.....
Title of the paper: Allied Mathematics – III Semester: III

Course code: LUMSGE31 Contact Hours: 6hrs/w Credits: 5

Course Learning Outcomes:

On completion of the course, the students are able to

- ❖ Enable the students to acquire basic knowledge in Differential equations.
- ❖ Study the application of differential equations.
- ❖ Understand the concept of Laplace Transforms and analytic functions.

- ❖ Understand the concept of exact differential equation.
- ❖ Understand the Cauchy Riemann equation.

Pre Required Knowledge:

- ✓ Differentiation and integration.
- ✓ Know the difference between ODE and PDE.
- ✓ Understanding the usual notations in ODE and PDE.

Unit I: Linear Equations of Higher Order

Exact differential equations – second order equations – second order equations with right hand side in the forms $x^n e^{ax}$, $\sin ax$, $\cos ax$, $e^{ax} \sin bx$, $e^{ax} \cos bx$.

Unit II: Application of Differential Equations

Growth, decay and chemical reactions – simple electric circuits – Planetary Motion.

Unit III: Partial Differential equations

Partial Differential equations – Formation of partial differential equations – Lagrange's equation – some standard forms.

Unit IV: Laplace transform

Laplace transform – Inverse – Laplace transformation – Solution of differential equations using Laplace Transforms.

Unit V: Analytical function

Analytical function – C.R. Equation (without proof) – Bilinear Transformation – Cross Ratios.

Suggested Topics for Group Discussion/ Presentation

- ✓ Second order Equations
- ✓ Growth and decay
- ✓ Standard forms
- ✓ Laplace Transforms
- ✓ CR Equations

Suggested Readings:

(i) Text Book:

S. Arumugam and Thangapandi, Issac, Ancillary Mathematics Paper III, New Gamma

Publications, 2003.

Unit - 1 Chapter – 3: Sections: 3.1 to 3.6

Unit - 2 Chapter – 7: Sections: 7.2, 7.6, 7.11

Unit - 3 Chapter – 6: Sections: 6.1 to 6.4

Unit - 4 Chapter – 5: Sections: 5.1, 5.2

Unit - 5 Chapter – 10: Sections: 10.2 , 10.3, Chapter 9-
Section 9.2, 9.3.

(ii) Reference Books:

1. Narayanan and Manickavasagam Pillai, Differential Equations, S.V.Publication Reprint,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. <https://www.emathhelp.net/calculators/differential-equations/differential-equation-calculator/>
2. <https://www.wolframalpha.com/examples/mathematics/differential-equations/>
3. https://mathinsight.org/ordinary_differential_equation_introduction
4. <https://tutorial.math.lamar.edu/Classes/DE/DE.aspx>
5. <http://eqworld.ipmnet.ru/en/solutions/ode.htm>
6. <https://www.khanacademy.org/math/differential->

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

.....
Title of the Course: Mechanics, Properties of Semester: I / III

Matter and Sound

Course Code: LUPMGE11/LUPHGE31 Contact Hours: hrs/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:

Murugesan.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>
<http://soft-matter.seas.harvard.edu>
2. <https://www.microsonic.de>

DEPARTMENT OF ZOOLOGY – UG – CBCS-LOCF

Title of the Course: Allied Zoology - III **Semester: III**
Course Code: LUZOG31 Contact Hours:4hrs/ w Credits : 4

Course Learning Outcome

On completion of the course, the students are able to

- summarize the structure and function of the different components and organelles of the cells
- perform monohybrid, dihybrid crosses, multiple alleles and sex-linkage
- understand the cloning, forensic and stem cells technology.
- identify the role of antigen presenting cells, lymphocytes, and phagocytic cells in immune responses.
- understand different concepts related to ecological economics

Pre- required knowledge

- ✓ Various cell organelles
- ✓ Inheritance of traits and cancer
- ✓ Application of biotechnology

- ✓ Evolution and Immuno-techniques

Unit I: Cell Biology:

1. Structure and functions of Plasma membrane, Mitochondria and Nucleus.
2. Chromosomes- Structure, types and functions.
3. Structure and functions of DNA
4. Cancer: Types, Causes, Diagnosis and Treatment.

Unit II: Genetics:

1. Mendelian principles – Mono and Dihybrid crosses.
2. Multiple Alleles - ABO Blood group, Rh factor.
3. Sex linked inheritance (eg. Colour blindness and Haemophilia) determination in Man (Chromosome and Barr body). And sex
4. Genetic counseling- eugenics, euthenics and euphenics

Unit III: Biotechnology:

1. rDNA technology application and Biotechniques (PAGE& PCR).
2. Hybridoma Technology.
3. DNA finger printing Technology.
4. Stem Cells - Properties, Types and application.

Unit IV: Immunology:

1. Types of Immunity (Innate and Acquired immunity).
2. Antigen: its properties and Antigen – Antibody reactions
3. Immunoglobulin – Types and structure.
4. Immuno-techniques- Western Blotting, ELISA,

Unit V: Bioeconomics

1. Ecosystem- Structure, food chain and Food web with reference to pond ecosystem.

2. Ecosystem Services. Categories of ecosystem services, Biodiversity and its importance, Eco-labelling
3. Economic value of the world's ecosystems and services, Millennium Ecosystem Assessment
4. Wildlife conservation – Objectives and in situ & ex situ methods

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATION

1. Mutations and cancer
2. Blood groups and their importance
3. Stem cell technology
4. Immunological techniques in disease diagnosis
5. Biodiversity hotspots

Suggested Readings:

i) Text Books

1. Meyyan R. P. 2005, Cell Biology, Saras Publication.
2. Gupta, P. K. 2010. Genetics, Rastogi Publication, New Delhi.
3. Dubey, R. C. 2004, Text Book of Biotechnology, S.Chand & Co
4. Verma, P.S and Agarwal, V.K. 2012. Cell biology, Genetics and Evolution, S.Chand Publications. New Delhi

ii) Reference Books:

1. **Ambrose, E.J. and Dorothy, M.E.** Cell Biology. ELBS Calmet Press, Great Britain.
2. **De Robertis and De Robertis.** Cell and Molecular Biology. WB Saunders Co., Philadelphia.
3. **Dupraw, E.J.** Cell and Molecular Biology.

Academic Press, New York.

4. **Gardener *et al.***, Principles of Genetics, 3rd Edition. John Wiley & Sons Publication, New York, 1991.
5. **Sinnot Dunn and Dobzhansky.** Principles of Genetics. Tata-McGraw Hill India Reprint.
6. **Dubey, R.C.** Text Book of Biotechnology. S. Chand & Co., 1995.
7. **Dharmarajan, M.** Genetic Engineering. S. Viswanathan & Co. 1989.
8. **Primrose, S.B.** Modern Biotechnology. Blackwell Scientific Publication, London. 1987.
9. Roitt, I.M. Essential Immunology. Blackwell Scientific Publishers. 2000.
10. Kuby, J. Immunology. W.H. Freeman and Company, New York. 1999.
11. Verma, P.S. and V.K. Agarwal. Cytology, S. Chand & Co. 1985.
12. Nagabushanam R. Animal Physiology. S. Chand & Co. 1991.
13. Odum, E.P., – Fundamentals of Ecology. W.B. Saunders Company, Philadelphia. 1971.
14. Rastogi, V.B. and M.S. Jayaraj, – Animal Ecology and distribution of animals, Kedarnath Ramnath. 1989.
15. Mayumi, K., Martinez, J. (2012). The Origins of Ecological Economics: The Bioeconomics of Georgescu-Roegen. Routledge; 1 edition.

iii) Web sources

1. <https://swayam.gov.in/course/150-cell-biology> .
2. <https://swayam.gov.in/courses/5173-biochemistry-and-cell-biology>

3. <https://www.jove.com/science-education-library/9/cell-biology>
4. <https://www.khanacademy.org/science/biology>
5. Coursera,
<https://www.coursera.org/courses?query=immunology>

DEPARTMENT OF TAMIL – UG – CBCS
PART I- TAMIL

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Title Of The Course: புனை கதை இலக்கியமும் சிறுகதையும் **Semester : IV**
Course Code : LUPITA41 **Contact Hours :** 6hrs/w **Credit: 3**
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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 - கடவுள் விரும்பும் மொழி
5. கண்ணதாசன் - கமலப்புவே

6. வாலி - இலக்கிய நாயகன் இராமன்
7. அப்துல்ரகுமான் - உழவர்களைப் பாடுவோன்
8. மு.மேத்தா - தேசப்பிதாவுக்கு ஒரு
தெருப்பாடகனின் அஞ்சலி
9. வைரமுத்து - இருபது கட்டளைகள்
10. நாட்டுப்புறப்பாடல் - உழவர்பாட்டு நா.வானாமலை
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 - சமைதாங்கி
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 செஞ்சரி 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](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

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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
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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. Plunge : 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 CHEMISTRY – UG – CBCS - LOCF

Title of the paper: Organic Spectroscopy Semester: IV
Course Code: LUCHCT41 Contact Hours: 4hrs/w Credits: 3

Course Learning outcomes

On completion of the course, the students are able to

- know the basics of UV-VIS spectroscopy
- learn about the concepts in IR spectroscopy.
- understand and apply the concepts in NMR spectroscopy

- solve the problems on the applications of spectroscopy to organic compounds
- learn the basic principle of spectroscopy technique

Pre-Required Knowledge:

- ✓ Absorption laws
- ✓ Finger print region
- ✓ Coupling constants

Unit I: UV - VISIBLE SPECTROSCOPY

Ultraviolet and Visible: Introduction –Type of electronic transition –absorption laws – bathochromic, hypsochromic, hyper chromic and hypo chromic shifts – solvent effect -Applications of UV to organic compounds - Woodward Fieser rule - calculation of λ_{\max} .

Unit II: IR - SPECTROSCOPY

Infrared – Introduction – Modes of vibration – overtone and combination bands – Applications of IR to organic compounds – finger print region – effect of hydrogen bonding.

Unit III: ¹H- NMR SPECTROSCOPY

¹H- NMR: Introduction – solvents used - chemical shift – shielding and deshielding effects – factors influencing chemical shift – spin-spin coupling, number of signals, peak area – coupling constants - NMR spectra of ethanol, anisole, benzaldehyde, acetamide, ethylacetate, benzoic acid.

Unit IV: ¹³C-NMR SPECTROSCOPY

Basic principles, Chemical shift, FT technique – assignment of signals – Broad band decoupling and off resonance decoupling - gauche effect – additivity relationship – calculation of chemical shifts for aromatic and aliphatic compounds.

Unit V: PROBLEMS USING UV-VIS, IR AND NMR SPECTROSCOPY

Application of the above techniques (UV, IR, MASS, ¹H NMR, ¹³C NMR) to structural elucidation of simple molecules and interpretation of spectral data of simple organic molecules.

SUGGESTED TOPICS FOR GROUP DISCUSSION/ PRESENTATIONS:

- * Role of spectroscopy in medical imaging technologies
- * Role of spectroscopy in Forensic Investigations
- * Biological applications of NMR technique
- * Need for Spectroscopy in Natural Product chemistry
- * Spectral determination of molecular structure: How far effective?

Suggested Readings:

Text Books:

1. Y.R. Sharma, Elementary organic spectroscopy – principles and chemical applications, S.Chand&Co., 1980
2. William Kemp, Organic spectroscopy, 3rd Edition, Sarmaha publishers, 2002
3. M.K.Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 2009
4. R.T. Morisson and R.W. Boyd S.K. Bhattacharjee, Organic Chemistry, Pearson Prentice Hall, 7th Edition, 2012.

References Books:

1. S.K. Dewan, Organic Spectroscopy, CBS Publishers, I Edition, 2010.
2. D.L. Pavia, G.M. Lampman and G.S. Kriz Introduction to Spectroscopy, Thomson Learning Inc., 2001.

WebSources:

1. <https://nptel.ac.in/content/storage2/courses/102103044/pdf/mod2.pdf>
2. <https://nptel.ac.in/courses/104/108/104108078/>
3. <https://nptel.ac.in/content/storage2/courses/104106075/Week8/ MODULE%2033.pdf>

DEPARTMENT OF CHEMISTRY – UG – CBCS - LOCF

(For those who join in June 2022)

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Title of the paper: Volumetric Analysis Semester:III&IV
Course Code: LUCHCL41 Contact Hours: 2hrs/w Credits: 2
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Course Learning outcomes

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

- ❖ understand the basic concept of volumetric titrations.
- ❖ use and calibrate volumetric flasks, pipettes and burettes.
- ❖ understand laboratory safety and safe handling of chemicals.
- ❖ prepare standard solutions of acids and bases.
- ❖ analyse and estimate a chemical substance using titrimetric principles.
- ❖ plan experimental projects and execute them.

LIST OF EXPERIMENTS:

I Acidimetry and Alkalimetry

1. Estimation of Na_2CO_3 .
2. Estimation of NaOH / KOH .
3. Estimation of Oxalic acid.
4. Estimation of HCl
5. Estimation of H_2SO_4

II Redox Titrations

a) Permanganometry

- 1) Estimation of ferrous ion.
- 2) Estimation of oxalic acid.

b) Dichrometry

- 1) Estimation of ferrous ion
- 2) Estimation of ferric ion using external indicator (class work only)

III Iodometry and Iodimetry

1. Estimation of potassium dichromate.
2. Estimation of potassium permanganate.

Suggested Readings:

Text Book:

Venkateswaran, V., Veerasamy, R. and Kulandaivelu, A.R, *Basic Principles of Practical Chemistry*, 2nd Ed., Sultan Chand & Sons, New Delhi, 2017.

Reference Books:

1. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part II), S. Viswanathan Co. Pvt., 1996.
2. B.S. Furniss, A.J. Hannaford, P.W. G. Smith, A.R. Tatchell, Vogel's Text Book of Practical Organic Chemistry. 5th Edn., Pearson Education, 2005.
3. Jeffery, G.H.; Bassett, J.; Mendham, J.; Denney, R.C. Vogel's Textbook of Quantitative Chemical Analysis, John Wiley and Sons.1989,
4. Gnanaprakasam, N.S and Ramamurthy, G. *Organic Chemistry Lab Manual*, S. Viswanathan, Pvt. Ltd, 2007.

Web Sources:

1. <https://www.youtube.com/watch?v=wRAo-M8xBHM>
2. <https://en.wikipedia.org/wiki/Titration>
3. https://en.wikipedia.org/wiki/Acid%E2%80%93base_titration
4. https://chem.libretexts.org/Ancillary_Materials/Demos_Techniques_and_Experiments/General_Lab_Techniques/Titration/Redox_Titration
5. <http://www.titrations.info/iodometric-titration>
6. <https://www.youtube.com/watch?v=KyZtyEF6kqk>
7. <https://www.youtube.com/watch?v=sFpFCPTDv2w>
8. <https://www.youtube.com/watch?v=YqfvRBJ-iPg>

DEPARTMENT OF MATHEMATICS – UG – CBCS -LOCF

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Title of the Course: Allied Mathematics - IV Semester: IV

Course Code: LUMSGE41 Contact Hours: 6hrs/w Credits: 5

Course Learning Outcomes:

- On completion of the course, the students are able to
- Acquire the knowledge in Arithmetic operations in solving real world problems.
- understand the concepts of iteration process.
- Implement the concepts of Newton's method.
- Understand the concepts of bijection method.
- Understand the concept of numerical differentiation and integration.

Pre Required Knowledge:

- ✓ Basic concept of differentiation and integration.
- ✓ To know the usage of arithmetic calculator.
- ✓ To know the mathematical problems solving techniques.

Unit I: Solution of Algebraic and transcendental equations

Solution of transcendental equations – Iteration method – Newton Raphson's method – Regular False method.

Unit II: Solution of simultaneous linear equations

Solution of simultaneous linear equations – Gauss method – Gauss Jordan method – Iteration method – Gauss seidal method.

Unit III: Finite difference

Finite difference – Forward difference – Backward difference – Operators E , μ , Δ , Δ operator and relations and properties.

Unit IV: Interpolation

Interpolation – Newton's Interpolation formula – Divided difference – Newton's divided difference formula – Stirling's and Bessel's formula – Gauss forward – Backward formula – Lagrange's formula.

Unit V: Numerical differentiation and Integration

Numerical differentiation and Integration – Trapezoidal rule – Simpson's 1/3 and 3/8 rule – Weddel's rule.

Suggested Topics for Group Discussion/ Presentation

- ✓ Iteration method
- ✓ Gauss Method
- ✓ Forward Difference Method
- ✓ Interpolation
- ✓ Trapezoidal Rule

Suggested Readings:

i) Text Book:

T.K. Manickavasagam Pillai and Narayanan, S. Vishwanathan, Numerical Analysis, Publications and printers, New Edition, 1994.

Unit 1: Chapter II – Sections 1,3,4,5

Unit 2: Chapter IV – Sections 1,2,3

Unit 3: Chapter V – Sections 1

Unit 4: Chapter VI – Section 1 (1.1 to 1.9)

Unit 5: Chapter VII – Section 1, 2

ii) Reference Books:

1. Grewal. B.S., Numerical Methods in Engineering & Science, Khanna Publishers, New Delhi, 2015.
2. Arumugam. S., Thangapandi Isaac. A. and Somasundaram. A., Numerical Methods, Second

Edition, SciTech Publications (India) Pvt. Ltd., Chennai, 2015.

3. Kandasamy.P.,Thilagavathy. K. and Gunavathy.K., Numerical Methods, 3rd Edition,S. Chand & Company Pvt. Ltd., New Delhi, 2006..

iii)Web Resources:

1. <https://onlinelibrary.wiley.com>
2. <https://mathforcollege.com>
3. <https://www.coursera.org>
4. <https://www.britannica.com>

DEPARTMENT OF CHEMISTRY – UG-CBCS-LOCF

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Title of the paper: Forensic Chemistry Semester: IV

Course code: LUCHSC41

Credits: 2

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ know the art of collecting, packaging and preserving different types of physical and trace evidence at crime scenes
- ❖ know the utility of colorimetry, electrophoresis and neutron activation analysis in identifying chemical and biological materials.
- ❖ understand the significance of microscopy in visualizing trace evidence and comparing it with control samples.
- ❖ gain the classification and characteristics of the narcotics, drugs and psychotropic substances.
- ❖ know the classification of poisons and their modes of actions.

Pre-Required Knowledge

- ✓ Sample preparation for chromatographic and spectroscopic evidence.

- ✓ Fundamental principles magnification and resolution of microscopes.
- ✓ Significance of toxicological finding.

Unit I: INSTRUMENTS

Chromatographic methods. Fundamental principles and forensic applications of thin layer chromatography, gas chromatography. Spectroscopic methods. Fundamental principles and forensic applications of Ultraviolet – visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy and mass spectroscopy. X –ray spectrometry. Fundamental principles and forensic applications, Neutron activation analysis – fundamental principles and forensic applications

Unit II: MICROSCOPY AND FORENSIC PHOTOGRAPHY

Compound microscope and Electron microscope. SEM, TEM, Stereomicroscope Polarization and application Forensic applications of microscopy. Basic principles and applications of photography in forensic science. 3D photography. Photographic evidence. Infrared and ultraviolet photography. Digital photography Vediography. Crime scene and laboratory photography.

Unit III: BASICS OF TOXICOLOGY AND POISONS

Techniques used in toxicology. Toxicological analysis and chemical intoxication tests. Postmortem Toxicology. Human performance toxicology. Doseresponse relationship. Accidental, suicidal and homicidal poisonings. Signs and symptoms of common poisoning and their antidotes. Collection and preservation of viscera, blood and urine for various poison cases. Application of immunoassays. Carbon monoxide poisoning. Vegetable poisons. Poisonous seeds, fruits, roots and mushrooms. Beverages. Alcoholic and non-alcoholic illicit liquors.

Unit IV: NARCOTICS, DRUGS, PSYCHOTROPIC SUBSTANCES AND ALCOHOLIC BEVERAGES

Definition of narcotics, drugs and psychotropic substances. Narcotics, stimulants, depressants and hallucinogens. General characteristics and common example of each classification. Natural, synthetic and semi-synthetic narcotics, drugs and psychotropic substances. Crime scene

search for narcotics, searching a vehicle. Clandestine drug laboratories. Collection and preservation of drug evidence. Testing of narcotics, drugs and psychotropic substances. Presumptive and screening tests for narcotics, drugs and psychotropic substances in breast milk, saliva, urine, hair and antemortem blood.

Unit V: SOIL & CLOTH EVIDENCE

Importance, location, collection and comparison of soil samples. Cloth evidence – importance, collection, analysis of adhering material. Matching of pieces. Fibre evidence – artificial and man – made fibres. Collection of fibre evidence. Identification and comparison of fibres.

Suggested Readings:

Text Books:

1. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition. The Foundation Press, Inc., New York 1995.
2. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey 2004.

References Books:

1. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's , Techniques of Crime Scene Investigation, CRC Press, Boca Raton 2013.
2. F.G. Hofmann, A Handbook on Drug and Alcohol abuse, 2nd Edition, Oxford University Press, New York 1983.

WebSources:

1. <https://www.youtube.com/watch?v=wl9prpOuHD8>
2. <https://www.youtube.com/watch?v=9xxGVSyavSM>
3. <https://nptel.ac.in/noc/courses/noc17/SEM2/noc17-cy03/>
4. https://www.incb.org/documents/Psychotropics/forms/greenlist/Green_list_ENG_08673.pdf

5. <https://www.atsdr.cdc.gov/training/toxmanual/modules/1/lecturenotes.html>

DEPARTMENT OF CHEMISTRY – UG-CBCS-LOCF

Title of the paper: Good Laboratory Practices **Semester: IV**

Course code: LUCHSC42 **Credits: 2**

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ understand the general laboratory practices
- ❖ learn various techniques to study chemical compounds and salts
- ❖ learn the various research issues and their solutions

Pre-Required Knowledge:

- ✓ Molarity and normality
- ✓ pH meter,
- ✓ Drying of glasswares
- ✓ Dyes

Unit I: GENERAL LABORATORY PRACTICES

Common calculations in chemistry laboratories. Understanding the details on the label of reagent bottles. Preparation of solutions. Molarity and normality of common acids and bases. Dilutions. Percentage solutions. Molar, molal and normal solutions.

Unit II: TECHNIQUE OF HANDLING

Technique of handling micropipettes; Knowledge about common toxic chemicals and safety measures in their handling.

Unit III: LABORATORY INSTRUMENT-TECHNIQUES I

Use of micropipette, analytical balances, pH meter, conductivity meter, rotary evaporator, potentiometer.

Unit IV: LABORATORY INSTRUMENT-TECHNIQUES II

Use of purified water in lab experiments, Cleaning and drying of glass wares, Preparation of crystals from given salt.

Unit V: LABORATORY PREPARATION PROCEDURE

Preparation of Dyes, Demonstration of preparation of material using Sol-gel procedure.

Suggested Readings:

Text Books:

1. Seiler, J.P. Good Laboratory Practices: the why and how. Springer-Verlag Berlin and Heidelberg GmbH & Co. K; 2nd ed.2005.
2. Garner, W.Y., Barge M.S., Ussary. P.J. (1992). Good Laboratory Practice Standards: Application for field and Laboratory studies. Wiley VCH.

References Books:

1. Edition by Sandy Weinberg, Taylor & Francis Good Laboratory Practice Regulations Third Edition Revised and Expanded, 2002.
2. Milton A. Anderson GLP Essentials A Concise Guide to Good Laboratory Practice, Second Edition

Web Sources:

1. <https://youtu.be/0k92G0Tx1bg>
2. https://youtu.be/uEy_NGDfo_8
3. <https://youtu.be/uJv1O1QVK0Q>
4. <https://youtu.be/nTaij4trdCQ>
5. <https://youtu.be/W0oacysFTko>

DEPARTMENT OF CHEMISTRY – UG – CBCS - LOCF

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Title of the paper: Organic Chemistry - II

Semester: V

Course code: LUCHCT51 Contact Hours: 3hrs/w

Credits: 3

Course Learning outcomes

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

- ❖ explain the preparation and properties of aliphatic carboxylic acids and their derivatives.
- ❖ gain knowledge on the preparation and properties of aliphatic nitrogen compounds.
- ❖ explain the stereochemistry and conformational aspects of the molecules.
- ❖ understand the mechanism behind rearrangement reactions.
- ❖ gain knowledge on the preparation and properties of carbohydrates

Pre-Required Knowledge

- ✓ Oxidation of alcohols and aldehydes to carboxylic acids
- ✓ Ester hydrolysis
- ✓ Polarimetric determination of optical activity
- ✓ Symmetry elements and symmetry operations

Unit I: ALIPHATIC CARBOXYLIC ACIDS AND THEIR DERIVATIVES

Monocarboxylic acids: from Grignard reagent, hydrolysis of nitriles, Arndt-Eistert synthesis, Haloform reaction - Effects of substituent on acidity - Reactions – Reduction, Esterification, Acid halide, amide and Acid anhydride formation, HVZ reaction–inter-conversion of acid derivatives. Dicarboxylic acids: synthesis from acetoacetic ester and malonic ester - action of heat on oxalic acid, malonic acid, succinic acid - Blanc's rule. Synthesis of Maleic acid and Fumaric acid from bromosuccinic acid - conversion of maleic acid to fumaric acid and vice versa

Unit II: ALIPHATIC NITROGEN COMPOUNDS

Nitroalkane – preparation, properties and isomerism of nitroalkane. Diazo compounds - preparation and properties of diazomethane. Aliphatic amines – General methods of preparation and properties of aliphatic amines- Distinguish between primary, secondary and tertiary amines

Unit III: STEREOCHEMISTRY AND CONFORMATIONAL ANALYSIS

Stereoisomerism: Optical activity and optical isomerism – asymmetry - chirality, enantiomers – diastereomers - specific rotation - Configuration and projection formulae: Newmann, Sawhorse, Fischer and their interconversion - Chirality in molecules with one and two stereocentres; meso configuration. Racemic mixture and their resolution. D/L and R/S notations using CIP rules.

Geometrical isomerism: Geometrical isomerism of Maleic acid and Fumaric acid - cis-trans, syn-anti and E/Z notations.

Conformational analysis: Alkanes (Conformations, relative stability and energy diagrams of Ethane, Propane and butane) - relative stability of cycloalkanes – Baeyer strain theory- Cyclohexane conformations with energy diagram- Axial and equatorial positions - Conformations of monosubstituted cyclohexanes.

Unit IV: MOLECULAR REARRANGEMENTS

Detailed mechanisms of the following rearrangement reactions: Pinacol-pinacolone, Hofmann, Curtius, Claisen, Benzidine, Beckmann, Wagner-Meerwein, Fries, Cope rearrangement, Baeyer-Villiger rearrangement.

Unit V: CARBOHYDRATES

Monosaccharides – Classification with suitable examples- structural elucidation and configuration of glucose – Haworth structure – mutarotation - Fructose and Its properties - epimerization – Interconversion of glucose and fructose – Descent and ascent of the sugar series. Disaccharides - structure and properties of sucrose. Polysaccharides – structure and properties of starch and cellulose

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS:

- ✓ Chirality in biomolecules
- ✓ Bio polymers
- ✓ N-alkylation in synthesis of drugs
- ✓ Importance of strained molecules
- ✓ Problems involving R&S Notation

Suggested Readings

Text Books:

1. Bahl and Arun Bahl, Advanced Organic Chemistry, S. Chand Limited, 1987
2. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 2009
3. R.T. Morisson and R.W. Boyd S.K. Bhattacharjee, Organic Chemistry, Pearson Prentice Hall, 7th Edition, 2012.

Reference Books:

1. I. L. Finar, Organic Chemistry, Vol 1 and 2 (6th edition) England, Addison Wesley Longman Ltd. 2002.
2. G.R. Chatwaal, Chemistry of Natural Products, Volume I, Himalaya Publishing House, 2005.

WebSources:

1. <https://nptel.ac.in/courses/104/103/104103071/>
2. <https://nptel.ac.in/courses/104/106/104106119/>
3. <https://nptel.ac.in/courses/104/103/104103022/>

DEPARTMENT OF CHEMISTRY – UG – CBCS - LOCF

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Title of the paper: Inorganic Chemistry-II Semester: V

Course code: LUCHCT52 Contact Hours: 3hrs/w Credits: 3

Course Learning Outcomes

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

- ✓ gain knowledge on nuclear models, radioactivity and their types and applications
- ✓ learn the nomenclature, isomerism and theories of coordination compounds

- ✓ understand about the chemistry of halogens & noble gases.
- ✓ gain knowledge on classification and general properties of various non – aqueous solvents

Pre-Required Knowledge:

- ✓ Covalent bond-Coordination compounds and double salt
- ✓ Definition and basic understanding on halogens, halides and noble gases.
- ✓ Radioactivity definition-energy source of the sun-Atomic power projects in India.

Unit I: NUCLEAR CHEMISTRY

Constitution of the nuclei – stable and unstable nuclei – their relationship to n-p ratio – magic number – mass defect and binding energy – packing fraction – mass energy relationship– Soddy's group displacement law – law of radioactivity – disintegration – nuclear fission - atom bomb – nuclear fusion - hydrogen bomb – Applications of radioactivity in Medicine–Agriculture–Industry–as trace elements - investigation of reaction mechanism–Carbon dating.

Unit II: COORDINATION CHEMISTRY-I

IUPAC nomenclature of Ligands-Types of ligands- Monodentate and poly dentate ligands- Chelates and chelate effect - Stability constant- factors affecting stability constant- Isomerism (coordination number 4 and 6) in Complexes – Geometrical and Optical isomerism – Werner's Theory – Sidgwick Theory – EAN rule – Valence Bond theory – Low spin and high spin complexes – Magnetic properties – Limitation of VBT

Unit III: COORDINATION CHEMISTRY-II

Crystal field Theory – CFSE splitting of Octahedral and tetrahedral complexes - CFSE calculation - Spectrochemical series - Factors influencing the magnitude of CFSE –Colour and magnetic moment of the complexes - Spinels and inverse spinels– Jahn-Teller Distortion (elementary idea)- Difference between VBT and CFT

Unit IV: HALOGENS & CHEMISTRY OF NOBLE GAS

Halogens: Position of halogen in the periodic table– Basic properties of halogens– basic iodine. Anomalous behavior of fluorine – Interhalogen compounds – preparation, properties, uses and structure of ClF, BrF₃, IF₅ and IF₇ - Preparation, properties and uses of pseudohalides (cyanide) and pseudohalogens(cyanogen).Chemistry of noble gas: Position of noble gases in the periodic table–inert nature and uses of noble gases – geometry and shape of xenon compounds (XeF₂, XeF₄, XeF₆, XeOF₂ and XeO₃).

UNIT V: NON-AQUEOUS SOLVENTS

Non-aqueous Solvents: Classification of solvents – General properties of ionizing solvents-chemical reactions in liquid ammonia-Liq.SO₂, Liq. H₂S, Liq.HF as solvents. Comparison of chemical reactions in liquid ammonia and water.

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

- ✓ Natural and Artificial radioactivity
- ✓ Werner's Coordination theory
- ✓ Chelation
- ✓ Anomalous behavior of fluorine
- ✓ Ionizing and non-ionizing solvents

Suggested Readings:

Text Books:

1. B.R. Puri and L.R. Sharma & K.C. Kalia. Principles of Inorganic Chemistry, Vishal Publishing Co., 2017
2. P.L. Soni, and M. Katyal, Text Book of Inorganic Chemistry, (Twentieth Edition) Sultan Chand and Sons, 2015.

Reference Books:

1. J.D. Lee, Concise Inorganic Chemistry, 5th edn., Blackwell Science, London, 2014.

2. R.D. Madan, Modern Inorganic Chemistry. S.Chand& Company, Ltd., 2002.
3. R. Gopalan and V. Ramalingam, Concise Coordination, Chemistry, Vikas Publishing House Pvt Ltd, 2003.
4. W.U.Malik, G.D.Tuli and R.D. Madan Selected Topics in Inorganic Chemistry, (First Edition) S. Chand & Company Ltd., 2008.
5. Cotton, F.A., Wilkinson, G. and Gus, P.L., *Basic Inorganic Chemistry*, (Third Edition) John Wiley & Sons (Asia) Pte. Ltd., 2007.

Web Sources:

1. <https://nptel.ac.in/courses/115/104/115104043/>
2. <https://nptel.ac.in/courses/104/105/104105033/>
3. <https://classnotes.org.in/class12/chemistry12/p-block-elements12/oxoacids-halogens- interhalogen-compounds/>
4. <https://www.youtube.com/watch?v=s9OckI9AoNk>
5. <https://nou.edu.ng/sites/default/files/2018-09/Reviewed%20CHM424%20Non%20Aqueous%20Solvents%20%20Edited%20by%20prof%20Ayi%20%282%29.pdf>

DEPARTMENT OF CHEMISTRY – UG – CBCS – LOCF

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Title of the paper: Physical Chemistry - II Semester: V
Course code:LUCHCT53 Contact Hours: 3 hrs/w Credits: 3

Course Learning Outcomes

On completion of the course, the students are able to

- ✓ know about the theory of phase rule and its applications to various systems; and to study the Clausius Clapeyron equations.
- ✓ gain the knowledge about kinetics and its theories and can solve the problems related to kinetics.
- ✓ gain knowledge on the topic of catalysis and its applications, and the also the concept of adsorption and its significance.

- ✓ acquire knowledge about second and third law of thermodynamics.

Pre-Required Knowledge:

- ✓ KI – water system
- ✓ Critical solution temperature
- ✓ Catalytic decomposition of H_2O_2

Unit I: CHEMICAL EQUILIBRIUM

Reversible and irreversible reactions-statement and mathematical formulation of the law of mass action-Derivation of the law of Mass action from Kinetic theory-verification - K_p and K_c and their relationship-Factors influencing an equilibrium- Variation of K with temperature –Van't Hoff's isochore .Application of the law of Mass Action to the following equilibria – HI & PCl_5 - Le-chatelier's principle - Statement-Application to Haber's synthesis of NH_3 .

Unit II: PHASE RULE

Definitions of various terms in phase rule – Gibb's phase rule – one component system – water, and sulphur – polymorphism – two component system- reduced phase rule – simple eutectic system- Pb-Ag system– system involving compound formation with congruent and incongruent melting point – Zn - Mg system – FeCl_3 – H_2O system- Na_2SO_4 – H_2O system – $\text{CuSO}_4 \cdot \text{H}_2\text{O}$ dehydration phase diagram. Clausius - Clapeyron equations and their applications to equilibria in phase transitions. (Solid – liquid, liquid–vapour, solid–vapour).

Unit III: CHEMICAL KINETICS

Introduction – rate of reaction - rate law and rate constant – order and molecularity reaction- Second, third and zero order reactions – derivation of rate constant of a first order reaction. Reaction of Uni and pseudo-unimolecular reactions. Catalytic decomposition of N_2O_5 , inversion of cane sugar and hydrolysis of ester by acid.Influence of temperature on the rate of reaction – Arrhenius rate equation and its significance. Theory of reaction rates:– unimolecular reactions – Lindemann's hypothesis – Absolute Reaction Rate theory.

Unit IV: SURFACE CHEMISTRY AND CATALYSIS

Adsorption: Definition of variation terms- adsorption of gases on solids – physical adsorption and chemisorption – factors influencing adsorption – adsorption isotherm – Freundlich isotherm, Langmuir isotherm– application of adsorption Catalysis: definition- characteristics -theories of catalysis – promoters and poisons – enzyme catalysis – mechanism – Michaelis Menten equation acid –base catalysis and autocatalysis – application of catalysis.

Unit V: SECOND AND THIRD LAW OF THERMODYNAMICS

Limitation of 1st law of thermodynamics –spontaneous process –statement of second law – conversion of heat into work-thermodynamic efficiency-Carnot cycle- Carnot theorem. Entropy-definition and significance.

Free energy function –Helmholtz free energy (A) - definition and its temperature dependence - Gibbs free energy (G) - definition, variation of Gibbs free energy with temperature and pressure. Maxwell's relationship – Criteria for spontaneity - Gibbs – Helmholtz equation and its applications - criteria for reversible and irreversible processes in terms of entropy and free energy changes

Third law of Thermodynamics - Nernst heat theorem and its applications-third law of thermodynamics – a simple treatment of the law.

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATION

Le-chatelier's principle
FeCl₃ – H₂O system
Theory of reaction rates
Theories of catalysis
Carnot cycle

Suggested Readings:

Text Books:

1. B.R. Puri, L.R. Sharma, M.S.Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2008
2. B. S. Bahl, G. D. Tuli and Arun Bahl, —Essentials of Physical Chemistryll, S. Chand & Company Ltd, New Delhi, 12th Ed., 2011

Reference Books:

1. A.S Negi and S.C Anand, A Text book of Physical Chemistry, Wiley Eastern Ltd., 1994.
2. J.Rajaram and J.C. Kuriacose, Thermodynamics, Shoban Lal Nagin Chand and Co,1986
3. P.W. Atkins, Physical Chemistry, 7th edition, Oxford University, 2001

WebSources:

1. <https://nptel.ac.in/courses/103/105/103105127/>
2. <https://nptel.ac.in/courses/112/104/112104248/>
3. <https://www.youtube.com/watch?v=EAyqcA3HdIA>
4. <https://www.youtube.com/watch?v=ZO1fjHp9mgs&list=PLk2sb31ABn16N1NV-lqTBzRSjQdTlvGk8>
5. <https://www.youtube.com/watch?v=ZO1fjHp9mgs&list=PLk2sb31ABn16N1NV-lqTBzRSjQdTlvGk8&index=1>

DEPARTMENT OF CHEMISTRY – UG – CBCS - LOCF

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Title of the paper: **Organic Estimation and Organic analysis** Semester: **V**

Course Code: **LUCHCL51** Contact Hours: **3hrs/w** Credits: **3**

Course Learning Outcomes

- On completion of the course, the students are able to
- write the reactions involved in organic estimation.
- estimate the amount of organic compound given in the unknown solution
- Identify the nature of the functional groups of organic compounds.

- know how to prepare solid derivative of organic compound.

I ORGANIC ESTIMATION: ANY FOUR

1. Estimation of phenol
2. Estimation of aniline.
3. Estimation of glycine.
4. Estimation of acetone.
5. Estimation of sucrose.
6. Estimation of formalin.
7. Estimation of acetyl group.

II ORGANIC ANALYSIS

Analysis of an organic compound containing one or two functional groups and confirmation by the preparation of a solid derivative – carboxylic acids, phenols, aldehydes, ketones, esters, nitro compounds, amines (primary and secondary), amides, anilides, aliphatic diamide, side chain and nuclear halogen compounds, aliphatic diamide containing sulphur and monosaccharides.

Suggested Readings

Text Books:

1. Basic Principles of Practical Chemistry, Kulandaivelu A.R., Veeraswamy R. Venkateswaran, Sultan Chand & Sons, 2017.
2. Vogel's Text book of Practical Organic Chemistry, Brian S. Furniss, Antony J. Hannaford, Peter W. G. Smith, Fifth Edition, Bath Press, Great Britain, 1989

Reference Books:

1. Practical Chemistry, Pandey D.N., Sultan Chand Publishers, 2018.
2. Vogel's Textbook of Quantitative Chemical Analysis, G H Jeffery, J Bassett, J Mendham, R C Denney, Fifth Edition, Bath Press, Great Britain, 1989

Web Sources:

1. <https://nptel.ac.in/courses/104/106/104106108/>
2. <https://nptel.ac.in/courses/104/106/104106108/#>

Title of the paper: Gravimetric Analysis & Organic Preparation **Semester: V**

Course Code: LUCHCL52 Contact Hours: 5hrs/w Credits: 3

Course Learning Outcomes

On the completion of the course the student will be able to

- ❖ acquire, theoretical and practical knowledge on organic preparation and inorganic gravimetric measurements
- ❖ understand the principles and terminology involved in gravimetric measurements.
- ❖ carryout preparation of simple organic compounds and gravimetric estimation.
- ❖ interpret experimental results and draw reasonable conclusions

I. Gravimetric Estimation:

- Estimation of lead as lead chromate
- Estimation of barium as barium chromate
- Estimation of calcium as calcium oxalate monohydrate.

II. Organic Preparation:

Oxidation: Preparation of benzoic acid from benzaldehyde.

Hydrolysis: (i) Preparation of benzoic acid from benzamide.

(ii) Preparation of benzoic acid from ethyl benzoate.

Acetylation: Preparation of acetanilide from aniline.

Bromination: Preparation of p-bromoacetanilide from acetanilide.

Nitration: (i) Preparation of m-dinitrobenzene from nitrobenzene (ii) Preparation of picric acid from phenol.

Benzoylation: Preparation of β -naphthyl benzoate from β -naphthol

Addition: Preparation of osazone from glucose.

Suggested Readings

Text Books:

1. Venkateswaran, V., Veerasamy, R. and Kulandaivelu, A.R., Basic Principles of Practical Chemistry (Second Edition), Sultan Chand and Sons, New Delhi, 2017.
2. Practical Chemistry by A.O. Thomas, Scientific Book Centre, Cannanore, 2003.

Reference Book:

1. Vogel's textbook of practical organic chemistry (5th ed.), revised by Brian S. Furniss, Antony J. Hannaford, Peter W. G. Smith, and Austin R. Tatchell, 5ed Paperback, Pearson 2003.

Title of the paper: Electrochemistry Semester: V
Course Code: LUCHDS51 Contact Hours: 3hrs/w Credits: 3

Course learning outcomes

On completion of the course, the students are able to

- ❖ know the fundamental concepts of conductance studies
- ❖ learn the fundamentals of electro chemical cells and the calculate on of cell potential.
- ❖ understand the various applications of conductivity measurements
- ❖ understand the various applications of EMF measurements.
- ❖ learn the knowledge on the determination of pH

Pre-Required Knowledge:

- ❖ Oswald's dilution law, Debye-Huckel theory of strongelectrolytes.
- ❖ Quantitative aspects of Faraday'slaws of electrolysis
- ❖ Wien effect, Debye-Falkenageneffect, Walden'srules
- ❖ Theories of corrosion

Unit I: INTRODUCTION TO ELECTROCHEMISTRY

Introduction - definition and determination of specific, equivalent and molar conductance - variation of equivalent conductance with dilution - Strong and weak electrolytes - anomaly of strong electrolytes – Debye-Huckel-Onsager equation (no derivation) - Kohlrausch's law of ionic mobilities and its applications- transport number of ions and their determination by moving boundary method.

Unit: II: P^H AND ITS DETERMINATION

Applications of conductivity measurements- degree of dissociation of weak electrolytes –ionic product of water - conductometric titrations. - solubility and solubility product of sparingly soluble salts- p^H and p^{OH} of solutions- buffer solutions –theory of buffer action- Derivation of Henderson-Hasselbalch equation.

Unit III: ELECTROCHEMICAL CELLS

Electrochemical Cells: Cell diagram and terminology –conventions regarding signs of cell emf – calculation of cell e.m.f from single electrode potential- standard emf of the cell- Types of electrodes –(i) Metal-Metal ion electrodes (ii) Amalgam electrodes (iii) Gas electrodes (iv) Metal insoluble salt electrodes (v) Oxidation –reduction electrodes. Electrode reactions – electrode potentials – reference electrodes – standard electrode potentials. Nernst equation for electrode potential.

Unit IV: TYPES OF CELLS

Concentration cells-Definition-Types of electrolytes - concentration cells- Concentration cells with and without transferences, liquid junction potential; determination of activity coefficients. Qualitative discussion of potentiometric titrations (acid-base and red oxtitrations).Galvanic cell - reversible and irreversible cells-thermodynamics and electromotive force-calculation of ΔG , ΔH , ΔS and K for cell reaction .

UnitV: EMF & CORROSION

Applications of emf measurements: Determination of solubility and solubility products of sparingly soluble salt. Determination of Equilibrium constants. Determination of pH using hydrogen electrode, glass electrode and quinhydrone electrode. corrosion – definition – types of corrosion -factors affecting corrosion and preventing measurements.

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

- * Strong and weak electrolytes
- * Theory of buffer action
- * Standard electrode potentials
- * Types of electrolyte concentration cells
- * Factors affecting corrosion

Suggested Readings:

Text Book:

1. B.R. Puri, L.R. Sharma and M.S. Pathania., Principles of Physical Chemistry, Vishal Publishing Co., 2012.

Reference Books:

1. Atkins, P.W and Paula, J.D. Physical Chemistry, 10th Ed., Oxford University Press, 2014.
2. Crow, D.R. Principles and applications of Electrochemistry, Chapman and Hall.1988
3. Bockris, J. O'M. and Reddy, A.K.N. Electrochemistry, Vol I and II, Rosetta edition, 2002.

Web Sources:

1. <https://nptel.ac.in/courses/103/108/103108162/>
2. <https://byjus.com/chemistry/electrochemical-cell/>
3. [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_\(Analytical_Chemistry\)/Electrochemistry](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Electrochemistry)
4. <https://opentextbc.ca/chemistry/chapter/17-7-electrolysis>

5. <https://courses.lumenlearning.com/boundless-chemistry/chapter/electrochemical-cells/>
6. <https://nptel.ac.in/content/storage2/courses/103108100/module6/module6.pdf>

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Title of the paper: Polymer Chemistry	Semester: V
Course code: LUCHDS52 Contact Hours: 3hrs/w	Credits: 3

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ name and explain the techniques of polymerization Understand the different types of polymers and its applications
- ❖ outline and construct the classifications of polymers
- ❖ know the processes of identifications of polymers
- ❖ relate and explain the preparation and properties of various polymers
- ❖ illustrate and utilize the techniques to determine the molecular weights and thermal analysis of polymers

Pre-Required Knowledge

- ✓ Specific chemical tests for various polymers and group analysis.
- ✓ Preparation and properties of resins.
- ✓ Average molecular weight of polymers.

UNIT-I: INTRODUCTION TO POLYMERS

Introduction – history – concept of functionality and reactivity – degree of polymerization – techniques of polymerization: Bulk, solution, emulsion and suspension polymerization.

UNIT-II: CLASSIFICATIONS OF POLYMERS

Homopolymers, co-polymers, linear polymers, branched polymers, cross linked and three dimensional polymers, block co-polymers, organic- inorganic polymers, natural and synthetic polymers, chain and step growth polymers, thermoplastic and thermoset.

UNIT-III: IDENTIFICATION OF POLYMERS

Preliminary tests, elemental analysis, solubility chart, specific end group analysis (acid value, hydroxyl Value, iodine value, epoxy value, SAP value, amine value) – spectroscopic analysis (IR & NMR) – solubility chart for identification of polymers –

UNIT-IV: PREPARATION AND PROPERTIES OF POLYMERS

Preparation, properties and applications of polyethylene (HDPE, MDPE, LDPE, LLDPE), polypropylene (PP), polyisobutylene (PIB), acrylics (PMMA & PAN), polyvinyls (PVC), and polystyrene - Polyamides: Nylon-6, Nylon-6,6 and Kevlar.

UNIT-V: MOLECULAR WEIGHT OF POLYMER

Molecular weight determination using viscometry, osmometry, light scattering, ultracentrifuge

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

- ✓ Water based polymers
- ✓ Chain and step growth polymers
- ✓ Solubility chart for identification of polymers
- ✓ Molecular weight of polymers.

Suggested Readings:

Text Book:

Gowariker, V.R., Viswanathan, N.V., JayadevShreedhar, Polymer Science, New Age International, India, 1997.

References Books:

1. Bhatnagar, M.S., Text book of Polymer Chemistry, S Chand publication, 2008.
2. Stevens, M.P., Polymer Chemistry, 2nd Ed., Oxford Univ. Press., 1990.
3. Premamoy Ghosh, Polymer Science and Technology of Plastics and Rubbers, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1996.

Web Sources:

1. https://onlinecourses.nptel.ac.in/noc20_cy21/preview
2. <http://web.mit.edu/5.33/www/lec/poly.pdf>
3. <https://pubs.acs.org/doi/pdf/10.1021/ed058p837>
4. <https://ncert.nic.in/ncerts/l/lech206.pdf>

DEPARTMENT OF ENGLISH – UG – CBCS-LOCF

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Title of the Course: Communicative English-I **Semester: V**
Course Code: LUENNM51 **Contact Hours: 2hrs/w** **Credits: 2**
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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/1_3226186&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 Lok Sabha – The Rajya Sabha –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
- 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://legislative.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. New Delhi: 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.icaai.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.

NON MAJOR ELECTIVE
DEPARTMENT OF MATHEMATICS – UG – CBCS - LOCF
(For those who join in June 2022)

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Title of the paper: Mathematical Skills for
Competitive Examinations- I

Course code: LUMSNM51 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- Provide the students with an overview of Aptitude view in Mathematics.
- Learn about topics such as logic and proofs and easy calculations ways.
- Give clear idea about competitive exams.
- Develop various Mathematical skills to solve the problems.
- Evaluate various real life situations by resorting to analyse of key issues and factors.

Pre Required Knowledge:

- ✓ Understand the foundation of mathematics.
- ✓ Problem solving skills.
- ✓ Basic knowledge of mathematics ideas.

Unit I: Problems on Numbers.

Problems on Numbers.

Unit II: Ratio and Proportions

Ratio and Proportions.

Unit III: Time and work

Time and work.

Unit IV: Time and Distance

Time and Distance.

Unit V: Problems on Trains

Problems on Trains.

Suggested Topics for Group Discussion/ Presentation

1. Formation of equations
2. Problems on Proportion
3. Important facts and Formulae on time and work
4. Important facts and Formulae on time and distance
5. Problems on Trains

Suggested Readings:**(i) Text Books:**

R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations, Revised and Enlarged edition. S.Chand Publications, New Delhi, Reprint 2011.

Unit I: Chapter 7

Unit I: Chapter 12

Unit III: Chapter 15

Unit IV: Chapter 17

Unit V: Chapter 18

(ii) Reference Books:

1. R. Gupta, Quantitative aptitude, unique Publishers Pvt. Ltd, 2013.
2. G. K. Ranganath, C. S. Sampangiram and Y. Rajaram, A text book of business Mathematics, 2008, Himalaya Publishing House.
3. R.V. Praveen, Quantitative Aptitude and Reasoning by, 2nd revised edition, 2013, Prentice – Hall of India Pvt. Ltd.

(iii) Web Resources:

1. <https://affairsccloud.com/aptitude-questions/age.html>
2. <https://affairsccloud.com/aptitude-questions-profit-and-loss-set-23.html>
3. <https://www.youtube.com/watch?v=0Hqd1M0UuAQ>
4. <https://www.bankexamstoday.com/2013/10/time-and-distance-problems-solutions.html>
5. <https://www.bankexamstoday.com/2015/07/simple-interest-and-compound-interest.html>

DEPARTMENT OF PHYSICS – UG – CBCS - LOCF

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

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>
3. <https://byjus.com>

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 parts and 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 parts and 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. Subramaniam. (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-esplanted/5520>.

DEPARTMENT OF NCC – UG - CBCS - LOCF

PART IV - NON MAJOR ELECTIVE

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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 about NCC organization.
- ✓ Understanding the Military 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 defense Organization 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 CHEMISTRY – UG –CBCS- LOCF

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Title of the paper: Analytical Chemistry Semester: V
Course Code: LUCHSE51 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes

On completion of the course, the students are able to

- gain knowledge in principle of precipitation and gravimetric analysis
- understand the basic principle of different analytical techniques
- perform experiments with accuracy and precision.
- acquire knowledge about qualitative and quantitative analysis
- understand the theory and applications of chromatography techniques
- understand the theory and applications of chromatography techniques.

Pre-Required Knowledge

- ✓ Introduction to Precipitation
- ✓ Types of error
- ✓ Acid base titration
- ✓ Basic Principles of common types of chromatography

Unit I: PRECIPITATION

Principle of gravimetric analysis - Methods of obtaining the precipitate — choice of precipitants - merits and demerits of organic precipitants—specific and selective precipitants – DMG, cupferron, salicyladehyde, ethylene diamine –Sequestering agents—co-precipitation and post-precipitation—differences- precipitation from homogeneous solution.

Unit II: ERROR ANALYSIS

Definition of terms mean, median and range- Precision-standard deviation– accuracy—absolute and relative

error - minimization of errors -determinate (systematic), indeterminate (or random) errors. Significant figures & computation values. Analysis of experimental results – Graphical method – curve fitting – method of least square – Problems involving straight line graphs

Unit III: QUALITATIVE AND QUANTITATIVE ANALYSIS

Principles of reaction involved in qualitative and quantitative analysis - Types of qualitative and quantitative analysis- oxidation-reduction, and complexometric titrations using EDTA-use of indicators - definition of various concentration terms-molarity,normality,molality and mole fraction.

Unit IV: INSTRUMENTATION

Basic principle and instrumentation of conductometry, potentiometry and UV-Vis spectrophotometry

Unit V: CHROMATOGRAPHY

Nature of the adsorbent solvent systems – R_f value - various modes of development: ascending, descending and horizontal–Detection of spots–Thin layer chromatography–paper chromatography-Reversed phase and Preparative column chromatography–Gas chromatography–Applications

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

- ✓ Principles of gravimetric analysis
- ✓ Minimization of errors
- ✓ Normality concept
- ✓ UV-Vis spectrophotometry
- ✓ Thin layer chromatography

SUGGESTED READINGS:

Text Books:

1. R.Gopalan, P.S.Subramanian and K. Rengarajan, Elements of Analytical Chemistry, Sultan Chand & Sons, New Delhi, 2003.

2. Chatwal, G.R. Analytical Chemistry, Himalaya Publishing house, 1st Ed., 2011.

Reference Books:

1. A.I. Vogel, Textbook of Quantitative Inorganic Analysis, 3rd edition, Longman, London, 1961.
2. Douglas A. Skoog and Donald M. West, Principle of Instrumental Analysis, Saunders, Philadelphia, 1980.
3. Mikes, O. Laboratory Hand Book of Chromatographic & Allied Methods, Elsevier Harwood John Wiley 1979.
4. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson, 2009.
5. Skoog D.A., Holler F.J., Nieman T.A., Principles of instrumental analysis, 5th Edn., Brooks & Cole 1997.
6. Christian, G.D. Analytical Chemistry, 6th Ed. John Wiley & Sons, New York, 2004.

Web Sources:

http://chem320.cs.uwindsor.ca/Notes_files/320_I15.pdf
<https://nptel.ac.in/courses/104/105/104105084/#>
<https://nptel.ac.in/content/storage2/courses/102103044/pdf/mod5.pdf>
https://onlinecourses.nptel.ac.in/noc20_cy18/preview

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Title of the paper: Nano Chemistry Semester: V
Course code: LUCHSE52 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes

On completion of the course, the students are able to

- * gain the basics of Nano-Chemistry and Nano science
- * gain preparation and properties of Nano Particles
- * gain knowledge on the topic of Synthetic Techniques: Techniques to synthesize nanoparticles
- * acquire knowledge about Instrumental Techniques used in nano chemistry

Pre-Required Knowledge

- ✓ Green synthesis of nanoparticles
- ✓ Metal nanoparticles
- ✓ Applications of nanotechnology

Unit I: BASIC OF NANO CHEMISTRY

Basics of Nanochemistry: Introduction – definition – length scales – importance of nanoscale and its technology – self assembly of materials – self assembly of molecules – porous solids, nanowires, nanomachines and quantum dots.

Unit II: TYPES OF NANOPARTICLES

Nano Particles: Introduction – different types of nanoparticles – Inorganic based, Carbon based, Organic based and composite based nano particles – examples.

Unit III: SYNTHETIC METHODS

Synthetic of nanoparticles - Techniques used to synthesize nanoparticles – top down and bottom up approaches – common growth methods.

Unit IV: CARBON NAN MATERIALS

Nano Materials: Preparation, properties and applications of carbon nanotubes, nanorods, nano fibre and nanoclay.

Unit V: INSTRUMENTAL TECHNIQUES

Instrumental Techniques: Basic principles of Electron microscopes – scanning electron microscopes (SEM) – transmission electron microscopes (TEM) – atomic force microscopy (AFM) – scanning tunneling electron microscope (STEM)

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS:

- Importance of Nanochemistry
- Applications of Nanochemistry to different fields
- Scanning Electron Microscope (SEM)
- Nanochemistry in prehistoric time

Suggested readings:

Text Book:

S. Shanmugam, Nanotechnology, MJP Publishers, Chennai, 2010.

Reference Books:

1. A Handbook on Nanochemistry, Patrick Salomon, Dominant Publishers and Distributers, New Delhi.
2. Nanobiotechnology, S. Balaji, MJP Publishers, Chennai, 2010.
3. A Handbook on Nanochemistry, Patrick Salomon, Dominant Publishers and Distributers, New Delhi.
4. Nanobiotechnology, S. Balaji, MJP Publishers, Chennai, 2010.

WebSources:

1. <https://www.youtube.com/watch?v=k61wjab7iUs>
2. <https://www.youtube.com/watch?v=urkHytFJmck>
3. https://www.nanowerk.com/what_are_synthetic_nano_particles.php
4. <https://www.youtube.com/watch?v=sGmIF7mlc2Y>
5. <https://www.youtube.com/watch?v=R-330HJI6Dc>
6. <https://www.youtube.com/watch?v=hshvGT959qw>
7. <https://www.youtube.com/watch?v=Z51R49OOqAA>
8. https://www.youtube.com/watch?v=iiT_KJJ1Uhs

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Title of the paper: Mushroom Culture Technology Semester: V
Course code: LUCHSC51 Contact Hours: 0 Credits: 2

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ recall various types and categories of mushrooms.
- ❖ demonstrate various types of mushroom cultivating technologies.

- ❖ examine various types of food technologies associated with mushroom industry.
- ❖ value the economic factors associated with mushroom cultivation
- ❖ devise new methods and strategies to contribute to mushroom production.

Pre-Required Knowledge

- ✓ Composting technology in mushroom production
- ✓ Nutrition - Proteins - amino acids,
- ✓ mineral elements nutrition Carbohydrates, Crude fibre content - Vitamins

Unit I: INTRODUCTION TO MUSHROOM TECHNOLOGY

Introduction, History. Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms.

Unit II: EDIBLE MUSHROOMS

Types of edible mushrooms available in India - *Volvariellasp*, *Pleurotussp.*, *floridasp.*, *Agaricussp.*

Unit III: CULTIVATION TECHNOLOGY

Cultivation Technology for oyster mushroom- substrate- bed preparation, spawning, - maintains- forcers.

Unit IV: STORAGE OF MUSHROOM

Post mushroom Storage and preservation- Short-term storage, Long term Storage (canning, pickles, papads).

Unit V: MARKETING

Food Preparation: Types of foods prepared from mushroom. Research Centres - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value.

Suggested Readings:

Text Book:

1. Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore, 1991.

Reference Books

1. Tewari, Pankaj and Kapoor, S.C., Mushroom cultivation, Mittal Publications, Delhi.1988.
2. Nita Bahl Hand book of Mushrooms, II Edition, Vol. I & Vol. II.1984-1988.
3. Swaminathan, M. Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore – 560018,1990.

Web Sources:

1. <https://www.youtube.com/watch?v=7agK0nkiZpA>
2. <https://www.slideshare.net/alihaider408/nutritional-and-medicinal-benefits-of-mushrooms>
3. <https://www.epicurious.com/ingredients/how-to-buy-and-store-different-types-of-mushrooms-recipes-article>
4. <https://nptel.ac.in/courses/110/104/110104068/>

Title of the paper: Environment Impact Analysis Semester: V

Course code: LUCHSC52 Contact Hours: 0 Credits: 2

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ have a basic knowledge of various pollution sources and their impacts
- ❖ understand basic the various types of environmental pollution
- ❖ know about the impact of various types of pollutants and their assessment techniques.
- ❖ know about the positive and negative Environmental impact assessment.

Pre-Required Knowledge

- ✓ Introduction for Water and Air pollution, characteristics of water pollutants
- ✓ Source of soil pollution, pesticide pollution. Noise pollution

Unit I:INTRODUCTION POLLUTION

Classification of Pollution and Pollutants, Air Pollution Primary and Secondary Pollutants, air pollutants-sulfur dioxide- nitrogen dioxide, carbon monoxide, Impact of air pollutants on human, vegetation and environment, Ambient Air Quality Standards

Unit II: WATER POLLUTION

Source of Pollution, Major Pollutants of Water, Physical, chemical and biological

characteristics of water, Water borne diseases, Water Quality standards

Unit III NOISE POLLUTION:

Sources of Noise, Effects of Noise, measurement of noise, Equivalent sound pressure

level, Control measures

Unit IV: SOLID POLLUTION

Classification and sources of Solid Waste, Characteristics of Solid Waste, e-waste, radioactive wastes, Effects of urbanization on land degradation, Impact of Modern Agriculture on Soil, pesticide pollution, Effect on Environment.

Unit V: ENVIRONMENTAL IMPACT ASSESSMENT

Scale of impact-Global, local pollutants, Climate change, Ozone layer depletion, Deforestation, land degradation Environmental impact assessment, Need for EIA, EIA Procedure-Screening, Scoping, EIA procedure in India, Impact analysis- checklists, matrix methods, overlay analysis, Case studies of EIA.

Suggested Readings:

Text Books:

1. B.C Punmia , “Waste Water Engineering”, Laxmi Publications Pvt. Ltd,
2. Dr. PN Modi, “Sewage Treatment & Disposal and Waste water Engineering”, Standard Book House, New Delhi
3. John Glasson, RikiTherivel& S Andrew Chadwick “Introduction to EIA” University College London Press Limited
4. Larry W Canter, “Environmental Impact Assessment”, McGraw Hill Inc. , Newyork.

Reference Books:

1. Mackenzie L Davis, Introduction to Environmental Engineering, McGraw hill Education (India)
2. Peavy H S, Rowe, D.R. Tchobanaglou “Environmental Engineering” Mc Graw Hill Education.
3. Rau G J and Wooten C.D “EIA Analysis Hand Book” McGraw Hill 8. Robert A Corbett “Standard Handbook of Environmental Engineering” McGraw Hill

Web Sources:

1. <https://nptel.ac.in/courses/105/104/105104102/>
2. https://onlinecourses.swayam2.ac.in/nou21_bt02/preview
3. <https://www.classcentral.com/course/youtube-environmental-remediation-of-contaminated-sites-47479>
4. <https://www.classcentral.com/course/swayam-environmental-studies-14042>
5. <https://nptel.ac.in/courses/120/108/120108005/>

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Title of the paper: Organic Chemistry – III Semester: VI
Course Code: LUCHCT61 Contact Hours: 3hrs/w Credits: 3

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ know the preparation, properties and uses of aromatic acids and their derivatives.
- ❖ get the knowledge on preparation, properties and applications of N- containing compounds.
- ❖ know the preparation and properties of dyes, color and its constituents
- ❖ get an idea on the synthesis, reactions, applications and important features of heterocyclic compounds.

Pre-Required Knowledge:

- ✓ Introduction for mono and dicarboxylic acids
- ✓ Classification of Heterocyclic compounds
- ✓ Theory of colour and classification of dyes

Unit I: AROMATIC MONOCARBOXYLIC ACIDS AND THEIR DERIVATIVES

- Preparation and properties of benzoic acids - Effect of substituent on acidic characters.
- Preparation and properties of substituted benzoic acids: salicylic and anthranilic acids –
- Derivatives of benzoic acids – preparation and properties of benzoyl chloride and benzamide
- Side chain carboxylic acids : Preparation and properties of mandelic acid and cinnamic acid.

Unit II: AROMATIC DICARBOXYLIC ACIDS AND THEIR DERIVATIVES

Dicarboxylic acids – preparation and properties of phthalic acid, isophthalic acid and terephthalic acids.
Derivatives of phthalic acid – preparation and properties of phthalic anhydride and phthalimide.

Unit III :AROMATIC NITROGEN COMPOUNDS

Aromatic nitro compounds-preparation and properties of nitro compounds of benzene and toluene. Aromatic amino compounds: preparation and properties of aniline and isomers of toluidines- Synthetic uses of benzene diazonium chloride

Unit IV: HETEROCYCLIC CHEMISTRY

Heterocyclic compounds: Heterocyclic compounds containing one hetero atom – preparation, properties and structure of pyrrole, furan, thiophene, indole, pyridine,quinoline and isoquinoline.

Alkaloids: Definition - Classification of alkaloids and general methods for determining the structure of alkaloids – synthesis of nicotine, papavarine and piperine.

Unit V: DYES, COLOUR AND CONSTITUENTS

Definition - constitution-classification of dyes according to structure and applications. Azodyes-preparation of methyl orange congo red and bismark brown. Triphenyl methane dyes: preparation of malachite green, rosaniline and crystal violet. Phthalein dyes: preparation and properties of phenolphthalein, fluorescein and eosin. Vat dyes-preparation of Indigo

SUGGESTED TOPICS FOR GROUP DISCUSSION/ PRESENTATIONS:

- ✓ Aromatic monocarboxylic acids
- ✓ Aromatic Dicarboxylic acids
- ✓ structure of alkaloids
- ✓ Synthetic uses of Aromatic nitrogen compounds
- ✓ Classification of dyes and applications

Suggested Readings

Text Books:

1. M.K.Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing, Co., 2009.
2. Bahl and Arun Bahl, Advanced Organic Chemistry, S. Chand Limited, 1987

Reference Books:

1. I. L. Finar, Organic Chemistry, Vol 1 and 2 (6th edition) England, Addison Wesley Longman Ltd. 2002.
2. R.T.Morisson and R.W. Boyd S. K. Bhattacharjee, Organic Chemistry, PearsonPrentice Hall, 7th Edition, 2012.

Web Sources:

1. <https://nptel.ac.in/courses/104/103/104103071/>
2. <https://www.swayamprabha.gov.in/index.php/program/current/10/29315>
3. <https://www.youtube.com/watch?v=wFYsufJ9XMM>
4. <https://nptel.ac.in/courses/116/104/116104046/>
5. <https://www.swayamprabha.gov.in/index.php/program/archive/10>
6. <https://nptel.ac.in/course.html>

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Title of the paper: Inorganic Chemistry -III **Semester: VI**
Course code:LUCHCT62 Contact Hours: 3hrs/w **Credits: 3**

Course learning outcomes

On completion of the course, the students are able to

- ✓ understand the role of essential elements in biological system
- ✓ apply EAN rule calculations to organometallic compounds
- ✓ gain insight into the structure and function of Haemoglobin and myoglobin in our body
- ✓ get a detailed idea about inorganic polymers
- ✓ explain the extraction of lanthanides

- ✓ understand the general characteristics of transition elements

Pre-Required Knowledge

- ✓ Position in the periodic table – electronic configuration
- ✓ Elementary idea of poly nuclear metal carbonyl
- ✓ Comparison of lanthanides and actinides

Unit I: ORGANO METALLIC CHEMISTRY:

Organo metallic compounds- Definition – types of organo metallic compounds – Nomenclature of organometallic compounds- EAN rule as applied to organometallic compounds – ferrocene – preparation, properties – structure (Bonding not needed) – metal carbonyls (mono nuclear) preparation and structure and bonding – elementary idea of poly nuclear metal carbonyl.

Unit II: BIOINORGANIC CHEMISTRY:

Role of essential elements in biological system – Metallo porphyrin – chlorophyll and vitamin B12 (structure and function) – Hemoglobin and Myoglobin (structure and their role in biological system) – metalloenzyme – carbonic anhydrase (functions only).

Unit III: TRANSITION ELEMENTS (d-BLOCK ELEMENTS):

Position in the periodic table – electronic configuration – General characteristics – oxidation state – Reduction properties, colour, catalytic properties – origin of paramagnetism and Diamagnetism – Guoy's method – comparison of the properties of elements of first transition series with those of elements 2nd and third transition series.

Unit IV: INNER TRANSITION ELEMENTS (f-BLOCK ELEMENTS):

Inner transition elements a) The lanthanide series – occurrence – properties – Electronic configuration – Oxidation state, ionic radii – lanthanide contraction – consequences – causes – colour, magnetic properties, oxidation potentials, basic character, solubility of compounds

– Extraction of lanthanides from monazite sand –uses of lanthanides.

b) The actinide series – sources – transuranic element – preparation – Electronic configuration – properties – oxidation state – ionic radii – colour – formation of complexes – comparison of lanthanides and actinides.

Unit V: INORGANIC POLYMER:

Inorganic polymer – Definition and General properties – Glass transition temperature – structure and uses – phosphorus based polymer (polyphosphonitrilic chlorides) – Sulphur based polymers (polymer sulphur nitride) – boron based polymer (polymer boron nitride)- silicon based polymer (silicon rubber).

SUGGESTED TOPICS FOR GROUP DISCUSSION/PRESENTATIONS

- ✓ Poly nuclear metal carbonyl.
- ✓ Vitamin B₁₂ (structure and function)
- ✓ General characteristics of Transition Elements.
- ✓ Oxidation states of Lanthanides
- ✓ Silicon based polymer
- ✓ Guoy's balance method
- ✓ Vitamin B₁₂ (structure and function)
- ✓ General characteristics of Transition Elements.

Suggested Readings:

Text Books:

1. Puri, Sharma and Kalia. Principles of Inorganic Chemistry. Vallabhah Publications, 2003
2. R. Gopalan, Inorganic Chemistry for undergraduates, University Press, 2009.
3. .R.D.Madan. Modern Inorganic Chemistry, S.Chand& Company Ltd., 2002.

Reference Books:

1. Gary L Miessler and Donald A Tarr, Inorganic Chemistry, 3rd edition, Pearson Education, 2009
2. J.E. Huheey, E.A. Keiter and R. L. Keiter Inorganic chemistry: Principle of structure and reactivity, Harper Collins college publishers, IV edition, 1993

Web Sources:

1. <http://mpbou.edu.in/slm/mscche3p2.pdf>
2. http://www.aurobindo.du.ac.in/uploads/pdf/1587349118_Bioinorganic_Chemistry_Notes_for_B.Sc._LS_3rd_Year_VI_Semester.pdf
3. <https://chemistrynotes.com/pages/organic-chemistry-notes>
4. [http://www.vpscience.org/materials/Unit-IV%20Inorganic%20Polymers%20\(Sem-V\).pdf](http://www.vpscience.org/materials/Unit-IV%20Inorganic%20Polymers%20(Sem-V).pdf)

Title of the paper: Physical Chemistry – III Semester: VI
Course Code: LUCHCT63 Contact Hours: 4hrs/w Credits: 3

Course learning outcomes

On completion of the course, the students are able to

- ❖ know the basic principles of spectroscopy
- ❖ understand the various types of photochemical processes.
- ❖ equip learners with concepts of symmetrical elements and outcome.

Pre-Required Knowledge:

- ✓ ESR spectrum of Hydrogen atom, $(\text{SO}_3)_2 \text{NO}^-$ radical anion and Naphthalene negative ion
- ✓ Principles of the spectroscopy.
- ✓ Kinetics of the anthracene reaction
- ✓ Groups multiplication table – C_{3v}

Unit I: SPECTROSCOPY:I

Introduction-electromagnetic radiation-different regions- concept of frequency, wavelength, wave number, energy levels, quantization. Interaction of electromagnetic radiation with matter. Basic principles of atomic and molecular spectroscopy. Absorption spectroscopy.

Microwave spectra-selection rule-calculation of energy and internuclear distance for rigid diatomic molecule

Vibrational spectra: IR spectra of diatomic molecules- Hooke's law –simple harmonic oscillator - force constant –selection rule –vibrational energy level diagram.

Unit II: SPECTROSCOPY:II

Raman spectra- Raman effect–Quantum Theory-stokes and anti-stokes lines Electronic spectra-Born-Oppenheimer approximation-Franck-Condon principle Electron spin resonance spectroscopy-principle– presentation of ESR spectrum –hyperfine structure in ESR spectrum-selection rule - ESR spectrum of methyl radical.

Unit III: PHOTOCHEMISTRY

Definition of photochemical reactions Comparative study of thermal and photochemical reactions - laws of photochemistry - Lambert and Beer law – Grotthus-Draper law – Stark-Einstein law - Quantum efficiency and its determination -consequence of light absorption by atoms and molecules - photo physical processes- fluorescence, phosphorescence and other deactivating processes - Jablonski diagram.

Unit IV: PHOTOCHEMICAL PROCESSES

Kinetics of photochemical reactions- kinetics of photochemical combination of H_2-Cl_2 , H_2-Br_2 and decomposition of HI. Photochemical Equilibrium – flash photolysis - photo-sensitization, chemiluminescence – bioluminescence.

Unit V: GROUP THEORY

Molecular symmetry elements and symmetry operations
– Various point group with examples- Point group-
identification and determination- comparison of
molecular and crystallographic symmetry- Types of
symmetry operations - products of symmetry operations
- properties of a group - classes and sub groups –
groups multiplication table - C_{2v} . Point groups
Classification of molecules into point groups – C_{2v} , C_{3v} ,
 C_{2h} , D_{2h} , D_{3h} , D_{4h} , D_{6h} , T_d and O_h .

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

Basic principles of atomic and molecular spectroscopy
Born-Oppenheimer approximation
Laws of photochemistry
Flash photolysis
Various point group with examples

Suggested Readings:

Text Book:

1. B.R. Puri, L.R. Sharma and M.S. Pathania., Principles of Physical Chemistry, Vishal Publishing Co., 2012.
2. B. S. Bahl, G. D. Tuli and Arun Bahl, —Essentials of Physical Chemistryll, S. Chand & Company Ltd, New Delhi, 12th Ed., 2011

Reference Books:

1. C.N.Banwell, Fundamentals of molecular spectroscopy, 3rd Edition, McGraw Hill Book company, 1983.
2. V. Ramakrishna and Gopinath, Group theory in Chemistry, 2nd Edn, Vishal publications, 1991.

WebSources:

1. https://onlinecourses.nptel.ac.in/noc20_cy13/preview
2. <https://nptel.ac.in/courses/104/101/104101099/>
3. <https://nptel.ac.in/courses/104/106/104106075/>

4. https://www.youtube.com/watch?v=M1v_77kswgg
5. <https://nptel.ac.in/courses/104/106/104106048/>
6. https://www.youtube.com/watch?v=V_8m2rkvMVg
7. <https://www.youtube.com/watch?v=CM4qsSlitQOY>

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Title of the paper: Physical Chemistry Experiments Semester: VI
Course Code: LUCHCL61 Contact Hours: 4hrs/w Credits: 3

Course learning outcomes

On completion of the course, the students are able to

- know how to draw graphs.
- know how to determine the different physical parameters using physical chemistry experiments.

PHYSICAL CHEMISTRY EXPERIMENTS:

1. Determination of molecular weight by
 - a) Transition temperature
 - b) Rast method
2. Phase diagram
 - a) Simple eutectic – m-dinitrobenzene – naphthalene
 - b) Compound formation
3. Critical solution temperature Determination of CST of phenol – water system and effect of impurity on CST – Strength of sodium chloride.
4. Thermo chemistry Heat of solution – ammonium oxalate
5. Kinetics Relative strength of acids – rate constant determination
6. Electrochemistry.
 - a) Conductivity
 - i) Conductivity titration between an acid and base.
 - b) Potentiometric titrations
 - ii) KMnO_4 Vs FAS

Suggested Readings:

Text books:

1. Venkatesan, V., Veeraswamy, R. and Kulandaivelu, A.R. Basic Principles of Practical Chemistry, 2ndEd., Sultan Chand & Sons Publication, New Delhi, 1997.
2. Viswanathan, B., Raghavan, P.S. Practical Physical Chemistry Viva Books, 3rd Ed., 2009.

Reference books:

1. Thomas, A.O. Text Book of Practical Chemistry, Scientific Publication, 4th Revised Edition, 1976.
2. B. S. Bahl, G. D. Tuli and Arun Bahl, —Essentials of Physical Chemistry, S. Chand & Company Ltd, New Delhi, 12th Ed., 2011
3. Yadav, J. B. Advanced Practical Physical Chemistry, 22ndEd., GOEL publishing House, Krishna Prakashan Media Ltd, 2005.

Web Sources:

1. <https://www.youtube.com/watch?v=RR3ys87p9aA>
2. <https://www.youtube.com/watch?v=2VzEpsEZOY0>
3. <https://www.youtube.com/watch?v=tOGdZFDU2eU>
4. https://www.youtube.com/watch?v=8jp_wlQcE3Y
5. <https://www.youtube.com/watch?v=WwjFwNhmhZ0>

Title of the paper: PROJECT

Semester: VI

Course Code: LUCHPJ61 Contact Hours: 4hrs/w Credits: 4

Course learning outcomes

- On completion of the course, the students are able to
- know how to develop an aptitude for research in chemistry.
- know how to learn research methodology and literature search
- learn to identify appropriate research topic and presentation

Procedure

- Topics of chemical interest can be selected for the project. Project is to be done by a group not exceeding 5 students.
- Every student should submit typed (A4 paper, 12 Font, 1.5 Space, 20- 30 pages), spirally bind project report duly attested by the supervising teacher and the Head of the Department on the day of practical examination before a board of two Examiners for viva voce examination. The viva-voce based on the project is conducted individually.
- Project topic once chosen shall not be repeated by any later batches of students. List of projects submitted year wise is to be maintained in a register and submitted before the examiners if requested.
- The project report may contain the following sections:
 1. Preliminary (Title page, declaration, certificate of the supervising teacher, content etc.)
 2. Introduction with relevant literature review and objective
 3. Materials and Methods
 4. Results
 5. Discussion
 6. Conclusion / Summary
 7. References.

TOUR VISIT

Study tour and Factory/ research institute visit
Students are directed to visit one research institute/ chemical factory preferably within the state of Tamil Nadu. Scientifically prepared hand written/typed study tour report along with photographs of candidate at the places of visit must be submitted by each student for summative examination on the day of the examination of project evaluation. The board of examiners can decide the scheme of evaluation of project, study tour report and viva voce.

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Title of the paper: Chemistry for Competitive Examinations Semester: VI

Course code: LUCHDS61 Contact Hours: 3hrs/w Credits: 3

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ understand atomic and molecular structure, fundamental particles
- ❖ solve numerical problems in electrochemistry, gaseous state, equilibria and thermodynamics
- ❖ write the mechanisms for organic reactions and rearrangements
- ❖ study the knowledge on main group elements and transition metals
- ❖ gain knowledge on instrumental methods and principles of qualitative and quantitative analysis

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: PHYSICAL CHEMISTRY-I

Basic Mathematical Concepts: Functions; maxima and minima; integrals; ordinary differential equations; vectors and matrices; determinants; elementary statistics and probability theory.

Atomic and Molecular Structure: Fundamental particles; Bohr's theory of hydrogen-like atom; wave-particle duality; uncertainty principle; Schrödinger's wave equation; quantum numbers; shapes of orbitals; Hund's rule and Pauli's exclusion principle; electronic configuration of simple homonuclear diatomic molecules.

Theory of Gases: Equation of state for ideal and non-ideal (van der Waals) gases; Kinetic theory of gases; Maxwell-Boltzmann distribution law; equipartition of energy.

Solid State: Crystals and crystal systems; X-rays; NaCl and KCl structures; close packing; atomic and ionic radii; radius ratio rules; lattice energy; Born-Haber cycle; isomorphism; heat capacity of solids.

Chemical Thermodynamics: Reversible and irreversible processes; first law and its application to ideal and nonideal gases; thermochemistry; second law; entropy and free energy; criteria for spontaneity.

Unit II: PHYSICAL CHEMISTRY-II

Chemical and Phase Equilibria: Law of mass action; K_p , K_c , K_x and K_n ; effect of temperature on K ; ionic equilibria in solutions; pH and buffer solutions; hydrolysis; solubility product; phase equilibria– phase rule and its application to one-component and two-component systems; colligative properties.

Electrochemistry: Conductance and its applications; transport number; galvanic cells; EMF and free energy; concentration cells with and without transport; polarography; concentration cells with and without transport; Debye-Huckel-Onsager theory of strong electrolytes.

Chemical Kinetics: Reactions of various order; Arrhenius equation; collision theory; transition state theory; chain reactions – normal and branched; enzyme kinetics; photochemical processes; catalysis.

Adsorption: Gibbs adsorption equation; adsorption isotherm; types of adsorption; surface area of adsorbents; surface films on liquids.

Spectroscopy: Beer-Lambert law; fundamental concepts of rotational, vibrational, electronic and magnetic resonance spectroscopy.

Unit III: ORGANIC CHEMISTRY

Basic Concepts in Organic Chemistry and Stereochemistry: Electronic effects (resonance, inductive, hyperconjugation) and steric effects and its applications (acid/base property); optical isomerism in compounds with and without any stereocenters (allenes, biphenyls); conformation of acyclic systems (substituted ethane/n-

propane/n-butane) and cyclic systems (mono- and di-substituted cyclohexanes).

Organic Reaction Mechanism and Synthetic Applications: Chemistry of reactive intermediates (carbocations, carbanions, free radicals, carbenes, nitrenes, benzyne etc...); Hofmann-Curtius-Lossen rearrangement, Wolff rearrangement, Simmons-Smith reaction, Reimer-Tiemann reaction, Michael reaction, Darzens reaction, Wittig reaction and McMurry reaction; Pinacol-pinacolone, Favorskii, benzoic acid rearrangement, dienone-phenol rearrangement, Baeyer-Villiger reaction; oxidation and reduction reactions in organic chemistry; organometallic reagents in organic synthesis (Grignard, organolithium and organocopper); Diels-Alder, electrocyclic and sigmatropic reactions; functional group inter-conversions and structural problems using chemical reactions. Qualitative Organic Analysis: Identification of functional groups by chemical tests; elementary UV, IR and ¹H NMR spectroscopic techniques as tools for structural elucidation.

Natural Products Chemistry: Chemistry of alkaloids, steroids, terpenes, carbohydrates, amino acids, peptides and nucleic acids.

Aromatic and Heterocyclic Chemistry: Monocyclic, bicyclic and tricyclic aromatic hydrocarbons, and monocyclic compounds with one hetero atom: synthesis, reactivity and properties.

Unit IV: INORGANIC CHEMISTRY

Periodic Table: Periodic classification of elements and periodicity in properties; general methods of isolation and purification of elements.

Chemical Bonding and Shapes of Compounds: Types of bonding; VSEPR theory and shapes of molecules; hybridization; dipole moment; ionic solids; structure of NaCl, CsCl, diamond and graphite; lattice energy.

Main Group Elements (s and p blocks): General concepts on group relationships and gradation in properties; structure of electron deficient compounds involving main group elements.

Transition Metals (d block): Characteristics of 3d elements; oxide, hydroxide and salts of first row metals; coordination

complexes: structure, isomerism, reaction mechanism and electronic spectra; VB, MO and Crystal Field theoretical approaches for structure, color and magnetic properties of metal complexes; organometallic compounds having ligands with back bonding capabilities such as metal carbonyls, carbenes, nitrosyls and metallocenes; homogenous catalysis. Bioinorganic Chemistry: Essentials and trace elements of life; basic reactions in the biological systems and the role of metal ions, especially Fe^{2+} , Fe^{3+} , Cu^{2+} and Zn^{2+} ; structure and function of hemoglobin and myoglobin and carbonic anhydrase.

Unit V: INSTRUMENTAL METHODS AND ANALYTICAL CHEMISTRY

Instrumental Methods of Analysis: Basic principles; instrumentations and simple applications of conductometry, potentiometry and UV-vis spectrophotometry; analysis of water, air and soil samples.

Analytical Chemistry: Principles of qualitative and quantitative analysis; acid-base, oxidation- reduction and complexometric titrations using EDTA; precipitation reactions; use of indicators; use of organic reagents in inorganic analysis; radioactivity; nuclear reactions; applications of isotopes.

SUGGESTED TOPICS FOR GROUP DISCUSSION/PRESENTATIONS

- ✓ Entropy and free energy- criteria for spontaneity.
- ✓ Reactions of various order
- ✓ Stereocenters (allenes, biphenyls)
- ✓ Essentials and trace elements of life
- ✓ Heterocyclic Chemistry
- ✓ Metal carbonyls

Suggested Readings:

References Books:

Organic Chemistry

1. Morrison Boyd & Bhattacharjee Organic Chemistry | Seventh Edition | By Pearson Paperback – 1,2010.

2. Paula Yurkanis Bruice Organic Chemistry | 8th Edition | By Pearson Paperback – 1, 2020
3. T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder Solomons's Organic Chemistry, Global Edition Paperback – 1, 2017.
4. Jonathan Clayden, Nick Greeves, Stuart Warren Organic Chemistry: Second Edition Paperback – 1, 2014.
5. Marc Loudon, Jim Parise Organic Chemistry Hardcover – Import, 2015
6. Michael B. Smith March's Advanced Organic Chemistry: Reactions, Mechanisms and Structured Paperback – 1, 2015.

Inorganic Chemistry

1. J.D. Lee, Concise Inorganic Chemistry: Fifth Edition, 2008.
2. Huheey / Medhi Inorganic Chemistry | Fourth Edition | By Pearson: Principles of Structure and Reactivity Hardcover – 1, 2006.
3. B.R. Puri, L.R. Sharma, K.C. Kalia, Principles of Inorganic Chemistry
4. Peter Atkins & Tina Overton & Jonathan Rourke & Mark Weller & Fraser Armstrong Shriver and Atkins' Inorganic Chemistry, 5th Edition
5. Concise Coordination Chemistry; R. Gopalan & V. Ramalingam; Vikas.
6. Basic Inorganic chemistry; F.A. Cotton, G. Wilikinson & P.L. Gauss; Wiley

Physical Chemistry

1. Principles of Physical Chemistry by B. R. Puri, Madan S. Pathania, L. R. Sharma, Edition 47, 2017.
2. Atkins' Physical Chemistry: by Peter Atkins, Julio de Paula, James Keeler
3. A Textbook of Physical Chemistry K L KAPOOR

Spectroscopy & Analytical Chemistry

1. C.N Banwell, and McCash, Fundamentals of Molecular Spectroscopy, 4th Edition, 2017.
2. Douglas A. Skoog, Donald M. West San Jose Fundamentals of Analytical Chemistry. 9th Edition. Stanford University, 2013.
3. Subramanian P.S. Gopalan R., Rangarajan K. Elements of Analytical Chemistry, 2003.
4. Y.R Sharma, Elementary Organic Spectroscopy Principles and Chemical Applications, 2021.

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/>

Title of the paper: Pharmaceutical Chemistry Semester: VI
Course Code: LUCHDS62 Contact Hours: 3hrs/w Credits: 3

Course Learning Outcomes

On completion of the course, the students are able to

- ❖ study about the important terminologies of Pharma Chemistry, and brings about the knowledge towards Indian Medicinal Plants.
- ❖ know about Sulpha drugs, Antibiotics and their important features, and gives the clinical uses of Antiseptics and disinfectants.
- ❖ bring about a clear idea towards the drugs for cancer, Diabetes, AIDS and Blood related diseases.
- ❖ discuss about Vitamins, Hormones, Enzymes and their classifications

Pre-Required Knowledge

- ✓ Pharmaceutical index
- ✓ Structure-Activity relationship
- ✓ Vitamins and Hormones - introduction

Unit I: BASIC PHARMACEUTICAL CHEMISTRY

Definition of the following terms: drug, pharmacophore, pharmacology, Pharmacopeia, bacteria, virus and vaccine. Causes, symptoms and drug for anemia, jaundice, cholera, alaria and filarial. Indian Medicinal plants and uses – Tulasi, Neem, Kizhanelli, Mango, Semparuthi, Adadodai and Thoothvelai.

Unit II: ANTIBACTERIALS

Sulpha drugs-examples and actions-prontosil, sulphathiazole, sulphafurazole. Antibiotics-definition and action of penicillin, streptomycin, chloramphenicol, erythromycin-tetracyclin –SAR of chloramphenicol only. Antiseptics and disinfectans – definition and distinction –phenolic compounds, chlorocompounds and cationic surfactant.

Unit III: ANALGESICS AND CNS STIMULANTS

Analgesics: Definition and Actions – narcotic and non narcotic – morphine and its derivatives, pethidine and methodone – disadvantages and uses. Antipyretic analgesics -salicylic derivative, paracetamol, ibuprofen. Drugs affecting CNS – Definition, distinction and examples for tranquilisers, sedatives, hypnotics, psychedelic drugs – LSD, Hashish –their effects.

Unit IV: ANASTHETICS AND DRUGS FOR CHRONIC DISEASES

Anaesthetics - definition – local and general – volatile nitrous oxide, ether, Chloroform, cyclo propane – uses and disadvantages – non – volatile intravenous – thiopental sodium, methohexitone, propanidid. Causes, medicines and their mode of action for the treatment of cancer – antineoplastics – diabetes – hypoglycemic agents IDS – AZT,

DDC. Blood: Grouping, composition, Rh factor, blood pressure, hyper tension and hypotension.

Unit V: VITAMINS, HARMONES AND ENZYMES

Vitamins – fat soluble vitamins – (i) vitamin A; (ii) vitamin D; (iii) vitamin B complex; (iv) vitamin C; (V) vitamin E; (vi) vitamin K; (vii) vitamin P. Hormones – Introduction, properties and function of hormones, chemical nature of hormones. Physiological function of some harmones: Adrenaline, thyroxin, oxytoxin, insulin, the sex harmones. Enzymes – Chemical nature of enzymes, classification of enzymes, properties of enzymes, mechanism of enzyme action. Action of Co-enzymes.

SUGGESTED TOPICS FOR GROUP DISCUSSION/ PRESENTATIONS

- ✓ Covid-19: a boost to pharma sector?
- ✓ Pharmacological response to Covid-19 – rapid or ineffective?
- ✓ Harmful and Fruitful effects of Hormone injections.
- ✓ Lifestyle: impact on hormonal balance.
- ✓ CNS stimulants: does it really stimulate?

Suggested Readings:

Text Books:

1. Jayashree Ghosh, A Text Book of Pharmaceutical Chemistry, 3rd Edition, S.Chand& Company Ltd., New Delhi, 2003.
2. RamaRaoNadenla, Principles of Organic Medicinal Chemistry, 1st Edition, New Age International (P) Ltd, 2005.

Reference Books:

1. Ashutosh Kar, Medicinal Chemistry, 4th edition, New Age International 2012.
2. Dr. Lakshmi, Pharmaceutical Chemistry 3rd edn. Sultan and sons2005.

Web Sources:

1. <https://ccsuniversity.ac.in/bridge-library/pdf/Principle-Organic-Medicine-Chemistry.pdf>
2. https://www.fpharm.uniba.sk/uploads/media/Seminar_1_from_Pharmaceutical_chemistry_0pdf
3. <https://nptel.ac.in/content/storage2/courses/104103071/pdf/mod15.pdf>
4. <https://nptel.ac.in/courses/104/106/104106106/>

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Title of the paper: Applied Chemistry Semester: VI
Course Code: LUCHSE61 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes

On completion of the course, the students are able to

- gain knowledge on rubber and paper industry.
- gain knowledge on the domestically useful chemical products.
- know about match Industry and Silicate Industry.
- understand the fundamental idea about Petrochemicals, Paints and lacquers.
- know about Preparation, Properties and applications of polymers.

Pre-Required Knowledge

- ✓ Rubber and its compositions
- ✓ Elementary study of petrochemicals and Colored smokes
- ✓ Types of Polymerizations Process

Unit I: RUBBER AND PAPER INDUSTRY

Rubber - Natural and synthetic rubbers – Neoprene, Styrene – Butadiene rubber (SBR). Paper Industry – Raw materials – Manufacturing – Bleaching of Paper – Colouring of Paper.

Unit II: PREPARATION OF DOMESTICALLY USEFUL CHEMICAL PRODUCTS

Washing powder – Cleaning powder – Phenyls (White & Black coloured), shampoo, Liquid Blue, Blue, red and Green inks, Soap oil and pain balm.

Unit III: MATCH INDUSTRY AND SILICATE INDUSTRY

Match Industry – Pyrotechnics and explosives – Raw materials needed for match industry – Manufacturing process. Silicate Industry – Cement, Glass and Ceramics, Raw materials and manufactures of Cement, Glass and Ceramics.

Unit IV: PETROCHEMICALS, PAINTS AND LACQUERS

Petrochemicals – Definition – Origin – Composition – Chemicals from natural gas, Petroleum, Light Naphtha and Kerosene – Synthetic Gasoline.

Paints and lacquers – Pigments – Paints – Ingredients in Paints – Manufacture – Lacquers – varnishes.

Unit V: POLYMERS

Polymer, monomer, examples of polymers, biopolymers - Addition and condensation polymerization – Mechanism – Copolymer and Homopolymer – Definition of natural and synthetic fibers – Bakelite – Urea formaldehyde – decron – Nylon 66.

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

Polymers classifications and biopolymers
Natural and synthetic rubbers
Phenyls (White & Black coloured)
Raw materials and manufactures of Cement
Synthetic Gasoline.

Suggested Readings:

Text Book:

Sharma B.K. Industrial Chemistry, Krishna Prakashan Media (P) Ltd., 2011.

Reference Books:

1. Ashutosh Kar, Medicinal Chemistry, New Age International Publisher, 2005

- Jayashree ghosh, a text book of pharmaceutical chemistry, S. Chand & Company Ltd., 2012.

Web Sources:

- <https://www.youtube.com/watch?v=ppdkT8TGHbl>
- <https://www.youtube.com/watch?v=X4j1DRHvIpc>
- <https://slideplayer.com/slide/5701489/>
- <https://www.wikihow.com/Formulate-Black-Phenyle-Disinfectant>
- <https://www.youtube.com/watch?v=wrgeFVMUKm4>
- <https://nptel.ac.in/courses/103/106/103106108/>

Title of the paper: Clinical and Medicinal Chemistry Semester: VI

Course Code: LUCHSE62 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes

- On completion of the course, the students are able to
- Understand the fundamental concepts used in clinical laboratory.
- Gain theoretical knowledge on chemical and physical examination of urine.
- Recognize sources of drugs and its pharmacology.
- Aware of the types of communicate diseases.
- Gain knowledge on sulpha drugs and antibiotics.

Pre-Required Knowledge

- ✓ Introduction to clinical chemistry-clinical reagents and safety precautions.
- ✓ Collection of blood and Blood banking.
- ✓ Introduction to endemic medicinal plants and their conservation.

UNIT I -CLINICAL LABORATORY ETHICS AND INSTRUMENTATION

Organization of a clinical laboratory – code of conduct for a medical lab personnel – Accident and First aid in labs (acid burn, alkali burn, poisoning, Injury caused by

broken glass) – Precautions for the avoidance of accidents – list of first aid equipment for laboratory – Records and reports.

UNIT II-CLINICAL MEASUREMENTS

Urine analysis: Chemical examination of urine: Test for glucose, acetone, bile pigments. Blood – composition – Blood grouping and Rh typing. Estimation of blood sugar – Glucose tolerance test – Normal values of blood urea, Serum cholesterol, Triglycerides (TGL) and uric acid.

UNIT III-INTRODUCTION TO MEDICINAL CHEMISTRY

Important terminologies – definition of the following terms – drug pharmacology, pharmacy, therapeutics, toxicology, chemotherapy, pharmacopedia (B, P, IP, and USP), bacteria, virus, vaccines, primary immunization and therapeutic index.

Various sources of drugs, pharmacologically active constituents in plants, Indian medicinal plants – tulsi, neem, keezhanelli – their significance.

UNIT IV -DRUGS AND DISEASES

Introduction – various mode of transmission of diseases namely droplet contact, oral, direct and indirect transmission – common communicable diseases: transmission, symptoms, diagnosis, treatment and prevention of malaria, jaundice and anemia.

UNIT V -SULPHA DRUGS AND ANTIBIOTICS

Introduction – antibacterials and sulphonamides – synthesis and application of few sulphonamides like sulphadiazine – mechanism of action of sulpha drugs – antibiotics – structure and significance of penicillin and chloramphenicol (structural elucidation not required).

SUGGESTED TOPICS FOR GROUP DISCUSSIONS/PRESENTATIONS

Laboratory personnel ethics and responsibility
Blood grouping methods
Vaccination and its necessity
Common communicable diseases
Antivirals

Suggested Readings:

Text Books:

1. R Sood, Medical lab tech – Methods and Interpretation, 5thed. Jaypee Brothers Medical publishers, (2007).
2. Jeyashree Gosh, A Textbook of Pharmaceutical Chemistry, S. Chand, 2014.

Reference Books:

1. General text book of nursing Evelyn Pearce ELBS, (1990).
2. Dr. Lakshmi, Pharmaceutical Chemistry (2005).
3. Plummer, D. Practical Biochemistry, Tata McGraw-Hills Publishing Company, 2005.

WebSources:

1. https://www.indiascienceandtechnology.gov.in/sites/default/files/file-uploads/guidelineregulations/1527507559_GCLP.pdf
2. <https://www.youtube.com/watch?v=p70AaqotHnc>
3. <https://www.nurseslearning.com/courses/nrp/labtest/course/section3/index.htm>
4. <https://pharmafactz.com/medicinal-chemistry-glossary/>
5. https://annamalaiuniversity.ac.in/studport/download/engg/pharm/resources/pharmd_3Y_3.5_medicinal%20Chemistry.pdf

DEPARTMENT OF ENGLISH – UG – CBCS-LOCF

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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](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](https://www.SpokenEnglishpractice.com/learn-english-speaking-online)
3. <https://global-exam.com/blog/en/general-english-what-are-best-websites-tolearn-english/>

DEPARTMENT OF HISTORY - UG

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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
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. 1.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.clearias.com)

[https:// www.toppr.com](https://www.toppr.com)

[https:// www.mapsofindia.com](https://www.mapsofindia.com)

DEPARTMENT OF COMMERCE – UG – CBCS - LOCF

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Title of the Paper: Practical Banking Semester: VI
Course Code: LUCONM61 Contact Hours: 2hrs/w Credits: 2
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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: Recent 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 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 & Sons.

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>

DEPARTMENT OF PHYSICS – UG – CBCS – LOCF

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Title of the Paper: Fundamentals of Physics – II Semester: VI
Course Code: LUPHNM61Contact 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>

NON MAJOR ELECTIVE
DEPARTMENT OF MATHEMATICS – UG – CBCS - LOCF

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Title of the paper: Mathematical Skills for Semester: VI
Competitive Examinations- II

Course code:LUMSNM61 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

- On completion of the course, the students are able to
- enable the students to have fundamental formulae and fast solving technique of quantitative aptitude for the purpose of preparing for competitive examination.
 - pioneer the strong foundation of Mathematics for competitive examination.
 - develop the skill of arithmetical ability for quantitative aptitude.
 - enhance creative thinking and presence of mind to answer the questions of any competitive examination.
 - develop various mathematical skills to solve the problems

Pre Required Knowledge:

- ✓ Basic concept of simple interest and compound interest.
- ✓ Problem solving skills.
- ✓ Knowledge of reading comprehension.

Unit I: Simple interest.

Simple interest.

Unit II: Compound Interest

Compound interest.

Unit III: Calendar and Clocks

Calendar and Clocks.

Unit IV: Verbal Reasoning

Verbal Reasoning – Mathematical operations, Inserting the missing character.

Unit V: Non Verbal Reasoning

Non-Verbal Reasoning- Analytical Reasoning, completion of incomplete pattern.

Suggested Topics for Group Discussion/ Presentation

1. Important Facts and Formulae on Simple interest
2. Important Facts and Formulae on Compound interest
3. Problems on Calendar
4. Mathematical operations
5. Analytical Reasoning

Suggested Readings:**(i)Text Books:**

1. R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations, Revised and

Enlarged edition. S.Chand Publications, New Delhi,
Reprint 2011.

Unit I:Chapter 21

Unit I:Chapter 22

Unit III:Chapter 27, 28

2. R.S. Agarwal, Verbal and Non-Verbal reasoning S.Chand
Publications, New Delhi,

Reprint 2009.

Unit IV: Chapter 21,

Unit V: Chapter 22.

(ii) Reference Books:

1. R. Gupta, Quantitative aptitude, unique Publishers Pvt. Ltd,
2013.

2. R.V. Praveen, Quantitative Aptitude and Reasoning by,
2nd revised edition, 2013, Prentice – Hall of India Pvt. Ltd.

(iii) Web Resources:

1. <https://www.youtube.com/playlist?list=PLXjJ5c4vskp6yidDJs-NttEQwng8tu6Lo>

2. <https://www.careerbless.com/aptitude/qa/home.php>

3. <https://www.indiabix.com/aptitude/questions-and-answers/>

DEPARTMENT OF BOTANY – UG – CBCS- LOCF

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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 CHEMISTRY – UG - CBCS
ADD-ON PROGRAMMES
CERTIFICATE COURSE IN HOUSE NEEDS PREPARATION
(For those who join in June 2020 and After)

Title of the paper: House Needs Preparation Semester: II

Course Code: EADCCH Total Contact Hours: 40

This Certificate course in House Needs Preparation is a practical paper. This paper deals with the preparation of various house needs of the following. (Any ten Preparations).

- Ink
- Shampoo
- Soap
- Detergent powder
- Phenyl
- Floor Cleaner
- Hand wash
- Tooth powder
- Liquid wash
- Cleaning powder
- Room freshener
- Agarbathi
- Omam Water
- Sottu Neelam-Washing Blue
- Readymade Computer sambarani
- Chalk – White and Colored
- Candle – Colorless and colored

**DEPARTMENT OF CHEMISTRY – UG - CBCS
ADD-ON PROGRAMMES
DIPLOMA PROGRAMME IN FOOD & WATER ANALYSIS
(For those who join in June 2020 and After)**

.....
**Title of the paper: Food & Water analysis and Semester: III & IV
Data handling –Theory**

Course Code: EADDCH1

Total Contact Hours: 40

Learning Objectives:

To enable the students.

- ❖ learn in detail the chemistry of food and their importance.
- ❖ study the food additives and the various adulterants.
- ❖ study the types, sources and properties of water.

Unit I: Food Analysis

Food Chemistry-Definition and importance-Physicochemical and functional properties of Carbohydrates, Protein and Amino acids and Lipids in foods.

Unit II: Food Analysis - II

Self life of food-Water activity and its impact on self life of food-Effect of processing- Losses of vitamins and minerals due to processing - Food additives- preservatives-Browning reaction in foods-Enzymes in foods and food industry. Adulteration – modes of adulteration.

Unit III: Water Analysis - I

Water- Introduction: Types: Hard, Soft and Heavy water- Sources of water - Sea water as a source of Drinking water – Methods (Electro dialysis and RO methods)- Physical Properties of water – Water Quality standards (WHO, ICMR and ISI)

Unit IV: Water Analysis - II

Chemical and biological standards significance of the contaminants over the quality and their determinations - Electrical conductivity - turbidity - pH, total solids, TDS – acidity, alkalinity - hardness - chlorides - DO - BOD- COD

Unit V: Data Handling using MS-Excel

Microsoft Excel : Introduction to MS-Excel - Navigating in a Worksheet (Selecting Cells, Columns, Rows , Entering Numbers, Dates/Times, Formulas - Numbers (or values) - Formulas Editing Cell Contents - Deleting/Inserting/Moving Rows or Columns)- Formulas and Functions (Addition and Subtraction - Multiplication and Division -Totals and Grand Totals) - Use of spreadsheet in the calculation of Use Excel functions to perform specific calculations- Charts (Types of Charts, Creating and Formatting Charts, Chart Preliminaries, Column Charts, Pie Charts, Copying Charts to a Word Processor Document)- XY Graphs: Drawing x-y graph; 'Best-fit' trendlines; Error bars, Regression & Correlation (Slope & Intercept);

Learning Outcomes:

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

- ❖ explain the concept of food chemistry and its practical importance
- ❖ discuss the different modes of adulteration
- ❖ measure the physical properties of water and water quality standards
- ❖ explain about chemical and biological standards and contaminants over the quality
- ❖ expert in data handling using MS–Excel.

Text Book:

1. Food Analysis, S. Suzanne Nielsen, *Food Analysis Laboratory Manual*, Third Edition, Springer, 2003

Reference Books:

1. Arthur Hounslow, *Water Quality Data: Analysis and Interpretation*, Sold by Amazon.com.
2. D.B.Hibbert, J.J. Gooding, *Data Analysis for Chemistry*, Oxford University Press, 2006.

**DEPARTMENT OF CHEMISTRY – UG - CBCS
ADD-ON PROGRAMMES
DIPLOMA PROGRAMME IN FOOD & WATER ANALYSIS
(For those who join in June 2020 and After)**

.....
**Title of the paper: Food & Water analysis and Semester: III & IV
Data handling –Practical**

Course Code: EADDCH2

Total Contact Hours: 40

1. **Identification tests of common adulterants in the following food items: (Any ten)**
 - Tea
 - Coffee
 - Turmeric powder
 - Asafetida
 - Rava
 - Chilli powder
 - Pepper
 - Pulses
 - Milk
 - Butter
 - Ghee
 - Cheese
 - Common salt
 - Dals
 - Eatable oil
 - Scented supari

2. Determination of the following properties of water: (Any four)
 - pH
 - Acidity
 - Alkalinity
 - TDS
 - Hardness
 - Dissolved Oxygen
 - BOD
 - COD
3. Using MS-Excel:
 - Calculate Mean, Median and Total, Grand Total etc.,
 - Simple calculations, use of standard mathematical functions and Complex calculations involving user-made functions and statistical function
 - Plotting DATA in Standard and customized charts and graphs.
 - Plotting calibration curves, slope, intercept and coefficient of determination,

Use of Chart Wizard for plotting the graph from given experimental data related to physical chemistry.

**DEPARTMENT OF PHYSICAL EDUCATION – UG – CBCS
ADD-ON COURSES**

DIPLOMA COURSE IN HOLISTIC HEALTH

**Title of the paper: Yoga, Meditation and Semester: V & VI
Holistic Health-Practical**

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.)**
 - 1. Breathing exercises (10 type)**
 - 2. Relaxation techniques (4 types)**
 - 3. Music and movement therapy**
 - 4. Basic Yogasanas (20 types)**
 - 5. Mutras (10 types - energy)**
 - 6. Physical exercises (5 types)**
 - 7. Meditation skills (5 types)**
 - 8. Healing techniques (5 types)**
 - 9. Field visit, to understand human**
 - 10. Body, visit to Government Medical College Hospital**
 - 11. 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 report 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
	-----		-----
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	K1	K2	K3	K4	K5/K6	TOTAL MARKS
SECTIONS						
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	K1	K2	K3	K4	K5/ K6	TOTAL MARKS
SECTIONS						
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	K1	K2	K3	K4	K5/K6	TOTAL MARKS
SECTIONS						
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 pattern)

(Two Questions from each unit)

SECTION – B

2. Short type questions 5 x 4 = 20 Marks

Answer any Five questions (5/8)

(Choosing at least 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 unit 3 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.