SARASWATHI NARAYANAN COLLEGE
(An Autonomous Institution Affiliated to Madurai Kamaraj University)
(Reaccredited with Grade 'B' by NAAC)
MADURAI – 625 022.

DEPARTMENT OF PHYSICS

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

B.Sc. Physics Programme

(For those who join in June 2022)

PRINCIPAL

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

DEPARTMENT OF PHYSICS

1. **Dr. N.S.Minimala , M.Sc., M.Phil., Ph.D.,**
   - Assistant Professor & Head
2. **Dr. M.S.S.Saravanakumaar , M.Sc., B.Ed., Ph.D.,**
   - Assistant Professor
3. **Dr. T.Premkumar , M.Sc., M.Phil., Ph.D.,**
   - Assistant Professor
4. **Dr.R.Sankaranarayan , M.Sc., Ph.D.,**
   - Assistant Professor
5. **Dr.T.Sarveswaran , M.Sc., M.Phil., B.Ed., Ph.D.,**
   - Assistant Professor
6. **Dr.N.Narayana Moorthy, M.Sc., M.Phil., B.Ed., Ph.D.,**
   - Assistant Professor
7. **Mr.B. Shenbaga Balakrishnan, M.Sc., M.Phil.,M.Tech.,**
   - Assistant Professor

PROFILE OF THE COLLEGE

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

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

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

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

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B.Sc. Physics - Course Structure

SEMESTER I									
Part	**Course type**	**Title of the course**	**Course Code**	**Hrs./ Week**	**Credits**	**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	Mechanics	LUPHCT11	4	4	3	25	75	100
III	CC-2	Properties of matter and Sound	LUPHCT12	4	4	3	25	75	100
III	CC-3	Major Physics Practical - I	LUPHCL21	2	-	-	-	-	
III	GEC-1	Allied Mathematics – I	LUMSGE11	6	5	3	25	75	100
IV	AEC-1	EVS	LUP4ES11	2	2	3	25	75	100
				30	21				
SEMESTER II									
Part	**Course type**	**Title of the course**	**Course Code**	**Hrs./ Week**	**Credits**	**Exam Hrs.**	**Int.**	**Ext.**	**TOTAL**
I	LC-T2	Tamil-II	LUP1TA21	6	3	3	25	75	100
II	LC-E2	English-II	LUP2EN21	6	3	3	25	75	100
III	CC-4	Heat and Thermodynamics	LUPHCT21	4	4	3	25	75	100
III	CC-3	Major Physics Practical - I	LUPHCL21	2	2	3	40	60	100
III	GEC-2	Allied Mathematics – II	LUMSGE21	6	5	3	25	75	100
IV	SEC-1	Testing of Materials	LUPHSE21	2	2	3	25	75	100
IV		Optical Communication System and Fiber Optics	LUPHSE23						
IV	SEC-2	Medical Physics	LUPHSE22	2	2	3	25	75	100
IV		Metrology	LUPHSE24						
IV	AEC-2	VE	LUP4VE21	1	1	3	25	75	100
IV	AEC-3	YOGA	LUP4YA21	1	1	3	-	50	50
V	AEC-4	NSS/NCC/LE/PE	LUP4NC21 LUP4NS21 LUP4LS21 LUP4PE21	-	1	2	40	60	100
				-	1	2	25	75	100
Ad.Cr. Co	SLC-1	Laser and its Applications	LUPHSC21	-	-	2	-	50	100
		Measurement and its Instrumentation	LUPHSC22						
				30	24				

SEMESTER III									
Part	**Course type**	**Title of the course**	**Course Code**	**Hrs./ Week**	**Credits**	**Exam Hrs.**	**Int.**	**Ext.**	**TOTAL**
I	LC-T3	Tamil-III	LUP1TA31	6	3	3	25	75	100
II	LC-E3	English-III	LUP2EN31	6	3	3	25	75	100
III	CC-5	Electricity	LUPHCT31	4	4	3	25	75	100
III	CC-6	Major Physics Practical - II	LUPHCL41	2	-	-	-	-	
III	GEC-3	Allied Mathematics – III	LUMSGE31	6	5	3	25	75	100
III	GEC-4	Allied Applied Electronics – I	LUELGE31	4	4	3	25	75	100
III	GEC-5	Allied Applied Electronics Practical – I(Sem 3& 4)	LUELGL41	2	-	-	-	-	-
Ad.Cr. Co	SLC-2	Astrophysics	LUPHSC31	-	-	2	-	50	100
		Measuring Instruments & House wiring	LUPHSC32						
	MOOC	MOOC-1		-	-	-	-	-	-
				30	19				
SEMESTER IV									
Part	**Course type**	**Title of the course**	**Course Code**	**Hrs./ Week**	**Credits**	**Exam Hrs.**	**Int.**	**Ext.**	**TOTAL**
I	LC-T4	Tamil-IV	LUP1TA41	6	3	3	25	75	100
II	LC-E4	English-IV	LUP2EN41	6	3	3	25	75	100
III	CC-7	Electromagnetism	LUPHCT41	4	4	3	25	75	100
III	CC-6	Major Physics Practical - II	LUPHCL41	2	2	3	40	60	100
III	GEC-6	Allied Mathematics – IV	LUMSGE41	6	5	3	25	75	100
III	GEC-7	Allied Applied Electronics – II	LUELGE41	4	4	3	25	75	100
III	GEC-5	Allied Applied Electronics Practical – I (Sem 3 & 4)	LUELGL41	2	2	3	40	60	100
Ad.Cr. Co	SLC-3	Non-Conventional Energy Sources	LUPHSC41	-	-	2	-	50	100
		Physics of Electrical Appliances	LUPHSC42						
	MOOC	MOOC-2		-	-	-	-	-	-
				30	23				

SEMESTER V									
Part	**Course type**	**Title of the course**	**Course Code**	**Hrs./ Week**	**Credits**	**Exam Hrs.**	**Int.**	**Ext.**	**TOTAL**
III	CC-8	Optics and Spectroscopy	LUPHCT51	3	3	3	25	75	100
III	CC-9	Atomic Physics and Relativity	LUPHCT52	3	3	3	25	75	100
III	CC-10	Object Oriented Programming	LUPHCT53	3	3	3	25	75	100
III	CC-11	Major Physics Practical – III	LUPHCL51	4	3	3	40	60	100
III	CC-12	Major Physics Practical – IV	LUPHCL52	4	3	3	40	60	100
III	GEC-8	Allied Applied Electronics – III	LUELGE51	4	3	3	25	75	100
III	GEC-9	Allied Applied Electronics Practical – II (Sem 5 & 6)	LUELGL61	2	-	-	-	-	-
III	DSE-1	Solar Energy	LUPHDS51	3	3	3	25	75	100
III		Mobile Communication	LUPHDS52						
IV	SEC-3	Microprocessor and its Applications	LUPHSE51	2	2	2	25	50	100
IV		Thin Film Technology and its Applications	LUPHSE52						
IV	GEC-10	Fundamentals Of Physics - I	LUPHNM51	2	2	2	25	50	100
Ad.Cr.Co	SLC-4	Biophysics	LUPHSC51	-	-	-	-	50	100
		Materials for Special Applications	LUPHSC52						
	MOOC	MOOC-3		-	-		-	-	-
				30	25				
SEMESTER VI									
III	CC-13	Nuclear Physics	LUPHCT61	3	3	3	25	75	100
III	CC-14	Materials Science	LUPHCT62	3	3	3	25	75	100
III	CC-15	Classical and Statistical Mechanics	LUPHCT63	4	3	3	25	75	100
III	CC-16	Major Physics Practical - V	LUPHCL61	4	4	3	40	60	100
III	CC-17	Project	LUPHPJ61	3	3		50	50	100
III	GEC-11	Allied Applied Electronics -IV	LUELGE61	4	3	3	25	75	100
III	GEC-9	Allied Applied Electronics Practical – II (Sem 5 & 6)	LUELGL61	2	2	3	40	60	100
III	GEC-12	Fundamentals Of Physics - II	LUPHNM61	2	2	2	25	50	100
III	DSE-3	Physics for Competitive Examinations	LUPHDS61	3	3	3	25	75	100
III		Weather forecasting	LUPHDS62						
IV	SEC-4	Nano Physics	LUPHSE61	2	2	2	25	50	100
IV		Crystal Growth Techniques	LUPHSE62						
				30	28				

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DEPARTMENT OF TAMIL – UG – CBCS
PART I- TAMIL

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

பாடத் திட்டத்தைக் கற்றுக் கொண்ட பின்பு மாணவர்கள் பெறும் பயன்கள் :

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

பாடத்திட்டத்திற்குத் தேவையான முன் அறிவு :

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

கூறு I: செய்யுள்

1. பத்துப்பாட்டு

நெடுநல்வாடை முழுவதும்

எட்டுத் தொகை

2. நற்றிணை -5 பாடல்கள் - 1, 115, 216, 305, 388

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

கூறு II: அற இலக்கியம்

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

கூறு III: உரைநடைக் கட்டுரைத் தொகுப்பு

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

கூறு IV: இலக்கணம்

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

கூறு V: இலக்கிய வரலாறு

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

பரிந்துரைக்கப்பட்ட நூல்கள்:

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

2. **பார்வை நூல்கள் :**

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

3.இணைய ஆதாரங்கள் :

சங்க இலக்கியம்

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

அற இலக்கியம்

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

உரைநடை

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

பொருள் இலக்கணம்

அகம், புறம்

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

இலக்கிய வரலாறு

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

DEPARTMENT OF ENGLISH – UG – CBCS-LOCF

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

Course Learning Outcomes:

On completion of the course, the students are able to

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

Pre-required Knowledge:

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

Unit I: Prose

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

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

3. Robert Lynd : The Pleasures of Ignorance

4. Leo Tolstoy : The Three Questions

Unit II : Poetry

1. Rabindranath Tagore : Upagupta

2. Chinua Achebe : Refugee Mother and Child

3. D.H Lawrence : Don'ts

4. Seamus Heaney : Digging

Unit III : Short Stories

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

Unit IV : Grammar

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

Unit V : Conversation and Writing Skills

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

Suggested Topics for Presentation:

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

Suggested Readings:

i)Text Book:

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

ii)Reference Books:

1. Radhakrisnapillai, G. *English Grammar and Composition*. Chennai: Emerald Publishers, 2002.
2. Murphy, Raymond. *Intermediate English Grammar*. New Delhi: Foundation Books, 2005.
3. Bose,M.N.K. Ed. *Better Communication in Writing*. Madras: New Century Book House (P) Ltd, 2004.

iii) Web Sources:

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

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

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

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

DEPARTMENT OF PHYSICS – UG – CBCS – LOCF

Title of the Course: Mechanics	**Semester: I**
Course Code: LUPHCT11 Contact Hours: 4hrs/w	**Credits: 4**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the impact of forces on rigid bodies and losses of energies
- explain moment of inertia and its role in various objects
- describe the kinetic energy of a rotating body and its dynamical parameters
- know the perspectives of hydrodynamics
- understand the Physics of gravitation and its impact

Pre-Required Knowledge:

- Newton's law of equation of motion and its trajectory.
- Physics behind the sports, musical instruments
- Role of gravitation on rocket / space craft launching.

Unit I: Fundamental principles of impact

Impulse of a force-collision-oblique impact of a smooth sphere on a fixed smooth plane-direct impact of two smooth spheres-loss of K.E. due to direct impact of two smooth spheres-oblique impact of two smooth spheres-loss of K.E. due to oblique impact.

Unit II: Moment of inertia

General theorems on Moment of Inertia – Calculation of Moment of Inertia – Particular cases of Moment of Inertia (A uniform rod, A thin circular ring, a circular lamina, a solid cylinder, a hollow cylinder, a spherical shell, a solid sphere).

Unit III: Angular momentum

Kinetic energy of a rotating body- torque-angular momentum- relation between torque and angular momentum-angular momentum of system of particles-conservation of angular momentum- torsion of a body-torsional oscillations of a body.

Unit IV: Hydrodynamics

Equation of continuity- energy of the liquid- Euler's equation for unidirectional flow -Bernoulli's theorem-application of Bernoulli's theorem, Torricelli's theorem, venturi meter, pitot tube.

Unit V: Gravitation

Newton's law of gravitation– Kepler's laws of planetary motion–determination of G- Boys 'experiment–variation of g with latitude or rotation of the earth–variation of with g altitude– variation of g with depth–the compound pendulum.

Suggested Topics for Group Discussion/Presentation

- Impulse of a force & collision
- Perpendicular axes theorem and parallel axes theorem
- Relation between torque and angular momentum
- Application of Bernoulli's theorem
- Kepler's laws of planetary motion

Suggested Readings:

i) Text Books:

1. Murugeshan R, Properties of Matter, S.Chand & Co Ltd, (2012). Unit: I, III, IV, V
2. Mathur DS, Mechanics, S. Chand & Co Ltd, (2009). Unit: II

ii) Reference Books:

1. Dilip Sharma, Pathak KK, Mechanics, Vishal Publishing Co, (2021).
2. Shukla RK, Anchal Srivastava, Mechanics, New age international Publishers, (2006).

iii) Web Sources:

1. http://hyperphysics.phy-astr.gsu.edu › hbase › flobi
2. https://byjus.com › JEE › IIT JEE Study Material
3. https://www.zigya.com › share

Title of the Course: Properties of Matter and Sound Semester: I
Course Code: LUPHCT12 Contact Hours: 4hrs/w Credits: 4

Course Learning Outcomes:

On completion of the course, the students are able to

- identify the materials suitable for construction of buildings, based on the moduli of elasticity
- know about the properties of liquids and its determination of coefficient of viscosity
- understand the Physics of sound and its applications
- know the different methods of producing ultrasonic waves and its applications
- know about the concept of acoustics and better understanding of the theories used in building acoustics

Pre-Required Knowledge:

- Hooke's law and its importance
- The nature of flow of liquids, Reynold number
- Physics behind the production of sound waves and its applications in nowadays world

Unit I: Elasticity

Introduction – Different moduli of elasticity–three types–Poisson's ratio–work done in different types of strains–Relation between the elastic moduli – Bending of beams–Definitions-Expression for the bending moment-Depression

of the loaded end of a cantilever – Uniform bending of a beam– Measurement of young's modulus-by bending of a beam.

Unit II: Viscosity

Introduction–Streamline flow and turbulent flow– Poiseuille's formula for the flow of a liquid through a capillary tube– Corrections to Poiseuille's formula–Poiseuille's method for determining coefficient of viscosity of a liquid- Ostwald's viscometer–Poiseuille's method for determining coefficient of viscosity of a liquid[variable pressure head]–terminal velocity and Stoke's formula– Stoke's method for the coefficient of viscosity of a viscous liquid.

Unit III: Surface tension

Introduction–Explanation of surface tension on kinetic theory–Work done in increasing the area of a surface– Work done in blowing a bubble–Forms of liquid drops–Angle of contact– Spreading of one liquid over another– Pressure difference a cross a liquid surface– Excess pressure inside a curved liquid surface- Experimental determination of surface tension–Jaegar's method– variation of surface tension with temperature– Quincke's method.

Unit IV: Beats & Stationary waves

Demonstration of beats–Analytical treatment of beats-Applications of the phenomenon of beats– Stationary waves– Equation fora stationary wave–Properties of stationary longitudinal waves– Melde's experiment.

Unit V: Ultrasonics

Introduction–Piezoelectric effect– Production of ultrasonic waves - Piezoelectric crystal method– Magnetostriction method – Detection of ultrasonic waves- properties of ultrasonic waves- Determination of velocity of ultrasonic waves in a liquid–Applications of ultrasonic waves- Acoustics of buildings- Reverberation – derivation of sabine's formula – Jaeger's method –Factors affecting the Acoustics of buildings- Sound distribution in an Auditorium.

Suggested Topics for Group Discussion/Presentation:

- Moduli of elasticity – types
- Streamline flow and turbulent flow
- Determination of surface tension
- Stationary waves – Properties and applications
- ultrasonic waves – Production and properties

Suggested Readings:

i) Text Book:

1. Murugeshan R, Properties of Matter, S. Chand & Co.Ltd, (2012).

ii) Reference Books:

1. Mathur DS, Elements of Properties of matter, Syamala trust, reprint (2001).
2. Dilip Sharma, Pathak KK, Mechanics, Vishal Publishing Co, (2021).

iii) Web Sources:

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

DEPARTMENT OF MATHEMATICS – UG – CBCS - LOCF

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 Trignometry 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 $\sin^n x$, $\cos^n x$, $\sec^n x$, $\cot^n x$, $\csc^n x$, $\sin^m x.\cos^n x$ 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 andK.S.Ganapathy, S.Viswanathan Publishers Private Limited 2004
2. Calculucs Volume 1 by S.Narayanan and T.K.Manicavachagom Pillay, S.Viswanathan Publishers Private Limited 2004.
3. Ancillary Mathematics Volume 1 and 2, P.Balasubramnian and K.G. Subramanian
4. Ancillary Mathematics Volumei and ii, P. Kandasamy and K.Thilgavathi, S.Chand and Co., NewDelhi, 2004.

(iii) Web Resources:

1.https://math.stackexchange.com/questions/88917/relation-betwen-coefficients-and- roots-of-a-polynomial

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

3.https://math24.net/curvature-radius.html

4.https://www.egyankosh.ac.in/bitstream/123456789/11956/1/Unit-3.pdf

5.https://www2.slac.stanford.edu/comp/winnt/software/scientificworkplace/manuals/domath/chapter4-5.pdf

PART IV – ENVIRONMENTAL STUDIES – UG – CBCS - LOCF

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

Learning Objectives:

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

Unit I:

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

Unit II:

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

Unit III:

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

Unit IV:

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

Unit V:

Water and Noise Pollution-causes, effects & control measures. Water scarcity and solutions to overcome. Road safety – Rules, Traffic Signals, Conduct of road safety

awareness programme. Role of academic institutions and academicians and students in village adoption.

Learning Outcomes:

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

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

Text Book:

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

Reference Books:

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

DEPARTMENT OF TAMIL – UG – CBCS
PART I- TAMIL

Title Of The Course: காப்பிய இலக்கியமும் நாடகமும் **Semester : II**

Course Code : LUPITA21 Contact Hours : 6hrs/w Credit: 3

பாடத் திட்டத்தைக் கற்றுக் கொண்ட பின்பு மாணவர்கள் பெறும் பயன்கள்:-

1. காப்பிய இலக்கியம் படிக்கும்போது மாணவர்கள் தமிழப் பண்பாட்டைப் பற்றியும்,தமிழரின் வாழ்க்கை முறை பற்றியும் தெரிந்து கொள்கின்றனர்.

2. சமயம் பற்றிப் படிக்கும்போது ஆன்மீக ஈடுபாடும் ஆன்மீக அறிவும் வளர்கிறது.
3. நாடக நூல்களைப் படிப்பதனால் மாணவர்கள் பிரச்சனைகளை எதிர்கொள்ளும் திறனைப் பெறுகின்றனர்
4. மாணவர்கள் சொற்களை உருவாக்கி சிறந்த வாக்கியங்களைப் படைக்க இலக்கணம் துணை நிற்கின்றது.
5. இலக்கிய வரலாறு படிப்பதனால் மாணவர்கள் பாடத் திட்டத்தின் முழுமையான செய்திகளை அறிந்து கொள்ள உதவுகிறது.

பாடத்திட்டத்திற்குத் தேவையான முன் அறிவு:

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

கூறு I: காப்பியம்

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

கூறு II: சமயக்காப்பியம்

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

கூறு III: நாடகம்

1. அழுக்குப் படாத அழகு - மா.கமலவேலன்

கூறு IV: இலக்கணம்

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

கூறு V: இலக்கிய வரலாறு

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

1. பரிந்துரைக்கப்பட்ட நூல்கள்:

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

2. பார்வை நூல்கள் :

- சிலப்பதிகாரம் - அடியார்க்கு நல்லார் உரை
- சீவகசிந்தாமணி - நா.மாணிக்காவாசகன் உரை
- நற்றமிழ் - தொ.பரமசிவம்
- இரட்டை காப்பியங்கள் - வா.சுப.மாணிக்கம்
- பெரியபுராணம் - பி.ரா.நடராசன் உரை
- மணிமேகலை - புலியூர்க் கேசிகன் உரை
- நன்னூல் - வெள்ளை வாரணனார் உரை
- தமிழ் இலக்கிய வரலாறு - மு.வரதராசனார்
- தமிழ்இலக்கிய வரலாறு - சிற்பி, நீலபத்மநாபன்

3. இணைய ஆதாரங்கள்:

காப்பியம்

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

சமயக்காப்பியம்

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

அழுக்குப்படாத அழகு (செய்யுள் நாடகம்)

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

இலக்கிய வரலாறு (நாடக வளர்ச்சி)

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

DEPARTMENT OF ENGLISH - UG – CBCS-LOCF

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

Course Learning Outcomes:

On completion to the course the students are able to

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

Pre-required Knowledge:

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

Unit: I-Prose

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

Unit: II-Poetry

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

Unit: III-One Act Play and Excerpt from Play

Anton Chekhov	-	A Marriage Proposal

Eugene O'Neill	-	Before Break Fast
Shakespeare	-	The Trial scene from, The Merchant of Venice

Unit: IV-Grammar

Word Formation

Tenses

Question tags

Unit: V -Conversational and Writing Skills

Every day English Part - II

Report Writing

Letter Writing (Formal)

Suggested Topics for Presentation:

- ✓ Situational uses of present perfect tense
- ✓ Demonstrate conversations in official situations
- ✓ English for survival
- ✓ Importance of English speaking skill in everyday life
- ✓ Advantages of studying poetry

Suggested Readings:

i)Text Book:

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

ii)Reference Books:

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

iii) Web Sources:

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

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

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

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

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

DEPARTMENT OF PHYSICS – UG – CBCS - LOCF

Title of the Course: Heat and Thermodynamics Semester: II
Course Code: LUPHCT21 Contact Hours: 4hrs/w Credits: 4

Course Learning Outcomes:

On completion of the course, the students are able to

- understand various units related to measurement of temperature and know the concept of specific heat capacities of matter
- understand the concept of attaining low temperature of gases
- understand the various modes of transmission of heat through medium
- conceptualize kinetic theory of gas molecules and derive transport properties of gases from it.
- discuss various laws of thermodynamics and its applications

Pre-Required Knowledge:

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

Unit I: Thermometry and calorimetry

Thermometry – Celsius and Fahrenheit and Rankine Scales – Peltier Effect - Seebeck effect - International temperature scale – Thermistor - Specific heat capacity of solids – Regnault's method of mixtures(solid) – Newton's law of cooling- specific heat capacity of liquids – Specific heat capacity of gases – Cp and Cv – Meyer's relation – Cv by Joly's differential steam calorimeter method – Cp by Regnault's method.

Unit II: Low temperature Physics

Joule - Kelvin expansion - Liquefaction of Air-Linde's Process – liquefaction of hydrogen - liquefaction of helium - Kammerling - Onne's method - production of low temperatures - adiabatic demagnetization machines.

Unit III: Transmission of heat

Conduction – coefficient of thermal conductivity – Wiedemann Franz law –Lee's method for bad conductors– convection-Application of convection –Central heating system-Thermopile- Radiation - black body – Kirchhoff's law – Stefan – Boltzmann law - energy distribution in black body spectrum - Wien's law – Rayleigh Jean's law– Planck's law.

Unit IV: Kinetic theory of gases

Kinetic Theory of gases - postulates - Molecular collisions – mean free path – expression for mean free path – Transport phenomenon – Brownian motion and its features - expression for viscosity, Diffusion and thermal conductivity of gas.

Unit V: Thermodynamics

Zeroth and first law of thermodynamics – reversible and irreversible processes – isothermal process - adiabatic process - gas equation during adiabatic process - work done during adiabatic and isothermal process - second law of thermodynamics – Carnot's engine – its efficiency - Entropy – change of entropy in reversible and irreversible processes – temperature – entropy diagrams – physical significance of

entropy - change of entropy when ice converted into steam - third law of thermodynamics (statement).

Suggested Topics for Group Discussion/Presentation:

- Various scales of temperature measurement and instruments, at least one method of determination of specific capacity of matter.
- Adiabatic demagnetization and couple of experimental methods to liquefy gases.
- Conduction, convection and radiation of heat energy
- Derivation of transport properties of gases using kinetic theory
- Carnot engine, refrigerator and entropy

Suggested Readings:

i) Text Book:

Brijlal, Subrahmanyam. N and Hemne P.S., Heat Thermodynamics and statistical Physics, S. Chand& Company Pvt. Ltd, New Delhi, 2nd Edition, (2014).

ii) Reference Books:

1. Varma H.C, Concepts of Physics Volume I and II, Bharathi Bhawan Publishers, New Delhi, (2015).
2. Mathur D.S, Heat and Thermodynamics, Sultan Chand & Sons, 5th Edition, New Delhi, (2014).
3. Murugesan R and Kiruthiga Sivaprasath, Thermal Physics, S. Chand& Co, II Edition, New Delhi, (2008).

iii) Web Sources:

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

5. https://ocw.mit.edu/courses/chemistry/5-60-thermodynamics-kinetics-spring-2008/video-lectures/lecture-2-work-heat-first-law/

Title of the Course: Testing of materials	**Semester: II**
Course Code: LUPHSE21 Contact Hours: 2hrs/w	**Credits:2**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the principles of destructive and non-destructive testing of materials
- explain the basics of liquid penetrant method and its advantages
- know the principles of ultrasonics flaw detection method
- describe radiography and fluoroscopy
- discuss various types of new materials

Pre-Required Knowledge:

- The concepts of Ultrasound.
- Basic principle of X ray
- Concept of radiography

Unit I: Need of NDT

Need for NDT - Definition and uses of Non-Destructive Testing (NDT) - Comparison of destructive and non-destructive testing - Objectives of NDT- Various aspects involved in NDT.

Unit II: Liquid penetrant method

Various types of NDT methods – Steps involved in Liquid penetrant method of detecting surface defects – characteristics of liquid penetrant - characteristics of developers - Advantages and limitations of Liquid penetrant method.

Unit III: Ultrasonic flaw detector and scanning

Principle, description and working of Ultrasonic flaw detector – advantages and disadvantages of ultrasonic flaw detector – Ultrasonic Scanning methods: A–Scan method – B–Scan method – T–M Scan method - Applications.

Unit IV: Radiography and fluoroscopy

Radiography-Law of absorption of X-rays - Principle, construction and working of X-ray Radiography- displacement method - merits and demerits of displacement method – Principle, construction and working of X-ray fluoroscopy- Merits and Demerits –Differences between radiography and fluoroscopy.

Unit V: New materials

Metallic glasses: preparation - properties – applications. Nano phase materials: preparation – properties – applications. Shape memory alloys: structure, characteristics, applications - Biomaterials.

Suggested Topics for Group Discussion/ Presentation

- Objectives of Non destructive testing
- Advantages of liquid penetrant method
- Working of ultrasonic flaw detector
- Law of absorption of X-rays
- Shape memory alloys

Suggested Readings:

i) Text Book:

1. Senthilkumar.G, Engineering Physics, VRB Publishers, Revised (2006).

ii) Reference Books:

1. Mani, P, Engineering Physics, Dhanam Publications, Chennai (2014).
2. Arumugam, M, Engineering Physics, Anuradha Publishers, Chennai (2010)

iii) Web Sources:

1. https://www.twi-global.com/technical-knowledge/faqs/what-is-non-destructive-testing
2. https://serc.carleton.edu/research_education/ geochemsheets / techniques/XRF.html
3. https://padeepz.net/shape-memory-alloys/

Title of the Course: Optical Communication system and Fiber Optics **Semester: II**

Course Code: LUPHSE23 **Contact Hours: 2hrs/w**

Course Learning Outcomes:

On completion of the course, the students are able to

- know the communication systems and basics of fiber optics
- understand the principle and propagation of messages using fiber optics
- explain various types of optical fibers
- know the general applications of optical fiber communication systems
- understand the in-depth knowledge on some of the specific use of fiber optics

Pre-Required Knowledge:

- The concept of communication systems
- Basic knowledge on Fiber Optics methods
- Applications of Optical Fibers

Unit I: Optical communication

Introduction to the history of evolution of communication systems– typical communication system- various types of cables- Block diagram and working of an optical communication system – Optical Transmitter, Optical Receiver.

Unit II: Introduction to fiber optics

Constructional details of optical fiber – features of optical fibers - principle and propagation of light through

optical fibers - Numerical Aperture and Acceptance angle – expressions-numerical problems.

Unit III: Types of Optical fibers

Glass and plastic fibers – single-mode fibers – multi-mode fibers – differences between single and multimode fibers – step index fiber - graded index fiber – differences between step index and graded index fiber

Unit IV: Applications of optical fibers

Engineering applications of optical fibers - Industrial and Medical applications of Optical fibers – fiber optic sensors and types – applications of optical sensors - construction and working of pressure sensor - construction and working of displacement sensor.

Unit V: Studies on optical fibers

Study on spectral response of a photo diode used in a fiber optic link – Study on coupling light in to the fiber - Inspection of fiber end - Measurement of numerical aperture- Measurement of fiber attenuation – Measurement of time dispersion in fiber.

Suggested Topics for Group Discussion/ Presentation

- Optical Transmitter, Optical Receiver Communication Systems
- Acceptance angle in Fiber optics communication System
- Differences between step index and graded index fiber
- Engineering applications of optical fibers
- Measurement of fiber attenuation and its use

Suggested Readings:

i) Text Books:

1. Anuradha, De, Optical fiber and LASER (Principles and applications), New Age International (p) Ltd, Revised (2005). Unit: I, V
2. Senthil Kumar G, Engineering Physics, VRB Publishers, Revised (2016). Unit: II, III, IV

ii) Reference Book:

1. Subir Kumar S, Optical fibre and fibre Optic communication, 4th revised Edison (2003).

iii) Web Sources:

1. https://en.wikipedia.org/wiki/Fiber-optic_communication
2. http://www.nitttrchd.ac.in/sitenew1/app_sc/ppts/ofc/4.%20Optical%20Sources_RB.pdf
3. https://mrcet.com/downloads/digital_notes/ECE/III%20Year/FIBER%20OPTICAL%20COMMUNICATIONS.pdf

Title of the Course: Medical Physics **Semester: II**

Course Code:LUPHSE22 Contact Hours: 2hrs/w **Credits: 2**

Course Learning Outcomes:

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

- understand the basics of human anatomy and anatomical terminology
- know about working of human heart
- inculcate the perspectives of different parts of human ear and applications of physics on Ear.
- describe the Physics of the eye and vision, applications of light in medicine
- discuss about ECG, EEG, EMG and CT

Pre-Required Knowledge:

- Concept and methods from physics to the diagnosis,
- Treatment of human diseases, planning
- Development of treatment equipment

Unit – I Basic anatomy

Medical Physics – An Introduction – Anatomical Terminology – Modelling and Measurement – Forces on and in the body – Physics of the Skeleton – Hot and cold in Medicine – Energy, Work and Power of the body.

Unit – II Physics of the heart

Introduction – Pressure system of the body – Physics of Cardiovascular system – work of the Heart – Transmural Pressure across blood vessel walls – The blood flow conditions in the cardiovascular system – Electricity within the body – Electricity and Magnetism in medicine.

Unit – III Physics of the ear

Sound in Medicine – Physics of the ear and hearing – Configuration of ear – The outer Ear – The Eardrum – The middle Ear – The inner Ear - Light in medicine – Application of UV and IR light in medicine – Applications of lasers in medicine.

Unit – IV Physics of the eye

Physics of eye and vision – General structure of the eye – Refractive focusing of the eye system – Structure of the receptor system – Diffraction effects of the eye – Optical Aberrations of eyes – Eye defects – Myopia – Hypermetropia

Unit – V ECG, EEG, EMG, CT

ECG – ECG lead configuration – Bipolar limb leads – Augmented unipolar limb leads – Unipolar chest leads – ECG recording setup – EEG – origin of EEG – EMG – Recording setup – Computer Tomography – Principle – Mathematical basis of image construction – Block diagram – data presentation – Scan artifacts – Applications.

Suggested Topics for Group Discussion/Presentation

- Anatomical Terminology
- Physics of Cardiovascular system
- Configuration of ear
- Optical Aberrations of eyes
- origin of EEG

Suggested Readings:

i) Text Book:

1. Mujiber Rahman A, Medical Physics, SciTech Publications India Pvt. Ltd. (2019).

2.

ii) Reference Books:

1. **Muhammad Maqbool,** An Introduction to Medical Physics, Springer (2017).
2. Suzanne Amadoe Kane, Introduction to Physics in Modern Medicine, CRC Publishers, (2009).

iii) Web Sources:

1. https://www.vanderbilt.edu
2. https://www.pnas.org
3. https://www.sensortips.com

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

Course code: LUPHSE24 Contact Hours: 2hrs/w Credits:2

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the methods of measurements of physical quantity
- know about the types of calipers
- explain the principle of interferometry
- understand the features of comparators
- know about screw Thread terminology.

Pre-Required Knowledge:

- Types of measurements in metrology
- Basic idea of interference
- Comparator uses

Unit I: Introduction to metrology

Definitions of metrology - Types of metrology – Metrological terminologies – Principal aspects of measurement – Methods of measurements.

Unit II: Linear metrology

Calipers – Types of calipers –Micrometers- Outside micrometer – Accessories for precision micrometer – Inside micrometer – Depth micrometers.

Unit III: Interferometry

Monochromatic light as the basis of interferometry – The principle of Interference – Interference bands using optical flats – Examples of Interference patterns – NPL flatness Interferometer – Gauss length Interferometer.

Unit IV: Comparator

Desirable features of comparators - Classification of comparators – Mechanical comparator- Micrometer dial comparator – Lever type dial indicator –Advantages and limitations of Mechanical comparator.

Unit V: Metrology of screw threads

Screw thread terminology – Types of Threads – British Association Thread – Measurements of screw threads – Measurement of major diameter –Measurement of minor diameter – Measurement of internal threads - Measurement of major diameter – Measurement of minor diameter

Suggested Topics for Group Discussion/Presentation

- Metrological Terminologies
- Types of Calipers
- Examples of interference pattern
- Classification of comparators
- Measurements of Screw Threads

Suggested Readings:

i) Text Book:

1. Anand K Bewoor, Vinay A Kulkarani, Metrology & Measurement, McGraw Hill Education (India) Private Limited, Chennai, Seventeenth Reprint (2017).

ii) Reference Book:

1. Raghavendra, NV, Krishnamurthy L, Engineering Meteorology and Measurements, Oxford University Press, (2015).

iii) Web Sources:

1. https://www.keyence.com/ss/products/measure-sys/measurement- selection/basic/method.jsp
2. https://learnmech.com/what-is-comparators-in-metrology/
3. http://www.historyofpencils.com/drawing-tools/caliper/

Title of the Course: Laser & its Applications Semester: II
Course Code: LUPHSC21 Addl. Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the theory behind the production of LASER
- explain population inversion and LASER actions
- understand the principles of various types of LASER
- apply LASER to various fields including biomedical field.
- discuss the wide applications of LASER

Pre-Required Knowledge:

- The theory behind the LASER photon emission
- Various types of LASER sources and their productions
- The various applications of LASER

Unit I: Laser Principles

Introduction- Differences between ordinary light and laser beam-Characteristics of Lasers - Principle of Laser action-Absorption-Stimulated emission, Spontaneous emission- Differences between stimulated and spontaneous emission of radiation.

Unit II: Pumping methods

Population inversion - Pumping methods - Optical resonator - Laser action, Laser action applications.

Unit III: Laser Properties

Resonant Cavity – Optical Amplification – Intensity – Directionality - Monochromatic - Coheren

Unit IV: Types of lasers

Different types of Lasers - Liquid Lasers - Solid State Laser - Gas Laser - Semiconductor Laser.

Unit V: Applications of lasers

Industry – Medicine – Surgery - Bar coding - Laser printing - Laser Application in Military - Laser Application in Computer

Suggested Readings:

i) Text Books:

1. Mani.P, Engineering Physics, Dhanam Publishers, (2017). Unit: I, II, III, IV, V
2. Anuradha De, Optical fibre and laser (Principles and applications), New Age International (P) Ltd., Revised (2005). Unit: IV, V

ii) Reference Book:

1. Murugesan R, Optics and Spectroscopy, S. Chand & Company Ltd, (2001).

iii) Web Sources:

1. https://www.youtube.com/watch?v=7vFDdgmxJmY
2. https://www.youtube.com/watch?v=PK4yFaGHSFc
3. https://www.youtube.com/watch?v=-W0pwzaJHu8

Title of the Course: Measurement and its Instrumentation **Semester: II**

Course code: LUPHSC22 **Addl. Credits: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the theory behind transducers and various measuring instruments
- know about zero order and second order system
- explain low pressure measurement

- understand the working principle of magnetic flow meter
- discuss the theory behind thermoelectric effect

Pre-Required Knowledge:

- Working principle of transducer
- Importance of low-pressure measurement device
- Various temperature scales

Unit I: Transducers

Capacitive transducers- piezoelectric transducers- photoelectric effect- photoconductive transducers- Ionization transducers- Hall effect transducers-Digital displacement transducer.

Unit II: Performance characteristics

Introduction- Generalized measurement-zero order system- second order system- Dead time element- specification and testing of dynamic response.

Unit III: Pressure measurement

Mechanical pressure measurement devices- Bourdon tube pressure gauge- The Bridgeman gauge- dead weight Tester- Low pressure measurement- The Mc lead gauge.

Unit IV: Flow measurement

Positive displacement methods- Flow obstruction methods- Flow measurement by drag effects- Hot wire and Hot film anemometers- Magnetic flow meters.

Unit V: Measurement of temperature

Temperature scales- The ideal gas thermometer- temperature measurement by mechanical effects- temperature measurements- Thermistor- Thermoelectric effects.

Suggested Readings:

i) Text Book:

1. Ghosh A.K, Introduction to measurements and Instrumentation PHI, New Delhi, (2012)

ii) Reference Books:

1. Rangan, C.S., Sharma, G.R. and Mani, V.S.V. Instrumentation Devices and Systems TMH, New Delhi (2008).
2. Holman, J.P. Experimental methods for Engineers, MH., New Delhi (2012)

iii) Web Sources:

1. https://www.electronics-tutorials.ws/io/io_1.html
2. https://instrumentationtools.com/basics-of-pressure-measurement/
3. https://www.toppr.com/guides/science/heat/heat-and-measuring-temperature/

- the errors and corrections of Instruments
- calculate the value of "g"
- determine Young's modulus of the given beam by various methods
- determine the refractive index of a glass prism
- calculate the number of lines per meter in grating by normal incidence method

List of Experiments

1. Basic measurement, techniques and identification of Least count, Error and Correction of (i) Vernier Caliper (ii) Screw Guage (iii) Spectrometer (iv) Travelling microscope.
2. Determine the viscosity of liquid by Stoke's Method
3. Determine the viscosityof liquid by Poiseuille's Method
4. Determine the Young's Modulus of the material by Cantilever Depression method
5. Determine the acceleration due to gravity and radius of gyration by using Compound pendulum.
6. Determine the rigidity modulus of the wire and moment of inertia of the disc by using Torsional Pendulum
7. Determine the Young's Modulus of the material by Pin and Microscope method (uniform bending)

8. Determine the Young's Modulus of the material by Optic lever and telescope method (non- uniform bending)
9. Determine the Young's Modulus of the material by Optic lever and telescope method (uniform bending)
10. Determine the Young's Modulus of the material by Pin and Microscope method (non- uniform bending)
11. Determine refractive index of a given material of a prism by using Spectrometer
12. Determine the number of lines per metre in Grating by Normal incidence method by using Spectrometer.
13. Determine the surface Tension of a liquid by Capillary rise method
14. Determine refractive Index by Real and apparent depth.
15. Verify the Laws of transverse vibrations of a stretched string by using Sonometer.
16. Find the frequency of the given tuning fork by Melde's String method.

Suggested Readings:

i) Reference Book:

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

ii) Web Sources:

1. https://vlab.amrita.edu/?sub=1&brch=74
2. https://youtu.be/rkiMpF4r2Jk
3. https://youtu.be/3uZ_Boyt_AI
4. https://youtu.be/P-eJIXZimmQ
5. https://youtu.be/cDlzrrsfs3E
6. https://www.youtube.com/watch?v=QJd_OI7_UgM
7. https://physicsfeed.com/post/to-find-the-value-of-acceleration-due-to-gravity-g-radius-of-gyration-k-and-moment-of-inertia-i-by-using-compound-pendul/
8. https://www.youtube.com/watch?v=oRch7irmLvo

9. https://pgslogan.weebly.com/uploads/2/4/7/0/24706722/physics_lab_manual.pdf

DEPARTMENT OF MATHEMATICS – UG – CBCS - LOCF

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-Soleniodal - 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.Manicavachagom Pillay, S.Viswanathan Publishers Private Limited 2004
3. Ancillary Mathematics Volume 1 and 2, P.Balasubramnian and K.G. Subramanian

4. Ancillary Mathematics Volumei 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=zWMTTRJ0l4w
3. https://www.youtube.com/watch?v=7G07dPSlWbY
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
6. https://www.slideshare.net/hardik6034off/half-range-sine-cosine-fourier-series

PART IV – VALUE EDUCATION – UG – CBCS - LOCF

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

Unit I: Education Theories

1. Gandhi

2. Tagore

3. Aristotle

Unit II: Values of Religion and Society

1. Religious Values and ideologies

2. Religious Values and Social functions

3. Impact of Religious values

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

1. Meaning of Professional value

2. Basic concept of Values

3. Value formation through social institutions

Unit IV: Constitutional values and Fundamental Rights

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

Unit V: Directive Principles of State Policy and Fundamental Duties

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

Learning Outcomes:

On completion of this course, Students will be able to

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

Suggested Topics:

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

Text Books:

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

Reference Books:

1. *K.G.S. Ramanan, Value Education, New Century Book House, Chennai, 2016.*

2. *R.C.Agarwal, Constitutional Development and National Movement of India.*
3. *M. Laxmikanth, Indian Polity, Tata Mc Graw Hill, New Delhi, 2011.*

***Web Sources**:*

1. https://www.iberdrola.com

2. https://www.edb.gov.hk

3. ttps://www.index.com

DEPARTMENT OF NSS – PART - V

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

Course Learning Outcomes:

On completion of the course, the students are able to

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

Pre-required Knowledge

- ✓ History and Growth of NSS
- ✓ Objective and role of NSS volunteers
- ✓ Social issues
- ✓ Disaster management

Unit I: Basic concepts of NSS

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

Unit II: Administrative Structure of NSS and Volunteerism

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

Unit III: Programmes and Regular Activities

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

Unit IV: Community Development and Addressing the Social Issues

1. Women Empowerment, Human Right Education – Communal Harmony
2. Entrepreneurship development - Entrepreneurial skills- government self-employment schemes
3. Rainwater harvesting – Issues with plastics and Preserve natural resources
4. National Integration and RTI

Unit V: Village Adoption & Disasters Management

1. Planning and Preparation of Camping Activities, Conducting Survey
2. Medical and Veterinary Camp, Literacy Camp, Plantation and Immunisation

3. Introduction to Disasters Management, classification of Disasters
4. Role of Volunteers in Disasters Management

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATION

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

Suggested Readings:

i) Text Book

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

ii) Reference Books:

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

iii) Web Sources:

1. http://nss.nic.in/speccamp.asp
2. ^ National Service Scheme—NIT Calicut Chapter Retrieved 2012-08-01.
3. ^ National Service Scheme — P.G.D.A.V College, University of Delhi NSS P.G.D.A.V College, University of Delhi,
4. http://www.thebetterindia.com/140national-service-scheme-nss/

DEPARTMENT OF PHYSICAL EDUCATION– UG – CBCS-LOCF

PART – V

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

Course learning out comes:

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

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

Pre-Required knowledge:

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

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

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

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

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

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

Suggested topics for Group Discussion / Presentation

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

Text Books:

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

Reference Books:

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

Web Sources:

www.swayamprabha.gov.in
www.e-yantra.org
www.vlabs.co.in
www.fossee.in

DEPARTMENT OF PHYSICS – UG – CBCS – LOCF

Title of the Course: Electricity	**Semester: III**
Course Code: LUPHCT31 Contact Hours:4hrs/w	**Credits:4**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the uses of capacitor
- discuss the uses of various electrical meters.
- measure various electrical quantities.
- analyse electrical circuits using Kirchoff's laws.
- apply and analyse Peltier emf, Thomson emf

Pre-Required Knowledge:

- The concepts of electric field.
- The role of electrostatic force in everyday life.
- Effect of a dielectric capacitor

Unit I: Charge and field

Introduction- Coulomb's law-Electric Field- Flux of the Electric Field- Gauss's Law- Its Proof- Applications of Gauss law – Electric field due to a Uniformly charged sphere- a) at a point outside the surface b) at a point on the surface, c) at a point inside the surface – Electric field due to an infinite plane sheet of charge – Coulomb's theorem- Mechanical Force experienced by unit Area of a charged conductor – Electric potential – Relation between electric field and electric potential – potential at a point due to a uniformly charged conducting sphere.

Unit II: Capacitors

Introduction – Capacitance of a conductor – principle of a capacitor - Capacitance of a Spherical Capacitor (Outer sphere earthed and inner sphere earthed) – Capacitance of a cylindrical capacitor – Parallel plate capacitor – Parallel plate capacitor partly filled with dielectric slab – Types of capacitors.

Unit III: Electrical measurement

Electric Current and Current density – Ohm's Law and Electrical Conductivity – Kirchhoff's laws – Application of kirchhoff's laws to Wheatstone's network – Sensitivity of Wheatstone's bridge – Carey Foster bridge – Determination of the temperature coefficient of resistance – Principle of Potentiometer – Determination of internal resistance of the cell using potentiometer – calibration of ammeter – calibration of voltmeter (low and high range).

Unit IV: Magnetic effect of electric current

The Biot-Savart law – Magnetic induction at a Point due to a straight conductor carrying current – Magnetic Induction at a point on the Axis of a circular coil carrying current – Moving coil Ballistic galvanometer – theory – Damping correction – conditions for a Moving coil

galvanometer to be Dead-beat and ballistic – Determination of the absolute capacitance of a capacitor – Comparison of two capacitances using B.G.

Unit V: Thermo-electricity

Seebeck Effect – Law of Intermediate metals –Law of intermediate Temperatures – Measurement of Thermo EMF using potentiometer – Peltier Effect – Peltier Coefficient – Thomson Effect – Thomson coefficient – Thermo-Electric Diagrams – uses of Thermoelectric Diagrams –Determination of Total emf, Peltier emf, Thomson emf – Thermo emf in a general couple, neutral temperature and temperature of inversion.

Suggested Topics for Group Discussion/Presentation:

- Applications of Gauss law
- Types of capacitors
- Determination of the temperature coefficient of resistance
- Determination of the absolute capacitance of a capacitor
- Measurement of Thermo EMF using potentiometer

Suggested Readings:

i) Text Book:

Murugesan. R, Electricity and Magnetism, S. Chand& Company Ltd., New Delhi, (2011)

ii) Reference Books:

1. Tewari K. K, Electricity & Magnetism with Electronics, S. Chand& Co Ltd. New Delhi, (2001).
2. Vasudeva D. N, Electricity& Magnetism with Electronics, S. Chand& co Ltd, (1992)

iii) Web Sources:

1. https://www.electrical4u.com/coulombs-law/
2. http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
3. https://www.physicsclassroom.com/class/estatics/Lesson-3/Coulomb-s-Law

DEPARTMENT OF PHYSICAL EDUCATION– UG – CBCS-LOCF

PART IV

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

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

Course Learning Outcomes:

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

Pre-Required Knowledge:

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

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

Unit – V: MUDRAS, PRANAYAMAS AND MEDITATION

(i) MUDRA

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

(ii) PRANAYAMAS

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

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

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

Concept of Yoga

Yoga and Health

Introduction to Nutrition and Dietetics

Ardha-Padmasana [virasana],.Ardha-Halasana

Viparithakarani-Mudra

Suggested Readings:

Text Books:

1. Yoga Practice I - The World Community Service Centre - Vethathiri Publications, Erode, 1st Ed - 2009, 4 th Edition 2012
2. Mind, Vethathiri maharishi, Vethathiri publication, Erode, 1st Ed – 1999

3. Simplified Physical Exercises - Vethathiri Maharishi, 1st Edition, 1977, 44th Edition,2015, Vethathiri Publications.
4. Yoga for Modern Age - Vethathiri Maharishi, 1st Edition 1972, 19th Edition Oct. 2015 – Vethathiri Publications.
5. Body, Life - force and Mind :Vethathiri Maharishi - Ist Edition 2006, 2nd Edition May 2006 – Vethathiri publications.

References Books:

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

Web Sources:

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

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE
PART – V

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

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

Course Learning Outcomes:

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

- Trace the History of Libraries.
- Classify information Sources.
- Follow the modern trends in the field of library science.
- Appreciate the value of books and other reading materials.
- Understand the importance of libraries in the modern society.

Pre required knowledge:

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

Unit I – Evolution of Libraries

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

Unit II – Modern Library System:

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

Unit III – Knowledge Organisation :

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

Unit IV – Modern Trends:

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

Unit V – Library and Society:

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

Suggested Topic for Group Discussion and Presentation:

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

Text book:

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

References Books:

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

Websites and e-Learning Sources:

- IGNOU – CLIS –Study materials.
- http://www.ignouhelp.in/ignou-clis-study-material
- Manomaniam Sundaram University – CLIS – Study Materials.
- https://www.msuniv.ac.in/Download/pdf/4e55f868a24b4a7
- Wikipedia.
- Encyclopaedia Britannica.

DEPARTMENT OF NCC – UG - CBCS - LOCF
PART V

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

On completion of the course, the students are able to

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

Pre-required Knowledge

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

Unit – I Drill

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

Unit – II Weapon Training

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

Unit – III Map Reading

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

Unit – IV Judging Distance

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

Unit –V Self Defence

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

Suggested Topics / Practical Exercises

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

SUGGESTED READINGS:

i) Text Books:

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

ii) Reference Books:

1. Specialized Subject Army (2018).New Delhi, Govt. Of India Press.
2. Precis, (2009). Kamptee, Published by Officer Training School.
3. Cadet's diary. (2000).Chennai, Published by cadets' center.

4. Gupta.R. (2015) Ramesh Publishing House, NCC: Handbook of NCC cadets.
5. Lt. Saravanamoorthy. S.N. (2015). A hand book of NCC-Army wing. Jayalakshmi publications.

iii) Web sources:

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

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

3. https://joinindianarmy.nic.in/default.aspx

4. https://www.joinindiannavy.gov.in/

5. https://indianairforce.nic.in/

DEPARTMENT OF TAMIL – UG – CBCS
PART I- TAMIL

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

பாடத் திட்டத்தைக் கற்றுக் கொண்ட பின்பு மாணவர்கள் பெறும் பயன்கள்: -

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

பாடத்திட்டத்திற்குத் தேவையான முன் அறிவு:

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

கூறு I: பக்தி இலக்கியங்கள்

1. திருஞானசம்பந்தர்- திருஆலவாய்ப் பதிகம் (முதல் 5 பாடல்கள்)
2. திருநாவுக்கரசர்-நமச்சிவாயப் பதிகம் (முதல்5 பாடல்கள்)
3. சுந்தரமூர்த்தி நாயனார்- திருப்புனவாயில் பதிகம் (முதல் 5 பாடல்கள்)
4. மாணிக்கவாசகர்-திருவெம்பாவை (முதல் 5 பாடல்கள்)
5. குலசேகர ஆழ்வார்-பெருமாள் திருமொழி (முதல்10 பாடல்கள்)
6. ஆண்டாள் - நாச்சியார் திருமொழி (திருப்பாவை முதல் 10 பாடல்கள்)
7. சித்தர் பாடல்கள்

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

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

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

கூறு II: சிற்றிலக்கியங்கள்

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

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

கூறு III: புதினம்

1. திக்கற்ற பயணம் - ராமன் மதி

கூறு IV: இலக்கணம்

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

கூறு V: இலக்கிய வரலாறு

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

II. எழுத்துப் பயிற்சி :

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

1. பரிந்துரைக்கப்பட்ட நூல்கள்:

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

2. பார்வை நூல்:

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

3. இணைய ஆதாரங்கள் :

தமிழ்விடு தூது

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

முக்கூடற்பள்ளு

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

குற்றாலக்குறவஞ்சி

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

DEPARTMENT OF ENGLISH – UG – CBCS-LOCF

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

Course Learning Outcomes:

On completion of the course, the students are able to

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

Pre-required Knowledge:

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

UNIT I-PROSE

O'Henry -The Gift of the Magi

Robert Lynd -On Forgetting

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

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

UNIT II -POETRY

Rabindranath Tagore -Leave This Chanting

LalDed -LalDed'sVakhs

William Wordsworth -The World is too much With Us

Walt Whitman -O Captain! My Captain!

UNIT III -NOVEL

Charles Dickens - Oliver Twist

UNIT IV- GRAMMAR

Voices

Transformation of Sentences

Idioms and Phrases

UNIT V COMPOSITION

Curriculum Vitae

Memoranda, Notices, Agenda & Minutes

E-Mail Writing

Suggested Topics for Presentation:

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

Suggested Readings:

i)Text Book:

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

ii)Reference Books:

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

iii)Web Sources:

1.https://english.washington.edu

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

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

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

5.https://poemanalysis.com>ocaptain

Title of the Course: Allied Applied Electronics - I Semester: III
Course code: LUELGE31 Contact Hours: 4hrs/w Credits: 4

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the fundamental principle of semiconductors and characterize PN junction diode
- know about the operation of various types of diode
- apply PN junction diode for different types of rectifiers
- discuss the operation of photovoltaic cell and photo conductive cell
- explain about basic transistor configurations namely common base, common emitter and common collector and also about current and voltage gain.

Pre-Required Knowledge:

- Energy band description of semiconductor
- Electrical concepts - current, voltage and resistance relationship
- Series and parallel connections

Unit I: P-N junction diode

V-I characteristics - forward characteristics - reverse characteristics - diode current equation - effect of temperature on diode Characteristics - static and dynamic resistance of diode-diode applications-power and current rating of a diode-testing a diode.

Unit II: Special diodes

Zener diode – reverse characteristics of zener diode - Tunnel diode – V-I Characteristics of the tunnel diode – Varactor Diode - Varactor Diode applications – Schottky diode – Schottky diode applications –PIN diode.

Unit III: Rectifiers and filters

Half wave rectifier - Half wave rectifier with transformer coupled input - Full wave rectifier – Center tapped

full wave rectifier – Ways of drawing full wave rectifier circuit – effects of turns ratio on full wave rectifier output voltage – advantages and disadvantages of center tapped full wave rectifier – full wave Bridge rectifier – ways of drawing a bridge rectifier circuit – advantages and disadvantages of bridge rectifier – Filters - Inductor filter - Capacitor filter - LC filter.

Unit IV: Optoelectronic devices

Light Emitting Diode – LED voltage drop and current – LED applications – Photo diode applications – photo conductive cells – photo voltaic cell – laser diode – laser diode applications.

Unit V: Transistor

Transistor Biasing - Operation of NPN transistor - Current gain in CB, CE and CC mode-Relation between current gain α and β Transistor characteristics in CE configuration – Input and output characteristic of a transistor in common emitter configuration - D.C Operating point - Load line - Q-Point and maximum undistorted output - Base bias - Voltage divider bias.

Suggested Topics for Group Discussion/Presentation

- Effect of temperature on semiconductor
- Different types of diode and its applications
- Types of filters used in rectifier
- Advantages of optoelectronic devices
- Transistor biasing and stabilization

Suggested Readings:

i) Text Book:

Sedha, R.S., A Text Book of applied electronics, S. Chand and Company Edition, Reprint(2021).

ii) Reference Books:

1. Milman and Halkias, Electronic devices and circuits, McGraw Hill International edition 5th reprint (1993).

2. S.Salivahanan, N.Sureshkumar and A.Vallavaraj, Electronic Devices and Circuits,Tata McGraw Hill (1998).

iii) Web Sources:

1. https://www.tutorialspoint.com/basic_electronics/basic_electronics_quick_guide.htm
2. https://www.instructables.com/Basic-Electronics/
3. https://www.arrow.com/en/research-and-events/articles/types-of-diodes-and-their-applications

Title of the Course: Astrophysics	**Semester: III**
Course Code: LUPHSC31	**Addl. Credits: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand about Helio-centric theory
- know about Comets, Meteors
- discuss about Structure of the Sun
- know about the various type of stars
- discuss about Origin of Universe

Pre-Required Knowledge:

- Knowledge on gravitation.
- The function and role of heavenly bodies.
- Various theories to understand the origin of universe.

Unit I: Astronomy and planets

Birth of modern Astronomy – Celestial Sphere – Geo Centric Theory –Helio Centric Theory - Terrestrial - Jovian Planets –Kepler's law – Newton's law of Gravitation – Asteroids- Comets.

Unit II: Astronomical instruments

Orientation of Earth in Space –Arc and Time Units – Local Time –Standard Time –Different between Local Time

and Standard Time – Elements of Telescopes and it's processing

Unit III: Solar Physics

Introduction **–** Physical properties – Structure of Sun – Nuclear Reactions – Sun Spots – Sun Spot Cycle **–** Butterfly diagram – Solar Wind – Auroras **–** Solar Prominences – Solar Flares – Space Weather Effects.

Unit IV: Stellar Physics

Classification of Stars – Hertzsprung – Russell Diagram – Luminosity of a Star – Stellar Evalution – White Dwarfs – Neutron Stars – Black Holes – The Basic Physics of Black Holes.

Unit V: Galaxies

Nomenclature– Types of Galaxies – Milky way Galaxies – Star Clusters – Galactic Clusters – Pulsars – Supernova Explosion

Suggested Readings:

i) Text Book:

1. MujiberRahman A, Introduction to Astrophysics, KAMS Publications, 1th Edition, (2018).

ii) Reference Books:

1. Abiyankar, K.D. Astro physics of the solar system, University press India (2011).
2. Baidyanath Basu, An introduction to Astro Physics, 2nd Edition, Prentice Hall of India, New Delhi. (2010).

iii) Web Sources:

1. https://en.m.wikipedia.org
2. https://www.livescience.com
3. https://www.bighistoryproject.com

Title of the Course: Measuring Instruments & House wiring **Semester: III**

Course Code: LUPHSC32 **Addl.Credits: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the principles of earthing
- explain the principle of moving iron instruments
- discuss various types of dynamometers
- know the general applications of wiring materials and accessories
- have the in-depth knowledge on some of the specific earthing and it's necessity

Pre-Required Knowledge:

- The concept of moving coil instrument
- Acquire basic knowledge on Deflecting Torque
- Applications of Permanent magnet type

Unit I: Instruments classification

Introduction - Classification of Instruments - Indicating instruments - Deflecting Torque - Opposing Torque – Moving Iron Instruments Attraction Type – Moving Iron Instrument Repulsion Type - Permanent magnet type - Moving Coil Instrument - Dynamometer Type.

Unit II: House wiring

Wiring Materials and Accessories Introduction - Switches - Lamp Holders – Lamp – Plugs - Main Switch - Distribution Fuse Bound - Types of wiring - Best principles of earthing - earthing and it's necessity -Earthing through a plate wiring - Layout for a residential building.

Unit III: Electrical power

Power Generation – Transmission System - Transmission System working – Distribution System – Main Components of Transmission and Distribution Systems – Comparison of overhead (OH) and Underground (UG) System

Unit IV: Electrical machines

DC Generator – Principle – Construction – EMF Equation – Type of DC Generator – Electrical Equivalent Circuits – Terminal Markings – Separately Excited DC Generator – DC Shunt Generator – Series Generator- DC Generators Characteristics - Applications of DC Generators.

Unit V: DC generators

DC Motor – Principle – Construction – Working – Type of DC Motors and Electrical Equivalent – Torque and Speed Equations – Characteristics of DC Motors – Shunt Motors – Series Motors –Compound Motors -Losses in DC Machines – Speed Control of DC Motors – Starting of D.C. Motors.

Suggested Readings:

i) Text Book:

Basic Electrical and Electronics Engineering, Muthu subramanian .R & Salivaganam, S,McGraw Hill Education (India), 21st reprint (2015)

ii) Reference Book:

Uppal S.L and Gard G.C, Electrical Wiring estimating and costing, Khanna Publishers, 6th Edition, (2010).

iii) Web Sources:

1. https://www.youtube.com/watch?v=fgb0PSpr-jg
2. https://www.youtube.com/watch?v=B5lIZpwSEEY
3. https://www.electrical4u.com/electrical-measuring-instruments-types-accuracy-precision-resolution-speed/

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 Rations.

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-equations

DEPARTMENT OF TAMIL – UG – CBCS
PART I- TAMIL

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

பாடத் திட்டத்தைக் கற்றுக் கொண்ட பின்பு மாணவர்கள் பெறும் பயன்கள்: -

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

பாடத்திட்டத்திற்கு தேவையான முன் அறிவு :

❖கவிதை படைப்பதை அறிந்து கொள்ளல்

❖உரைநடையின் தோற்றம், ஆசிரியர்கள் பற்றி தெரிந்து கொள்ளல்

❖படைப்பாற்றலை மேம்படுத்துதல்

கூறு I: கவிதை

1. பாரதியார் - நல்லதோர் வீணை செய்தே
2. பாரதிதாசன் - நீங்களே சொல்லுங்கள்
3. கவிமணி தேசியவிநாயகம் பிள்ளை - ஆசிய ஜோதி
4. முடியரசன் - கடவுளர் விரும்பும் மொழி
5. கண்ணதாசன் - கமலப்பூவே

6. வாலி - இலக்கிய நாயகன் இராமன்
7. அப்துல்ரகுமான் - உழவர்களைப் பாடுவோம்
8. மு.மேத்தா - தேசப்பிதாவுக்கு ஒரு தெருப்பாடகனின்அஞ்சலி
9. வைரமுத்து - இருபது கட்டளைகள்
10. நாட்டுப்புறப்பாடல் - உழவர்பாட்டு நா.வானமாமலை
11. மீரா - போலிகளை நம்புகிறாய்
12. சண்முகம் சரவணன் - துறவியின் இசைக் குறிப்புகள்

கூறு II: ஹைக்கூ கவிதைகள்

1. 40 கவிதைகள்

கூறு III: சிறுகதை

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

கூறு IV: இலக்கணம்

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

கூறு V: இலக்கிய வரலாறு

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

II. எழுத்துப் பயிற்சி :

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

1. பரிந்துரைக்கப்பட்ட நூல் :

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

2. பார்வை நூல் :

- தமிழ் இலக்கிய வரலாறு - மு.வரதராசன் வகைமை நோக்கில்
- தமிழ் இலக்கிய வரலாறு - பாக்கிய மேரி
- நற்றமிழ் இலக்கணம் - தொ.பரமசிவம் வகைமை நோக்கில்
- தமிழ் இலக்கிய வரலாறு - ஈஸ்வரன்
- தாய் வழி இலக்கணம் - மீ.முத்துராணி
- நன்னூல் - வெள்ளை வாரணனார் உரை
- நவீன இலக்கியப் போக்குகள் - முருகேசப் பாண்டியன்
- தமிழில் சிறுகதை பிறக்கிறது - சி.சு.செல்லப்பா
- படைப்பாக்க உத்திகள் - சவரிமுத்து

3. இணைய ஆதாரங்கள்:

சிறுகதைகளின் தோற்றமும் வளர்ச்சியும்

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

புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்

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

மரபுக் கவிதையின் தோற்றமும் வளர்ச்சியும்

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

DEPARTMENT OF ENGLISH – UG – CBCS-LOCF

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

Course Learning Outcomes:

On Completion of the Course the students are able to

- speak and write clearly in fair English.
- listen and read carefully the various viewpoints of different writers and engage with them.
- understand the world with the help of English language.

- develop an awareness of the linguistic –cultural richness of India.
- practise language skills for successful communication

Pre-required Knowledge:

- ✓ Comfortability on language skills
- ✓ Functional Grammar competence
- ✓ Active vocabulary package

UNIT-I-PROSE

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

UNIT-II-POETRY

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

UNIT-III-DRAMA

William Shakespeare : As You Like it

UNIT-IV-GRAMMAR

Direct and Indirect speech
Degrees of Comparison
One word substitution

UNIT-V-COMPOSITION

Interview Skills
Group Discussion
Meeting, Seminars and Conferences

Suggested Topics for Presentation:

- ✓ Martin Luther King and civil rights movement.
- ✓ A.K.Ramanujan's writing style.
- ✓ Money is a madness-How?

- ✓ Shakespeare and his major comedies.
- ✓ Grammar and Language competence

Suggested Readings:

i)Text Book:

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

ii)Reference Books:

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

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

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

iii)Web Sources:

1.https://www.inc.com

2.https://www.litbullseye.com

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

DEPARTMENT OF PHYSICS – UG – CBCS - LOCF

Title of the Course: Electromagnetism Semester: IV
Course Code: LUPHCT41 Contact Hours:4hrs/w Credits: 4

Course Learning Outcomes:

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

- ➢ apply and analyse the behaviour AC circuits based on L, C and R.
- ➢ understand various uses of Eddy currents.
- ➢ know the EMF Induced in a coil rotating in a Magnetic field.
- ➢ measure various electrical quantities of LCR circuits.
- ➢ understand about maxwell's equations

Pre-Required Knowledge:

- The phenomenon of electromagnetic induction.

- The various methods of producing induced emfs.
- The notion of root mean square value of alternating current

Unit I: Electromagnetic induction

Faraday's laws of electromagnetic induction - Lenz's law – self-Induction – Determination of self –inductance by Raleigh's method – Mutual Induction – Experimental determination of mutual inductance using BG (with theory) – Coefficient of coupling – Eddy currents

Unit II: Transient current

Growth of current in a circuit containing a resistance and inductance – Decay of current in a circuit containing L and R – Charge and discharge of a capacitor through a Resistor – growth of charge in a circuit with inductance, capacitance and resistance – discharge of a capacitor through and a resistor in series (Decay of charge in LCR circuit) – importance in wireless Telegraphy

Unit III: Alternating current

EMF Induced in a coil rotating in a Magnetic field – peak value of alternating current – mean value of alternating current – Root mean square value of an alternating current – form factor – Effective value of an A.C – Impedance – LCR circuits- Series Resonance circuit – Parallel Resonance circuit – Comparison between series and parallel resonant circuit – A.C bridges – Maxwell's bridge (for determination of self-inductance of a coil) – Owen's bridge, De Sauty's bridge

Unit IV: Magnetic properties of materials

Definition of **B, H, M**and Magnetic susceptibility – Properties of diamagnetic, paramagnetic, ferromagnetic materials- Antiferromagnetic and Ferrimagnetism –Experiment to draw B-H curve (Ballistic method) – the importance of hysteresis curves – Choice of magnetic materials – Permanent Magnets – Electro-magnets- Transformer cores – Ferrites –Determination of susceptibility by curie balance method

Unit V: Maxwell's equation and electromagnetic waves

Displacement current – Maxwell's equations in material media – plane Electromagnetic waves in free space – velocity of light- Poynting vector – Hertz experiment for production and detection of electromagnetic wave.

Suggested Topics for Group Discussion/Presentation

- Determination of self –inductance by Raleigh's method
- Discuss about Decay of charge in LCR circuit
- Comparison between series and parallel resonant circuit
- Determination of susceptibility by curie balance method
- Derive Maxwell's equations in material media

Suggested Readings:

i) Text Book:

Murugesan. R, Elecricity and Magnetism, S. Chand& Company Ltd., New Delhi, (2011).

ii) Reference Books:

1. Tewari K. K, Electricity & Magnetism with Electronics, S. Chand& Co Ltd. New Delhi, (2001).
2. Vasudeva D. N, Elecricity& Magnetism with Electronics, S.Chand& co Ltd, (1992).

iii) Web Sources:

1. https://www.elprocus.com/what-is-magnetic-hysteresis-b-h curve-its-applications/
2. http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
3. https://vlab.amrita.edu/?sub=1&brch=75&sim=330&cnt=1

Title of the Course: Allied Applied Electronics – II Semester: IV
Course Code:LUELGE41 Contact Hours:4hrs/w Credits: 4

Course Learning Outcomes:

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

- understand the operation of Amplifier and Oscillator
- know the working principle of JFET and MOSFET
- understand the working principle and Characteristics of UJT
- understand the working principle and Characteristics of TRIAC
- understand the working principle and Characteristics of DIAC

Pre-Required Knowledge:

- Semiconductors, PN junction, diode,
- Transistor, rectifier,
- Uses of diode and transistor

Unit I: Amplifiers

Classification of amplifiers – Transistor as an amplifier – Common emitter transistor amplifier – Common emitter amplifier parameters – Characteristics and uses of common emitter amplifier – Common base amplifier - Characteristics and uses of common base amplifier – Common collector amplifier - Characteristics and uses of common Collector amplifier – Comparison of three amplifier configurations.

Unit II: Feedback in amplifiers

Principle of feedback amplifiers-Advantages and disadvantages of negative feedback –Types of feedback connection – voltage series feedback connection – voltage shunt feedback connection - current series feedback connection - current shunt feedback connection - comparison of feedback connection - Negative feedback in transistor amplifiers – common emitter amplifiers without bypass capacitor- emitter follower.

Unit lll: Oscillators

Comparison between an amplifier and an Oscillator - Classification of Oscillator – The Barkhausen Criterion – Hartley oscillator - Colpitt's oscillator – Crystal Oscillator circuit – Phase shift oscillator.

Unit IV: FET

Types of FET - N-Channel JFET-Operation-Drain Characteristics of JFET-Comparison of JFET and BJT-MOSFET-Enhancement MOSFET and depletion MOSFET (construction and working) Advantages of N- channel MOSFET over P –channel

Unit V: Thyristors

SCR-Rectifier using SCR-Half wave, Full wave and Bridge rectifier using SCR -TRIAC-DIAC-UJT - operation, characteristics and their applications.

Suggested Topics for Group Discussion/Presentation

- Comparison of three amplifier configurations.
- Types of feedback connection
- Classification of Oscillator
- MOSFET
- TRIAC-DIAC

Suggested Readings:

i) Text Books:

1. Sedha RS, A Text Book of applied electronics, S. Chand and Company, (2021). Unit: I, II, III, IV
2. Salivahanan S, Sureshkumar N and Vallavaraj A, Electronic Devices and Circuits, Tata McGraw Hill (2003). Unit: V

ii) Reference Books:

1. Gupta JB, Electronic devices and circuits, SK Kataria and sons, (2013).
2. Milman and Halkias, Electronic devices and circuits, Mc Graw Hill International edition (1993).

iii) Web Sources:

1. https://www.analog.com
2. https://electronicsdesk.com
3. https://www.sciencedirect.com

Title of the Paper: Non-Conventional Energy Sources	**Semester: IV**
Course Code: LUPHSC41	**Addl.Credits:2**

Course Learning Outcomes:

On completion of the course, the students are able to

- know the various forms of non-conventional energy sources
- understand the tapping of solar energy and its uses
- know the basics of wind energy and its usage
- discuss hydrogen energy production, storage and transportation
- know the basics behind chemical energy and its applications

Pre-Required Knowledge:

- The concepts of energy sources
- The role of wind energy in day-to-day life.
- Fuel cells

Unit I: Energy sources

Types of Energy sources- energy consumption as a measure of prosperity of a nation- world energy future - Renewable energy resources – Prospects of renewable energy.

Unit II: Solar energy and its applications

Solar radiation measurements: Types - Pyrheliometers – Armstrong Compensation Pyrheliometers, Abbot Silver Disc Pyrheliometers, Eppley Pyrheliometers. Pyranometers: A basic voltaic system for power generation - Applications of Solar Photo Voltaic system.

Unit III: Wind energy

Introduction – Basic, Block diagram of a Wind energy Conversion System (WECS) – Diagram of Physical wind generating Station and its function – Classification of Wind energy Conversion System – Advantages & Disadvantages of Wind energy Conversion Systems.

Unit IV: Hydrogen Energy

Electrolytic production of hydrogen – solar energy method - Hydrogen Storage Compressed gas storage – Liquid storage – Line packing – Underground storage – Metal Hydrides - Hydrogen transportation

Unit V: Chemical energy

Fuel cell: Design and principle of operation of a fuel Cell - Classification of fuel cells Advantages & Disadvantages of a Fuel Cell –- Applications of fuel Cells.

Suggested Readings:

i) Text Book:

1. Rai G.D, Non-conventional energy sources, Khanna Publishers, Fifth edition (2012).

ii) Reference Books:

2. Agarwal MP, Solar energy, S.Chand and Company, First edition, (1983).
3. Sukhatme SP, Solar energy, Tata McGraw –Hill company (1984)

iii) Web Sources:

1. https://bookondieting.com/abbot-silver-disk-pyrheliometer-35/
2. https://www.nationalgeographic.org/encyclopedia/geothermal-energy/
3. https://electricalacademia.com/renewable-energy/fuel-cell working principle characteristics-systems-advantages-disadvantages/#

Title of the Course: Physics of Electrical Appliances	Semester: IV
Course Code: LUPHSC42	Addl.Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the types of passive components
- know about Ohm's law
- describe the AC and DC voltage
- know the perspectives of Invertor
- understand the working of various electrical appliances

Pre-Required Knowledge:

- Electronic discrete components
- Functions of resistors and capacitors
- Electric circuits

Unit – I Discrete components

Resistance and its types–capacitance and its types–Colour codes-inductance and its units –Transformers–Electrical Charge–Current–Electrical Potential.

Unit – II Measuring instruments

Ohm's law–Galvanometer, Ammeter, Voltmeter and Multimeter Analog and Digital- Electrical Energy–Power–Watt–kWh–Consumption and electrical power.

Unit – III AC and DC

AC and DC–Single phase and three phase connections –RMS and peak values, House wiring–Star and delta connection–overloading –earthing–short circuiting–Fuses– Colour code for insulation wires

Unit – IV Electric instruments

Inverter–UPS–generatorandmotor–types–differenttypesofwindings–circuit breaker-Electrical switches and its types.

Unit – V Home appliances

Electrical bulbs–Fluorescent lamps–Street Lighting–Floodlighting–Electrical Fans– Wet Grinder– Mixer – Water Heater– Storage and Instant types, electric iron box, micro wave oven–Stabilizer, fridge.

Suggested Readings:

i) Text Book:

Theraja BL and Theraja AK, A text book in Electrical Technology, S Chand & Co (1999).

ii) Reference Books:

1. Saravanakumar R, Jagadeesan V and Vinoth kumar K, Basic Electrical and Electronics Engineering, Wiley publilshers, (2011).
2. Theraja BL, Basic Electronics (Solid State), S Chand & Co, (2006).

iii) Web Sources:

1. http://homework.uoregon.edu/pub/class/appliance1.html
2. https://www.sciencedirect.com/topics/physics-and-astronomy/electrical-appliance
3. https://spark.iop.org/power-and-domestic-appliances

Title of the Course: Major Physics Practical – II Semester: III/IV
Course Code: LUPHCL41 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- determine Electro Chemical Equivalent
- calculate the frequency of A.C
- calibrate ammeter and voltmeter
- compare the values of capacitance
- calculate the self-inductance of given inductance coils

List of Experiments

1. Determine the absolute capacity of a condenser by using Spot Galvanometer
2. Compare the capacitances of two capacitors by using Spot Galvanometer
3. Find the frequency of A.C main by using Sonometer
4. Determine the resistance and resistivity of given unknown wire by using Carey Foster Bridge.
5. Find electro chemical equivalent (e.c.e) by using Copper Voltammeter
6. Compare the Emf's of two primary cells by using Potentiometer.
7. Compare the Emf's of two primary cells by using Spot Galvanometer
8. Compare the Capacitances of two given capacitors by using De-Sauty's Bridge.
9. Determine the Impedance and Power Factor of the coil byusing LR circuit
10. Determine the Impedance and Power Factor of the coil by using CR circuit
11. Calibrate a given low range Voltmeter by using Potentiometer
12. Calibrate a given Ammeter by using Potentiometer
13. Determine the Self-inductance of a given coil by using Owen's Bridge
14. Determine the Self-inductance of a given coil by using Maxwell's Bridge
15. Determine the self-inductance of the given coil in LCR series resonance circuit
16. Determine the resonant frequency and impedance of the circuit at resonance in LCR parallel resonance circuit

Suggested Readings:

i) Reference Books:

1. Ouseph C.C, Rao U.J and Vijayendran V, Practical Physics and Electronics, Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai (2014).
2. Mary mathelane R and Arulmozhi M, Practical Physics, Golden Net Computers, Tiruchirappalli (2015).

ii) Web Sources:

1. http://vlabs.iitkgp.ac.in/asnm/exp8/index.html
2. https://youtu.be/CWWrpTkh5RA
3. https://youtu.be/AgoplKn11f4

Title of the Course: Allied Applied Electronics Semester: III/IV
Practical – I

Course Code:LUELGL41 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- generate sine wave form using Hartley oscillator
- draw the characteristics of PN junction diode and Zener diode.
- draw the characteristics of NPN transistor
- draw the characteristics of FET
- design voltage doubler and tripler circuit

List of Experiments

1. Test the diodes, Transistor and Values of resistances by using Cathode Ray Oscilloscope, Audio Frequency Oscillator.
2. Study the superposition theorem using simple wiring
3. Construct a Voltage Doubler circuit using Diodes
4. Construct a Voltage Tripler circuit using Diodes
5. Study the Transistor characteristics in common emitter mode

6. Study the PN junction Diode Characteristics
7. Study the Zener Diode Characteristics
8. Study the behaviour of a Bridge Rectifier circuit
9. Construct a Half Wave Rectifier using Diode and study their wave shaping properties
10. Construct a Full Wave rectifier using Diode and study the load characteristic curve
11. Study the Field Effect Transistor Characteristics
12. Study the Uni Junction Transistor characteristics
13. Construct the Relaxation Oscillator using Uni Junction Transistor
14. Calculate the self-inductance of the coil by using Hartley oscillator
15. Determine self – inductance of the coil by using Colpitt's oscillator
16. Construct a Single stage Amplifier and study its frequency response curve
17. Design a 5V regulated power supply and to measure its output

Suggested Readings:

i) Reference Books:

1. Ouseph C.C, Rao U.J and Vijayendran V, Practical Physics and Electronics, Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai (2014).
2. Mary mathelane R and Arulmozhi M, Practical Physics, Golden Net Computers, Tiruchirappalli (2015).

ii) Web Sources:

1. http://vlabs.iitkgp.ac.in/asnm/exp8/index.html
2. http://gjucomlab.weebly.com/uploads/1/4/4/6/14464994/exp4_hartley.pdf
3. http://www.kctgroups.com/downloads/files/Digital-Electronics-Lab%20manual-min.pdf
4. https://youtu.be/S0GsrzjVkd4

DEPARTMENT OF MATHEMATICS – UG – CBCS -LOCF

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, Del 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 PHYSICS – UG – CBCS - LOCF

Title of the Course: Optics and Spectroscopy **Semester: V**

Course Code: LUPHCT51 Contact Hours: 3hrs/w **Credits: 3**

Course Learning Outcomes:

On completion of the course, the students are able to

- know the phenomenon of Refraction of light through lenses and prisms
- understand the concepts of various aberrations in lenses and their removal
- derive and understand the theory of interference and diffraction and their applications
- understand the theory and its applications of polarization of light by the material medium
- understand various spectroscopic techniques

Pre-Required Knowledge:

- Ray diagram of light, convex lens, concave lens, Image formation due to lenses, Refractive index of the medium, velocity of light in the medium.
- Superposition of light waves, bending of light around the obstacles, polarization of light.
- Electromagnetic spectrum and its uses to determine the characteristics of molecules, molecular vibrations, basics of spectroscopic techniques.

Unit I: Geometrical optics

Refraction through thin lens - Equivalent focal length of two thin lens system - in contact Separated by a distance – achromatism in prisms – deviation without dispersion and dispersion without deviation – Direct vision spectroscope - Aberration in lenses –Spherical – methods of minimization – Chromatic aberration in lenses – Achromatism using two lenses – in contact – separated by a distance.

Unit II: Interference

Coherent sources – Young's double slit experiment – theory of interference fringes- Interference in thin films – reflected and transmitted light - Newton's rings –determination of wavelength, refractive index using Newton's rings - Michelson's interferometer – Types of fringes - Applications – Determination of wave length – difference in wavelength between two closed spaced spectral lines.

Unit III: Diffraction

Rectilinear propagation – Fresnel's explanation - Zone plate – Theory – Comparison with convex lens– Fresnel diffraction at straight edge – Fraunhofer diffraction at single slit – Plane transmission diffraction grating – dispersive power of grating - Determination of wavelength of spectral lines using grating - Resolving power of optical instruments – Rayleigh's criterion - Telescope, grating and prism.

Unit IV: Polarization

Polarization – polarization by reflection – Law of Malus – Pile of plates – Double refraction –Huygene; s theory and construction - Nicol prism –- QWP – HWP – Production of plane, circularly and elliptically polarized light - theory – detection - Quarter wave plate, Half wave plate theory – Optical activity – Fresnel's theory of optical rotation – experimental verification - Specific rotation – Laurentz half shade polarimeter.

Unit V: Spectroscopy

Microwave spectroscopy – Theory of pure rotational spectrum of a molecule – Rigid rotator – non-rigid rotator – Infrared spectroscopy – energy and vibrations of diatomic molecule – harmonic, Anharmonic oscillator – calculation of force constant – Infrared spectra – Double beam Infrared spectrometer – Experimental study of Raman effect – Classical and quantum theory of Raman effect – Complementarity of Raman & IR spectra – Application of Raman effect – Techniques and instrumentation.

Suggested Topics for Group Discussion/Presentation

- Dispersion through prism, direct vision spectroscope, achromatism in lenses.
- Theory of interference fringes, Newton's rings and its applications
- Diffraction of light through apertures, resolving power of instruments
- Production and detection of polarized light, optical rotation
- Raman and Nuclear Magnetic spectroscopic techniques

Suggested Readings:

i) Text Books:

1. Murugeshan R. And Kiruthiga S, Optics and Spectroscopy, S. Chand& Co., Nineth Revised edition, New Delhi, Reprint (2014). Unit: I, II, III, IV
2. Murugeshan, R. & Kiruthiga, S., Modern Physics, S. Chand & Co. New Delhi, Reprint, (2018). Unit: V

ii) Reference Books:

1. Subrahmanyam L, BrijLal, Avadhanulu, M.N. A Textbook of Optics, S. Chand & Co, 23rd Revised Edition, New Delhi, (2006).
2. Kakani, S.L. and Bhandari, K.C. Optics, I Edition – Sulthan Chand & Sons, New Delhi, (2002).

iii) Web Sources:

1. https://ocw.mit.edu/courses/mechanical-engineering/2-71-optics-spring-2009/
2. https://ocw.mit.edu/courses/mechanical-engineering/2-71-optics-spring-2014/lecture-notes/MIT2_71S14_lec2_notes.pdf
3. https://freevideolectures.com/course/2876/fundamentals-of-physics-iii/16
4. https://freevideolectures.com/course/2876/fundamentals-of-physics-iii/17
5. https://freevideolectures.com/course/2876/fundamentals-of-physics-iii/18

Title of the Course: Atomic Physics and Relativity Semester: V
Course Code:LUPHCT52 Contact Hours: 3hrs/w Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the atom and its structures
- recognize the importance of X Rays and its applications on crystal structures
- describe the wave nature of particle and its experimental evidence
- understand the fundamental concepts of quantum mechanics and its
- applications
- describe the special relativistic effects and appreciate the nuances of special theory of relativity

Pre-Required Knowledge:

- Fundamentals of atomic structure,
- Electromagnetic spectrum, Maxwell's equation,
- Dual nature of matter

Unit: I Structure of the atom

Introduction – Bohr atom model – Correspondence principle – critical potentials – Franck and Hertz experiment - Davis and Goucher's method – Sommerfield's relativistic atom model – The vector atom model – Quantum numbers associated with the vector atom model - Coupling schemes – Pauli's exclusion principle – Stern-Gerlach experiment – Larmor's theorem – Normal and Anomalous Zeeman effect

Unit: II X- Rays

Introduction – production of X Rays – Absorbance of X Rays - Bragg's law – The Bragg X ray spectrometer – X ray spectra – Characteristics X ray spectrum – Auger effect - Moseley's law – Compton scattering, theory and experiment verification – Bravais Lattices – Miller Indices.

Unit: III Wave mechanics

Introduction – The De Broglie wavelength – Expression for group velocity – Davission and Germer's experiment – G.P. Thomson's experiment – Uncertainty principle with illustration –Derivation of time dependent and steady state form of Schrodinger's equation – Properties of wave function – The particle in a box – Hydrogen atom.

Unit: IV Operators formalism of quantum mechanics

Introduction – Postulates of Quantum mechanics – Operators in quantum mechanics – commuting operators – simultaneous Eigen functions - simultaneous measurability of observables – Hermitian operators – Parity operator – Probability density - Probability current density –Wave packet - Ehrenfest' s Theorem.

Unit: V Theory of relativity

Introduction – Frame of reference - Galilean transformation – equations – The Michelson Morley experiment – Postulates of special theory of relativity – The Lorentz transformation equations – Length contraction – Time Dilation – Relativity of simultaneity – Addition of velocities – Variation of mass with velocity – Mass Energy equivalence

Suggested Topics for Group Discussion/Presentation

- Quantum numbers associated with the vector atom model
- X ray spectra
- Uncertainty principle with illustration
- Postulates of Quantum mechanics
- Postulates of special theory of relativity

Suggested Readings:

i) Text Book:

Murugesan R, Kiruthika Sivaprasath, Modern Physics, S. Chand& Co Ltd, New Delhi (2018).

ii) Reference Books:

1. Arthur Beiser, Perspectives of Modern Physics, Tata McGraw Hill Publishing Company Ltd, New Delhi (1969).
2. Subramaniam N, Brijlal & Jivan Seshan, Atomic and Nuclear Physics, S. Chand &Co Ltd, New Delhi (2006).

iii) Web Sources:

1. https://en.wikipedia.org › wiki › Atomic physics
2. https://www.atomicarchive.com › science › physics
3. https://www.space.com › 36273-theory-special-relativity

Title of the Course: Object Oriented Programming **Semester: V**

Course code: LUPHCT53 Contact Hours: 3hrs/w Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- differentiate object-oriented programming and procedural programming
- construct classes, functions and objects
- implement the constructors, destructors and inheritance

- develop programs using dynamic memory management techniques
- overload functions and operators in C++

Pre-Required Knowledge:

- Important functions of an Operating system
- Difference between branching and looping statements in C++
- Advantages of learning C++ programming language

Unit I: Beginning with C++

Procedure oriented programming - Basics concept of object-oriented programming – Encapsulation – Inheritance and Polymorphism – Benefits of OOP - structure of a C++ program- Data types – tokens – Identifiers – variables – constants – Operators – Control structures and loops.

Unit II: Functions, Classes and Objects

Specifying a class – Defining a member – Object - Access Control – Class scope – Scope Resolution Operator – Inline functions – Memory Allocation for Objects – Static Data Members – Arrays of Objects – Objects as Function Arguments – Friend Functions.

Unit III: Constructors, Destructors, Inheritance

Introduction to Constructors – Default constructors – Parameterized Constructors – Multiple constructors in a class – Destructors – Introduction to inheritance – Defining Derived Classes – Single Inheritance – Multiple Inheritance – Multilevel Inheritance – Hierarchical Inheritance virtual – Hybrid Inheritance.

Unit IV: Pointers, Virtual Functions and Polymorphism

Introduction to Memory management – new operator and delete operator – Pointers to objects – Pointers to Derived classes – Polymorphism – Compile time polymorphism – Run Time polymorphism – Virtual Functions – Overloading – Function Overloading – Operator Overloading.

Unit V: C++ Programs

Largest of any three numbers – Sum of first 100 natural numbers – Sum and average of the given numbers – Factorial of a number – Sort numbers in ascending order – Exchange the content of two variables using Call by value and Call by reference – Smallest number in the given array – Matrix multiplication – Display the address and the content of a pointer variable.

Suggested Topics for Group Discussion/Presentation

- Encapsulation, Inheritance and Polymorphism
- Scope Resolution Operator
- Types of Inheritance
- Function overloading
- Virtual Functions

Suggested Readings:

i) Text Books:

1. Balagurusamy E, Object Oriented Programming with C++, Sixth edition, McGraw Hill Education (India) Private Ltd, New Delhi. (2013). Unit I, II, III, IV
2. Ravichandran D, Programming with C++, Tata McGraw Hill publishing company

   Ltd, New Delhi Thirteenth Reprint, (2001). Unit V

ii) Reference Books:

1. Ashok Kamthane, Programming in C++, Second Edition, Pearson Education, (2013).
2. Bjarne Stroustrup, The C++ Programming Language, Fourth Edition, Addison -Wesley Pearson Education, (2013).

iii) Web Sources:

1. https://www.tutorialspoint.com/cplusplus/cpp_quick_guide.htm
2. https://www.cet.edu.in/noticefiles/285_OOPS%20lecture%20notes%20Complete.pdf
3. https://ecomputernotes.com/cpp

Title of the Course: Allied Applied Electronics – III Semester: V

Course Code: LUELGE51 Contact Hours: 4hrs/w Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the basic gates and universal logic gates
- apply Boolean laws and algebra.
- knows about Adder - Subtractor
- know about flip flop
- know about Multiplexers and Encoder

Pre-Required Knowledge:

- Fundamental ideas of Number Systems and Logic Gates
- Acquire knowledge Flip-Flops
- Counters and Registers

Unit I: Digital logic

The Basic Gates – NOT, OR, AND – Universal logic Gates – NOR, NAND –AND – OR – Invert GATES – Positive and Negative Logic – Boolean Laws and Theorems.

Unit II: Combinational logic circuits

Sum-of-Products Method – Truth table to Karnaugh Map – Pairs, Quads and Octets – Karnaugh Simplifications – Don't – Care Conditions – Product-of-Sums Method – Product-of-sums Simplification

Unit III: Data processing circuits

Multiplexers – Demultiplexers - 1 – of – 16-Decoder – BCD-to-decimal Decoders – Seven-segment Decoders – Encoders – Exclusive-or Gates.

Unit IV: Number systems and codes

Binary Number System –Binary-to-Decimal Conversion – Decimal-to-Binary Conversion – Octal Numbers – Hexadecimal Numbers-The ASCII code-the Excess -3 code -The Gray code.

Unit V: Arithmetic circuits

Binary Addition – Binary Subtraction – Unsigned Binary Numbers – Sign-magnitude Numbers – 2's Complement Representation – 2's Complement Arithmetic – Arithmetic Building Blocks – The Adder – subtractor – Full Adder – Arithmetic Logic Unit – Binary Multiplication and Division.

Suggested Topics for Group Discussion/ Presentation

- Boolean Laws and Theorems and its Application
- Introduction Truth table to Karnaugh Map
- 1 – of – 16- Decoder its Working
- Binary-to-Decimal Conversion Method
- 2's Complement Arithmetic Method

Suggested Readings:

i)Text Book:

1. Donald P Leach/Albert Paul Malvino / GautamSaha, Digital Principles and Applications, The McGraw – Hill Publications, Sixth Edition, Year (2006).

ii) Reference Book:

Salivahanan S, Electronics Devices and Circuits, II Edition, Year (2003).

iii) Web Sources:

https://www.sgbau.ac.in/Syllabus/pdf/Engineering_Technology/m.sc.applied-electronics.pdf

https://www.msuniv.ac.in/images/academic/academic_affairs/Sem%20III_VI/B.Sc%20Electronics%20Comm.pdf

https://collegedunia.com/courses/bachelor-of-science-bsc-applied-electronics

Title of the Course: Solar Energy **Semester: V**

Course Code: LUPHDS51 Contact Hours: 3hrs/w Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- describe the Physics of energy and its manifestation
- explain about solar energy, its radiation and its uses
- understand the solar ponds, non convective solar ponds and salt gradient ponds
- recognize the importance of geothermal and tidal energy
- understand the basic principles and functions of various solar energy collectors

Pre-Required Knowledge:

- Basic knowledge on types of energy sources in nature.
- Future perspectives of solar energy
- Importance of green energy for future world.

Unit – I Various forms of energy

Energy – an introduction – Potential Energy has 4 forms – Kinetic Energy has 5 Forms – Renewable and Non-Renewable Energy system - Merit and Demerits (Renewable and Non-Renewable Energy system).

Unit – II Solar energy basics

Sun – an introduction – Physical properties of the Sun – Solar Energy – Energy flow in the Sun – Solar Radiation propagation in the Atmosphere – Solar heater – Crop Dryers Space Cooling – Solar cooling Systems.

Unit – III Solar energy collectors

Physical principles of the conversion of solar radiation into heat – Flat plate Collector – Type of flat plate collector – Solar concentrating collectors – Advantages and disadvantages of concentrating collectors – Concentrating

collectors over flat plate collector – Difference between flat plate and concentrating collectors – Solar Selective coatings.

Unit – IV Solar energy applications

Solar Ponds – Convecting Solar Ponds – Non-convecting Solar Ponds – Salt Gradient Ponds – Solar Cooker – Water Desalination – Photo Voltaic Basics – Photo Conduction.

Unit – V Geothermal wave and tidal energy

Geothermal energy – Wind energy – Power from the wind – Ocean Thermal Electric Conversion (OTEC) – Methods and working principles of OTEC power generation plants – A close cycle OTEC system – Open cycle OTEC system – Wave and Tidal Energy – Advantages and disadvantages of wave energy.

Suggested Topics for Group Discussion/Presentation

- Renewable and Non-Renewable Energy system
- Solar heater
- Salt Gradient Ponds
- Ocean Thermal Electric Conversion (OTEC)
- Solar concentrating collectors

Suggested Readings:

i) Text Books:

Mujiber Rahman A, Solar Energy, Scitech Publications (India) Pvt. Ltd, (2019).

ii) Reference Books:

1. Sukhatma SP and Nayak JK, Solar energy, MC Graw Hill Publisher (2017).
2. Rai GD, Non-Conventional Energy sources, Khanna Publishers (1998)

iii) Web Sources:

https://www.seci.co.in

1. https://mnre.gov.in › solar › current-status
2. https://www.irena.org › solar

Title of the Course: Mobile communication	Semester: V
Course Code:LUPHDS52 Contact Hours: 3hrs/w	Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- describe mobile communication
- explain about cell structure
- understand the wireless protocol and its functions
- recognize the importance of 3G
- understand the basic principles of Bluetooth technology

Pre-Required Knowledge:

- Basic knowledge on mobile
- Generations of mobile phones
- Importance of network

Unit – I Wireless communication

Advanced mobile phone service-Global system for mobile communication -Digital cellular system-Cord less telephony-Third generation wireless systems.

Unit – II Network signalling

Cell structure -Handoff- roaming management-Handoff detection -Channel assignment techniques - Interference- ACI, CCI - Intersystem hand off and authentication - Network signalling- Cellular digital packet data.

Unit – III Mobility management

GSM-Network signalling, mobility management, short message service-International roaming, administration and operation.

UNIT-IV Wireless application protocol

Wireless application protocol -Architecture-Datagram-Transport layer securities- Transaction protocol - Session protocol application environment, wireless markup language, WML-Script wireless telephony applications.

UNIT-V 3G Mobile services

Third generation mobile services–Specifications for 3G – Areas of Applications – Wireless local loop-Bluetooth technology.

Suggested Topics for Group Discussion/Presentation

- Third generation wireless systems
- Network signaling
- GSM
- Transport layer securities
- Bluetooth Technology

Suggested Readings:

i) Text Book:

Rapparport, Wireless and Mobile Communication, Pearson Education, (2001).

ii) Reference Books:

1. Yi-BingLin & Imnch Chlantee, Wireless and Mobile Networks Architecture, John Wiley, (2001).
2. Jayashri Arokiamary V, Cellular and mobile communication, Technical Publications (2008).

iii) Web Sources:

1. https://www.uky.edu/~jclark/mas355/WAP.PDF
2. https://www.javatpoint.com/wireless-application-protocol-in-mobile-computing
3. https://mrcet.com/downloads/digital_notes/ECE/IV%20Year/3.Cellular%20&%20Mobile%20Communications.pdf

Title of the Course: Microprocessor and Its Application **Semester: V**

Course Code: LUPHSE51 Contact Hours: 2hrs/w Credits:2

Course Learning Outcomes:

On completion of the course, the students are able to

- know the principles of microcomputers
- understand the assembly language programming
- understand the principle behind microprocessor
- understand the basics of interrupt controller and memory address systems.
- know the architecture of 8085 microprocessor

Pre-Required Knowledge:

- Number systems (Binary and Hexadecimal)
- Logic gates
- Counters and Registers

Unit I: Introduction to 8085 microprocessor

Introduction-Explanation of Basic terms (Bit,Word,Byte, Nibble, Kilobyte, Megabyte, RAM, DRAM, SRAM, ROM, Microcomputer, Bus, system bus, High level language, Assembly language, Machine language, Assembler, compiler, Interpreter) – Microprocessor- based system- Origin of microprocessor.

Unit II: Classification of microprocessors

Classification of Microprocessors, Types of Memory-classification of primary memory- Input and Output Devices-Technology improvements adapted to microprocessor and computers- Pin diagram of the 8085 – signal groups diagram of the 8085

Unit III: Intel 8085 microprocessor architecture

Introduction-Architecture of 8085- Arithmetic and Logic unit- Functional block diagram of Intel 8085- General purpose Registers – Special purpose Registers – Accumulator – flag register –Program counter – stack pointer –Instruction register

and decoder – timing and control unit – data bus – address bus – control bus – Schematic representation of the 8085-bus structure.

Unit IV: Interrupts

Types of Interrupts –vectored and Non-vectored interrupts – Maskable and non-maskable Interrupts- Software and hardware interrupts –Interrupt sources and vector addresses in 8085- Software interrupts – hardware interrupts and priorities – SIM instruction – RIM instruction.

Unit V: Introduction to 8085 instructions

Instruction set of 8085- format of assembly language instructions and programs – Data transfer Instructions – Arithmetic instructions –Logical instructions – branching instructions – machine control instructions – program for adding two 8-bit numbers

Suggested Topics for Group Discussion/Presentation

- Discuss origin of Microprocessor
- Explain the memory classification of 8085 microprocessor
- Discuss the concept of Bus and Bus organization
- Explain the Software and hardware interrupts
- Discuss the logic and branch operation of 8085 microprocessor

Suggested Readings:

i) Text Book:

SenthilKumarN, Saravanan M, and Jeevanathan S, Microprocessors and Microcontrollers, Oxford University press, Second Edition (2016).

ii) Reference Books:

1. Ramesh S.Gaonkar, Microprocessor, Architecture, Programming and Applications with the 8085, Penram International publishing (India) private Ltd, Sixth edition, (2013).

2. NagoorkaniA, Microprocessors and Microcontrollers, Second Edition, McGraw Hill Education(India) Private Ltd, Chennai.(2012).
3. Krishna Kant, Microprocessors and Microcontrollers Architecture Programming and System Design8085, 8086, 8051, 8096, Ninth Edition, PHI Learning Private Ltd, New Delhi, (2012).

iii) Web Sources:

1. https://edusera.org/pin-diagram-of-8085-microprocessor/
2. https://www.electronicsengineering.nbcafe.in/interrupt-sources-and-vector-addresses-in8085-microprocessor/
3. https://www.tutorialspoint.com/microprocessor/microprocessor8085instructionsets.html

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Title of the Course: Thin Film Technology and its Applications **Semester: V**

Course Code:LUPHSE52 Contact Hours: 2hrs/w Credits:2

Course Learning Outcomes:

On completion of the course, the students are able to

- know about Thin Films.
- understand theories and measurements of thin Film materials.
- understand characterization Techniques of thin Film materials.
- apply thin Films in various devices.
- understand about AFM

Pre-Required Knowledge:

- The concepts of thin film.
- Types of spectroscopies
- Effect of a Characterization of film

UNIT I: Introduction to thin films

Introduction to thin films, Application of thin films, thin film deposition process, physical processes, chemical and electro-chemical process.

UNIT II: Measurements

Thickness measurements, resistivity measurements, Cyclic Voltammetry (CV), Linear Sweep Voltammetry (LSV).

UNIT III: Characterization

Introduction, Optical absorption, optical transmittance, X-ray diffraction, Raman spectroscopy.

UNIT IV: Microscopy techniques

Scanning Electron Microscopy (SEM), Energy Dispersive Analysis by x- Rays measurement (EDS), Transport Properties, Atomic Force Microscopy (AFM).

UNIT V: Applications

Thin film diodes & commercial application, Thin film transistors: Manufacture, applications, structure of a TFT display matrix, Light emitting diodes, Solar cells.

Suggested Topics for Group Discussion/Presentation

- Application of thin films
- Linear sweep Voltammetry (LSV).
- optical transmittance, X-ray diffraction
- Atomic Force Microscopy (AFM).
- Thin film transistors

Suggested Readings:

i) Text Book:

1. Goswami, A., Thin film fundamentals, New Age International publications, New Delhi, (2006)

ii) Reference Books:

1. West.A. R,Solid State Chemistry, John willey & Sons, Singapore, (2003).
2. Chopra.K. L,Thin Film Phenomena, McGraw Hill, New York (1969)

iii) Web Sources:

1. https://www.intechopen.com/chapters/75002
2. https://nptel.ac.in/content/storage2/courses/112108092/module2/lec08.pdf
3. https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Analytical_Chemistr2.1 (Harvey)

Title of the Course: Biophysics	**Semester: V**
Course code: LUPHSC51	**Addl.Credits: 2**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the properties of solution and colloids
- know about pH and buffer solutions
- know about various types of inter and intermolecular forces
- understand the various instrumentations used for separation techniques
- know about the structure and functioning of various sensory organs in humans.

Pre-Required Knowledge:

- Basics on solutions and solute
- Basic Chemistry of molecules
- Organs in mammals.

Unit-I: Solutions and colloids

Solutions- definition– Types – solution of liquids, solids, gases in liquids – characteristics of true solution – Saturated – Unsaturated – supersaturated – Ideal – Nonideal solutions – solubility – solubility product – Solubility curves – Concentration – Strength of solutions – Classification of colloids – Gel – emulsions – importance – properties and applications of colloids

Unit-II: pH and buffer solutions

Acids and bases – conjugate Acid-Base pair - Strength – pH definition – dissociation of water pOH values –

pH scale – measurement of pH – indicators methods – biological applications of indicators – pH meter – hydrogen electrode – Calomel Electrode – their advantages and disadvantages – biological importance of pH – Buffer capacity – factors affecting – various types of buffers – applications.

Unit-III: Molecular interactions in biological systems

Inter and Intramolecular interactions – chemical bond - atomic orbital theory – bond length – angle – energy – bond order – Ionic, covalent, hydrogen bonds – van der Waal's forces – dipole interaction.

Unit-IV: Separation techniques

Sedimentation – Centrifugation technology – Chromatography – paper chromatography – Thin layer chromatography – Principle, preparation, development and detection – ion exchange – affinity and gas chromatography – Gel electrophoresis.

Unit-V: Biomechanics and neuro biophysics

Muscles – Types, Properties, function and structures – molecular components of muscles – contraction – biomechanics in vertebrates – life in fluids – swimming of fish – nervous system – biophysics of membrane potential – sensory mechanism – The eye – structure of human eye – Parts of ear – Biophysical aspects of hearing.

Suggested readings:

i) Text Book:

1. Banerjee, P.K. Introduction to Biophysics, 2nd edition, S. Chand and company limited, New Delhi, Reprint (2021).

ii) Reference Book:

1. Vasantha Pattabhi & Gautham, N, Kluwer academic publishers, Narosa Publishing House, Chennai. (2002).

iii) Web Sources:

1. https://www.youtube.com/watch?v=eHV1s2g4s4o
2. https://www.youtube.com/watch?v=qpZhc2Zn_TI

3. https://www.khanacademy.org/science/ap-biology/gene-expression-and-regulation/biotechnology/a/gel electrophoresis#:~:text=Gel%20electrophoresis%20is%20a%20technique,move%20towards%20the%20positive%20electrode

Title of the Course: Materials for Special Applications **Semester: V**

Course Code: LUPHSC52 **Addl. Credits: 2**

Course Learning Outcomes:

On completion of the course the students, are able to

- Know about various materials used in our day-to-day life.
- understand the structure and properties of the special materials.
- Know the basics, uses and implementation of nuclear energy in power generation.
- understand the properties and Physics of special materials used for space program.
- understand the principle behind the functioning of various microscopic techniques and instruments

Pre-Required Knowledge:

- Properties of conductors, insulators and semi-conductors.
- Differences between amorphous and single crystals and basics of polymers.
- Basics of space, rockets for launching satellites.

Unit I: Super conductivity and semiconductor materials

Introduction-Experimental results - Theoretical approaches - applications of super conductivity. Introduction to semiconductor – intrinsic and extrinsic semiconductors - band structure of semiconductors - preparation of single crystal semiconductor.

Unit II: Polymers

Classification of polymers – structure - crystalline in polymers - mechanical properties and applications.

Unit III: Nuclear engineering

Nuclear power generation- nuclear Vs thermal power - Nuclear fuel - fuel cladding Moderators - control materials – coolant - shielding materials.

Unit IV: Space engineering

Space programme - structural materials and their properties - system requirement - extreme high temperature materials – materials for thermal protection.

Unit V: Modern techniques for material studies

Optical microscopy – Electronic microscopy - Photo electron spectroscopy - Non-destructive testing.

Suggested Readings:

i) Text Book:

Rajput, R.K. Engineering Materials, S. Chand & Co., New Delhi (2012).

ii) Reference Books:

1. Srinivastava, C.M. Srinivasam, C.: Science of Engineering materials – Wiley Eastern Ltd. New Delhi, (2011).
2. Douglas B. Murphy, Micheal W. Davidson, Fundamentals of light microscopy and electronic imaging,Wiley & Sons, Jew Jersey (2013).

iii) Web Sources:

1. https://www.youtube.com/watch?v=JGosV7k0zEA
2. https://en.wikipedia.org/wiki/Electron_microscope
3. https://en.wikipedia.org/wiki/Microscopy
4. https://www.youtube.com/watch?v=bQ23kCvokAc
5. https://www.azom.com/article.aspx?ArticleID=12034

Title of the Course: Major Physics Practical – III Semester: V
Course Code: LUPHCL51 Contact Hours: 4hrs/w Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- form Newton's Rings
- find the dispersive power of a Prism
- find the thickness of wire
- determine wavelength of different colours using grating
- determine the radius of curvature of the given lens

List of Experiments

1. Calculate the refractive index of material of a prism using Spectrometer by i-d curve method
2. Measure the dispersive power of a Prism by using Spectrometer
3. Determine the wavelength of light for different colours by plane transmission Grating using mercury light
4. Measure the angle of emergence i' for various known angle of incidence i and to draw the i – i' curve
5. Calculate the refractive index of small angled prism by using Spectrometer
6. Determine the thickness of a thin wire by Air wedge method
7. Determine the radius of Curvature of a given convex lens by forming Newton's Rings method
8. Determine the wavelength of sodium light by using Biprism
9. Determine the value of Cauchy's constant of a material of a prism
10. Calculate Hartmann's constant and determine wavelength of the spectral lines using Prism & and Spectrometer

11. Determine the resolving power of a grating by using spectrometer

Suggested Readings:

(i) Reference Book:

1. Mary mathelane R and Arulmozhi M, Practical Physics, Golden Net Computers, Tiruchirappalli (2015).

(iii) Web Sources:

1. https://youtu.be/cDlzrrsfs3E
2. https://youtu.be/PU-SeNfIRcs
3. https://youtu.be/b9FdsgepDD0
4. https://youtu.be/ewRYz9dgoaQ
5. https://www.youtube.com/watch?v=gRRTExJtNJ0

Title of the Course: Major Physics Practical – IV Semester: V
Course Code:LUPHCL52 Contact Hours: 4hrs/w Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- know about the features of "C++"
- understand the concepts of object-oriented programming
- know the different types of operators and expressions in "C++" language
- choose the Loops and decision-making statements to solve the problem
- use function to solve the given problem

List of Experiments

1. Write a C++ Program to find the square of its number using a function declaration.
2. Write a C++ Program to find the largest number in the given array.

3. Write a C++ Program to sort the given numbers in descending order
4. Write a C++ Program to calculate the sine value.
5. Write a C++ Program to find the sum of given non-negative integer of n numbers Sum= 1+2+3+……. n
6. Write a C++ Program to find the sum of the even numbers using do…..while loop.
7. Write a C++ program to display the address and content of a pointer variable, subtract with an integer quantity and to display the address and the content of a pointer variable.
8. Write a C ++ Program to display the memory address of a variable using pointer before decrementation and after decrementation.
9. Write an Assembly Language Program to carry out 8-bit addition of two numbers using 8085 Microprocessor Kit
10. Write an Assembly Language Program to carry out 8-bit subtraction of two numbers using Microprocessor Kit
11. Construct a Dual power supply using IC 7812 and IC 7912 and study its percentage of regulation.

Suggested Readings:

i) Reference Book:

Ravichandran D, Programming with C++, Tata McGraw Hill publishing company Ltd, New Delhi Thirteenth Reprint, (2001).

ii) Web Sources:

1. https://wptripura.nic.in/C%20Programming%20Lab.pdf
2. https://www.anits.edu.in/online_tutorials/Programming-with-C-and-Lab.pdf

DEPARTMENT OF ENGLISH – UG – CBCS-LOCF

Title of the Course: Communicative English –II Semester: VI
Course Code: LUENNM61 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

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

Pre-required Knowledge:

- Fundamental Grammatical Competence
- Working Vocabulary and Spoken idioms
- Different strategies and barriers of effective communication

Unit I: Listening

A Discussion between two friends, Booking accommodation at an outstation Hotel, Enquiring about Flight, Getting an appointment for interview over phone, At the Library, Between a brother and sister, Attending a career guidance Fair – About Medical Transcription, About call Centre, Option in Higher Education.

Unit II: Speaking- I

Asking for information, Asking for someone's opinion, Asking if someone is sure, Asking someone to say something again, Checking that you have understood, Asking whether

someone knows, Asking about Starting conversation with a Stanger.

Unit III: Speaking –II

Leaving someone for a short time, Ending a conversation, Asking possibility, Asking about preference , Asking if someone is about to do something , Asking if someone agrees, Asking if you are obliged to do something, Describing something , Some useful expressions.

Unit IV: Writing

Writing Essays, Writing Advertisements and posters, Writing Reports, Summarizing and Outlining, Information Transfer Exercise, Dialogue Writing.

Unit V: Professional Skills

Negotiating, Body Language, Group Discussion, Seminar and Public Speaking.

Suggested Topics for Presentation:

- Difference between acceptable and unacceptable sentences in English.
- Appropriateness, grammaticality and acceptability of the English language.
- To assist the students in learning the concepts of register, style and jargon as well as the various varieties of English.
- Application and use various kinds of jargons and register as per context.
- Preparing situational dialogues

Suggested Readings:

i)Text Books:

1. JayashreeBalan, *Spoken English*.Vijay Nicole Imprints Pvt. Ltd, Chennai , 2006.
2. G.Radhakrishnan Pillai and K. Rajeevan.*Spoken English For You*. Emerald Publishers, Chennai ,2002.

ii)Reference Books:

1. M.N.K.Bose. *Better Communication in Writing,* New Century Book House (P) Ltd, Madras, 2004.
2. T. M. Farhathullah. *Communication Skills for Under Graduates.* R.B.A. Publications, Chennai.

iii)Web Sources:

1. https:// www.nyp.org/blog/2012/11/28/11-great-free-websites-practice-English
2. https:// www.Spoken English practice.com/ learn-english-speaking-online
3. https://global-exam.com/blog/en/general-english-what-are-best-websites-tolearn-english/

DEPARTMENT OF HISTORY - UG

Course Title: Working of Indian Constitution **Semester: V**

Course Code: LUHSNM51 Contact Hours: 2hr **Credit: 2**

Course learning outcomes:

On completion of the course students are able to

Understand the stages of framing of Indian Constitution

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

Unit I : Framing of Indian constitution

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

Unit II: Basic concepts

Classification of constitution – Forms of Government.

Unit III: Legislature

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

Unit IV: Executive

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

Unit V: Judiciary

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

Suggested topics for group discussion/ presentation

- Dr. B.R. Ambedkar
- 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, Ponnaiah Pathipagam, Chennai, 2001.
- Ebi James, Working of Indian constitution, Tensy Publications, Sivakasi, 2018

Reference Books:

- C.N. Joshi, The Constitution of India, Macmillan India Limited, Madras, 1983.
- Acharya Durga Das Basu, Introduction to the Constitution of India, Prentice Hall of India Private Limited, Delhi, 1997.
- Graville Austin, The Indian Constitution, Oxford University Press, Madras, 1966.

- M.V. Pylee, India's Constitution, S. Chand & Company Ltd., Delhi, 2011.
- VidyaDhar Mahajan Select Modern Governments, S.Chand & Co.Pvt Ltd, New Delhi,1975.

Web Sources

https://academic.oup.com

https://blog.ipleaders.in

https://legilative .gov.in

Title of the Paper: Fundamentals of Accounting
Semester: V

Course Code:LUCONM51 Contact Hours: 2hrs/w Credit:

Course Learning Outcomes:

On completion of the course, the students are able to

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

Pre required Knowledge:

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

Unit- I:Accounting and Book-Keeping

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

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

Unit-III: Subsidiary Books

Purchase Book, Purchase Returns Book, Sales Book, Sales Returns Book and Cash Book (Single Column

Only – Simple Problems).

Unit- IV: Trial Balance

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

Unit- V: Final Accounts

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

Suggested Topics/Practical Exercises:

The Learners are required to

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

Suggested Readings:

(i) Text Books

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

(ii) Reference Books:

1. Arulanandam.M.A. & Raman K.S. (2018) Advanced Accountancy (Part – I),Mumbai:Himalaya Publishing House.
2. Dr. Maheshwari.S.N. (2019). Advanced Accountancy (Vol–I). New Delhi:Vikas Publishing House Private Limited.
3. Jain.S.Pand Narang.K.L. (2020).Advanced Accountancy. (Vol–I), New Delhi:Kalyani Publishers.

4. Reddy.T.S. &Murthy.A (2020). Financial Accounting. Chennai:Margham Publications.
5. Gupta R.L.&Radhaswamy.M. (2019). Advanced Accountancy. (Vol-I).New Delhi: Sultan Chand & Sons.

(iii) Web-Sources:

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

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

NON MAJOR ELECTIVE

DEPARTMENT OF MATHEMATICS – UG – CBCS - LOCF

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

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

1. G. K. Ranganath, C. S. Sampangiram and Y. Rajaram, A text book of business Mathematics, 2008, Himalaya Publishing House.

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

(iii) Web Resources:

1. https://affairscloud.com/aptitude-questions/age.html
2. https://affairscloud.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 CHEMISTRY – UG –CBCS- LOCF

Title of the paper: Chemistry in everyday life **Semester: V**

Course code: LUCHNM51 **Contact Hours: 2hrs/w** **Credits: 2**

Course Learning outcomes

On completion of the course, the students are able to

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

Pre-Required Knowledge

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

Unit I: FOOD:

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

Unit II: VITAMINS

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

Unit III: FUELS

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

Unit IV: SOAPS AND DETERGENTS

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

Unit V: THERAPEUTIC DRUGS

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

SUGGESTED TOPICS FOR GROUP DISCUSSION / PRESENTATIONS

Milk: Denaturation and pasteurization

Diseasesdue to deficiency of vitamins.

Natural and Artificial fuels.

Making of soap and detergents.

Classification of drugs.

Suggested Readings:

Text Book:

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

Reference Books:

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

Web Sources:

1. https://byjus.com/biology/food-adulteration/
2. https://www.youtube.com/watch?v=vppFkXW7Dt8
3. https://www.youtube.com/watch?v=ub86Dhg67tM
4. https://www.youtube.com/watch?v=OO9wEw5CfNM
5. https://youtu.be/OJhdag89Pq4

DEPARTMENT OF BOTANY – UG-CBCS- LOCF

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

Course learning outcomes:

On completion of the course, the students are able to

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

Pre-required knowledge:

- Cereals
- Fiber yielding plants
- Cash crop

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

Rice and Wheat,

Sugars and starch: Sugarcane and Tapioca

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

Red gram, Soybean and Black gram;

Nuts: Coconut and Cashew nut.

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

Tomato, Brinjal, Mango, Grapes and Banana

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

Cotton, Jute, Rubber and Eucalyptus oil.

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

Tobacco and Areca nut.

Spices and Condiments: Cardamom and Pepper

Non-alcoholic beverages: Tea and Coffee.

Suggested Topics for Seminar / Presentation / Group Discussion:

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

Suggested Readings:

Text Books:

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

Reference Books:

1. Diego Cunha Zied, Arturo Pardo-GimAcnez. (2017). Edible and Medicinal Mushrooms: Technology and Applications. *John Wiley & Sons*.
2. Kochhar, S.L. (1981). Economic Botany in the Tropics. *McMillan India Ltd*., Madras.

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

Web Sources:

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

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

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

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

Course Learning Outcomes

On Completion of this Course, the students are able to

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

Pre–required Knowledge:

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

Unit – I: NCC-Overview

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

Unit – II: National Integration

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

Unit – III: Military History

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

Unit – IV: Civil Defense and Disaster Management

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

Unit –V: First Aid

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

Suggested Topics/ Practical Exercises

- knowing higher officials of NCC in National and State level.
- applying knowledge on National Integration in challenges.

- recognise the techniques in wars like Indo-Pakistan war and Kagil war etc.,
- apply the role of NCC in disasters.
- finding the right First Aid treatment in accidents.

Suggested Readings:

i) Text Books:

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

ii) Reference Books:

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

iii) Web sources

1. https://indiancc.nic.in/
2. https://play.google.com/store/apps/details?id=com.chl.ncc&hl=en_IN&gl=US
3. https://joinindianarmy.nic.in/default.aspx
4. https://www.joinindiannavy.gov.in/
5. https://indianairforce.nic.in/
6. https://www.joinindiannavy.gov.in/
7. https://indianairforce.nic.in/

Title of the Course: Nuclear Physics Semester: VI
Course Code: LUPHCT61 Contact Hours: 3hrs/w Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- describe the Nucleus and its classification with different models
- understand the basic concepts of radioactivity and its theory
- recognize the physics of nuclear energy sources
- realize the role of nuclear reactions and application of radio isotopes
- understand the concept of accelerator and detector and its applications

Pre-Required Knowledge:

- Perspectives of nucleus in an atom and various forms of nuclear energy.
- Basics of isotopes and its real time
- Applications in nowadays medical and industries.

Unit I: Introduction to the nucleus

Classification of Nuclei – General properties of Nucleus – Binding energy – Nuclear stability – Nuclear forces – Meson theory of nuclear forces – Models of Nuclear structure – Liquid drop model – Shell model – Collective model.

Unit II: Radioactivity

Natural Radioactivity – α, β,γ rays – Properties of α, β,γ rays – Determination of e/m of Alpha particles – Range of α -particles – Geiger-Nuttal law – Theory of alpha decay – Determination of e/m of Beta particles – Kaufmann's experiment – Nuclear Isomerism – Soddy Fajan's Displacement law – Law of Radioactive disintegration – The

mean life – Measurement of Decay constants – Law of successive disintegration – Radioactive dating.

Unit III: Nuclear energy sources

Nuclear fission – Energy released in fission – features of the fission reaction – Chain reaction – Atom bomb – Nuclear reactors – Nuclear fusion – Source of Stellar energy – Thermonuclear reactions – Fusion reactors.

Unit IV: Artificial transmutation of elements

Q value equation for nuclear reaction –Energy balance in Nuclear reactions and Q value - Threshold energy of an Endoergic reaction – Types of Nuclear reactions – Conservation laws - Nuclear Transmutation – The scattering cross-section – Artificial Radioactivity – Preparation of Radio elements – Applications of Radio isotopes – The Neutron – Basic properties of the Neutron – Neutron sources – Neutron Detection.

Unit V: Particle accelerators & detectors

Particle Accelerators – The Cyclotron – Synchrocyclotron - Betatron - Synchrotron –– Proton Synchrotron –Detector – Wilson Cloud Chamber – Bubble Chamber – Nuclear Emulsion.

Suggested Topics for Group Discussion/Presentation

- Classification of Nuclei
- Properties of α, β,γ rays
- Chain reaction
- Applications of Radio isotopes
- Synchrotron and Betatron

Suggested Readings:

i) Text Book:

Murugesan R, Modern Physics, 18th edition, S. Chand & Co, New Delhi. (2018).

ii) Reference Books:

1. Arthur Beiser, Perspectives of Modern Physics, Tata McGraw Hill Publishing company Ltd. New Delhi (1997).
2. Kaplan, Nuclear Physics, Wiley Publishing Company (1992).

iii) Web Sources:

1. https://physicsanduniverse.com › introduction-to-nucleus
2. https://opentextbc.ca › chapter › properties-of-nuclei
3. https://opentextbc.ca › chapter › particle-accelerators

Title of the Course: Materials Science	**Semester: VI**
Course Code: LUPHCT62Contact Hours: 3hrs/w	**Credits:3**

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the basic idea about crystalline and amorphous substances.
- know about different types of magnetism
- understand the basic idea about super conductors and their classifications
- analyze the behavior and properties of dielectric materials
- know the properties of semiconducting materials

Pre-Required Knowledge:

- Concepts of crystallography
- Properties of magnetic, superconducting and dielectric materials
- Classification of semiconducting materials

Unit I: Crystal structure

Basic concepts-lattice points-Basis- Unit cell – Bravais lattice- Crystal plane & Miller indices-importance of Miller indices- Crystal structures –Nearest neighbour distance –Atomic radius – coordination number - Atomic packing

factor– SC – BCC – FCC – & HCP – Important crystal structures.

Unit II: Magnetic materials

Classification of Magnetic materials – Dia-magnetic material & its properties – Langevin's theory Results & draw backs - Paramagnetic material - Langevin's theory & its drawbacks -Weiss theory - Ferromagnetic material - Weiss theory & Domain theory, magneto strictive energy.

Unit III: Superconductivity

Properties of Super Conductors, Critical temperature, critical field, isotopic effect - Meissner effect – Types of Super Conductors – BCS theory, Electron lattice interaction, Cooper pair - Existence of energy gap –First & second London equations - Penetration depth.

Unit IV: Dielectric materials

Electronic, Ionic, Orientational, Space charge polarization- dielectric loss – Local field – Clausius-Mosotti Equation, - Dielectric breakdown - Properties of dielectric materials.

Unit V: Semiconducting materials

Introduction – Carrier concentration in intrinsic semiconductors - Carrier concentration in N-type semiconductors – Carrier concentration in P-type semiconductors – variation of carrier concentration with temperature – Hall effect – Determination of hall co efficient.

Suggested Topics for Group Discussion/Presentation

- Crystal structure of diamond
- Langevin's theory of Para magnetism
- BCS theory of superconductivity
- Different types of dielectric breakdown
- Determination of Hall coefficient

i) Text Book:

Ilangovan, K. Solid State Physics, First Edition, S. Viswanathan Publishers, Chetput, Chennai-31(2007).

ii) Reference Books:

1. Palanichamy, P.K. Solid State Physics, SciTech Publications Pvt. Ltd, India, (2003).
2. Pillai, S.O. Solid State Physics, Wiley eastern limited, (1994).
3. Murugesan, R. Modern Physics, Chand &Co., XI Revised Edition (2003).
4. Puri, R.K. & Babbar, V.K. Solid State Physics, Chand & Co I Edition(1997).

iii) Web Sources:

1.https://www.iit.edu/sites/default/files/2021-02/crystal_structures.pdf

2. https://cse.umn.edu/irm/2-classes-magnetic-materials

3.https://www.globalspec.com/learnmore/materials_chemicals_adhesives/electrical_optical_specialty_materials/superconductors_superconducting_materials

4.https://physics.info/dielectrics/

Title of the Course: Classical and Statistical Mechanics **Semester: VI**

Course Code:LUPHCT63 Contact Hours: 4rs/w Credits:3

Course Learning Outcomes:

On completion of the course, the students are able to

- Know about D'Alembert's principle, Lagrangian dynamics and their uses.
- understand the formulation of Hamiltonian dynamics and its use in simple problems
- understand the common terminology used in Statistical mechanics and usage of the statistical mechanics to classical particles.
- understand about quantum statistics and its applications.
- under stand the behaviour of particles obeying quantum statistics

Pre-Required Knowledge:

- Newton's laws of motion, application of Newton's laws to solve the dynamic motion of particles. Definitions and concepts of velocity and acceleration of particles.
- Understanding the equations of motions and their Vector notations, vector
- algebra for many body problems.
- Basics of Probability and statistics.

Unit I: Mechanics of a system of particles

External and internal forces, centre of mass - Conservation of linear momentum -Conservation of angular momentum - Conservation of energy-work-energy theorem – Constraints - Types of constraints – Examples - Degrees of freedom - Generalized coordinates (transformation equations).

Unit II: Lagrangian formulations

Principle of virtual work - D'Alembert's principle and its applications - Lagrange's equation of motion from D'Alembert's principle - General form and for conservative system - Applications-simple pendulum - Atwood's machine - compound pendulum - Hamilton's principle - Deduction of Lagrange's equation of motion from Hamilton's principle.

Unit III: Hamiltonian formulations

Generalized momentum and cyclic coordinates - Hamiltonian function H and conservation of energy – Deduction of Hamilton's Canonical equation of motion – Hamilton equations in different coordinate system – Cartesian, Polar, cylindrical and spherical Applications-Harmonic oscillator- Central Force Field – Simple pendulum.

Unit IV: Classical statistics

Micro and macrostates - Thermodynamical probability - The mu-space and gamma space - fundamental postulates of statistical mechanics – Ensembles - different types - entropy and probability - Boltzmann's canonical distribution

law (Derivation only, evaluation of constants A & □ are not needed) - Maxwell-Boltzmann statistics - Maxwell-Boltzmann energy distributive law - General form – Maxwell's distribution law of velocities.

Unit V: Quantum statistics

Development of Quantum statistics - Bose - Einstein distribution law - Derivation of Planck's radiation formula from Bose – Einstein statistics – Fermi-Dirac distribution law - Free electrons in metal - Fermi gas - Application to liquid helium - Comparison and Differences between classical and quantum statistics.

Suggested Topics for Group Discussion/Presentation

- Newton's laws of motion, work energy theorem and conservation of angular and linear momentum
- Generalized coordinates, Lagrange's equation of motion and its applications
- Hamilton equations of motions and its applications
- Probabilistic methods to understand the mechanics of particles.
- Various statistical methods employed to understand the properties of various Particles

Suggested Readings:

i) Text Books:

1. Upadhyaya J.C, Classical Mechanics, Himalaya Publishing House, Mumbai, (2015). Unit: I, II, III
2. Brijlal, Subrahmanyam, N, & Hemne, P.S. Heat, Thermodynamics & Statistical Physics, S. Chand & Company Ltd, (2016). Unit: IV, V

ii) Reference Books:

1. Gupta, B.D., Satyaprakash, Classical Mechanics, 9th ed., Kadernath Ramnath Publ., Meerut, (1991).
2. Gupta, Kumar, Sharma, Classical Mechanics, Pragati Prakashan Publ., Meerut. (2005).

3. Spiegal, M.R. Theoretical Mechanics, Schaum's outline series, McGraw Hill
Publ. Co., New Delhi, (1981).
4. Gupta, S.L and Kumar, V, Elementary Statistical Mechanics, Pragati Prakashan, (2015).

iii) Web Sources:

1. https://ocw.mit.edu/courses/physics/8-09-classical-mechanics-iii-fall-2014/lecture-notes/MIT8_09F14_full.pdf
2. https://ocw.mit.edu/courses/physics/8-333-statistical-mechanics-i-statistical-mechanics-of-particles-fall-2013/
3. https://en.wikipedia.org/wiki/Lagrangian_mechanics

Title of the Course: Allied Applied Electronics - IV Semester: VI
Course Code: LUELGE61 Contact Hours: 4hrs/w Credits: 3

Course Learning Outcomes:

On completion of the course, the students are able to

- know about register types and its working
- understand about clock generator
- discuss about OP AMP
- explain logic families.
- understand about Counters Method and its type

Pre-Required Knowledge:

- Fundamental ideas on Op Amp
- knowledge on IC 555 and BJT
- About Logic Families

Unit I: Clocks and timing circuits

Clock Wave forms – TTL Clock – Schmitt Trigger – 555 Timer – Astable – 555 Timer - Monostable– Monostables with Input Logic

Unit II: Operational amplifier:

Operational Amplifier Parameters - Inverting Amplifier - Non inverting Amplifier – Summing Amplifier - Differential Amplifier – Comparator – Integrator – Differentiator - Active fitters.

Unit III: Flip –flops

RS Flip – flops –Gated Flip-flops – Edge – Triggered RS Flip-flops - Edge – Triggered D Flip-flops - Edge – Triggered JK Flip-flops - Flip-flops Timing – JK Master-Slave Flip-flops – Switch Contact Bounce Circuits – Various Representations of Flip-flops.

Unit IV: Registers

Types of Registers – Serial In – Serial Out - Serial In – Parallel Out - Parallel In – Serial Out - Parallel In – Parallel Out – Application of Shift Registers

Unit V: Counters

Asynchronous Counters – Decoding Gates – Synchronous Counters – Changing the Counter Modulus – Decade Counters.

Suggested Topics for Group Discussion/ Presentation

- Monostable with Input Logic Circuits and workings
- Operational Amplifier Parameters and its Application
- Flip-flops – Edge – Triggered RS Flip-flops its workings
- Application of Shift Registers
- Asynchronous Counters and its workings

Suggested Readings:

i)Text Books:

1. Donald P Leach, Albert Paul Malvino, Gautam Saha, Digital Principles and Applications, Tata McGraw – Hill Publications, Sixth Edition, Year (2006). Unit: I, III, IV, V

2. Salivahanan. S, Electronics Devices and Circuits, II Edition, Year (2003). Unit: II

ii) Reference Books:

1. Sedha, R.S, A Text Book of applied electronics, S. Chand and Company, Reprint (2016).
2. Salivahanan S, Digital Circuits and Design. II edition (2016).

iii) Web Sources:

1. https://www.sgbau.ac.in/Syllabus/pdf/Engineering_Technology/m.sc.applied-electronics.pdf
2. https://www.msuniv.ac.in/images/academic/academic_affairs/Sem%20III_VI/B.Sc%20Electronics%20Comm.pdf
3. https://collegedunia.com/courses/bachelor-of-science-bsc-applied-electronics

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Title of the Course: Physics for Competitive Examinations **Semester: VI**

Course Code:LUPHDS61 Contact Hours: 3hrs/w Credits: 3

Course Learning Outcomes:

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

- understand the basics of coordinate system and types of forces
- know the principle of interference, diffraction and polarization
- describe the laws of thermodynamics
- calculate the expectation values
- discuss about transistor characteristics in common emitter mode

Pre-Required Knowledge:

- Concept of different coordinate system
- Structure of atomic nucleus
- Difference between amplifier and oscillator

Unit – I Mechanics, Properties of Matter and Sound

Velocity and acceleration in Cartesian – Centrifugal and Coriolis forces – Newtons laws of motion and applications – conservative and Non- conservative forces – Polar and Cylindrical coordinate systems – Kepler's law – Gravitational law and field , Motion under a central force and system of particles – Conservation of linear and angular momentum – conservation of energy – Rigid body motions – Moment of Inertia – Parallel and Perpendicular axes Theorem – Bernoulli's Theorem – Equation of continuity – Elastic and inelastic collisions – Sound waves in Media

Unit – II Optics, Electricity and Magnetism

Thin lens and lens combination – Thick lens – Fraunhofer diffraction – Rayleigh criterion – Resolving power – Doppler effect – Diffraction gratings – Polarization – linear , circular and elliptical polarization – Double refraction and optical rotation – Coulomb's law – Gauss law – electric field and potential – Biot -Savart law – Ampere's law – Faraday's law of Electromagnetic induction – Self and Mutual inductance – Alternating currents – Simple AC and DC circuits with R, L and C components. Maxwell's equations– plane electromagnetic waves – Displacement current – Poynting's Theorem – Lorentz force – Motion of charged particle in electric and magnetic fields.

Unit – III Kinetic Theory and Thermodynamics

Elements of kinetic theory of gases – Velocity distribution and Equipartition of energy – Specific heat of mono - di and triatomic gases – Ideal gas – Van- der -waals gas and equation of state , Mean free path – Laws of Thermodynamics – Zeroth law and concept of thermal equilibrium – First law and its consequences – Isothermal and adiabatic process – Reversible – irreversible and quasi state process – Second law and entropy - Carnot cycle – Maxwell's thermodynamic relations and simple applications – Thermodynamic potentials and their applications.

Unit – IV Modern Physics

Inertial frames and Galilean invariance – Postulates of special relativity – Lorentz transformations – Length contraction – Time dilation – Relativistic velocity addition theorem – mass – energy equivalence – Black body radiation – photo electric effect – Compton effect – Bohr's atomic model – X- rays – Wave - particle duality – Uncertainty principle – superposition principle – calculation of expectation values – Schrodinger equation and its solution for one , two and three dimensional boxes – Structure of atomic nucleus – mass and binding energy – Radioactivity and its applications – laws of radioactive decay.

Unit – V Solid State Physics and Electronics

Crystal structure – Bravais lattices – Miller indices – X-ray diffraction and Bragg's law – intrinsic and extrinsic semiconductors – variation of resistivity and temperature- BJT characteristics in CB - CC – CE modes – Single stage amplifier – two stage R - C coupled amplifier – Simple Oscillators – Barkhausen condition – sinusoidal oscillators – OPAMP and applications – Inverting and non-inverting amplifier - Boolean algebra – Binary number system – conversion from one system to another system – binary addition and subtraction – Logic gates – AND, OR, NOT , NAND , NOR, exclusive OR – Truth Tables – Combinations of gates - De-Morgan's Theorem.

Suggested Topics for Group Discussion/Presentation

- ✓ Conservative and Non-conservative forces
- ✓ Sound waves in media
- ✓ Laws of Thermodynamics
- ✓ Radioactivity and its application
- ✓ Two stage RC coupled amplifier

Suggested Readings:

i) Text Books:

1. Halliday Resnick and Krane S, Physics, Volume 1, Fifth Edition, Wiley India Pvt. Ltd, NewDelhi Reprint (2014).
2. Halliday Resnick and Krane S, Physics, Volume 2, Fifth Edition, Wiley India Pvt. Ltd, NewDelhi Reprint (2009).
3. Donald P Leach, Albert Paul Malvino, Gautam Saha,, Digital Principles an Applications, Tata McGraw – Hill Publications, Sixth Edition, Year (2006).

ii) Reference Books:

1. Verma H.C, Concepts of Physics, Volume 1, Bharati Bhawan (Publishers and Distributors) , New Delhi (2020).
2. Verma H.C, Concepts of Physics, Volume 2, Bharati Bhawan (Publishers and Distributors) , New Delhi (2020).

iii) Web Sources:

1. https://www.bdu.ac.in/cde/SLM/SLM_SAMPLE/BSc-Physics.pdf
2. http://spcollegelibrary.in/496/1/electricity-magnetism-optics-and-modern-physics.pdf
3. https://www.tutorialspoint.com/digital_circuits/digital_circuits_logic_gates.htm

Title of the Course: Weather Forecasting **Semester: VI**

Course Code:LUPHDS62 Contact Hours: 3hrs/w Credits: 3

Course Learning Outcomes:

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

- know about different layers of atmosphere
- explain radiation laws
- know the perspectives of Weather systems
- describe the Climate and Climate Change

- understand the basics of weather forecasting

Pre-Required Knowledge:

- Concept and methods of weather system
- Knowledge about climate
- Concept of weather maps

Unit 1: Introduction to atmosphere

Elementary idea of atmosphere: physical structure and composition; compositional layering of the atmosphere; variation of pressure and temperature with height; air temperature; requirements to measure air temperature; temperature sensors: types; atmospheric pressure: its measurement; cyclones and anticyclones: its characteristics.

Unit II: Measuring the weather

Wind; forces acting to produce wind; wind speed direction: units, its direction; measuring wind speed and direction; humidity, clouds and rainfall, radiation: absorption, emission and scattering in atmosphere; radiation laws.

Unit III: Weather systems

Global wind systems; air masses and fronts: classifications; jet streams; local thunderstorms; tropical cyclones: classification; tornadoes; hurricanes.

Unit IV: Climate and Climate Change

Climate: its classification; causes of climate change; global warming and its outcomes; air pollution; aerosols, ozone depletion, acid rain, environmental issues related to climate.

Unit V: Basics of weather forecasting:

Weather forecasting: analysis and its historical background; need of measuring weather; types of weather forecasting; weather forecasting methods; criteria of choosing weather station; basics of choosing site and exposure; satellites observations in weather forecasting; weather maps; uncertainty and predictability; probability forecasts.

Suggested Topics for Group Discussion/Presentation

- Temperature sensors
- Measuring wind speed
- Global wind systems
- Climate: its classification
- Weather maps; uncertainty and predictability; probability forecasts.

Suggested Readings:

i) Text Book:

1. Ghadekar SR, Meteorology, Agromet Publishers, Nagpur (2001).

ii) Reference Books:

1. Joshi IC, Aviation Meteorology, Himalayan Books, (2014).
2. Tim Vasquez, Weather Analysis and forecasting, colour edition, (2015).

iii) Web Sources:

1. https://www.metoffice.gov.uk/weather/learn-about/met-office-for-schools/other-content/other-resources/how-to-measure-the-weather
2. https://climate.nasa.gov/resources/global-warming-vs-climate-change/
3. https://www.sciencedaily.com/terms/weather_forecasting.htm

DEPARTMENT OF PHYSICS – UG – CBCS - LOCF

Title of the Course: Nanophysics **Semester: VI**

Course Code:LUPHSE61 **Contact Hours: 2hrs/w** **Credits:2**

Course Learning Outcomes:

On completion of the course, the students are able to

- explain the principles of nano technology
- know the different methods of preparations of nano materials
- explain various characterization techniques available to characterize newly synthesized nano materials.

- understand the principle behind nano tubes
- discuss the applications of nano materials in wide range of fields.

Pre-Required Knowledge:

- The basics of chemical reactions
- Basic concepts of atoms and molecules.
- Basic molecular mass

Unit I: Introduction of nano technology

Scientific revolution –Atomic structure – Daltons postulates – properties of subatomic particles – Types of bonding - Molecular & Atomic size.

Unit II: Preparation of nano materials

Nanomaterials – Plasma Arching – Methods of preparation - Chemical Vapor deposition – Sol gels, steps involved in preparation only – Electro-deposition – Ball milling.

Unit III: Characterization

Electron microscopes – Scanning Electronic Microscopes (SEM) - Scanning Probe Microscope (SPM), Scanning Tunnelling Microscope (STM), Transmission Electron Microscope (TEM), Nanomanipulator, Nano tweezer.

Unit IV: Carbon nano tubes

New structures of Carbon – Types of nano tubes – formation of nano tubes – properties – uses of nano tubes.

Unit V: Applications

Applications of Nano materials – Opto - electronic devises – Environmental applications – Nano particle coatings - Biomedical and sensors.

Suggested Topics for Group Discussion/Presentation

- Types of bonding
- Nano material preparation- chemical vapor deposition
- Construction and working of SEM.
- Formation of carbon nano tubes using laser method.
- Environmental applications of nonmaterial.

Suggested Readings:

i) Text Book:

Wilson,Kannangara, Smith, Simmons, Nano Technology, Raguse I Edition, Overseas Press Pvt. Ltd., New Delhi. (2005).

ii) Reference Book:

Ramachandra Rao.M.S, Shubra Singh, Nanoscience and Nanotechnology:

Fundamentals to Frontiers, Wiley India pvt. Ltd., New Delhi (2013).

iii) Web Sources:

1. https://azchemistry.com/postulates-of-john-dalton
2. https://www.vedantu.com/chemistry/carbon-nanotubes
3. https://www.elprocus.com/nanomaterials-classifications-and-its-properties

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Title of the Paper: Crystal growth techniques Semester: VI

Course Code:LUPHSE62 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- understand the different methods of crystal growth techniques.
- understand the various crystal systems.
- Understand the choice of solvent and solubility
- know the chemical physics of crystal growth
- know the idea of optical crystals

Pre-Required Knowledge:

- The concepts of Miller indices.
- Bravais Lattice.
- Crystal structures

Unit I: Unit cell, Basic crystal system:

Cubic- simple cubic, body centred cubic, face centred cubic, Tetragonal system, Orthorhombic system, Mono clinic, Tri clinic system, Trigonal system, hexagonal crystal system.

Unit II: Introduction, methods of crystal growth:

Solid growth, liquid growth, vapour growth, solution growth: low temperature growth, high temperature growth.

Unit III: Crystal growth apparatus

Nucleation, Ostwald's diagram, expression of super saturation, Habit modification, Material preparation, choice of solvent and solubility, preparation of solution and crystal growth, preparation of seed and mounting

Unit IV: Cooling rate

Agitation, Crystal habits, Perfection of the grown crystal, Chemical physics of crystal growth.

Unit V: Crystal growth technology:

Semiconductors, optical crystals, Laser and nonlinear crystals, Scintillation crystals, Epitaxy growth.

Suggested Topics for Group Discussion/Presentation

- Simple cubic, body centered cubic, face centered cubic
- High temperature growth.
- Preparation of solution and crystal growth
- Perfection of the grown crystal
- Scintillation crystals

Suggested Readings:

i) Text Book:

1. Bhat, H.I., Introduction to Crystal Growth Principles and practice, CRC Press, New York, (2015).

ii) Reference Book:

1. Santhana Ragavan P & Ramasamy P, Crystal growth processes& methods KRU publications (2000).

iii) Web Sources:

1. http://home.iitk.ac.in/~sangals/crystosim/crystaltut.html
2. https://byjus.com/jee/ostwald-process/
3. ttps://nptel.ac.in/content/storage2/courses/117104022/Lectures/Lec8.pdf

Title of the Course: Major Physics Practical –V	**Semester: VI**
Course Code: LUPHCL61 Contact Hours: 4hrs/w	**Credits: 4**

Course Learning Outcomes:

On completion of the course, the students are able to

- design Adder and Subtractor circuit using OP-AMP
- design OP – AMP circuit for mathematical operations
- design Low pass and high pass circuit by using OP-AMP
- draw the characteristics Zener diode.
- construct Clipping and Clamping circuits

List of Experiment

1. Construct a Voltage Regulator using IC 7805
2. Construct Schmitt Trigger using IC 555 timer and study its performance
3. Construct Astable Multivibrator Using IC 555 timer
4. Construct Astable Multivibrator using Bi Junction Transistor
5. Construct Adder and Subtractor circuit using Operational Amplifier
6. Construct Integrator and Differentiator circuit using Operational Amplifier
7. Construct Inverting and Non – Inverting Amplifier circuit using Operational Amplifier
8. Construct Transistor Shunt Regulator
9. Construct Voltage Regulator circuit using Zener diode

10. Construct Clipping Circuits and study their wave shaping property
11. Construct Clamping Circuits and study their wave shaping property
12. Construct Low pass filter circuit and find the cut-off frequency using Operational Amplifier
13. Construct High pass filter circuit and find the cut-off frequency using Operational Amplifier

Suggested Readings:

i) Reference Book:

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

ii) Web Sources:

1. https://www.cmi.ac.in/~debangshu/lab1/zener.pdf
2. http://vlabs.iitb.ac.in/rec-bootathon/innovationgeeks-clipper-clamper-skit/theory.html
3. http://vlabs.iitkgp.ernet.in/be/exp10/index.html#
4. https://bhagwantuniversity.ac.in/wp-content/uploads/2016/01/ELECTRONICS-LAB-II-SEM-IV.pdf
5. http://web.sonoma.edu/users/m/marivani/es231/units/experiment_06_clamping2.pdf

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Title of the Course: Allied Applied Electronics Semester: V/VI

Practical – II

Course Code:LUELGL61 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

- construct adder/subtractor by universal gates
- check logic gates by IC and discrete components
- acquire knowledge about Converter

- know about functionality of Decoders
- verification of De-Morgan and Boolean laws

List of Experiments

1. Construct logic Gates AND, OR, NOT, NAND and NOR using Discrete Components.
2. Realize NOT, AND, OR and Ex-OR gates using only NAND gates
3. Realize NOT, AND, OR and Ex-OR gates using only NOR gates.
4. Construct EX – NOR and EX – OR gates using ICs
5. Construct and study the operation of R-S Flip Flop
6. Construct and study the operation of J-K flip Flop
7. Construct Half adder and Half Subtractor using NAND Gates and NOR gates
8. Construct Full adder and Full subtractor by using NAND Gates
9. Construct Full adder and Full subtractor by using NOR Gates
10. Verification of De-Morgan's Laws
11. Verification of Boolean laws.
12. Verify Logic Gates using IC's
13. Karnaugh map reduction and logic circuit implementation
14. Construct four Bit Binary Subtractor
15. Construct Digital to Analog Converter (Weighed Resistor Method)
16. Construct BCD to 7 segment Decoder
17. Construct 2 to 4 Decoder
18. Construct BCD to decimal Decoder

Suggested Readings:

i) Reference Book:

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

Web Sources:

1. https://www.youtube.com/watch?v=H1p0XTe6H4M
2. https://www.youtube.com/watch?v=4AnVB9gwZfQ
3. https://neurophysics.ucsd.edu/courses/physics_120/Lab10-Phys120.pdf
4. http://nicadd.niu.edu/~fortner/course/phys475/lab/Le2_23lb.pdf
5. https://www.brcmcet.edu.in/downloads/files/n522061f647956.pdf

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

Course Learning Outcomes:

On completion of the course, the students are able to

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

Pre-Required Knowledge:

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

Unit I: Units and Measurements

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

Unit II: States of Matter

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

Unit III: Types of Energy

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

Unit IV: Renewable and Non-renewable Energy

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

Unit V: Reflection and Refraction

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

Suggested Topics for Group Discussion/Presentation

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

Suggested Readings:

i) Text Books:

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

ii) Reference Books:

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

iii) Web Sources:

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

DEPARTMENT OF ENGLISH – UG – CBCS-LOCF

Title of the Course: Communicative English –II Semester: VI
Course Code: LUENNM61 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students are able to

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

Pre-required Knowledge:

- Fundamental Grammatical Competence
- Working Vocabulary and Spoken idioms
- Different strategies and barriers of effective communication

Unit I: Listening

A Discussion between two friends, Booking accommodation at an outstation Hotel, Enquiring about Flight, Getting an appointment for interview over phone, At the Library, Between a brother and sister, Attending a career guidance Fair – About Medical Transcription, About call Centre, Option in Higher Education.

Unit II: Speaking- I

Asking for information, Asking for someone's opinion, Asking if someone is sure, Asking someone to say something again, Checking that you have understood, Asking whether someone knows, Asking about Starting conversation with a Stanger.

Unit III: Speaking –II

Leaving someone for a short time, Ending a conversation, Asking possibility, Asking about preference , Asking if someone is about to do something , Asking if someone agrees, Asking if you are obliged to do something, Describing something , Some useful expressions.

Unit IV: Writing

Writing Essays, Writing Advertisements and posters, Writing Reports, Summarizing and Outlining, Information Transfer Exercise, Dialogue Writing.

Unit V: Professional Skills

Negotiating, Body Language, Group Discussion, Seminar and Public Speaking.

Suggested Topics for Presentation:

- Difference between acceptable and unacceptable sentences in English.
- Appropriateness, grammaticality and acceptability of the English language.
- To assist the students in learning the concepts of register, style and jargon as well as the various varieties of English.

- Application and use various kinds of jargons and register as per context.
- Preparing situational dialogues

Suggested Readings:

i)Text Books:

1. JayashreeBalan, *Spoken English*.Vijay Nicole Imprints Pvt. Ltd, Chennai , 2006.
2. G.Radhakrishnan Pillai and K. Rajeevan. *Spoken English For You*. Emerald Publishers, Chennai ,2002.

ii)Reference Books:

1. M.N.K.Bose. *Better Communication in Writing,* New Century Book House (P) Ltd, Madras, 2004.
2. T. M. Farhathullah. *Communication Skills for Under Graduates.* R.B.A. Publications, Chennai.

iii)Web Sources:

1. https:// www.nyp.org/blog/2012/11/28/11-great-free-websites-practice-English
2. https:// www.Spoken English practice.com/ learn-english-speaking-online
3. https://global-exam.com/blog/en/general-english-what-are-best-websites-tolearn-english/

DEPARTMENT OF HISTORY - UG

Course Title :Indian National Movement		**Semester: VI**
Course Code: LUHSNM61	**Contact Hours: 2**	**Credits: 2**

Course learning outcomes:

On completion of the course students are able to

- Acquire knowledge about the early rebellions
- Describe the birth of Congress
- Understand the impact of Jallianwallabag tragedy

- Asses the causes for the Non-Co-operation movement.
- Evaluate the role of Gandhi in freedom movement.

Unit I: Early uprisings

South Indian Rebellion 1800- 1801- Vellore Mutiny of 1806, causes and results - Sepoy Multiny 1857.

Unit II: Indian National Congress

Birth of Congress– Moderates - Surat split 1907 – Extremist Movement.

Unit III: Reunion of Congress

Moderates and Extremists 1916 - Home Rule Movement 1916, Jalianwallabagh tragedy 1919.

Unit IV: Gandian era – phase I

Champron Satyagraha - Non Co-operation Movement - Chauri Chaura incident 1922.

Unit V: Gandian era – phase II

Civil Disobedience Movement - Dandi March 1930 - Gandhi - Irwin pact - Quit India Movement 1942 – Mountbatten Plan – dawn of independence.

Suggested topics for group discussion/ presentation

Causes and results of Sepoy Multiny 1857.

Surat split

Home Rule Movement

Chauri Chaura incident

Suggested Readings.

Text Books:

1. G .Thangavelu, History of India 3 Vols, Govt. of Tamilnadu Publications
2. G.Venkatesan History of Freedom Struggle in India, V C Publications, Rajapalayam

Reference Books:

1. *B. R. Tomilinzon, The Indian National Congress and the Raj, (1929 – 1942), The Macmillan, New York, 1976.*
2. *Tara Chand, History of the Freedom Movement in India Vol.I., Gowardha Kapur and Sons, New Delhi, 1970.*
3. *B. Shiva Rao, Indian Freedom Movement, Orient Longman Limited., New Delhi, 1972.*
4. *H. N. Pandit, Fragments of History, Sterling Publishers, New Delhi, 1982.*
5. *V.D. Mahajain, British Rule in India and After, S. Chand and Co., Ltd., New Delhi, 1972.*

Web Sources

https:// www.clearias.com

https:// www.toppr.com

https:// www.mapsofindia.com

DEPARTMENT OF COMMERCE – UG – CBCS – LOCF

Title of the Paper: Practical Banking **Semester: VI**

Course Code: LUCONM61 Contact Hours: 2hrs/w Credits: 2

Course Learning Outcomes:

On completion of the course, the students able to

- explain the banking systems in India;
- analyse the different schemes of commercial banks in India;
- illustrate the bank lending procedures;
- evaluate the credit appraisal system and explain the Management of NPA;
- apply the recent trends in Banking system;

Pre-required Knowledge:

- ✓ Origin of Indian banking system in India
- ✓ Negotiable Instruments

- ✓ Latest technology in banking system

Unit- I:Introduction

Banking - Definition – Functions – Reserve Bank of India – Introduction - Functions.

Unit- II: Relationship

Banker and Customer Relationship – General relationship only – Types of customers.

Unit- III: Deposits

Types of Deposit Accounts – Features of deposit accounts – Account opening procedure.

Unit- IV: Cheques

Meaning – Advantages - Crossing – Types of crossing- Endorsement.

Unit- V: Resent Development

Recent Developments in Banking system – ATM – Debit Card - Credit Card –Services available under Core Banking System.

Suggested topics / Practical Exercise:

The learners are required to:

- ✓ critically evaluate the functions of RBI
- ✓ discuss the special relationship between banker and customer
- ✓ show the different methods of crossing of cheque
- ✓ list the t benefits you enjoyed from debit and credit cards.
- ✓ fill cheque, chellan using specimen forms

Suggested Readings:

i) Text Books:

1. Gorden& Natarajan. (2018). Banking theory Law and practice. Bangalore: Himalaya Publishing House.
2. Sundharam& Varshney. (2019). Banking theory, law and practice. New Delhi: Sulthan Chand & Son**s.**

ii) Reference Books:

1. Radhaswamy, M.(2018). A Text Book of Banking. Delhi: S. Chand & Co.
2. Shekar & Lakshmi Shekar. (2019). Banking Law and Practice. UP: Vikas Publishing.
3. Santhanam.B. (2018).Banking and Finance System, Chennai: Margham Publication.

iii) Web-Sources:

1. https://library.um.edu.mo/ebooks/b33294872.pdf
2. http://dspace.gipe.ac.in/xmlui/bitstream/handle/10973/23714/GIPE-008631-Contents.pdf?sequence=2&isAllowed=y
3. https://www.amazon.in/Practical-Banking-India-Gupta-H/dp/8178358999
4. https://www.freebookcentre.net/Business/Banks-and-Banking-Books.html

NON MAJOR ELECTIVE

DEPARTMENT OF MATHEMATICS – UG – CBCS - LOCF

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

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 CHEMISTRY – UG –CBCS- LOCF

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

Course code:LUCHNM61 Contact Hours: 2hrs/w Credits: 2

Course Learning outcomes

On completion of the course, the students are able to

- ✓ understand basic chemistry involving types of elements and chemical reactions.
- ✓ understand the different concepts of acids and bases, water types, various chemical processes.
- ✓ study the knowledge on fertilizers, role of fertilizer in plant growth and fertilizer industry
- ✓ gain knowledge on Inorganic and organic pesticides, Fungicides and repellants

Pre-Required Knowledge

- ✓ Basic Mathematical Concepts
- ✓ Basic Concepts in Organic Chemistry-EDG, EWG-o, p and m and m directors
- ✓ Periodic Table: Periodic classification of elements

Unit I: Basic Chemistry – I

Elements – atoms and molecules – Chemical formulae and symbols – Important basic terms such as pressure, volume, atomic mass, molecular mass, temperature, atomic number, mass number- Radioactivity and Isotopes- periodic classification of elements – Group and period (elementary idea)- Metals and nonmetal – metaolloid, alloy, ore and minerals.

Unit II: Basic Chemistry – II

State of matter (Solid, liquid, gas and plasma)- ideal and real gases - Important laws of Chemistry (Boyle's law, Charle'slaw,Hess's law, Grahams law of diffusion, Beer's law, Henry's law, Faraday's law, Law of conservation of matter or energy)- Types of chemical reactions (exothermic and endothermic, Physical and chemical changes, oxidation and reduction)

Unit III: Basic Chemistry – III

Different concepts of Acids and Bases (Arrhenius, Bronsted and Lewis) – pH concept (no calculation) – Water – Hard and soft water - Solutions and their types (True, Colloidal and suspension) – uses of colloidal solution – Buffer solution –Definitions of some important chemical processes (Haber's, Contact's, Ostwald's, Process)

Unit IV: Agricultural Chemistry

Fertilizer: Definition-nutrients for plants-role of various elements in plant growth – natural and chemical fertilizer – Classification of chemical fertilizer – fertilizer industry in India.

Unit V: Insecticides and Pesticide

Definition- classification – Inorganic and organic pesticides (lead arsenate, lime, sulphur, DDT and gammaxane) – Fungicides and repellants

Suggested Readings:

Text books:

1. *Sharma B.K. Industrial chemistry, Krishna Prakashan Media (p) Ltd., 2011.*
2. *Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2004*
3. *Puri, Sharma and Pathania, Principles of Inorganic Chemistry, Vishal Publishing Co., 2004*

Reference Books:

1. *A.Bahl and B.S.Bahl, Advanced Organic Chemistry, S.Chand& Company, New Delhi,2012.*
2. *A.S.Negi and S.C.Anand, A text book of Physical Chemistry, New Age International publishers,3rd Edition,2022.*
3. *J. D. Lee, Concise Inorganic Chemistry, 5th ed., Blackwell Science, London, 1996.*
4. *Jain, P. C. and Jain, M. Engineering chemistry, 10th ed.; Dhanpat rai and sons: delhi, 1993*

Web Sources:

1. https://careerendeavour.com/net-question-paper/
2. https://ifasonline.com/csir-net-chemical-science/previous-year-question-papers.jsp
3. https://examprep.vpmclasses.com/
4. https://scoop.eduncle.com/csir-net-question-paper-free-download
5. https://career.aglasem.com/csir-ugc-net-question-paper-chemical-science/

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 PHYSICS – UG –CBCS - LOCF

ADD-ON COURSES

CERTIFICATE COURSE IN DESIGNING OF ELECTRONIC CIRCUITS

Title of the Course: Designing of Electronic Circuits **Semester: I & II**

Course code: EADCPH **Total Contact Hours: 40**

Course Learning Outcomes:

On completion of the course, the students are able to

- know about different electronic components
- design Emergency light
- understand the basic idea of Timer circuits
- assemble digital sounding system
- design power supply

List of Experiments

1. Identification, Working and Testing of components.
2. Designing of Power supply.
3. Designing of Zener Diode Regulated Power supply.
4. Designing of IC Regulated Power Supply.

5. Designing of Light Dimmer.
6. Designing of Water level indicator.
7. Designing of Fire Alarm.
8. Designing of Intruder Alarm.
9. Designing of Timer.
10. Designing of Emergency Light
11. Assembling of digital sound system (USB/BT Player)

Book for study and references: Materials prepared in the Department

i) Web Sources:

1. https://www.powerelectronicsnews.com/power-supply-design-tutorial/
2. https://www.designingbuildings.co.uk/wiki/Emergency_lighting
3. https://waterlevelcontrols.com/water-level-indicator/

DEPARTMENT OF PHYSICS – UG –CBCS - LOCF

ADD-ON COURSES

DIPLOMA COURSE IN SERVICING OF DOMESTIC EQUIPMENTS

Title of the Course: Servicing of Domestic Equipments -Theory	**Semester: III & IV**
Course code:EADDPH1	**Total Contact Hours: 40**

Course Learning Outcomes:

On completion of the course, the students are able to

- know the difference between A.C and D.C
- know the principles involved in different domestic instruments
- identify the different parts of the domestic instruments
- identify and rectification of faults &Maintenances
- install CCTV camera

Pre-Required Knowledge:

- A.C and D.C Current, Voltage and Resistance relationship
- Basic idea about Lamps
- Working principles of Motors

UNIT I: Alternating currents and direct current

Introduction to Electricity, Electric current, Difference between AC& DC, AC Frequency-Power, Power factor. Types of AC Supply-Single phase, Three Phase- Advantages. Safety Precaution while handling AC Supply. Testing equipments. Need for Earthing.

UNIT II: Lamp types

Lights Types- Incandescent lamp, fluorescent lamp – types, CFL, LED-merits and Demerits. Conversion of copper/Aluminum ballast to Electronic Choke fitting. Electric Fan Types, Working. Calling Bell Working. Troubleshooting and Maintenance.

UNIT III: Home appliances

Iron box –Types (automatic & Non-Automatic), Heaters, Hotplates, Toasters, Ovens, microwave Ovens, Geysers, Wet grinder Types (Conventional &Table top). Mixer grinder (Mixie). Troubleshooting and Maintenance.

UNIT IV: Electrical connections

Motors Types (AC) Single phase &Three phase, Universal, Brushless, Stepper and Servo Motors -Working, Troubleshooting and Maintenance. Motor Starters, Stabilizers, inverters-Troubleshooting and Maintenance- washing machine, types, identification of parts, trouble shooting.

UNIT V: Cameras

CCTV camera, types, DVR, types, power supply, installation

Suggested Topics for Group Discussion/Presentation

- ✓ Need for Earthing
- ✓ Working principle of Calling Bell

- ✓ Types of Wet-Grinders
- ✓ Troubleshooting and maintenance of Washing Machine
- ✓ CCTV camera installation

Book for study and references:

i) Materials prepared in the Department

Web Sources:

1. https://www.electrothinks.com/2020/03/CFL-bulb-circuit-working-explanation.html
2. https://studiousguy.com/microwave-oven-working-principle/
3. https://www.techprevue.com/cctv-cameras-different-types-purpose/

DEPARTMENT OF PHYSICS – UG –CBCS - LOCF

ADD-ON COURSES

DIPLOMA COURSE IN SERVICING OF DOMESTIC EQUIPMENTS

Title of the Course: Servicing of Domestic Equipments -Practical **Semester: III & IV**

Course code: EADDPH2 **Total Contact Hours: 40**

Course Learning Outcomes:

On completion of the course, the students are able to

- ➢ identify troubles in electric fan
- ➢ explain the working of iron box
- ➢ install inverter
- ➢ know the fitting of tube light
- ➢ trouble shoot the electrical appliances

List of Experiments

1. Tube light

2. Electric Fan
3. Iron box
4. Motor
5. Washing machine
6. Mixer
7. Grinder
8. Inverter
9. CCTV system
10. DTH installation

Book for study and references:

(i) Materials prepared in the Department

Web Sources:

1. https://www.electrical4u.com/working-principle-of-a-tube-light/
2. https://pikthebest.com/washing-machine-working-principle/
3. https://smartyengineer.blogspot.com/2020/09/how-does-ceiling-fan-work-its.html

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

DIPLOMA COURSE IN HOLISTIC HEALTH

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

Course Code: EADDPE2 **Total Contact Hours: 40**

1. *Physical exercises for whole body*
2. *Productive and creative manual work (cleaning, kitchen, garden, art work etc.)*
3. *Breathing exercises (10 type)*
4. *Relaxation techniques (4 types)*
5. *Music and movement therapy*

6. *Basic Yogasanas (20 types)*
7. *Mutras (10 types - energy)*
8. *Physical exercises (5 types)*
9. *Meditation skills (5 types)*
10. *Healing techniques (5 types)*
11. *Field visit, to understand human*
12. *Body, visit to Government Medical College Hospital*
13. *Visit to a reputed Yoga Centre (Encounter with Yoga experts)*

RULES AND REGULATIONS FOR THE PROJECT / DISSERTATION WORK (UG, PG AND M.PHIL)

- Research supervisors will be allotted to the students / scholars by the respective Department.
- Research topic shall be chosen by the student / scholar in consultation with his/ her research supervisor.
- Every department has to maintain the year-wise list of project works carried out by the students. Research works done by the students / scholars of the previous batches should not be repeated by the students / scholars of the current academic year.
- The general structure of the project report is given below.

Title page with college emblem

Research supervisor's certificate

Student's declaration counter signed by Research Supervisor and the HOD

Student's Acknowledgement

Contents

List of Tables if any

Introduction

Review of Literature

Materials and Methods

Results and Discussion

Summary of Findings and Conclusion

Bibliography

Annexure

- Four copies of the project repot should be submitted, typed in A4 Paper in Times New Roman with the font size of 12 and 1.5 line spacing.

SARASWATHI NARAYANAN COLLEGE

(Autonomous Institution – Affiliated to Madurai Kamaraj University)

(Reaccredited with $B^{(2.78)}$ Grade by NAAC in the second cycle)

MADURAI -22

EVALUATION METHOD UNDER CBCS- LOCF

CONTINUOUS INTERNAL ASSESSMENT (CIA)

Internal assessment is based on the continuous evaluation of performance of the students in each semester. Internal mark is awarded to each course in accordance with the following guidelines.

UNDER GRADUATE, POST GRADUATE AND M.PHIL:

1. Internal test will be conducted for the maximum of 60 marks and converted to 15 marks.
2. Two internal tests will be conducted and the average of marks secured in the two tests will be taken as the Final Internal Test mark.

3. The distribution of Internal Assessment marks is given below.

	THEORY		PRACTICAL	
Test -	15	Record Note	-	10
Seminar -	5	CIA	-	15
Quiz -	5	Model Exam	-	15
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Internal Maximum -	25	Internal Maximum -		40

1. There is no Cumulative Internal Assessment (CIA) for Self Learning Courses, Add on Certificate / Diploma Programmes and Part-1 subjects other than Tamil.
2. Internal marks for those UG, PG and M.Phil. students who have to Repeat the Semester (RS) for want of attendance should be marked “AA” in the foil card.
3. There is no minimum mark for Internal assessments marks for all the UG, PG and M.Phil. Programmes.
4. Internal test for improvement of marks is not allowed under any circumstances
5. Special Internal Assessment tests for the absentees may be conducted on genuine reasons with the prior approval of HOD, Dean and Principal. Such tests may be conducted before the commencement of the Summative Examinations.

SUMMATIVE EXAMINATIONS (SE)

1. Summative Examinations for all the UG, PG and M.Phil. Programmes are conducted in November and April for the Odd and the Even semesters respectively.
2. Question paper setting along with the scheme of valuation is purely external for all the UG, PG and M.Phil. Programmes.
3. The office of the CEO is conferred with the right of choosing the Question Paper Setters and the External Examiners from the Panels suggested by the Boards of Studies of Programmes offered by the respective Department and approved by the Academic Council of the College. The question papers set for the Summative Examinations will be finalised by the Scrutiny Committee constituted by the office of the COE.
4. Practical Examinations will be conducted by the External Examiner and the course teacher, who will act as the Internal Examiner. In the absence of course teacher / External Examiner, HOD will act as the Internal Examiner / External Examiner.
5. The marks scored by the students in the External Examinations in Self Learning Courses and Add – on Courses will be converted to 100 for each course.
6. The theses submitted by the M.Phil. scholars after the conduct of Awards Committee meeting can be valued and the Viva-Voce Examinations can be conducted. The Principal is empowered to declare the results and it can be ratified in the next Awards Committee meeting.

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S. No	Level	Parameter Description	Description
1	K1	Remembering	Remembering It is the ability to remember the previously learned
2	K2	Understanding	The learner explains ideas or Concepts
3	K3	Applying	The learner uses information in a new way
4	K4	Analysing	The learner distinguishes among different parts
5	K5	Evaluating	The learner justifies a stand or decision
6	K6	Creating	The learner creates a new product or point of view

WEIGHTAGE OF K–LEVELS IN QUESTION PAPER

K-LEVELS (Cognitive Level)						Total
	K1	K2	K3	K4	K5/ K6	
summative examinations– 75 marks pattern	21	30	18	18	13	100
summative examinations–50 marks pattern	24.5	24.5	17	17	17	100
continuous internal assessment(cia)	24	26	14	25	11	100

QUESTION PATTERN FOR SUMMATIVE EXAMINATIONS For those who join in June 2022 UG and PG (Language Courses, Core Courses, Discipline Specific Electives, Generic Elective Courses, Non-Major Electives (PG))	
	TOTAL MARKS **75**
SECTION–A (Answer all questions) **I. Choose the correct answer (FIVE questions –ONE question from each unit) (5 x 1 = 5)** (Q.No.1-5) - All questions are at K2 level **II. Fill in the blanks (FIVE questions - ONE question from each unit) (5x1=5)** (Q.No.6-10)-All questions are at K1 level	**10**
SECTION-B **Answer all questions not exceeding 50 words each.** **ONE set of questions from each unit** **Q. No. : 11 to 15 (5x2=10)** K2 level – 2 Questions K3 level – 1 Question K4 level –1 Question K5/K6 level – 1 Question	**10**
SECTION-C-Either/or type **Answer all questions not exceeding 200 words each.** **ONE set of questions from each unit.** **Q. No. : 16 to 20 (5 x5=25)** K1 level – 1 Question K2 level – 2 Questions K3 level – 1 Question K4 level – 1 Question	**25**
SECTION-D-Answer any THREE questions not exceeding 400 words each. **ONE question from each unit.** **Q. No. : 21 to 25 (3 x 10 =30)** K1 level – 1 Question K2 level – 1 Questions K3 level – 1 Question K4 level – 1 Question K5/K6 level – 1 Question	**30**
Total	**75**

QUESTION PATTERN FOR SUMMATIVE EXAMINATIONS For those who join in June 2022 UG and PG (Skill Enhancement Courses, Self Learning Courses, Non Major Electives (UG)and Part V Courses (except NCC))	
	TOTAL MARKS 50
SECTION–A(Answer all questions) **I. Choose the correct answer (FIVE questions–ONE question from each unit)** (Q.No.1-5) - All questions are at K2 level **II. Fill in the blanks (FIVE questions – ONE question from each unit) (5x1=5)** (Q.No.6-10) - All questions are at K1 level	**10**
SECTION-B **Answer all questions not exceeding 50 words each.** **ONE set of question from each unit** **Q. No. : 11 to 15 (5x2=10)** K1 level – 1 Question K2 level – 1 Question K3 level – 1 Question K4 level – 1 Question K5/K6 level – 1 Question	**10**
SECTION-C **Answer any THREE questions not exceeding 400 words each.** **ONE question from each unit** **Q. No. : 16 to 20 (3x10=30)** K1 level – 1 Question K2 level – 1 Question K3 level – 1 Question K4 level – 1 Question K5/K6 level – 1 Question	**30**
Total	**50**

QUESTION PATTERN FOR INTERNAL ASSESSMENT (CIA) For those who join in June 2022 UG and PG	
	TOTAL MARKS 60
SECTION–A(Answer all questions) **I. Choose the correct answer** (5 x 1 = 5) (Q.No.1-5)-All questions are at K2 level **II. Fill in the blanks (5x1=5)** (Q.No.6-10)-All questions are at K1 level	**10**
SECTION-B **Answer all questions not exceeding 50 words each. ONE set of question from each unit** (4 x 2 = 8) Q.No. 11 – K2 level Q.No. 12 – K3 level Q.No. 13 – K3 level Q.No. 14 – K5/ K6 level	**8**
SECTION-C-Either/or type (**Answer all questions not exceeding 200 words each**. (3 x 6 = 18) Q.No. 15 – K3 level Q.No. 16 – K4 level Q.No. 17 – K5/K6 level	**18**
SECTION-D **Answer any TWO questions not exceeding 400 words each. (2 x 12 = 24)** Q.No. 18 – K1 level Q.No. 19 – K2 level Q.No. 20 – K4 level	**24**
Total	**60**

QUESTION PATTERN FOR SUMMATIVE EXAMINATIONS For those who join in June 2022 UG and PG (Language Courses, Core Courses, Discipline Specific Electives, Generic Elective Courses, Non-Major Electives(PG))						
DURATION:3HRS			**MAXMARKS:75**			
K-LEVELS SECTIONS	**K1**	**K2**	**K3**	**K4**	**K5/K6**	**TOTAL MARKS**
SECTION A (Answer all questions, each question carries One Mark)	5	5				**10**
SECTION B (Answer all questions, each question carries TWO Marks, ONE question from Each unit)		4	2	2	2	**10**
SECTION C (Answer all questions-Either/or type-ONE Question from each unit)	5	10	5	5		**25**
SECTION D (Answer any THREE questions, ONE question from each unit, each question carries TEN Marks)	10	10	10	10	10	**30**
TOTAL	20	29	17	17	12	**75**

QUESTION PATTERN FOR SUMMATIVE EXAMINATIONS For those who join in June 2022 UG and PG (Skill Enhancement Courses, Self Learning Courses, Non Major Electives (UG) and Part V Courses (except NCC))						
DURATION:2HRS			**MAX MARKS:50**			
K-LEVELS SECTIONS	**K1**	**K2**	**K3**	**K4**	**K5/ K6**	**TOTAL MARKS**
SECTION A (Answer all questions, each question carries One Mark)	5	5				**10**
SECTION B (Answer all questions, each question carries TWO Marks, ONE question from Each unit)	2	2	2	2	2	**10**
SECTION C (Answer any THREE questions, ONE question from each unit, each question carries TEN Marks)	10	10	10	10	10	**30**
TOTAL	17	17	12	12	12	**50**

BLUE PRINT OF QUESTION PAPER FOR INTERNAL ASSESSMENT (CIA)						
DURATION:2HRS			**MAX MARKS:60**			
K-LEVELS / SECTIONS	**K1**	**K2**	**K3**	**K4**	**K5/K6**	**TOTAL MARKS**
SECTION A (Answer all question. Each question Carries **ONE** Mark)	5	5				**10**
SECTION B (Answer all questions. Each question carries **TWO** Marks)		2	4		2	**8**
SECTION C (Answer all questions- Either/or type -Each question carries **SIX** Marks)			6	6	6	**18**
SECTION D (Answer any TWO questions. Each question carries **TWELVE** Marks)	12	12		12		**24**
TOTAL	17	19	10	18	8	**60**

QUESTION PATTERN

FOR PART IV ENVIRONMENTAL STUDIES, VALUE EDUCATION YOGA and Course for Competitive Examinations – UG

(For those who joined in June 2022)

Blue print for External

Max. Marks: 75

I. Answer All Questions

Choose the Correct answer (Objective type pattern)

ADD-ON PROGRAMMES

- Add on Programmes have been in practice for all the UG students since the academic year 2014-2015. Each department has to conduct one Certificate Programme in the Second Semester with the duration of 40 hrs and a Diploma Programme in the Third and the Fourth Semesters with the duration of 40 hrs each.
- The certificate Programme consists of only one course (theory / practical) while the Diploma Programme consists of two courses (theory / practical).
- There is no Continuous Internal Assessment (CIA) for Add-on Programmes. Only Summative Examinations will be conducted and the valuation will be done only by External Examiners.
- Summative Examinations for the Add-On Certificate and Diploma Programmes will be conducted at the end of every semester for UG Arts and Mathematics Programmes. Whereas the same will be conducted at the end of the respective academic year for the science UG Programmes in science subjects except Mathematics.

COMMON QUESTION PATTERN FOR ADD – ON PROGRAMMES

(for those who joined in June 2020 and afterwards)

Blue print for External

Max. Marks: 50 **Duration: 2 hrs**

SECTION – A

1. Answer All Questions (No Choice) 10 x 1 = 10 Marks

Choose the correct answer (Objective patter)

(Two Questions from each unit)

SECTION – B

2. Short type questions 5 x 4 = 20 Marks

Answer any Five questions (5/8)

(Choosing atleast one question from each unit and not exceeding two questions)

SECTION - C

3. Essay type questions 2 x 10 = 20 Marks

Answer any Five questions (2/5)

(One question from each unit)

QUESTION PAPER PATTERN FOR M.Phil. COURSES

SECTION A

Answer All Questions

1. *Either or Pattern (one set from each unit) 5 x 6 = 30 Marks*

SECTION B

Answer any three questions out of 5 questions

1. *One question from each unit3 x 15 = 45 Marks*

QUESTION PATTERN FOR M.Phil. CHEMISTRY FOR ONLY INDEPTH PAPER
(Course Code No. DMPCHE11)

Answer any Five Questions out of Eight Questions

One question from each published literature. *5 x*

(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.