

B.Sc. Physics Curriculum
CHOICE BASED CREDIT SYSTEM
Effective from the Academic Year 2021-2022

Total number of Credit: 140

Category	Code No.	Course	Hours per week			Credits
			Lecture	Tutorial	Practical	
SEMESTER I						
LANG		Language–I (Tamil, Hindi & French)	3	0	0	3
ENG		English – I	3	0	0	3
CORE		Properties of Matter & Acoustics	4	1	0	5
CORE		Mechanics	4	1	0	5
CORE		Mathematics – I	4	0	0	4
CORE		Practical Physics – I	0	0	4	2
AECC		Communication Skills	1	0	2	2
			19	2	6	24
SEMESTER II						
LANG		Language–II (Tamil, Hindi & French)	3	0	0	3
ENG		English–II	3	0	0	3
CORE		Thermal Physics	4	1	0	5
CORE		Optics	4	1	0	5
CORE		Mathematics - II	4	0	0	4
CORE		Practical Physics - II	0	0	4	2
SEC		Soft Skills –I /Sector Skill Council Course	2	0	0	2
			20	2	4	24
SEMESTER III						
LANG		Language–III (Tamil, Hindi & French)	3	0	0	3
ENG		English–III	3	0	0	3
CORE		Electricity & Magnetism	5	0	0	5
CORE		Chemistry – I	5	0	0	5
CORE		Practical Physics – III	0	0	4	2
CORE		Chemistry Practical – I	0	0	4	2
AECC		Environmental Studies	2	0	0	2
SEC		Soft Skills –II /Sector Skill Council Course	2	0	0	2
			20	0	8	24

Category	Code No.	Course	Hours per week			Credits
			Lecture	Tutorial	Practical	
SEMESTER IV						
LANG		Language – IV (Tamil, Hindi & French)	3	0	0	3
ENG		English – IV	3	0	0	3
CORE		Atomic Physics	4	0	0	4
CORE		Astrophysics	4	0	0	4
CORE		Chemistry – II	4	0	0	4
CORE		Practical Physics – IV	0	0	4	2
CORE		Chemistry Practical – II	0	0	4	2
SEC		Soft Skills –III /Sector Skill Council Course	2	0	0	2
			20	0	8	24
SEMESTER V						
CORE		Quantum Mechanics	4	0	0	4
DSE		Discipline Specific Elective – I	4	0	0	4
DSE		Discipline Specific Elective – II	4	0	0	4
DSE		Discipline Specific Elective – III	3	0	0	3
DSE		Discipline Specific Elective – IV	3	0	0	3
DSE		Discipline Specific Elective Practical – I	0	0	4	2
SEC		Personality Development	2	0	0	2
			20	0	4	22
SEMESTER VI						
DSE		Discipline Specific Elective – V	5	0	0	5
DSE		Discipline Specific Elective – VI	4	1	0	5
DSE		Discipline Specific Elective Practical – II	0	0	4	2
GE		Generic Elective -I	3	0	0	3
SEC		Physics Workshop Skills	3	0	0	3
DE		Dissertation	0	0	8	4
			15	1	12	22
						140

VELS INSTITUTE OF SCIENCE, TECHNOLOGY & ADVANCED STUDIES
B.Sc., DEGREE COURSE IN PHYSICS
SCHEME OF EXAMINATION

SEMESTER I

Category	Code No.	Course	Marks			Exam duration	
			Internal	External	Total	Theory	Practical
LANG		Language–I (Tamil, Hindi & French)	40	60	100	3	0
ENG		English–I	40	60	100	3	0
CORE		Properties of Matter & Acoustics	40	60	100	3	0
CORE		Mechanics	40	60	100	3	0
CORE		Mathematics – I	40	60	100	3	0
CORE		Practical Physics – I	40	60	100	0	3
AECC		Communication Skills	40	60	100	3	0

SEMESTER II

Category	Code No.	Course	Marks			Exam duration	
			Internal	External	Total	Theory	Practical
LANG		Language–II (Tamil, Hindi & French)	40	60	100	3	0
ENG		English–II	40	60	100	3	0
CORE		Thermal Physics	40	60	100	3	0
CORE		Optics	40	60	100	3	0
CORE		Mathematics – II	40	60	100	3	0
CORE		Practical Physics – II	40	60	100	0	3
SEC		Soft Skills –I /Sector Skill Council Course	40	60	100	3	0

SEMESTER III

Category	Code No.	Course	Marks			Exam duration	
			Internal	External	Total	Theory	Practical
LANG		Language–III (Tamil, Hindi & French)	40	60	100	3	0
ENG		English–III	40	60	100	3	0
CORE		Electricity & Magnetism	40	60	100	3	0
CORE		Chemistry – I	40	60	100	3	0
CORE		Practical Physics – III	40	60	100	0	3
CORE		Chemistry Practical – I	40	60	100	0	3
AECC		Environmental Studies	40	60	100	3	0
SEC		Soft Skills –II /Sector Skill Council Course	40	60	100	3	0

SEMESTER IV

Category	Code No.	Course	Marks			Exam duration	
			Internal	External	Total	Theory	Practical
LANG		Language–IV (Tamil, Hindi & French)	40	60	100	3	0
ENG		English–IV	40	60	100	3	0
CORE		Atomic Physics	40	60	100	3	0
CORE		Astrophysics	40	60	100	3	0
CORE		Chemistry – II	40	60	100	3	0
CORE		Practical Physics – IV	40	60	100	0	3
CORE		Chemistry Practical – II	40	60	100	0	3
SEC		Soft Skills –III /Sector Skill Council Course	40	60	100	3	0

SEMESTER V

Category	Code No.	Course	Marks			Exam duration	
			Internal	External	Total	Theory	Practical
CORE		Quantum Mechanics	40	60	100	3	0
DSE		Discipline Specific Elective – I	40	60	100	3	0
DSE		Discipline Specific Elective – II	40	60	100	3	0
DSE		Discipline Specific Elective – III	40	60	100	3	0
DSE		Discipline Specific Elective – IV	40	60	100	3	0
DSE		Discipline Specific Elective Practical – I	40	60	100	0	3
SEC		Personality Development	40	60	100	3	0

SEMESTER VI

Category	Code No.	Course	Marks			Exam duration	
			Internal	External	Total	Theory	Practical
DSE		Discipline Specific Elective – V	40	60	100	3	0
DSE		Discipline Specific Elective – VI	40	60	100	3	0
DSE		Discipline Specific Elective Practical – II	40	60	100	0	3
GE		Generic Elective-I	40	60	100	3	0
SEC		Physics Workshop Skills	40	60	100	3	0
DE		Dissertation	40	60	100	0	3

LIST OF DISCIPLINESPECIFIC ELECTIVE COURSES (DSE)

S. No.	Code	Courses
1.		Laser Physics & Spectroscopy
2		Nuclear Physics
3		Analog and Digital Electronics
4		Microprocessor
5		Solid State Physics
6		Nanomaterials & Applications
7		Laser Physics
8		Solar Technology
		Dissertation

LIST OF GENERIC ELECTIVE COURSES (GEC)

S. No.	Code	Courses
1		Basic Physics
2		Everyday Physics
3		Electrical & Electronic Appliances
4		Renewable Energy Sources
5		Energy Physics

LIST OF ABILITY ENHANCEMENT COMPULSARY COURSES (AECC)

S. No.	Code	Courses
1		Communication Skills
2		Environmental Studies

LIST OF SKILL ENHANCEMENT COURSES (SEC)

S. No.	Code	Courses
1		Soft Skill – I
2		Soft Skill - II
3		Soft Skill - III
4		National Service Scheme – I
5		National Service Scheme – II
6		Personality Development
7		Physics Workshop Skills

SEMESTER-I

	TAMIL - I	L	T	P	Credits
		3	0	0	3

இக்காலக் கவிதைகள் – உரைநடை – பண்பாடு – மொழித்திறன்

அலகு 1: மரபுக்கவிதை

9 மணி நேரம்

1. பாரதியார் - பாரத தேசம் என்னும் தலைப்பில் ஆறு பாடல்கள்.
(பாடல் எண்கள் 1, 6, 7, 9, 12, 13)
2. பாரதிதாசன் - தமிழுக்கும் அமுதென்று பேர் என்னும் தலைப்பிலான கவிதை.
3. தேசிக விநாயகம் பிள்ளை - உடல் நலம் பேணல் என்னும் தலைப்பிலான கவிதை
4. முடியரசன் - காவியப் பாவை - “புண்படுமா” என்னும் கவிதை.

அலகு 2: புதுக்கவிதை

9 மணி நேரம்

1. நா. காமராசன் - **கறுப்பு மலர்கள்** தொகுப்பில் **காகிதப்பூக்கள்** என்னும் தலைப்பிலான கவிதை.
2. அப்துல் ரகுமான் - **ஆலாபனை** தொகுப்பில் **போட்டி** என்னும் தலைப்பிலான கவிதை
3. ஈரோடு தமிழன்பன் - **ஒரு வண்டி சென்ரியு** தொகுப்பில் தேர்ந்தெடுக்கப்பட்ட சென்ரியு கவிதைகள்
4. ஆண்டாள் பிரியதர்ஷினி - **முத்தங்கள் தீர்ந்துவிட்டன** தொகுப்பில் **'இங்கே வரும் போது'** என்னும் தலைப்பிலான கவிதை

அலகு 3: உரைநடை

9 மணி நேரம்

1. மாணாக்கரும் தாய்மொழியும் - திரு.வி.க.,
2. மன வலிமை வேண்டும் - மு.வரதராசனார்
3. செம்மொழித் தமிழின் சிறப்புகள்
4. பண்டைத் தமிழரின் சாதனைச் சுவடுகள்

அலகு 4: தமிழர் வாழ்வும் பண்பாடும்

9 மணி நேரம்

பண்பாடு - வாழ்வியல் முறை - அகம், புறம் - உணவு முறை - விருந்தோம்பல் - நம்பிக்கைகள் - விழாவும் வழிபாடும் - கலைகள் - கட்டடம் - சிற்பம் - ஓவியம் - இசை - கூத்து - தொழிலும் வணிகமும் - அறிவியல் நோக்கு.

அலகு 5: மொழித்திறன், இலக்கிய வரலாறு, இலக்கணம்

9 மணி நேரம்

1. எழுத்துப் பிழை, தொடர்ப் பிழைகள்
2. வேற்றுமை இலக்கணம்
3. செய்யுள் நலம் பாராட்டல்
4. பாடம் தழுவிய இலக்கிய வரலாறு (மரபுக் கவிதை, புதுக்கவிதை, உரைநடை)

TOTAL HOURS: 45

COURSE OUTCOME: (Employability)

At the end of this course the students will be able to,

CO 1: Recall and recognize heritage and culture of Tamils through History of Tamil Language.

CO 2: Interpret the cultural life style of Ancient Tamils.

CO 3: Evaluate social and individuals moral value after studying Ethics In modern Literature.

CO 4: Build the humanistic concept and moral life skills after studying divine and minor Literature.

CO 5: Improve their own creativity and writing skills after studying history of Modern Tamil Literature.

பார்வைநூல்கள்

1. தமிழர்நாகரிகமும்பண்பாடும், டாக்டர் அ.தட்சிணாமூர்த்தி, ஐந்திணைப்பதிப்பகம்
2. தவறின்றித்தமிழ்எழுதுவோம், மா. நன்னன், ஏகம்பதிப்பகம்
3. தவறின்றித்தமிழ்எழுத-மருதூர்அரங்கராசன், ஐந்திணைப்பதிப்பகம்
4. தமிழ்இலக்கியவரலாறு, வரதராசன், மு., புதுதில்லி : சாகித்தியஅக்காதெமி ,
5. புதியதமிழ்இலக்கியவரலாறு, நீல. பத்மநாபன், சிற்பிபாலசுப்ரமணியம், சாகித்தியஅகாடெமி
6. செம்மொழிதமிழின்சிறப்பியல்புகள் - முனைவர்மறைமலைஇலக்குவனார்;
<https://www.youtube.com/watch?v=HHZnmJb4jSY>

பாடநூல்தேடலுக்கானஇணையம் - <https://archive.org/>

	HINDI - I	L	T	P	Credits
		3	0	0	3

Course Objective: (Skill Development)

- To enable the students to develop communication skills
- To train students in official language
- To enrich their knowledge in Hindi literature
- To teach them human values & create awareness towards exploitation

Unit I	- ‘Ek atuut kadi’ by shri Rajkishore letter writing (application), Technical words (prashasanik vakyansh:1-50).	9
Unit II	‘Devi singh’ by agyeya , letter writing (bank A/C opening&closing), Technical words (prashasanik vakyansh:51-100).	9
Unit III	‘ kabiraa ki kaashi ’by Kumar Ravindra	9
Unit IV	‘ bharathiya vigyan ki kahaani - ‘hamne diyaa ,hamne liyaa’ ’by Gunakar mule, letter writing (shikayath pathra, gyapan) Technical words: takniki shabd-25.	9
Unit V	letter writing (sarkari pathra, ardha sarkaari pathra, kaaryalaya aadesh), Technical words: takniki shabd-25.	9

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course students will be able to,

CO 1: Students will be familiar with official letter writing

CO 2: will understand their responsibility in the society

CO 3: students will be moulded with good character understand human values

CO 4: students will gain knowledge about ancient &, rich culture of India

CO 5: will know the equivalent Hindi words for scientific terms

Text /Reference Books :

Agyeya ki sampoorna kahaniyaa - Rajpal &sons, year 2017,

Yatraye our bhi ,Kumar Ravindra Rashmi prakashan ,Lucknow

Bharathiya vigyan ki kahani, Hindi book centre, NewDelhi

Gadya Khosh

Weblinks:

<http://www.hindisamay.com/content/1321/1/%E0%A4%B0%E0%A4%BE%E0%A4>

<http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0>

<http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0>

<http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0>

	FRENCH - I	L	T	P	Credits
		3	0	0	3

Course Objective: (Skill Development)

- To introduce French language.
- To enable the students to understand and to acquire the basic knowledge of French language with elementary grammar.

UNIT I INTRODUCTION

9

Introduction-Alphabet-comment prononcer, écrire et lire les mots-base: les prénoms personnel de 1er , 2eme et 3eme personnes-conjugaisons les verbes être et avoir en forme affirmative, négative Et interrogative.

UNIT II- LECON 1-3

9

Leçon 1 :Premiers mots en français- 2.Les hommes sont difficiles 3.Vive la liberté-Réponses aux questions tires de la leçon-Grammaire: Les adjectives masculines ou féminines-Les article définies et indéfinis-Singuliers et pluriels.

UNIT III-LECON 4-6

9

Leçons 4. L'heure c'est l'heure 5.Elle va revoir sa Normandie 6.Mettez-vous d'accord groupe de nom-Réponses aux questions tires de la leçon-Grammaire :A placer et accorder l'adjectif en groupe de nom-Préposition de lieu-A écrire les nombres et l'heure en français

UNIT IV-LECON 7-9

9

Leçon 7.Trois visages de l'aventure , 8. A moi Auvergne 9.Recit de voyage-Réponses aux questions tires de la leçon- Grammaire : Adjectif possessif- Les phrases au présent de l'indicatif-Les phrases avec les verbes pronominaux au présent.

UNIT V- COMPOSITION :

9

A écrire une lettre a un ami l'invitant a une célébration différente ex: mariage-A faire le dialogue- A lire le passage et répondre aux questions.

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course students will be able to,

CO1: The content of the unit 1 aids the students to explore the basics of the new foreign language.

CO2: The content of unit 2 to experience the basic formations of words and its basic grammar by differentiating with English.

CO3: This imparts the additional information in terms of general in the sense of geographical and culture.

CO4: Enable students for framing the basics sentence.

CO5: Making the students community to know the French format of letter writing and essay writing.

Text Book:

Jack GIRARDER & Jean Marie GRIDLIG,<<Méthode de Français PANORAMA>>, Clé Internationale, Goyal Publication ,New Delhi Edition 2014.

Reference Books:

1. DONDO Mathurin, "Modern French Course", Oxford University Press, New Delhi Edition 2014.
2. Nithya Vijayakumar get ready French grammar-Elementary Goyal publications, New Delhi Edition 2014.

Web Sources:

1. <https://www.thoughtco.com/french-reading-tips-1369373>
2. <https://www.bnf.fr/fr>
3. <https://www.laits.utexas.edu/tex/>

	ENGLISH - I	L	T	P	Credits
		3	0	0	3

ENGLISH I - PROSE

Course Objective: (Skill Development)

- To enable students to develop their communication skills effectively. To make students familiar with usage skills in English Language.
- To enrich their vocabulary in English
- To develop communicative competency.

UNIT I 09

1. Dangers of Drug Abuse - Hardin B Jones
2. Tight Corners - E. V. Lucas

UNIT II 09

3. Futurology - Aldous Huxley
4. If You are Wrong, Admit it - Dale Breckenridge Carnegie

UNIT III 09

5. Industry - Dr.M.Narayana Rao & Dr.B.G.Barki
6. Turning Point of My Life - A.J Cronin

UNIT IV 09

7. Excitement - Mack R. Douglas
8. The Kanda Man Eater - Jim Corbett

UNIT V 09

9. Vocabulary and Exercises under the Lessons

Note: Lessons prescribed are from various anthologies and respective exercises therein will be taught.

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Examine the language of prose.

CO2: Utilize instructions on fundamentals of grammar

CO3: Develop their own style of writing after studying diverse prose essays.

CO4: Classify different essays on the basis of their types.

CO5: Critically comment on the textual content of prose.

Books Prescribed:

- English for Communication Enrichment: by Jeya Santhi June 2015.
- Dr. M. Narayana Rao and Dr. B. G. Barki – Anu's Current English for Communication (AnuChitra). June 2012.
- Dr. Ananthan , R. Effective Communication. Ed. Chennai : Anu Chithra Pub.2010.

Web Sources:

- <https://www.gradesaver.com/>
- <https://www.enotes.com/>
- <https://www.jstor.org/>
- <https://www.sparknotes.com/>
- <https://www.cliffsnotes.com/>

	PROPERTIES OF MATTER & ACOUSTICS	L	T	P	Credits
		4	1	0	5

Course Objective: (Employability)

To make the students to understand, the different kinds of moduli via experimental methods; surface tension for liquids; wave phenomena, in general and sound wave in particular; ultrasonics and acoustics.

UNIT –I Elasticity

15

Hooke's law – Stress – strain diagram – Elastic Moduli, three types of elastic Moduli– Relation between elastic constants – Poisson's Ratio – Expression for Poisson's ratio in terms of elastic constants – Work done in stretching and work done in twisting a wire – Determination of Rigidity modulus by static torsion - Torsional pendulum - Determination of Rigidity modulus and moment of inertia - Searle's method for determining E, G and ν .

UNIT – II Bending of Beams

15

Cantilever – expression for bending moment – expression for depression – cantilever oscillations – Expression for time period - Experiment to find Young's modulus - uniform - non-uniform bending - theory – experiment using pin and microscope method - Experiment to determine Young's modulus using mirror and telescope.

UNIT – III Surface Tension

15

Surface tension – Formation of liquid drops - Excess of pressure inside a liquid drop and inside a soap bubble - Quincke's Method- Experimental study of Surface tension - Drop weight method of determining surface tension and interfacial surface tension- Variation of surface tension with temperature - Theory and Experimental – Capillary rise - Angle of contact – Determination of surface tension by capillary rise method.

UNIT – IV Viscosity

15

Streamlined motion – Turbulent motion – Coefficient of viscosity and its dimension – Rate of flow of liquid in a capillary tube – Poiseuille's formula – Terminal velocity and Stoke's formula Experimental determination – Stokes Method and experimental determination – Effect of temperature on viscosity- Oswald's Viscometer – Variation of viscosity with temperature (theory and experimental) and pressure.

UNIT – V Acoustics

15

Music and noise – Characteristics of musical sound, quality of tone, consonance and dissonance – decibel – noise pollution. Acoustics of buildings - Reverberation - Reverberation time – Sabine's formula derivation – measurement of reverberation time – absorption coefficient – acoustical design of buildings– Ultrasonics – production, properties and applications.

TOTAL HOURS: 75

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Demonstrate the basic concepts of elastic moduli and their relation.
- CO2: Illustrate the uniform and non-uniform bending to determine Young's modulus.
- CO3: Apply the important concepts in surface tension and their experimental procedure.
- CO4: Demonstrate the rate of flow of liquid in a capillary tube.
- CO5: Utilize the different concepts in acoustics and apply it in building acoustics.

Text Books

1. R. Murugesan - Properties of Matter, S. Chand & Co, Delhi, 1994.
2. D.S. Mathur–Elements of Properties of Matter, S. Chand & Co, Delhi, 2006.
3. Brij Lal &Subramaniam–A Text book of Sound, Second Edition, Vikas Publishing, Delhi, 2008.

References

1. Resnick and Halliday - Physics, Volume – I & II, Wiley and Sons inc, Sixth edition.
2. C. J. Smith - General Properties of Matter, Orient & Longman Publishers, 1960.

Web Sources:

1. https://onlinecourses.nptel.ac.in/noc20_ce42/preview
2. <https://www.slideshare.net/MisSsiDD/surface-tension-2>
3. <https://nptel.ac.in/courses/112/106/112106225/>

	MECHANICS	L	T	P	Credits
		4	1	0	5

Course Objective: (Employability)

To have clear knowledge of mechanics so as to enable them to understand the other branches of Physics especially the mechanics of microscopic bodies, Quantum mechanics.

UNIT-I	Laws of Motion	15
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Newton's law of motion – Force – Mass – Momentum and Impulse, Law of Conservation of Linear Momentum – Collision – Elastic and Inelastic collision – Newton's law of impact - Coefficient of restitution – Impact of moving sphere on a fixed plane – Direct and Oblique impact of moving two smooth spheres – Calculation of final velocities – Loss of Kinetic energy – Projectile motion – Frictional forces – Conservation of Momentum in a system of particles.

UNIT-II	Dynamics of Rigid Bodies	15
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Moment of Inertia - Angular Momentum - Torque - Conservation of angular momentum - Kinetic energy of rotating body - Theory of Compound Pendulum - determination of g and k - Centre of Mass - Velocity and acceleration - M.I. of a diatomic molecule.

UNIT-III	Gravitation	15
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Centre of Gravity: Center of Gravity of a solid and hollow hemisphere, solid tetrahedron - Newton's Law of Gravitation- Determination of mass and Density of earth. Determination of 'G' by Boy's Method – Kepler's Laws of Planetary Motion - Newton's Law from Kepler's Law – Escape Velocity - Motion of Rocket - Orbital Velocity – Geo-stationary Orbit and its applications.

Unit – IV	Hydrodynamics	15
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Centre of pressure - Centre of pressure of a rectangular lamina and triangular lamina. Equation of continuity of flow – Euler's equation for unidirectional flow – Torricelli's theorem – Bernoulli's theorem - Venturimeter – Pitot tube.

UNIT-V	Relativity	15
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Frames of references - Michelson-Morley experiment - significance of negative result - postulates of special theory of relativity - Lorentz transformation equations - Length contraction - Time dilation - Law of addition of velocities – Mass energy equivalence – Basic ideas of general theory of relativity.

TOTAL HOURS: 75

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Illustrate the basic concepts about mechanics of microscopic bodies.
CO2: Demonstrate the knowledge about the dynamics of rigid bodies.
CO3: Select the applications of gravitational laws for solids.
CO4: Identify the centre of pressure of a rectangular and triangular lamina.
CO5: Apply the concepts of special theory of relativity in various fields of physics and Engineering.

Text Books

1. Narayanamoorthy - Mechanics Part I and II, National Publishing Company.
2. D. S. Mathur- Mechanics, II Edition, S. Chand and Co, 2001.
3. R. Murugesan - Mechanics and Mathematical Methods, 1st Edition, S. Chand and Co, 1996.

References

1. R.P. Feynman, R.B. Leighton and M. Sands - The Feynman Lectures on Physics, Vols. 1, 2 and 3, Narosa, New Delhi 1998.
2. D. Halliday, R. Resnick and J. Walker - Fundamentals of Physics, 6th Edition, Wiley, New York, 2001.

Web Sources:

1. <https://nptel.ac.in/courses/122/104/122104014/#:~:text=The%20basis%20of%20all%20solutions,acted%20upon%20by%20a%20force.&text=It%20also%20gives%20us%20how,via%20the%20equation%20F%20%3D%20ma.>
2. <https://nptel.ac.in/content/storage2/courses/112101096/download/lecture-1.pdf>

	MATHEMATICS - I	L	T	P	Credits
		4	0	0	4

Course objective: (Skill Development)

To develop the skills of the students in the areas of Algebra, Numerical methods Trigonometry and Calculus. The course will also serve as a prerequisite for post graduate and specialized studies and research.

UNIT – I ALGEBRA AND NUMERICAL METHODS

12

Algebra: Summation of series simple problems. Numerical Methods: Operators E, Δ, ∇ , difference tables -Newton's forward and backward interpolation formulae for equal intervals, Lagrange's interpolation formula.

UNIT- II MATRICES

12

Introduction-Basic operations-Symmetric-skew symmetric-Hermitian-Skew Hermitian –Unitary-orthogonal-Inverse of a matrix -Solution of linear system(Cramer's rule)- Finding the Eigen roots and Eigen vectors of a matrix-Cayley Hamilton theorem(without proof)

UNIT- III THEORY OF EQUATIONS

12

Polynomial equations with real coefficients, irrational roots, complex roots, symmetric functions of roots, transformation of equation by increasing or decreasing roots by a constant, reciprocal equation. Newton's method to find a root approximately - simple problems.

UNIT IV TRIGONOMETRY

12

Introduction- Expansions of $\sin n\theta$ and $\cos n\theta$ in a series of powers of $\sin\theta$ and $\cos\theta$ - Expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ in a series of sines, cosines and tangents of multiples of " θ " - Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in a series of powers of " θ " – Hyperbolic and inverse hyperbolic functions - Logarithms of complex numbers.

UNIT V DIFFERENTIAL CALCULUS

12

Differentiation-Successive differentiation, n^{th} derivatives, Leibnitz theorem (without proof) and applications, Jacobians, Curvature and radius of curvature in Cartesian co-ordinates, maxima and minima of functions of two variables.

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Evaluate the underlying assumptions of analysis tools and relations of Set Theory

CO2: Identify the applications of matrices and utilizes.

CO3: Interpret critically the uses and limitations of Theory of equations

CO4: Utilize the key terminology, concept tools and techniques used in trigonometry.

CO5: Apply the maxima and minima in detailed ways and the applications of partial differential equations.

TEXT BOOKS

2. P. Kandaswamy and K.Thilagavathy, Allied Mathematics paper I, 1st Semester, S.Chand Publishing Pvt. Ltd. 1st Edition,2003.
3. S. Narayanan and T.K. Manickavasagam Pillai – Ancillary Mathematics, S. Viswanathan Printers, 1986, Chennai.

REFERENCE BOOKS

1. P.R. Vittal, Allied Mathematics, Margham Publications, 4th Edition 2009.
2. A. Singaravelu, Allied Mathematics, Meenakshi Agency, 2007.
3. P. Duraipandian and S.UdayaBaskaran, Allied Mathematics, Vol. I & II Muhil Publications, Chennai.

Web sources

1. https://books.google.co.in/books?id=4C4rDAAAQBAJ&printsec=frontcover&source=gbg_ge_summary_r&cad=0#v=onepage&q&f=false
2. <https://ncert.nic.in/ncerts/l/keep203.pdf>
3. <http://www.universityofcalicut.info/SDE/VI%20Sem.%20B.Sc%20Maths%20-%20Additional%20Course%20in%20lie%20of%20Project%20-Theory%20of%20equations%20&%20fuzzy%20set.pdf>
4. <https://www.math.ust.hk/~machas/numerical-methods.pdf>
5. https://www.researchgate.net/publication/321825504_Differential_Calculus

	PRACTICAL PHYSICS – I	L	T	P	Credits
		0	0	4	2

Course Objective: (Skill Development)

To enable the student to explore the field of properties of matter and mechanics. To gain knowledge in the scientific methods and learn the process of measuring different Physical variables.

Any 10 Experiments

1. Young's modulus- uniform bending (pin & microscope)
2. Young's modulus- Non-uniform bending (pin & microscope)
3. Rigidity modulus- Torsion pendulum
4. Surface tension – capillary rise method
5. Viscosity of liquid- Poiseuille's method
6. Viscosity of liquid- Stoke's method
7. Sonometer - Frequency of tuning fork
8. Compound pendulum- To determine 'g'
9. Hook's Law – To study the motion of a spring and calculate (a) Spring Constant, (b) g.
10. To determine the Moment of Inertia of a Flywheel
11. To determine the Elastic Constants of a Wire by Searle's method

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Calculate the Young's modulus of the material.
- CO2: Estimate the parameters associated with torsional oscillation.
- CO3: Analyze the coefficient of viscosity at different pressure head.
- CO4: Measure the acceleration due to gravity.
- CO5: Determine the moment of inertia of a Flywheel.

Text Book

1. C. C. Ouseph, U. J. Rao, V. Vjiayendran, Practical Physics, 1st Edition, 2015.
2. Biswajit Saha, Practical Physics Book, LAP LAMBERT Academic Publishing, 1st Edition, 2020.

Web Sources:

1. <http://amrita.olabs.edu.in/?sub=1&brch=5&sim=155&cnt=2>
2. <https://vlab.amrita.edu/index.php?sub=1&brch=280&sim=1509&cnt=4>

SEMESTER-II

	TAMIL - II	L	T	P	Credits
		3	0	0	3

அற இலக்கியம் – சிற்றிலக்கியம் – சிறுகதை – பயன்பாட்டுத் தமிழ்

அலகு 1: அற இலக்கியங்கள்

10 மணி நேரம்

1. திருக்குறள் - வான் சிறப்பு(அறம்), ஊக்கமுடைமை(பொருள்), குறிப்பறிதல்(இன்பம்) – மூன்று அதிகாரங்கள் முழுமையும்.
2. நாலடியார் – மூன்று பாடல்கள். (2, 3, 5)
3. பழமொழி நானூறு – மூன்று பாடல்கள் (74, 75, 78)
4. திரிகடுகம் – மூன்று பாடல்கள் (10, 12, 22)
5. இனியவை நாற்பது – மூன்று பாடல்கள் (1, 12, 16)

அலகு 2: சிற்றிலக்கியம்

10 மணி நேரம்

1. முத்தொள்ளாயிரம்
 - சேரன் – வீரம் 14, 15 பாடல்கள்
 - சோழன் – காதல் 23, 24 பாடல்கள்
 - பாண்டியன் – நாடு 87, 88 பாடல்கள்
2. தமிழ்விடு தூது – முதல் 20 கண்ணிகள்
3. திருக்குற்றாலக் குறவஞ்சி – மலைவளம் கூறுதல் – முதல் 5 பாடல்கள்
4. முக்கூடற்பள்ளு – மூத்த பள்ளி நாட்டு வளம் கூறுதல் 3 பாடல்கள், இளைய பள்ளி நாட்டு வளம் கூறுதல் 3 பாடல்கள்.
5. கலிங்கத்துப் பரணி – பாலை பாடியது – முதல் 5 பாடல்கள்

அலகு 3: சிறுகதை

9 மணிநேரம்

1. அறிஞர் அண்ணா - செவ்வாழை
2. புதுமைப்பித்தன் - கடவுளும் கந்தசாமிப் பிள்ளையும்
3. ஜெயகாந்தன் - யுகசந்தி
4. கு.அழகிரிசாமி - காற்று
5. அம்பை - காட்டில் ஒரு மான்

அலகு 4: பேச்சுத் தமிழ்

8 மணி நேரம்

பேச்சுத் திறன் – விளக்கம் – பேச்சுத்திறனின் அடிப்படைகள் – வகைகள் – மேடைப்பேச்சு – உடையாடல் - பயிற்சிகள்

அலகு 5: எழுத்துத் தமிழ், இலக்கிய வரலாறு, இலக்கணம்

8 மணி நேரம்

1. கலைச் சொல்லாக்கம் – தேவைகள் – கலைச்சொற்களின் பண்புகள் – அறிவியல் கலைச் சொற்கள் – கடிதம் – வகைகள் – அலுவலகக் கடிதங்கள் – உறவுமுறைக் கடிதங்கள்.
2. பாடம் தழுவிய இலக்கிய வரலாறு (அற இலக்கியம், சிற்றிலக்கியம், சிறுகதை)
3. அணி இலக்கணம்
4. விண்ணப்பக் கடிதம் எழுதுதல்

மொத்தம்: 45 மணி நேரம்

TOTAL HOURS: 45

COURSE OUTCOME (Employability)

At the end of this course the students will be able to,

CO 1: Measure human mind through the studying of Tamil charity Literature in the aspect of moral value.

CO 2: Identify the contemporary social issues through studying Tamil Epics.

CO 3: Build the life skills after studying of the poetry.

CO 4: Develop narrative skill after reading short stories.

CO 5: Improve their own style of writing after studying Terminology methods.

பார்வைநூல்கள்

1. பேசும்கலை, முனைவர்கு. ஞானசம்பந்தன்விஜயாபதிப்பகம்
2. தமிழ்இலக்கியவரலாறு, வரதராசன், மு., சாகித்தியஅக்காதெமி ,புதுதில்லி
3. தமிழ்நடைக்கையேடு, மொழிஅறக்கட்டளை
4. பயன்பாட்டுத்தமிழ், முனைவர்அரங்கஇராமலிங்கம், முனைவர்ஒப்பிலாமதிவாணன், சென்னைபல்கலைக்கழகம், 2007
5. மொழிபெயர்ப்பியல்அடிப்படைகள், கா.பட்டாபிராமன், யமுனைப்பதிப்பகம், திருவண்ணாமலை
6. பாடநூல்தேடலுக்கானஇணையம்
 - <http://www.tamilvu.org/library>
 - <https://archive.org/>

	HINDI - II	L	T	P	Credits
		3	0	0	3

Course Objective: (Skill Development)

- To train students in translation
- To develop reading & writing skills
- To create interest towards reading different types of literature

Unit I	- 'Idgah' by Premchand' (kahani), Translation- Definition,Types	9
Unit II	'Pitha' by gyanranjan (kahani), Translation - Anuvadak ke gun	9
Unit III	- Jamun ka ped by Krishna chander ' (kahani) , Translation Practice	9
Unit IV	- Adhi rath ke baad by Shankar shesh (naatak), Translation Practice	9
Unit V	- Adhi rath ke baad by Shankar shesh (naatak), Translation Practice	9

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course students will be able to,

- CO 1: Students will know the importance & process of translation
CO 2: understand the values of elders in a family & extend their support
CO 3: will know the different writing skills of authors
CO 4: gain knowledge in Hindi literature
CO 5: will acquire knowledge in Hindi Sahithya

Text/Reference book :

Adhi rath ke baad ,by Shankar shah ,kitabghar prakashan ,2000
Idgah by Premchand,Bharathiya gyan peeth ,NewDelhi ,
Jamun ka ped by Krishna Chandra, Deepak publishers, Nov. 2019
Pitha by gyan ranjan,Rajkamal publication,Jan 2018
Glossary of Administrative terms ,Commission for scientific terms & Technical Terminology,2007
Patralekhan kala by Dr.Shivshankar Pandey,2018
Gadya khosh

Weblinks:

<https://premchandstories.in/eidgaah-story-munshi-premchand-pdf/>
<https://www.google.com/search?q=pitha+by+gyan+ranjan&oq=pitha+by+gya&aqs=chrome.1.69i57j0i13j0i22i30.10387j0j4&sourceid=chrome&ie=UTF-8>
<http://db.44books.com/2020/04/%E0%A4%86%E0%A4%7%E0%A5%80-%E0%A4%B0%E0%A4%BE%E0%A4%A4-%E0%A4%95%E0%A5%87-%E0%A4%AC%E0%A4%BE%E0%A4%A6.html>
http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0%A4%B8%E0%A4%BF%E0%A4%82%E0%A4%B9/_/%E0%A4%85%E0%A4%9C%E0%A5%8D%E0%A4%9E%E0%A5%87%E0%A4%AF

	FRENCH - II	L	T	P	Credits
		3	0	0	3

Course Objective: (Skill Development)

- To fortify the grammar and vocabulary skills of the students.
- To enable the students have an idea of the French culture and civilization

UNIT I LECON 10-11

9

Leçons :10 Les affaires marchent,11 un repas midi a problèmes- Réponses aux questions tiresde la leçon-grammaire :présent progressif passe récent ou future proche-complément d'Object directe-complément d'objet

UNIT II- LECON 12-13

9

Leçons 12 :tout est bien qui fini bien,-13 aux armes citoyens-réponses aux questions tires de la leçon-grammaire :les pronoms<<en ou y>> rapporter des paroles-Les pronoms relatifs que,qui ou ou.

UNIT III-LECON 14-15

9

Leçons 14.Qui ne risque rien n'a rien-15.la fortune sourit aux audacieux-réponses auxquestions tires de la leçon-grammaire : comparaison-les phrases au passe compose.

UNIT IV-LECON 16-18

9

Leçons 16 la publicité et nos rêves 17 la France la monde 18 campagne publicitaire réponsesaux questions tires de la leçon-grammaire :les phrases a l'imparfait-les phrases au future

UNIT V- COMPOSITION :

9

A écrire une lettre de regret//refus a un ami concernant l'invitation d'une célébration reçue-aécrire un essaie sur un sujet générale-a lire le passage et répondre aux questions.

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course students will be able to,

CO 1: This enable students to learn the language without any grammatical errors.

CO 2: As a result of the content makes the students to known about the types of pronouns and their usage.

CO 3: This imparts the students in order to develop their basic writing skills.

CO 4: Enable students for framing the basics sentence.

CO 5: Making the students community to know the French format of letter writing and essay writing.

Text Book:

Jack GIRARDER & Jean Marie GRIDLIG,<<Méthode de Français PANORAMA>>, CléInternationale, Goyal Publication, New Delhi Edition 2014.

Reference Books:

1. DONDO Mathurin, "Modern French Course", Oxford University Press, New Delhi Edition2014.
2. Nithya Vijayakumar get ready French grammar-Elementary Goyal publications, New DelhiEdition 2014.

Web Sources:

1. <https://www.thoughtco.com/french-reading-tips-1369373>
2. <https://www.bnf.fr/fr>
3. <https://www.laits.utexas.edu/tex/>

	ENGLISH - II	L	T	P	Credits
		3	0	0	3

ENGLISH II – POETRY

Course Objective: (Skill Development)

- To enable students to develop their communication skills effectively.
- To enrich their vocabulary in English
- To develop communicative competency.

UNIT I		09
1. Growing Old - Winston Farewell		
2. Ecology - A. K. Ramanujan		
UNIT II		09
3. Stopping by Woods on a Snowy Evening - Robert Frost		
4. Our Casuarina Tree - Toru Dutt		
UNIT III		09
5. Goodbye Party for Miss Pushpa T.S. - Nissim Ezekiel		
6. The Bull - Ralph Hodgson		
UNIT IV		09
7. If - Rudyard Kipling		
8. The Drowned Children - Louise Glück		
UNIT V		09
9. Australia - A.D.Hope		
10. A Far Cry from Africa - Derek Walcott		

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Learn to employ Poetic expressions in the course of daily speech.

CO2: Prove their better communicative ability.

CO3: Prove their skill in writing sentences with poetic impact.

CO4: Develop different sensibilities in approaching life.

CO5: Solve life's problems as highlighted in the selections.

Books Prescribed:

- Selections from Caribbean Literature. Mahaam Publishers, Chennai.
- Our Casuarina Tree - Vasan Publication By Dr.A Shanmugakani

Web Sources:

- <https://www.gradesaver.com/>
- <https://www.enotes.com/>
- <https://www.jstor.org/>
- <https://www.sparknotes.com/>
- <https://www.cliffsnotes.com/>

	THERMAL PHYSICS	L	T	P	Credits
		4	1	0	5

Course Objective: (Employability)

To understand the concept of heat, transmission of heat, kinetic theory of gases and laws of thermodynamics

UNIT I Thermometry and Calorimetry

15

Platinum resistance thermometer – Calendar and Griffith's bridge – Thermistor – Specific heat capacity – Specific heat capacity of solids – Method of mixtures – Radiation correction - Dulong and Petit's law – Specific heat capacity of liquid – Newton's law of cooling – Callendar & Barne's methods – Specific heat of gases – Two specific heat capacities of a gas - Determination of C_v by Joly's Differential Steam Calorimeter - determination of C_p by Regnault's method.

UNIT II Conduction & Radiation

15

Definition of thermal conductivity – thermal conductivity of bad conductor – Lee's disc method-radial flow of heat-thermal conductivity of rubber.

Radiation – Black body radiation – Wien's law, Rayleigh-Jean's law-Planck's quantum theory of radiation - Planck's law – Stefan's law-Deduction of Newton's law of cooling from Stefan's law – solar constant (Definition only).

UNIT III Kinetic Theory of Gases

15

Maxwell's law of distribution of molecular velocities – Experimental verification of molecular velocities – Mean free path of gaseous molecules – Transport phenomena – Diffusion of gases – Viscosity and thermal conduction of gases – Vander Waals equation of state – Determination of Vander Waals constant – Comparison of Vander Waals equation with Andrews experiment - Relation between Vander Waals constant and critical constants.

UNIT IV Low Temperature

15

Joule – Thomson's effect – Porous plug experiment – Liquefaction of gases – Linde's method – Adiabatic demagnetization – Properties of He^1 and He^2 – Practical applications of low temperature – Refrigeration and air conditioning.

UNIT V Laws of Thermodynamics

15

Zeroth and first law of thermodynamics – Reversible and irreversible process – Second law of thermodynamics – Carnot's engine – Derivation of efficiency – Carnot's theorem. Entropy – Change of entropy in reversible and irreversible processes– Temperature – entropy diagram (T.S) – Thermodynamic Scale of temperature – Third law of thermodynamics.

TOTAL HOURS: 75

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Demonstrate the basic concepts of specific heat capacities of solids, liquids and gases.

CO2: Identify the good and bad conductors and concepts of blackbody radiation and their applications.

CO3: Apply the fundamental principles of diffusion of gases and its practical problems related to Vander Waals equation of state.

CO4: Apply the concepts of Liquefaction of gases in the low temperature and its practical applications.

CO5: Develop the design and fabrication of various Heat engines and improve its efficiency.

Text Books

1. Brijlil and Subramininan, Heat & Thermodynamics, S. Chand &Co.1999.

References

1. R. Murugesan, Thermal Physics- S. Chand & Co, 2015.

2. D.S. Mathur, Heat and Thermodynamics, S. Chand and Company, 2006.

Web Sources:

1. <https://www.slideshare.net/CandelaContent/calorimetry-48238312>
2. https://onlinecourses.nptel.ac.in/noc21_me07/preview

	OPTICS	L	T	P	Credits
		4	1	0	5

Course Objective: (Employability)

To understand the concepts of optics, to study interference and diffraction of light and to learn the techniques of optical instruments

UNIT I Geometrical Optics 15

Spherical aberration in lenses - methods of minimizing spherical aberration and conditions – Coma - Chromatic aberration in lenses - Condition for achromatism of two thin lenses (in and out of contact) - Astigmatism - Dispersion produced by a thin prism - Combination of prisms to produce - Dispersion without deviation - Deviation without dispersion.

UNIT II Interference 15

Interference – Coherence – condition for coherence, Young’s double slit experiment - Optical path difference between the waves, Air wedge – Newton’s rings – Brewster’s fringes – Michelson Interferometer and its applications – Interference filter – Holography- Construction and reconstruction of a hologram – Applications.

UNIT III Diffraction 15

Fresnel’s diffraction – Diffraction at a circular aperture and narrow wire – Fraunhofer diffraction - single slit – Double slit (Theory)– Diffraction pattern – Grating (theory) – Determination of wavelengths using grating - Rayleigh’s criterion of resolution- Resolving power of a Telescope – Dispersive power and resolving power of a grating - Difference between resolving power and Dispersive power

UNIT IV Polarization 15

Double refraction - Nicol prism – Nicol prism as an analyzer and polarizer – Huygens’s explanation of Double refraction in uniaxial crystals – Double Image polarizing prisms – Elliptical and Circularly polarized light – Production and detection – Quarter wave and half wave plates – Dichroism - polaroids and their uses – Optical activity – Specific rotation - Laurent’s Half shade polarimeter.

UNIT V Optical Instruments 15

Microscopes – Simple Microscope (Magnifying glass) – Compound Microscope – Ultra-Microscope – Eyepieces - Huygen’s Eyepiece - Ramsden’s Eyepiece — Comparison of Eyepieces – Telescope – Refracting astronomical telescope – Abbe Refractometer – Pulfrich refractometer - Photographic Camera – Prism binocular

TOTAL HOURS: 75

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Illustrate the various types of aberrations in lens.
- CO2: Identify the application of interference in interferometer.
- CO3: Demonstrate the concept of diffraction and its application in finding the wavelength.
- CO4: Identify circular and elliptical polarization and methods to generate it.
- CO5: Analyze the working principle of various optical instruments.

Text Book

1. Subramaniam N & Brij Lal, Optics, S Chand & Co. Pvt. Ltd., New Delhi, 2004
2. Murugesan, Optics and Spectroscopy, S Chand & Co. Pvt. Ltd., New Delhi, 2010.

References

1. Eugene Hecht, Optics, 4th Edition, Addison Wesley, 2002.
2. Okan K. Ersoy, Diffraction, Fourier Optics and Imaging, John Wiley & Sons, 2007
3. Optics by Khanna D R & Gulati H R, R Chand & Co. Pvt. Ltd., New Delhi, 1979
4. Singh & Agarwal, Optics and Atomic Physics, Pragati Prakashan Meerut, Ninth edition, 2002.

Web Sources:

1. <https://www.cliffsnotes.com/study-guides/physics/light/geometrical-optics>
2. <https://www.toppr.com/guides/physics/ray-optics-and-optical-instruments/optical-instruments/>

	MATHEMATICS - II	L	T	P	Credits
		4	0	0	4

Course Objective: (Skill Development)

To impart the knowledge of Integral calculus, Differential Equations, Fourier Series and Laplace transform. The course will also serve as a prerequisite for post graduate and specialized studies and research.

UNIT I Integral Calculus 12

Integral calculus: Integration – Definite integrals – Bernoulli's formula -Reduction formula for $\int \sin^n x dx, \int \cos^n x dx, \int \tan^n x dx, \int x^n e^{ax} dx$.

UNIT-II DIFFERENTIAL EQUATIONS 12

Ordinary Differential Equations: First order of higher degree equations – Second order and non-homogenous linear differential equations with constant coefficient.

Partial Differential Equations: Formation of partial differential equations by eliminating arbitrary constants and arbitrary function- Solutions of four standard types of first order equation-Lagrange method of solving linear partial differential equation $Pp + Qq = R$

UNIT-III FOURIER SERIES 12

Fourier series of periodic functions on the interval $[c, c+2\pi]$ –Even and Odd functions- Half range sine and cosine series.

UNIT-IV LAPLACE TRANSFORM 12

Laplace transformation: Definition, Laplace transform of basic trigonometric, exponential and algebraic functions - Inverse Laplace transform- Solving differential equation of second order with constant coefficients using Laplace transform

UNIT – V VECTOR DIFFERENTIATION 12

Introduction-Scalar point functions-Vector point functions-Vector differential operator ∇ , Gradient-Divergence-Curl-Solenoidal-irrotational-identities- Simple problems

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Solve the key terminology, concept tools and techniques used in Integral calculus.
- CO2: Identify the applications of differential equations.
- CO3: Analyze the uses, limitations and applications of Fourier series.
- CO4: Evaluate Laplace transform and its applications.
- CO5: Utilize the key terminology, concept tools and techniques used in Vector Differentiation.

Text Books

1. P. Kandaswamy and K.Thilagavathy, Allied Mathematics paper II, 2nd Semester, S. Chand Publishing Pvt. Ltd. 1st Edition, 2004.
2. S. Narayanan and T.K. Manickavasagam Pillai – Ancillary Mathematics, S. Viswanathan Printers, 1986, Chennai.

Reference Books

1. P.R. Vittal, Allied Mathematics, Margham Publications, 4th Edition 2009.
2. A. Singaravelu, Allied Mathematics, Meenakshi Agency, 2007.
3. P. Duraipandian and S.UdayaBaskaran, Allied Mathematics, Vol. I & II Muhil Publications, Chennai

Web Sources:

1. http://mdudde.net/pdf/study_material_DDE/M.Sc.MAThematics/DIFFERENTIAL%20EQUATIONS.pdf
2. <https://ncert.nic.in/ncerts/l/lemh201.pdf>
3. http://www.universityofcalicut.info/SDE/Vector_calculus_BSc_Maths.pdf

	PRACTICAL PHYSICS - II	L	T	P	Credits
		0	0	4	2

Course Objective: (Skill Development)

To enable the student to explore the field of thermal physics and optics. To gain knowledge in the scientific methods and learn the process of measuring different Physical variables.

Any 10 Experiments

1. Lee's Disc method – Thermal conductivity of bad conductor
2. Joule's Calorimeter - determination of Specific heat capacity of liquid
3. Verification of Boyle's law
4. Newton's law of cooling
5. Specific heat capacity- Mixture of Solid and Liquid
6. Spectrometer – Grating (N & λ)
7. Spectrometer – Dispersive power of prism
8. Air wedge
9. Newton's Ring-Sodium lamp (Microscope)
10. Convex and convex lens – f , R and m
11. Solar constant.

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Examine the thermal conductivity of bad conductor using Lee's disc method.
 CO2: Calculate the wavelengths of different spectral line using spectrometer grating.
 CO3: Examine the refractive index dispersive power of the prism using spectrometer.
 CO4: Calculate the specific heat capacity of a given liquid.
 CO5: Measure the focal length of convex and concave lenses by UV method.

Text Book

1. C. C. Ouseph, U. J. Rao, V. Vjiayendran, Practical Physics, 1st Edition, 2015.
2. Biswajit Saha, Practical Physics Book, LAP LAMBERT Academic Publishing, 1st Edition, 2020.

Web Sources:

1. <https://vlab.amrita.edu/index.php?brch=194&cnt=1&sim=354&sub=1>
2. https://www.kau.edu.sa/Files/0011208/Files/59779_4-THIN_FILMS.pdf

SEMESTER-III

	TAMIL - III	L	T	P	Credits
		3	0	0	3

பக்தி இலக்கியம் – காப்பியம் – புதினம் - மொழிபெயர்ப்பு

அலகு 1: பக்தி இலக்கியம்

10 மணி நேரம்

- மாணிக்கவாசகர் - திருவாசகம் – மூன்று பாடல்கள்**
 - ✓ புல்லாகி பூடாகி (சிவபுராணம்)
 - ✓ எல்லாப் பிறப்பும் (சிவபுராணம்)
 - ✓ உற்றாரை யான் வேண்டேன் (திருப்புலம்பல்)
- ஆண்டாள் - திருப்பாவை – மூன்று பாடல்கள் (1, 3, 4)**
 - ✓ மார்கழித் திங்கள் ... (பாசரம் 1)
 - ✓ ஓங்கி உலகளந்த... (பாசரம் 3)
 - ✓ ஆழிமழைக் கண்ணா... (பாசரம் 4)
- வீரமாமுனிவர் - தேம்பாவணி – மூன்று பாடல்கள்**
 - ✓ நீ ஒரு தாய்; ஒரு தாதையும் நீ (698 - சூசை இறைவனின்தாயைப்போற்றுதல்)
 - ✓ அணிக் கலத்து அழகு அழுந்திய (1089 - வானவர் இயேசு நாமத்தைப் போற்றி வணங்கிய செய்தி)
 - ✓ வான் புறத்து இலகும் செஞ் சுடர் காண (3510 - இறைவன் சூசை முனிவர்க்கு ஏழு மணிகள் புறத்தில் ஒளிவிடும் முடியைச் சூட்டுதல்)
- குணங்குடி மஸ்தான் சாகிபு- பராபரக் கண்ணி 1-10 கண்ணிகள்**
- திருமூலர் - திருமந்திரம் – மூன்று பாடல்கள்**
 - ✓ உடம்பார் அழியின் உயிரார் அழிவர் (திருமந்திரம்: 724)
 - ✓ படமாடக் கோயில் பகவற்கு ஒன்று ஈயில் (திருமந்திரம்: 1857)
 - ✓ மரத்தை மறைத்தது மாமத யானை (திருமந்திரம்: 2290)
- இராமலிங்க அடிகள் - திருவருட்பா – மூன்று பாடல்கள்**
 - ✓ எத்துணையும் பேதமுறா... (5297)
 - ✓ ஒருமையுடன் நினது திருமலரடி நினைக்கின்ற (2938)
 - ✓ கோடையிலே... (4091)

அலகு 2: காப்பியம்-1

9 மணி நேரம்

- சிலப்பதிகாரம் – அடைக்கலக் காதை**
(தெரிவுசெய்யப்பட்ட பாடல் அடிகள் 120-199)
- சீவக சிந்தாமணி – விமலையார் இலம்பகம்**
(தெரிவுசெய்யப்பட்ட பாடல்கள்)

அலகு 3: காப்பியம்-2

9 மணி நேரம்

1. கம்பராமாயணம் – மந்தரை சூழ்ச்சிப் படலம்
(தெரிவு செய்யப்பட்ட பாடல்கள்)
2. பெரியபுராணம் – பூசலார் நாயனார் புராணம்
(தெரிவு செய்யப்பட்ட பாடல்கள்)

அலகு 4: புதினம்

8 மணி நேரம்

1. கல்மரம் - கோ. திலகவதி

அலகு 5: மொழிபெயர்ப்பு, இலக்கணம், இலக்கிய வரலாறு

9 மணி நேரம்

1. அலுவல்சார் மொழிபெயர்ப்பு
2. இலக்கணக் குறிப்பு
3. பாடம் தழுவிய இலக்கிய வரலாறு (பக்தி இலக்கியம், காப்பியம், புதினம்)

மொத்தம்: 45 மணி நேரம்

TOTAL HOURS: 45

COURSE OUTCOME (Employability)

At the end of this course the students will be able to,

- CO 1: Utilize the fundamental Tamil Grammar in their practical life.
CO 2: Improve their oratorical skill after studying of concept of oratory.
CO 3: Develop their own style of Translation Studies
CO 4: Translate English passage to Tamil.
CO 5: Apply their knowledge into journals, articles writings.

பார்வைநூல்கள்

1. தமிழ்இலக்கியவரலாறு, வரதராசன், மு., சாகித்தியஅக்காதெமி ,புதுதில்லி
2. தமிழ்நடைக்கையேடு, மொழிஅறக்கட்டளை
3. பயன்பாட்டுத்தமிழ், முனைவர்அரங்கஇராமலிங்கம்முனைவர்ஒப்பிலாமதிவாணன்,
சென்னைபல்கலைக்கழகம், 2007
4. மொழிபெயர்ப்பியல்அடிப்படைகள், கா.பட்டாபிராமன், யமுனைப்பதிப்பகம்,
திருவண்ணாமலை
5. பாடநூல்தேடலுக்கானஇணையம்
 - <http://www.tamilvu.org/library>
 - <https://www.tamildigitallibrary.in/book>

	HINDI – III	L	T	P	Credits
		3	0	0	3

Course Objective: (Skill Development)

- To enrich the knowledge of students through Tamil literature
- Enable them to learn ancient poems
- To develop interest in learning history of hindi literature

Unit I	- ‘Thirukkural’, Hindi Sahitya_ka ithihas (aadikal)	9
Unit II	- ‘Kabir ke pad’, Hindi Sahitya_ka ithihas (aadikal)	9
Unit III	- ‘Sur ke pad’, Hindi Sahitya ka ithihas (bhakthi kal)	9
Unit IV	- Thulsi ke pad, Hindi Sahitya ka ithihas (bhakthi kal)	9
Unit V	- Rahim ke dohe , Hindi Sahitya ka ithihas (Rithikal)	9

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course students will be able to,

CO 1: Students will know the valuable messages in Thirukkural

CO 2: will create interest in knowing ancient poems.

CO 3: Gain knowledge in Hindi literature

CO 4: will know the difference between Hindi & the languages used by ancient poets

CO 5: will be familiar with different styles of poetry writing

Text / Reference books:

Thirukkural translation by Venkata Krishnan

Ramcharitha manas, Githa press , Gorakhpur by Sri Hanuman Prasad

Sur Sanchayitha by Rajkamal prakashan , New Delhi

Padya khosh

Hindi Sahitya ka Ithihas by Dr.Nagendra, Dr.Hardayal ,

Noida

Weblinks:

http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0%A4%B8%E0%A4%BF%E0%A4%82%E0%A4%B9/_/%E0%A4%85%E0%A4%9C%E0%A5%8D%E0%A4%9E%E0%A5%87%E0%A4%AF

http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0%A4%B8%E0%A4%BF%E0%A4%82%E0%A4%B9/_/%E0%A4%85%E0%A4%9C%E0%A5%8D%E0%A4%9E%E0%A5%87%E0%A4%AF

	FRENCH - III	L	T	P	Credits
		3	0	0	3

Course Objective: (Skill Development)

To strengthen the Grammar and Composition in French language. To train the students to enhance his skills in French language for communication.

UNIT I LECON 11 9

Leçon 16-La famille Vincent. Page 44-Grammaire :Passe compose. Leçon 29- Vers l'hôtel.Page80-Grammaire :Impératif, a mettre phrases Singulier, Pluriel.

UNIT II- LECON 12-13 9

Leçon 40-L'Epicerie les Légumes et les Fruits. Page 112-Grammaire;Présent del'indicatif. Leçon 44 La poste. Page-124 l'Grammaire :A mettre les phrases a l'impératif

UNIT III-LECON 14-15 9

Leçon 51-Le café et tabac page142- Grammaire :A changer les phrases en interrogatif. Leçon 58-La chasse et la pêche.Page160-Grammaire :Le plus queparfait

UNIT :IV-LECON 16-18 9

Leçons 61-Un mariage a la campagne. Pagé-170 -grammaire :a changer auparticipe présent.

UNIT :V- COMPOSITION : 9

A écrire une lettre a un ami l'invitation d'une célébration différente

ex :Mariage-a faire un essaie sur un sujet générale-a lire le passage et répondreaux questions.

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course students will be able to,

CO 1: The content of the unit 1 aids the students to explore the basics of the new French culture and civilisation.

CO 2: The content of the unit 3 aids the students to adapt to the French society.

CO 3: The content of the unit 3 aids the students to adapt to the French society.

CO 4: The content of the unit 4 aids the students to know about francophonie.

CO 5: The content of the unit 5 aids the students to acquire the language proficiency.

Text Book:

Les leçons ont été choisi et tire de i & ii degré de gauger<<Cours de Langue et de Civilisation Française>> The Millenium, Publication Hachette, édition 2002

Reference Books:

DONDO Mathurin, "Modern French Course", Oxford University Press, NewDelhi Edition 2014.

Web Sources:

1. <https://www.thoughtco.com/french-reading-tips-1369373>

2. <https://www.bnf.fr/fr>

<https://www.laits.utexas.edu/tex/>

	ENGLISH - III	L	T	P	Credits
		3	0	0	3

ENGLISH III - DRAMA AND COMPOSITION

Course Objective: (Skill Development)

- To train students in the use of English language in varied literary and non-literary contexts.
- To teach them soft skills and strengthen their foundation in grammar and composition.
- To evaluate their comprehension skills.

UNIT I		09
• Introduction to Drama.		
UNIT II		09
• Shakespeare: Funeral Oration (Act III Scene II Julius Caesar) &		
• Monkey's Paw - W.W.Jacobs		
UNIT III		09
• Comprehension		
UNIT IV		09
• Precis -Writing and Note Taking		
UNIT V		09
• General Essay on Current Topics		

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course the students will be able to,

CO 1: Estimate the dramatic scenes in the light of appeal of values.

CO 2: Prioritize pragmatic day- to - day communication through comprehension.

CO 3: Develop dramatic skill after reading the scenes of plays.

CO 4: Improve their own style of writing after an expose to the prescribed dramatic pieces.

CO 5: Adapt themselves to life - context wherein soft skill demonstration is a must.

Books Prescribed:

- An Introduction to Drama. II Edition by George Whitfield
- Reading Comprehension for College Students Paperback – Import, 1984 by Reinhart G. Kussat (Author)
- The Monkey's Paw By W. W. Jacobs Publisher: Perfection Learning

Web Sources:

- <https://www.gradesaver.com/>
- <https://www.enotes.com/>
- <https://www.jstor.org/>
- <https://www.sparknotes.com/>

<https://www.cliffsnotes.com/>

	ELECTRICITY & MAGNETISM	L	T	P	Credits
		5	0	0	5

Course Objective: (Employability)

To understand the general concepts in Electrostatics, to educate scientifically the principles of magnetism and apply the physics concepts in solving problems.

UNIT-I Electrostatics 15

Coulomb's inverse square law – Gauss theorem and its applications (Intensity at a point due to a charged sphere & cylinder) – Principle of a capacitor – Capacity of spherical and cylindrical capacitors – Energy stored in a capacitor – Loss of energy due to sharing of charges.

UNIT II Chemical Effects of Electric Current 15

Faraday's laws of Electrolysis - Ionic velocities and mobilities. Calculation and experimental determination of ionic mobilities - transport number. Thermoelectricity- Peltier effect - Experimental determination of Peltier coefficient - Thomson coefficient – experimental determination of Thomson coefficient - application of thermodynamics to a thermocouple and connected relations - thermoelectric diagram and uses

UNIT-III DC and AC Circuits 15

DC Circuits: Growth and decay of current in a circuit containing resistance and inductance - growth and decay of charge in a circuit containing resistance and capacitor – growth and decay of charge in an LCR circuit - condition for the discharge to be oscillatory – frequency of oscillation - network analysis - Thevenin and Norton's Theorems.

AC Circuits: AC Voltage and current - Power factor and current values in and AC circuit containing LCR circuit - series and Parallel resonant circuits - AC motors - single phase, three phase - star and delta connections - electric fuses - circuit breakers.

UNIT IV Magnetic effect of electric current 15

Biot and Savart's law - magnetic field intensity due to a solenoid carrying current – effect of iron core in a solenoid - Helmholtz galvanometer - moving coil ballistic galvanometer – theory - damping correction - determination of the absolute capacity of a condenser using B.G.

UNIT V Electromagnetic Induction and its applications 15

Faraday's laws of electromagnetic induction - inductor and inductance - determination of self-inductance of a coil using Anderson method - mutual inductance – experimental determination of absolute mutual inductance - coefficient of coupling - Earth inductor - uses of earth inductor – Ballistic Galvanometer (B.G) - calibration of B.G. - Induction coil and its uses.

TOTAL HOURS: 75

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Illustrate the basic concepts of electrostatics and its applications.
- CO2: Apply the concepts of chemical effect in the thermoelectricity and its experimental techniques.
- CO3: Identify the various concepts involved in AC and DC circuits.
- CO4: Analyze the magnetic effect of electric current used in various galvanometer and its instrumentation techniques.
- CO5: Develop the design, fabrication and characterization techniques for the self and mutual inductances.

Text Books

1. Brijlal and N. Subrahmanyam, A Text Book of Electricity and Magnetism, RatanPrakasanMandir Educational & University Publishers, New Deihi,2000.
2. R. Murugesan, Electricity and Magnetism, 7th Edition, S. Chand & Company Pvt. Ltd. 2008
3. D. L. Sehgal, K. L. Chopra and N. K. Sehgal, Electricity and Magnetism, S. Chand & Sons. New Delhi. 1996.

References

1. Griffith D.J, Introduction to Electrodynamics, 4th Edition, Prentice Hall of India, 2012.
2. NavinaWadhani, Electricity and Magnetism, Prentice Hall of India, 2012.

Web Sources:

1. <https://www.slideshare.net/shanoofsharafsrk/electrolysis-38176704>
2. https://sajitsir.tripod.com/Books/Biot_Savart_Law.pdf
3. <https://www.wlww.k12.or.us/cms/lib/OR01001812/Centricity/Domain/1335/4%20Faradays%20Law.pdf>

	CHEMISTRY - I	L	T	P	Credits
		5	0	0	5

Course Objective: (Employability)

To understand the various theories of coordination chemistry. To study the various concepts of nuclear chemistry and bonding in metals. To learn the concepts of electro chemistry and its applications

UNIT I Nuclear Chemistry 15

Nuclear Chemistry: Fundamental particles of nucleus- isotopes, isobars, isotones and isomers – differences between chemical reactions and nuclear reactions, nuclear chain reactions - nuclear fusion and fission- Light water nuclear power plant - radioactive series.

UNIT II Coordination Chemistry 15

Nomenclature - Werner Theory - EAN Rule – Chelation - Stability of complexes – factors affecting the stability – structural isomerism- stereoisomerism – geometrical and optical isomerism in 4 and 6 coordinated Complexes - Valence bond theory

UNIT III Polymers and Composites 15

Polymers – definition – polymerization – types – addition and condensation polymerization –free radical polymerization and mechanism – Plastics, classification – preparation, properties and uses of PVC, polycarbonate, nylon-6,6 – Rubber – vulcanization of rubber. Synthetic rubbers. Composites – definition, types, polymer matrix composites – FRP only

UNIT IV Chromatographic Techniques and Applications 15

Principles of adsorption and partition chromatography - Column and Paper, TLC, ion-exchange chromatography – technique and applications. Gas chromatography, principle, detector and applications. Purification of solid organic compounds: recrystallisation, sublimation.

UNIT V Electrochemistry 15

Cells - electromotive force – electrode potential – their thermodynamic significance. Nernst equation standard electrode potentials and its determination - Reference electrodes - hydrogen, calomel and glass electrodes. Conductance – cell constant - specific conductance and equivalent conductance.

TOTAL HOURS: 75

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Utilize the knowledge of nuclear chemistry.
- CO2: Analyze about coordination chemistry.
- CO3: Analyze study on polymers and composites.
- CO4: Adapt the fundamental concept of chromatographic techniques and applications.
- CO5: Extend the knowledge about the electromotive force and electrode potential in electrochemistry.

Text Books:

- Gopalan R, Text Book of Inorganic Chemistry, 2nd Edition, Hyderabad, Universities Press, (India), 2012.
- Morrison R.T. and Boyd R.N., Bhattacharjee S. K. Organic Chemistry (7th edition), Pearson India, (2011)
- Puri B.R., Sharma L.R. and Pathania M.S. (2013), Principles of Physical Chemistry, (35th edition), New Delhi: Shoban Lal Nagin Chand and Co.

Reference Books:

- R. Gopalan, “Elements of nuclear Chemistry” S. Viswanathan & Co., 7th edition, 2009.
- P. L. Soni, “Text Book of Inorganic Chemistry” Sultan Chand & sons. 32nd edition. 2013.
- R. D. Madhan, “Modern Inorgnaic Chemistry” S. Chand & Co., 6th edition 2012.

Web Sources:

- <https://www.slideshare.net/MeenalAggarwal2/chromatographic-techniques>
- <https://www.slideshare.net/surendranparambadath7/electrochemistry-15300181>

	PRACTICAL PHYSICS - III	L	T	P	Credits
		0	0	4	2

Course Objective: (Skill Development)

To enable the student to explore the field of electricity and magnetism. To allow the student to have a deep knowledge of the fundamentals electromagnetic circuits.

Any 10 Experiments

1. Deflection magnetometer – Tan A position
2. Deflection magnetometer – Tan B position
3. Carey Foster Bridge – Determination of specific resistance of unknown coil
4. Potentiometer – EMF of thermocouple
5. Potentiometer-Calibration of Ammeter
6. Potentiometer- Calibration of Low range voltmeter
7. Field along the axis of a coil – Determination M
8. Field along the axis of a circular coil – Determination of B_H
9. Bifilar Pendulum
10. Young's modulus - Uniform bending (Optical Lever)
11. Young's modulus - Non-uniform bending (Optical Lever)

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Examine the magnetic moment of a bar magnet using deflection magnetometer by Tan A and Tan B position.

CO2: Calculate the EMF of a thermocouple.

CO3: Calculate the specific resistance of unknown coil using Carey Foster Bridge.

CO4: Measure the depression and elevation by uniform and non-uniform bending method.

CO5: Examine the refractive index dispersive power of the prism using spectrometer.

Text Book

1. C. C. Ouseph, U. J. Rao, V. Vjiayendran, Practical Physics, 1st Edition, 2015.
2. Biswajit Saha, Practical Physics Book, LAP LAMBERT Academic Publishing, 1st Edition, 2020.

Web Sources:

1. <http://arunkumard.yolasite.com/resources/4%20Young's%20Modulus%20Non%20Uniform%20Bending.pdf>
2. <https://www.vidyarthiplus.com/vp/attachment.php?aid=6506>

	CHEMISTRY PRACTICAL - I	L	T	P	Credits
		0	0	4	2

Course objective: (Employability)

To know about different types to titrations namely acid base, redox, iodometry and complexometric titrations.

1. Acidimetry and alkalimetry

- (a) Strong acid VS strong base
- (b) Weak acid VS strong base
- (c) Determination of hardness of water.

2. Permanganometry

- (a) Estimation of ferrous sulphate
- (b) Estimation of oxalic acid

3. Iodometry

- (a) Estimation of potassium dichromate
- (b) Estimation of potassium permanganate

4. Acid – Base Titrations

- (a) Estimation of Hydrochloric acid using oxalic acid
- (b) Estimation of sodium Hydroxide using sodium carbonate
- (c) Estimation Borax

5. Redox Titration

- (a) Estimation of oxalic acid using Mohr's salt
- (b) Estimation of Calcium
- (c) Estimation of Ferrous Sulphate using oxalic acid

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Make use of the chemicals safely in lab as well as in industry.

CO2: Estimate quantity of the acid or base in the given solution.

CO3: Determine the hardness of water.

CO4: Identify the various types of titrations.

CO5: Estimate the amount of inorganic salt present in given solution.

Text Books

1. Vogel's – "Textbook of quantitative Inorganic Analysis", Longmann, 12th edition, **2011**
2. N. S. Gnanaprasagam and G. Ramamurthy, Organic Chemistry lab manual, S. Viswanathan and Co. Pvt. Ltd. Chennai-1998.

Reference Books

1. S. Sundaram and K. Raghavan "Practical Chemistry", S. Viswanathan. Co. 3rd edition **2011**
2. J. N. Gurtu and R. Kapoor "Advanced experimental Chemistry", S. Chand and Co. 6th edition, **2010**

Web Sources:

1. <http://chemcollective.org/vlab/106>
2. <https://vlab.amrita.edu/?sub=3&brch=193&sim=352&cnt=1>

SEMESTER-IV

	TAMIL - IV	L	T	P	Credits
		3	0	0	3

சங்க இலக்கியம் – நாடகம் – வளர் தமிழ் - பொதுக்கட்டுரை

அலகு 1: சங்க இலக்கியம் - 1

10 மணி நேரம்

1. புறநானூறு (மூன்று பாடல்கள் - 183, 184, 192)
2. பதிற்றுப்பத்து (இரண்டு பாடல்கள் - 14, 69)
3. பட்டினப்பாலை (காவிரியின் சிறப்பு பாடல் அடிகள் 01-07, சோழநாட்டு வளம் பாடல் அடிகள் 20-28, பல்பொருள் வளம் பாடல் அடிகள் 183-193)
4. மதுரைக் காஞ்சி (பாண்டியர் பரம்பரை பாடல் அடிகள் 01-23, மன்னர்க்கு மன்னன் பாடல் அடிகள் 64-74, பாண்டியன் புகழ் பாடல் அடிகள் 197-209).

அலகு 2: சங்க இலக்கியம் - 2

9 மணி நேரம்

1. நற்றிணை (இரண்டு பாடல்கள் - 1, 172)
2. குறுந்தொகை (மூன்று பாடல்கள் - 3, 40, 135)
3. ஐங்குறுநூறு (மூன்று பாடல்கள் - 281, 283, 286)
4. அகநானூறு (இரண்டு பாடல்கள் - 4, 86)
5. கலித்தொகை (இரண்டு பாடல்கள் - 9, 133)

அலகு 3: நாடகம்

8 மணி நேரம்

1. ஆட்டனத்தி ஆதிமந்தி - கவிஞர் கண்ணதாசன்

அலகு 4: வளர்தமிழ்

9 மணி நேரம்

1. ஊடகத் தமிழ் – கணினித் தமிழ் அறிமுகம்

ஊடகத் தமிழ்: அச்சுக்கலை - இதழியல் - ஊடக வகைகள் - அச்ச ஊடகங்கள் - மின்னணு ஊடகம் -இதழியல் முன்னோடிகள் - அச்ச ஊடகங்களில் தமிழ் - கருத்துப் பரிமாற்றம் - மொழி நடையின் தன்மை - நாளிதழ்கள் - வார, மாத இதழ்கள் - மின்னணு ஊடகங்களில் தமிழ் - வானொலி- தொலைக்காட்சி- திரைப்படம்.

கணினித் தமிழ்: கணினித் தமிழின் அடிப்படையும் பயன்பாடும் -கணிப்பொறியின் வரலாறும் வளர்ச்சியும், கணினியும் தமிழும், விசைப்பலகை (Keyboard) - எழுத்துருக்கள் (Fonts) - தமிழைத் தட்டச்சு செய்ய உதவும் மென்பொருள்கள், தமிழைத் தட்டச்சு செய்யும் முறைகள் - தமிழ்த் தட்டச்சுப் பயிற்சி - இணையமும் தமிழ்ப் பயன்பாடும் - தேடுபொறி (Search) - வலைப்பூ (Blog), மின்னூலகம் (Online e-Library), - மின்னகராதி (e-Dictionary), - மின் செய்தித்தாள் - e-Paper, - இணையவழித் தமிழ்க் கற்றலும்-கற்பித்தலும் - மின்வழிக் கற்றல் - e Learning.

அலகு 5: பொதுக்கட்டுரை, இலக்கிய வரலாறு, இலக்கணம்

9 மணி நேரம்

1. பொதுக்கட்டுரை வரைதல்
2. பாடம் தழுவிய இலக்கிய வரலாறு (சங்க இலக்கியம், நாடகம், வளர்தமிழ்)
3. இலக்கணம் (பொருளிலக்கணம்) திணை, துறை விளக்கம்.

மொத்தம்: 45 மணி நேரம்

TOTAL HOURS: 45

COURSE OUTCOME (Employability)

At the end of this course the students will be able to,

CO 1: Interpret the cultural life style of Ancient Tamils.

CO 2: Formulate the new methods of fine arts through the sprite of ancient art of Tamils.

CO 3: Find out the solutions for the problems of life through the philosophical ideology of Tamil religions.

CO 4: Develop the Knowledge and understanding theories of Media Tamil - Introduction of Tamil Computing

CO 5: Formulate the art of life through Tamil traditional scientific approach.

பார்வைநூல்கள்

1. கணினித்தமிழ், முனைவர்இல.சுந்தரம், விகடன்பிரசுரம்
2. கணிப்பொறியில்தமிழ், த.பிரகாஷ், பெரிகாம்
3. தமிழ்க்கணினிஇணையப்பயன்பாடுகள், முனைவர்துரை.மணிகண்டன், மணிவானதிபதிப்பகம்
4. இதழியல்கலை, டாக்டர்மா. பா. குருசாமி, குரு - தேமொழிபதிப்பகம், திண்டுக்கல்
5. அச்சுக்கலைவழிகாட்டி, பாலசுப்பிரமணியன், ஆ., சென்னை : தனசுபதிப்பகம், 1966
6. தொலைக்காட்சிக்கலை, முனைவர்வெ. நல்லதம்பி,மங்கைப்பதிப்பகம், சென்னை42
7. பாடநூல்தேடலுக்கானஇணையம்
 - <http://www.tamilvu.org/courses/nielit/Chapters/Chapter1/11.pdf>
 - <https://www.tamildigitallibrary.in/>

	HINDI - IV	L	T	P	Credits
		3	0	0	3

Course Objective: (Skill Development)

- To develop interest in modern poetry
- To teach them the importance & development of hindi journalism.
- To train them in advertisement writings

Unit I	- Sansar by Mahadevi varma, Hindi Sahitya_ka ithihas (adhunik kal)	9
Unit II	- ‘ Mouun nimanthran’ by Sumithranandan panth, Hindi Sahitya_ka ithihas (adhunik kal)	9
Unit III	- ‘rah rahkar Tuutthaa rab kaa kahar’ by Dharmendra kumar nivathiya Hindi Sahitya_ka ithihas (adhunik kal)	9
Unit IV	‘samarpan’ by Subhadra kumara chouhan , Advertisement writing	9
Unit V	- ‘panthrah agasth kii pukaar ‘by atal bihari vajpayee, Advertisement writing	

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course students will be able to,

CO 1: Students will be familiar with modern poetry

CO 2: Students will understand the importance of protecting atmosphere

CO 3: will know the real meaning of patriotism & the value of freedom.

CO 4: will get the ability to write various types of advertisement

CO 5: will understand the different methods adopted in writing them

Text / Reference books:

Hindi swachandata kavya by Prem Shankar,Vani prakashan

Meri ikyavan kavithaye ,Kithab gharprakashan ,20106

Sanchayan :Mahadevi Verma by Nirmala jain ,Vani prakashan ,2016

Padya khosh

Hindi Advertisement writing - ek parichaya .Bokcrot.com

Weblinks:

http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0%A4%B8%E0%A4%BF%E0%A4%82%E0%A4%B9/_/%E0%A4%85%E0%A4%9C%E0%A5%8D%E0%A4%9E%E0%A5%87%E0%A4%AF

http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0%A4%B8%E0%A4%BF%E0%A4%82%E0%A4%B9/_/%E0%A4%85%E0%A4%9C%E0%A5%8D%E0%A4%9E%E0%A5%87%E0%A4%AF

http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0%A4%B8%E0%A4%BF%E0%A4%82%E0%A4%B9/_/%E0%A4%85%E0%A4%9C%E0%A5%8D%E0%A4%9E%E0%A5%87%E0%A4%AF

	FRENCH - IV	L	T	P	Credits
		3	0	0	3

Course Objective: (Skill Development)

To strengthen the Grammar and Composition in French language. To train the students to enhance his skills in French language for communication.

UNIT:I 9

Leçon 20 : Une grande Nouvelle-Grammaire Le future.

Leçon 46 : Le mètre ; l'autobus-Grammaire-A former ou a changer L'adjectif masculin ou féminin a l'adverbe-Trouvez les noms quicorrespondent aux verbes suivants.

UNIT :II 9

Leçon 48 : A la préfecture de police-Grammaire Les pronoms relatifs. Leçon 63 : les sports-Grammaire le conditionnel présent.

UNIT :III 9

Leçon :56 A Biarritz la page-Grammaire le future antérieure. Leçon :57 Dans les Pyrénées-Grammaire le future antérieure suite.

UNIT :IV 9

Leçons 65-a fin des vacances Grammaire-a changer les phrases du pluriel ausingulier, le présent du subjonctif.

UNIT :V 9

Grammaire et composition : Transduction - réponses aux questions sur le passage-essai sur un sujet générale, : lettre : Ecrire une lettre a une amie.

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course students will be able to,

CO 1: This unit enables the student to know about the French poet and poetry.

CO 2: To teach about the advanced grammar and the civic responsibility.

CO 3: To teach about the advanced grammar and the French monuments

CO 4: This unit enables the student to know about the French topographies

CO 5: This unit enables the student to know about the formal letter drafting.

Text Book:

Les leçons ont été choisis et tirés de i & ii degré de gauger << Cours de Langue et de Civilisation Française >> The Millenium, Publication Hachette, édition 2002

Reference Books:

DONDO Mathurin, "Modern French Course", Oxford University Press, New Delhi Edition 2014.

Web Sources:

1. <https://www.thoughtco.com/french-reading-tips-1369373>
2. <https://www.bnf.fr/fr>
3. <https://www.laits.utexas.edu/tex/>

	ENGLISH - IV	L	T	P	Credits
		3	0	0	3

ENGLISH IV - PRACTICAL ENGLISH (CONVERSATION PRACTICE)

Course Objective: (Skill Development)

- To train students in the use of English language in varied literary and non-literary contexts.
- To teach them soft skills and strengthen their foundation in grammar.
- To evaluate students to sensitivity in conversational competency.

UNIT I	09
i. At the Airport	
ii. In a Bank	
iii. On a Bus	
UNIT II	09
iv. In Flight	
v. In a Hotel	
vi. In a Library	
UNIT III	09
vii. Tea Time	
viii. On a Train	
ix. In a Restaurant	
UNIT IV	09
x. On a Picnic	
xi. In a Police station	
xii. In a Post office	
UNIT V	09
xiii. In a travel agency	
xiv. Asking the way	
xv. At the theatre	

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course students will be able to,

CO1: Feel confident to speak in different situations.

CO2: Learn befitting vocabulary words.

CO3: Have the ability to visualize speaking situations.

CO4: Be conversant with other conversational situations.

CO5: Categorize the nature of questions asked usually in interviews.

Books Recommended:

- English Conversation Practice, D.H.Spencer, Oxford.
- Communicative English by Department of English, National College (Autonomous), Trichy.

Web Sources:

- <https://self-publishingschool.com/how-to-write-dialogue/>
- <https://www.masterclass.com/articles/how-to-write-dialogue>

	ATOMIC PHYSICS	L	T	P	Credits
		4	0	0	4

Course Objective: (Employability)

To make the student understand the principles of atomic physics. To enable the student to explore the field of atomic structure, energy levels, and X-rays.

UNIT I Discharge Phenomenon through Gases 12

Determination of the Electronic Charge: Millikan's Oil-drop Method (Motion of a charge in transverse electric and magnetic fields) - Specific charge of an electron - Dunnington's method - Discovery and properties of positive rays- positive ray analysis- Thomson's Parabola Method (Positive rays) – Aston's and Dempster's mass spectrographs.

UNIT II Photo-electric Effect 12

Photo electric effect-Nature of the photo particles-Lenard's method to determine e/m for Photoelectrons-Richardson and Crompton experiment - Laws of photoelectric emission - Einstein photo electric equation - Millikan's experiment - Verification of photoelectric equation - Photo electric cells - Photo emissive cells - Photovoltaic cell - Photo conducting cell -Applications of photoelectric cells (Photomultiplier).

UNIT III Atomic Structure 12

Vector atom model - spatial quantization-various quantum numbers -Pauli's exclusion principle - angular momentum and magnetic moment - coupling schemes - LS and JJ coupling - Bohr magnetron – Selection rules - Explanation of periodic table - Stern and Gerlach experiment.

UNIT IV Ionization Potential and Splitting of Energy Levels 12

Excitation and ionization potential - Davis and Goucher's method - Zeeman effect - Larmor's theorem - Debye's explanation of normal Zeeman effect - Anomalous Zeeman effect - theoretical explanation. Lande's 'g' factor and explanation of splitting of D1 and D2 lines of sodium - Paschen back effect-theory - Stark effect (qualitative treatment only).

UNIT V X-Rays 12

Origin of X- ray spectrum – Continuous and characteristics spectra – X-ray Spectroscopy – Auger effect - X-ray absorption and fluorescence - Moseley's law - uses of X-rays - Compton Effect - experimental verification of Compton Effect.

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Demonstrate the discharge phenomenon through gases.
- CO2: Illustrate the ionization potential and splitting of energy levels.
- CO3: Interpret the structure of the atom.
- CO4: Analyze the continuous and characteristics spectra of X-rays.
- CO5: Analyze the working concepts of photo electric effect and their applications.

Text Books

1. R. Murugesan, KiruthigaSivaprasath, Modern Physics, S. Chand & Co., New Delhi, 2008.
2. N Subramanian and Brij Lal, Atomic and Nuclear Physics, S. Chand & Co. - 2000

References

1. Robley D. Evans, The Atomic Nucleus, TMH, 1982
2. Christopher. J. Foot, Atomic physics, Oxford University Press Inc, 2005.

Web Sources:

1. <https://nptel.ac.in/content/storage2/courses/115101003/downloads/module2/lecture25.pdf>
2. <https://www.lkouniv.ac.in/site/writereaddata/siteContent/202006151236284892NK-Paulis%20Exclusion%20Principle.pdf>
3. http://www.tcm.phy.cam.ac.uk/~bds10/aqp/lec12-14_compressed.pdf

	ASTRO PHYSICS	L	T	P	Credits
		4	0	0	4

Course Objective: (Employability)

Describe the nature, structure, distribution, and formation of astronomical objects, including planets, stars, and galaxies, and the history of the universe. Demonstrate an appreciation of the universality of physical laws and apply these laws to explain phenomena in astronomical systems and the universe. Define and interpret the observational properties of astronomical objects

UNIT I Astronomical Instruments

12

Optical telescope - reflecting telescope - types of reflecting telescope - advantages of reflecting telescope - Radio telescopes - astronomical spectrographs - photographic photometry - photo electric photometry - detectors and image processing.

UNIT II Solar System

12

The sun-physical and orbital data - Photosphere - Chromosphere - corona - solar prominences - sunspot - sunspot cycle - theory of sunspots - solar flare - mass of the sun - solar constant - temperature of the sun - source of solar energy - solar wind. Other members of the solar system - Mercury - Venus - Earth - Mars - Jupiter - Saturn - Uranus - Neptune - Pluto - Moon - Bode's law - Asteroids - comets - Meteors.

UNIT III Stellar Evolution, Binary and variable stars

12

Birth of a star - Death of a star - Chandrasekhar limit - white dwarfs - Neutron stars - black holes - Quasars - Nebulae - Supernovae Binary stars - Origin of Binary stars. Variable stars - Cepheid variables - RV Tauri variables - long period variables - irregular variables - flare stars.

UNIT IV Magnitudes, distance and spectral classification of stars

12

Magnitude and brightness - apparent magnitude of stars - absolute magnitude of stars - relation between apparent magnitude and absolute magnitude of stars - Luminosities of stars - measurement of stellar distance - Geometrical parallax method - distance from red shift measurement - Harvard system of spectral classification .

UNIT V Theories of the universe, galaxies and star clusters

12

Origin of the universe - the big bang theory - the steady state theory - the oscillating universe theory - Hubble's law. Galaxies - types of galaxies - Milky Way - star clusters - open clusters - globular clusters.

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Illustrate the fundamental theories of the universe and galaxies.
- CO2: Demonstrate the Harvard system of spectral classification of stars.
- CO3: Identify the requirements of instrumentation for modern astrophysical observations.
- CO4: Apply the universality of physical laws in astronomical systems.
- CO5: Apply basic cosmological models to predict the age and structure of the universe.

Text Books:

1. Matts Roos, Introduction to Cosmology, 3rd Edition, John Wiley and Sons Ltd, 2003.
2. Bradley W. Carroll, Dale A. Ostlie, An Introduction to Modern Astrophysics, 2nd Edition, Pearson, 2013

References

1. K.S. Krishnasamy, Astro Physics a modern perspective, Reprint, New Age International (p) Ltd, New Delhi, 2002.
2. Baidyanath Basu, An introduction to Astro physics, second printing, prentice - Hall of India Private limited, New Delhi, 2001.
3. Baker and Fredrick, 'Astronomy, ninth edition, Van No strand Rein hold, Co, New York - 1964.

Web Sources:

1. <http://www.phy.olemiss.edu/~perera/ast325/Lec23.pdf>
2. <https://www.astro.princeton.edu/~burrows/classes/204/stellar.atmospheres.HR.pdf>
3. <https://astronomy.swinburne.edu.au/sao/downloads/HET624-M14A01.pdf>

	CHEMISTRY - II	L	T	P	Credits
		4	0	0	4

Course Objective: (Employability)

To learn the basics of spectral analysis and nature of the compound. To understand the properties and applications of carbohydrates, amino acids and proteins. To study the basic nature of halogens and noble gases. To study the properties of aromatic compounds and organic reactions.

UNIT I Analytical Techniques

12

Beer–Lambert’s law (problem) – UV – visible spectroscopy and IR spectroscopy – principles – instrumentation (block diagram only) – estimation of iron by colorimetry – flame photometry – principle – instrumentation (block diagram only) – estimation of sodium by flame photometry.

UNIT II Carbohydrates, Amino acids and Proteins

12

Carbohydrates: classification – glucose and fructose – preparation and properties –structure of glucose – Fischer and Haworth cyclic structures.

Amino acids and proteins: Amino acids – Classification based on structure.

Essential and non – essentials amino acids – preparation, properties and uses – peptides (elementary treatment only) – proteins – Classification based on physical properties and biological functions. Structure of proteins – primary and secondary (elementary treatment).

UNIT III Aromaticity and Preparation of Aromatic Compounds

12

Aromaticity-Huckel’s rule-resonance in benzene –electrophilic substitution in aromatic compounds-general nitration, sulphonation, chlorination - Friedelcraft’s alkylation and acylation- polynuclear hydrocarbons – naphthalene, anthracene and phenanthrene – preparation, properties and uses.

UNIT IV Halogens and Nobel Gases

12

Comparative study of F, Cl, Br, I– elements reactivities, hydrogen halides, oxides and oxyacids. Exceptional properties of Fluorine. Electronic configuration and position of halogens in the periodic table. Applications, clathrates and compounds of xenon, hybridization and geometries of XeF₂, XeF₄, XeOF₄.

UNIT V Photosynthesis and Toxicity

12

Chloroplast- light reactions – structure of chlorophyll- Photosynthesis – Reactions – Type I and Type II photosynthetic reactions – Role of Manganese complex in evolution of oxygen Toxicity – Hg, Cd, Zn, Pb, and As.

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Apply the principle and application of UV-Visible and IR Spectroscopy.
- CO2: Demonstrate the structure of Carbohydrates, Aminoacids and Proteins.
- CO3: Identify aromaticity and Preparation of Aromatic Compounds.
- CO4: Analyze the properties and uses of Halogens and Nobel Gases.
- CO5: Demonstrate the reaction of Photosynthesis and Toxicity.

Text Books

1. P. L. Soni, “Text Book of Organic Chemistry” Sultan Chand & sons. 32nd edition. 2013
2. R. D. Madhan, “Modern Inorgnaic Chemistry” S. Chand & Co., 6th edition 2012
3. Lippard and Berg, “Principle of Bioinorganic Chemistry” –University- Science Book 7th edition, 1994

Reference Books

1. Robert Thornton Morrison, Robert Neilson Boyd, “Organic Chemistry” Ashok K. Ghosh 10th edition, 2013
2. James E. Huheey, Ellen, A. Keiter, Richard, L. Keiter, “Inorganic Chemistry” Pearson education (Singapore Pvt Limited) 9th edition, 2013

Web Sources:

1. <https://www.slideshare.net/Arrehome/halogens-and-noble-gases>
2. <https://www.slideshare.net/mnikzaad/plants-nutrients-and-deficiency-toxicity-symptoms>

	PRACTICAL PHYSICS - IV	L	T	P	Credits
		0	0	4	2

Course Objective: (Skill Development)

To enable the student to explore the field of electricity and mechanics of solids. To gain knowledge in the scientific methods and learn the process of measuring different Physical variables.

Any 10 Experiments

1. Rigidity modulus - Static torsion
2. Lamis Theorem
3. Young's modulus- Cantilever/Stretching (pin & microscope)
4. Post office box – Temperature coefficient
5. Metre bridge experiment
6. Spectrometer – i-d curve
7. Spectrometer- i-i' curve using prism.
8. Sonometer – AC frequency
9. Potentiometer- Calibration of High range voltmeter
10. LCR series resonance circuit
11. LCR parallel resonance circuit
12. Melde's string

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Determine the refractive index of the prism using spectrometer i-d curve.
- CO2: Analyze the rigidity modulus of a wire by static torsion method.
- CO3: Measure the temperature coefficient of resistance of a given wire by P.O box method.
- CO4: Determine the frequency of the tuning fork by using Sonometer.
- CO5: Construct the calibration of high range ammeter circuit using potentiometer.

Text Book

1. C. C. Ouseph, U. J. Rao, V. Vjiayendran, Practical Physics, 1st Edition, 2015.
2. Biswajit Saha, Practical Physics Book, LAP LAMBERT Academic Publishing, 1st Edition, 2020.

Web Sources:

1. <https://repo.iitbhu.ac.in/db/2016/ir-2016-373/LCR%20Manual.pdf>
2. http://www.stpius.ac.in/crm/assets/download/Practical_paper-2.pdf
3. <https://www.govinfo.gov/content/pkg/GOVPUB-C13-de3deba65157b29e94808d389a27adb2/pdf/GOVPUB-C13-de3deba65157b29e94808d389a27adb2.pdf>

	CHEMISTRY PRACTICAL - II	L	T	P	Credits
		0	0	4	2

Course objective: (Skill Development)

To learn the technique to identify acid radicals and basic radicals of each two with to interfering radicals as well as to prepare simple coordination compounds.

Inorganic Qualitative Analysis

Reactions of mercury, lead, copper, bismuth, cadmium, antimony, tin, ferrous and ferric iron, aluminium, zinc, manganese, cobalt, nickel, calcium, strontium, barium, magnesium, and ammonium; sulphide, carbonate, nitrate, sulphate, chloride, bromide, iodide, fluoride, oxalate, arsenite, phosphate, chromate and borate radicals.

Semimicro analysis of a mixture containing one cation and one anion.

List of Experiments

1. Reaction of simple radicals.
2. Reactions of groups I, II and III cations.
3. Reactions of groups IV, V and VI cations.
4. Analysis of salt mixture – I
5. Analysis of salt mixture – II
6. Analysis of salt mixture – III
7. Analysis of salt mixture – IV
8. Analysis of salt mixture – V
9. Preparation of Ferrous ammonium sulphate.
10. Preparation of tetraamminecopper (II) sulphate.
11. Preparation of potassium trioxalatoluminate.
12. Preparation of potassium trioxalatochromate.

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Make use of the chemicals safely in lab as well as in industry.
 CO2: Utilize the procedure for analyzing an inorganic salt.
 CO3: Analyze the reaction of simple radicals.
 CO4: Identify acid and basic radicals in a simple inorganic salt.
 CO5: Analyze the preparation of simple coordination compounds.

Text Book:

1. Vogel's – "Textbook of qualitative Inorganic Analysis", Longmann, 12th edition, 2011

Reference Books:

1. S. Sundaram and K. Raghavan "Practical Chemistry", S. Viswanathan.Co. 3rd edition 2011
2. J. N. Gurtu and R. Kapoor "Advanced experimental Chemistry", S. Chand and Co. 6th edition, 2010

Web Sources:

1. <https://vlab.amrita.edu/index.php?sub=2&brch=193>
2. <https://icv-au.vlabs.ac.in/>

SEMESTER-V

	QUANTUM MECHANICS	L	T	P	Credits
		4	0	0	4

Course Objective: (Employability)

To understand the concepts of matter waves, quantum theory of the hydrogen atom, selection rules and operator formalism of quantum mechanics.

UNIT I Wave properties of particles

12

Inadequacy of classical mechanics–Matter waves–Expression for de Broglie wavelength–Group velocity–Experimental study of matter waves: Davisson and Germer’s experiment–G.P. Thomson’s experiment–Heisenberg’s uncertainty principle–Mathematical proof–Bohr’s complementarity principle.

UNIT II Quantum theory of the hydrogen atom

12

The hydrogen atom–Solution of polar wave and radial equation–Expression for the energy of the electron of the hydrogen atom in the ground state–Normalized wave functions of the hydrogen atom–Significance of various quantum numbers–Electron probability density–Radiative transitions–Selections rules.

UNIT III Schrodinger Equation and its Applications

12

Derivation of time-dependent forms of Schrodinger equation–Time independent Schrodinger equation (steady state form)–Eigen values and Eigen functions–Physical significance of wave function–Applications of Schrodinger’s equation–The particle in a box: Infinite square well potential–Finite square potential well–The barrier penetration problem–Tunnel effect–Linear harmonic oscillator.

UNIT IV Operator formalism of quantum mechanics

12

Postulates of quantum mechanics–Operators in quantum mechanics: momentum, kinetic energy and total energy–Orbital angular momentum operator–Commuting operators–Simultaneous Eigen functions–Theorem of commutativity and simultaneity–Hermitian operator–Properties–Motion of wave packets–Ehrenfest’s theorem–Orthogonality of Eigen functions–Dirac delta function.

UNIT V Scattering and Perturbation theory

12

Introduction–Scattering experiment–Definitions of cross-section–Reduction of the two-body problem into one-body problem–Quantum theory theory–Partial wave analysis–Perturbation theory: time-independent for a non-degenerate energy level–Ground state of Helium.

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Demonstrate the wave-particle duality and Heisenberg’s uncertainty principle.
- CO2: Identify the solution of polar wave and radial equation.
- CO3: Analyze the postulates and operators formalism of quantum mechanics.
- CO4: Apply the Schrodinger’s equation to particle in a box.
- CO5: Develop the perturbation theory for selected problems in quantum mechanics.

TEXT BOOKS

1. Robert Eisberg and Robert Resnick, Quantum Physics, Wiley, 2nd Edition, 2002.
2. Arthur Beiser, Concepts of Modern Physics, 6th Edition, McGraw Hill Education, 2009.
3. R. Murugesan, Kiruthiga Sivaprasath, Modern Physics, S Chand, Eighteenth Edition, 2016

REFERENCES

1. Thankappan V.K., Quantum Mechanics, 2nd Edition, New Age International (P) Ltd, 1996.
2. Merzbacher E., Quantum Mechanics, 3rd edition, Wiley Publishing, 1998.
3. David J. Griffiths, Introduction to Quantum Mechanics, 2nd Edition, Pearson Publication, 2009.

Web Sources:

1. <https://nptel.ac.in/courses/122/106/122106034/>
2. <https://nptel.ac.in/courses/115/102/115102023/>
3. <https://nptel.ac.in/courses/115/101/115101107/>

SYLLABUS
DISCIPLINE SPECIFIC
ELECTIVE (DSE) COURSES

	LASER PHYSICS & SPECTROSCOPY	L	T	P	Credits
		4	0	0	4

Course Objective: (Employability)

To enable the students to understand the basic concepts of Lasers. To emphasize the principles involved in various spectroscopes.

UNIT I Fundamentals of Lasers and Types 12

Characteristics of a Laser - Directionality- High Intensity-High Degree of Coherence- Spatial and temporal coherence- Spontaneous and stimulated emission - Einstein's coefficients- Absorption - Amplification of radiation- Population Inversion- Laser pumping- Resonance cavity- Threshold condition for Laser emission - Ruby Laser-He-Ne Laser - Nd-YAG laser- CO₂ laser, Applications of Laser.

UNIT II Control of Laser Properties and Production 12

Resonators - Vibration modes of resonators- Number of modes/unit volume - Open resonators- Control resonators - Q Factor- Losses in the cavity - Threshold condition - Quantum Yield – Mode locking (active and passive) - Q Switching.

UNIT III Microwave Spectroscopy 12

Rotation of molecules-Rotational Spectra-Rigid and non-rigid diatomic rotator-Intensity of spectral lines- Isotopic Substitution-Poly atomic molecules (Linear and symmetric top)-Hyperfine structure and quadrupole effects-Microwave Spectroscopy-Techniques and instrumentation.

UNIT IV Infra-Red Spectroscopy 12

Basic Theory- Vibration of molecules-Diatomic vibrating rotator-vibrational rotational spectrum -Influence of rotation on the vibrational spectrum of linear and symmetric top and poly atomic molecules -Instrumentation- Sample Handling- Characteristic Vibrational Frequencies- Overtones- Combination bands and Fermi Resonance-FTIR.

UNIT V Resonance Spectroscopy 12

NMR - Basic principles - Classical and quantum mechanical description- Bloch equations - Spin-spin and spin-lattice relaxation times – Chemical shift and coupling constant. ESR: Basic principles – ESR spectrometer – Nuclear interaction and hyperfine structure –relaxation effects – g-factor – Characteristics – Free radical studies and biological applications.

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Illustrate the fundamental and operation principle of modern lasers.

CO2: Apply the laser operation principles to atom and molecular physics, solid state physics, quantum mechanics and physical optics.

CO3: Identify the applications of modern laser spectroscopic techniques.

CO4: Interpret the working principles and taking spectrum of IR spectroscopy device.

CO5: Examine the properties of different materials by applying the basic principles of NMR and ESR spectroscopy.

Text Books

- Colin Banwell and McCash, Fundamentals of Molecular Spectroscopy, TMH Publishers, 4th Edition, 2002.
- R. Murugesan - Optics & Spectroscopy, S. Chand & Co., New Delhi

References

- SuneSvanbag, Atomic and Molecular Spectroscopy: Basic Aspects and Practical Applications, Springer, 3rd Edition, 2001.
- Jeanne L Mc Hale, Molecular Spectroscopy, Pearson Education, 1 Indian Edition, 2008.
- Aruldas G., Molecular Structure and Spectroscopy, Prentice Hall of India, 2001.

Web Sources:

- <https://nptel.ac.in/courses/104/106/104106122/>
- <https://nptel.ac.in/courses/104/104/104104085/>
- <https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cy13/>

	NUCLEAR PHYSICS	L	T	P	Credits
		4	0	0	4

Course Objective: (Employability)

To make the student understand the principles of nuclear physics. To enable the student to explore the field of nuclear structure. To understand the concept of radioactivity, nuclear fission and fusion. To understand the elementary particles and their interactions.

UNIT I Structure of Nuclei

12

Structure of nucleus – Classification of nuclei – Nucleus properties - Nuclear size –Density – Charge – Nuclear magnetic moment - Electric quadrupole moment - Atomic mass unit and binding energy - Mass defect and packing fraction –Nuclear Model – Liquid drop model – Shell model – Magic numbers.

UNIT II Radioactivity

12

Natural radioactivity - α , β and γ decays – properties - Activity – α -decay - Geiger-Nuttall law - Gamow's theory of α decay - β -decay - Continuous β -spectrum - Neutrino hypothesis - Gamma rays-origin of the gamma rays - Internal conversion - Fundamental laws of radioactivity – Law of radioactive disintegration - Half-life period and mean life - Radioactive dating.

UNIT III Nuclear Detectors & Accelerators

12

Principle and working - solid state detector - proportional Counter - Wilson's cloud chamber - Scintillation counter. Accelerators: Synchrocyclotron - Synchrotron - Electron synchrotron - proton synchrotron - Betatron.

UNIT IV Nuclear Fission and Fusion

12

Nuclear fission – Energy released in Fission – Bohr and Wheelers theory of Nuclear fission – Chain reaction – Multiplication factor – Critical size – Atom Bomb – Nuclear reactor – Nuclear fusion – Source of Stellar energy – Carbon Nitrogen cycle – Proton-Proton cycle – Hydrogen bomb – Controlled thermo nuclear reactions.

UNIT V Elementary Particles

12

Classification of elementary particles - types of interaction - Elementary particle quantum numbers - symmetry and conservation laws - hadrons - leptons - baryons - mesons - strangeness - hyperons - antiparticles - Basic ideas about quarks - Types of quarks - Three generations of quarks and leptons.

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Demonstrate the knowledge of fundamental aspects of the structure of the nucleus.
- CO2: Utilize the radioactive decay, nuclear reactions and the interaction of radiation.
- CO3: Develop the various types of nuclear detectors and accelerators.
- CO4: Apply the knowledge of nuclear fission and fusion reactions.
- CO5: Identify the different kinds of interactions between elementary particles.

Text Books

1. D. C. Tayal, Nuclear Physics, Himalaya Publishing House, 2009
2. S. N. Ghoshal, Nuclear Physics, S. Chand & Co., Edition, 2003.

References

1. M. L. Pandya & R. P.S. Yadav, Elements of Nuclear Physics, KedarNath & Ram Nath, 2000.
2. Satya Prakash, Nuclear Physics, APragatiPrakasan Publication, 2011.
3. Jahan Singh, Fundamentals of Nuclear Physics, APragati Publication, 2012.

Web Sources:

1. <https://nptel.ac.in/courses/115/104/115104043/>
2. <https://nptel.ac.in/courses/112/103/112103243/>
3. <https://nptel.ac.in/courses/115/103/115103101/>

	ANALOG & DIGITAL ELECTRONICS	L	T	P	Credits
		3	0	0	3

Course Objective: (Employability)

To understand the concept of diodes and transistors. To familiarize the operation of amplifiers. To understand the basic concepts of number systems. To develop the digital concepts using logic gates. To apply digital concepts in sequential logic systems. To study operational amplifiers and clocks.

UNIT I Diode Characteristics and Applications 9

Zener Diode and its breakdown mechanism - voltage regulator - Half wave and full wave rectifier and their efficiency calculation - Ripple factor - Equivalent circuit – linear circuit analysis - Tunnel diode - Varactor diode - Gunn diode – Photo diode - LED.

UNIT II Transistor Characteristics and Biasing Techniques 9

Transistor-Transistor characteristics - CB, CE, CC - comparison between the three configurations - basic CE amplifier circuit -selection of operating point - need for bias stabilization - requirements of a biasing circuit - fixed bias - voltage divider biasing circuit -Types of FET - JFET - working principle - symbol - comparison with bipolar transistor - output characteristics - JFET parameters.

UNIT III Amplifiers 9

Single stage transistor amplifier - BJT, FET – Single stage amplifier-Multistage amplifier – graphical method - equivalent circuit method - gain of a multistage amplifier - RC and transformer coupling - frequency response curve of an RC coupled amplifier - analysis of two stage RC coupled amplifier - classification of amplifiers - single ended and power amplifier - push pull amplifier.

UNIT VI Number Systems and Logic Gates 9

Number Systems and Logic Gates: Different Number Systems -Binary, Octal and Hexa-decimal. Conversion between the number systems. Different Digital codes - ASCII, BCD, Gray codes. Basic logic gates: AND, OR, NOT, NOR, NAND, Ex-OR (Symbol, Truth-table, Circuit diagram, Working) Boolean algebra and K-Maps, Introduction, SOP and POS form of Boolean function, Karnaugh Map simplification (upto 4 variables), implementations of SOP and POS form using NAND, NOR gates

UNIT V Combinational and Sequential Circuits 9

Half adder, full adder, 8421 adders, 1's and 2's complement adders/subtractor, Excess 3 adder, multiplexer, demultiplexer, encoders and decoders, Flip-Flop (RS, JK, Master Slave JK, D and T-Type) Shift Register, Binary Counter, Modulo- N counter, up-down counter.

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Illustrate the properties and applications of semiconductor diodes.
- CO2: Analyze the rectifier and regulator circuits.
- CO3: Design and implement combinational logic circuits using reprogrammable logic devices.
- CO4: Demonstrate the programs of digital to analog and analog to digital conversion.
- CO5: Create circuits to solve clocked Flip-Flops problems.

Text Books:

1. Basic Electronics (Solid state), B.L. Theraja, S. Chand & Co., (2000)
2. Principles of Electronics, Metha, V.K. S. Chand & Co., (2001)
3. Digital Principles and Applications, Malvino and Leach, TMH.

Reference Books:

1. Digital Electronics, Avinash Kapoor &Maheswari, Principles and Practice.
2. Digital Electronics, A.P. Godse, Technical Publisher, Pune.

Web Sources:

1. <https://nptel.ac.in/courses/117/107/117107095/>
2. <https://nptel.ac.in/courses/117/101/117101106/>
3. <https://nptel.ac.in/courses/108/105/108105113/>

	DISCIPLINE SPECIFIC ELECTIVE PRACTICAL- I	L	T	P	Credits
		0	0	4	2

Course Objective: (Skill Development)

To enable the student to explore the field of analog and digital electronics. To gain knowledge in the scientific methods and learn the process of measuring different Physical variables.

Any 10 Experiments

1. Transistor characteristics Common Emitter.
2. Regulated power supply using Zener diode characteristics.
3. PN junction diode characteristics.
4. Dual power supply using IC.
5. OP AMP- Inverting amplifier, Non-inverting amplifier and Unity follower.
6. Basic gates (OR, AND, NOT, NOR, NAND and XOR).
7. Verification of Associative laws for AND and OR gates.
8. K-map reduction and logic circuit implementation.
9. Verification of DeMorgan's laws.
10. NAND as universal gate.
11. NOR as universal gate.
12. Half adder and Half subtractor.
13. Astable multivibrator using IC555

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Construct and verify the operations of basic logic gates.
CO2: Construct and verify the operations of universal logic gates.
CO3: Analyze the working operation of D/A convertor and A/D convertor.
CO4: Construct and verify the characteristics of operational amplifier using IC741.
CO5: Design and verify the operations of astable and monostable multivibrator using IC555.

Text Book

1. C. C. Ouseph, U. J. Rao, V. Vjiayendran, Practical Physics, 1st Edition, 2015.
2. Biswajit Saha, Practical Physics Book, LAP LAMBERT Academic Publishing, 1st Edition, 2020.

Web Sources:

1. <https://vlab.amrita.edu/?sub=1&brch=282&sim=1207&cnt=1>
2. <http://vlabs.iitkgp.ac.in/dec/>
3. <http://vlabs.iitkgp.ac.in/be/>

	SOLID STATE PHYSICS	L	T	P	Credits
		5	0	0	5

Course Objective: Employability)

The course is to understand the basic knowledge on crystal structures and crystal systems. To understand the various techniques available in X-Ray Crystallography. To acquire the knowledge of bonding in solids and Lattice waves. To comprehend the concepts of dielectric properties of solids and superconductivity.

UNIT I Crystal Physics 15

Crystalline and amorphous solids- Lattice and basis-Unit cell and primitive cell-Crystal systems- Bravais lattice - Cubic Crystal system - Simple - Body centered and face centered cubic lattices-Hexagonal close packed - Miller indices -Interplanar spacing.

UNIT II Bonding in Solids 15

Types of bonds in crystals – Ionic, covalent, metallic, Van-der-Waal’s and hydrogen bonding – characteristic of various bonding – cohesive energy of cubic ionic crystals – Madelung constant for sodium chloride crystal – Phonons – monoatomic one-dimensional lattice – specific heat of solids – Einstein’s theory – Debye theory.

UNIT III Free Electron Theory of Metals 15

Free electron theory – Drude Lorentz theory – Explanation of Ohm’s law – Electrical conductivity – Thermal conductivity –Wiedemann and Franz law – Hall effect – Hall voltage and Hall coefficient – Mobility and Hall angle – Importance of Hall effect – Experimental determination of Hall coefficient.

UNIT IV Dielectrics and Superconductivity 15

Dielectrics- Dielectric constant and displacement vector – Polarization – Types of polarization – Clausius-Mossotti relation– Superconductivity - Occurrence of superconductivity – Destruction of superconductivity by magnetic fields – Meissner effect - Type I and Type II superconductors – London equation – Josephson effect – Elements of BCS theory –Application of superconductors.

UNIT V Magnetic Properties 15

Different types of magnetic materials - classical theory of diamagnetism (Langevin theory) - Langevin theory of paramagnetism - Weiss theory of paramagnetism – Heisenberg interpretation on internal field and quantum theory of ferromagnetism - Antiferromagnetism - Hard and soft magnetic materials.

TOTAL HOURS: 75

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Apply the knowledge of crystal systems and spatial symmetries.
- CO2: Analyze the different types of matter depending on nature chemical bonds and their properties.
- CO3: Identify the lattice vibration phenomenon and thermal properties of solids.
- CO4: Analyze the characteristic features of different types of magnetic materials.
- CO5: Develop the applications of dielectric and superconducting materials.

Text Books

1. Pillai S.O., Solid State Physics, 6th Edition, New Age Science, 2013.
2. Charles Kittel, Introduction to Solid State Physics, Wiley, 2005.

References

1. Ashcroft W and Mermin N.D., Solid State Physics, Holt-Rinehart-Winston, 1976.
2. Blakemore J. S., Solid State Physics, 2nd Edition, Cambridge University Press, Cambridge, 1974.
3. Dekker A. J., Solid State Physics, Mac Millan, 1971.

Web Sources:

1. <https://nptel.ac.in/courses/115/104/115104109/>
2. <https://nptel.ac.in/courses/113/104/113104014/>
3. <https://nptel.ac.in/courses/115/105/115105122/>

	NANOMATERIALS AND APPLICATIONS	L	T	P	Credits
		4	1	0	5

Course Objective: (Employability)

To make the student understand the basic concepts in nanoscience. To enable the student to explore the field of nanomaterials. To acquire knowledge on the various applications of nanotechnology.

UNIT I Basics of Nanoscience

15

Basics of nanophase materials - Difference between bulk and nanoscale materials and their significance – Quantum confinement effect - Optical property - Magnetic property and electronic property - Size dependent behavior – Mechanical properties of Nanomaterials and Chemical properties of Nanoparticles.

UNIT II Classes of Nanomaterials

15

Classification of nanomaterials - Quantum dots - Quantum Wires - Quantum wells - Bucky balls - Carbon nanotubes (CNT) - Single walled and Multi walled CNT-Structure - Fullerenes/Bucky Balls/ C60 – Graphene – Nanocomposites.

UNIT III Synthesis of Nanomaterials

15

Top-down approach – Nanolithography - Soft lithography and hard lithography - E-beam lithography – Ball milling – Bottom-up approach - Physical Vapor deposition (PVD) - Chemical Vapor Deposition(CVD) – Sol-gel processing and Hydrothermal methods.

UNIT IV Characterization of Nanomaterials

15

X-Ray Diffraction (XRD) – Scanning Electron Microscope (SEM) - Transmission Electron Microscope (TEM) - Atomic Force Microscope (AFM) – UV-Vis absorption spectroscopy – Brunauer–Emmett–Teller (BET) Surface area analysis – X-Ray Photoelectron Spectroscopy (XPS).

UNIT V Applications of Nanomaterials

15

General applications of nanophase materials - Environment - Photocatalysis and waste water treatment - Energy Storage - Solar Cells and Fuel cells - Battery and Supercapacitor - Electronics - Nano Electro Mechanical Systems (NEMS) - Biomedical applications.

TOTAL HOURS: 75

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Demonstrate the general concepts and physical phenomena of relevance within the field of nanoscience.
- CO2: Identify the different types of nanostructures based on their dimensionality.
- CO3: Select the facile synthesis methods for nanostructured materials.
- CO4: Examine the various characterization techniques for synthesized nanomaterials.
- CO5: Analyze the various applications of prepared nanoscale materials.

Text Books

1. Pradeep T., Fundamentals of Nanoscience and Nanotechnology, McGraw Hill, 2012.
2. Chris Binns, Introduction to Nanoscience and Nanotechnology, 1ST Edition, Willey- Publication, 2010.

References

1. Gabor L. Hornyak, H. F. Tibbals, Joydeep Dutta, John J. Moore, Introduction to Nanoscience and Nanotechnology, CRC Press, 2008.
2. Chattopadhyay K.K., Introduction to Nanoscience and Nanotechnology, APH Publishing Corporation, 2006.
3. Charles P. Poole Jr and Frank J. Owens, Introduction to Nanotechnology, Wiley Interscience, 2007.

Web Sources:

1. <https://nptel.ac.in/courses/118/104/118104008/>
2. <https://nptel.ac.in/courses/118/107/118107015/>
3. <https://nptel.ac.in/courses/118/102/118102003/>

	DISCIPLINE SPECIFIC ELECTIVE PRACTICAL- II	L	T	P	Credits
		0	0	4	2

Course Objective:

To enable the student to explore the field of materials science. To gain knowledge in the scientific methods and learn the process of measuring different Physical variables.

Any 10 Experiments

1. Semiconductor diode laser– To determine the particle size using diffraction method.
2. Determination of wavelength of laser light using semiconductor laser
3. Determination of band gap by Four probe method
4. Dielectric Constant Measurement
5. Characteristics of thermistor.
6. Characteristics of photodiode
7. Characteristics of solar cell
8. Characteristics of phototransistor
9. Comparison of EMF of two given cells-Potentiometer
10. Determination of M and B_H TAN C position-Vibration magnetometer
11. Band gap determination of a thermistor using meter bridge
12. Determination of compressibility of a material using ultrasonic interferometer
13. Spectrometer – Cauchy's constant
14. Copper Voltammeter – Determination of B_H

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Determine the particle size by diffraction method using semiconductor diode laser.
- CO2: Analyze the V-I characteristics of photodiode.
- CO3: Analyze the V-I characteristics of solar cell.
- CO4: Determine the resistivity of a semiconductor material by four probe method.
- CO5: Determine the horizontal component of earth's magnetic field by copper voltammeter.

Text Book

1. C. C. Ouseph, U. J. Rao, V. Vjiayendran, Practical Physics, 1st Edition, 2015.
2. Biswajit Saha, Practical Physics Book, LAP LAMBERT Academic Publishing, 1st Edition, 2020.

Web Sources:

1. <https://vlab.amrita.edu/?sub=1&brch=282>
2. <https://vlab.amrita.edu/index.php?sub=1&brch=195>
3. <https://vlab.amrita.edu/index.php?sub=1&brch=189>

	LOW TEMPERATURE PHYSICS	L	T	P	Credits
		4	0	0	4

Course Objective: To understand the general scientific concepts of low temperature physics. To understand the properties of materials at low temperature. To educate the new techniques available to produce and measure low temperatures. To understand the concept of specific heat and hyperfine properties.

UNIT I Production of Low Temperature

12

Introduction - Joule Thomson effect - Regenerative cooling - Vacuum pumps - liquefaction of air - Hydrogen - Helium - Maintenance of low temperature - production of temperature below 1 K - Adiabatic demagnetization - Evaporative cooling of He-3 - Dilution refrigeration - Laser cooling - Nuclear demagnetization.

UNIT II Measurement of Low Temperature

12

The gas thermometer and its corrections - Secondary thermometers- resistance thermometers, thermocouples- vapour pressure thermometers- magnetic thermometers.

UNIT III Liquid and Solid Cryogenics

12

Liquid Nitrogen - Liquid oxygen - Liquid hydrogen - Liquid He -4 and He -3 - Solid He- 4 and He -3 - Lambda point - Superfluidity - Density - Compressibility factor - viscosity and thermal properties - Velocity of sound in liquid helium.

UNIT IV Electrical and Magnetic Properties

12

Experimental observations - Theories of Sommerfeld and Bloch - Superconductivity - magnetic properties of superconductors - Thermal properties of superconductors - penetration depth and high frequency resistance - Ferromagnetism - Diamagnetism - paramagnetism - Paramagnetic saturation.

UNIT V Specific Heats, Spectroscopic and Hyperfine Properties

12

Specific heats - Rotational specific heat of Hydrogen – Einstein's and Debye's theories -Schottky effect - Anomalies in specific heats at low temperature - Infrared- visible spectra - Zeeman spectra at low temperature - Dielectric constant and its measurement - Magnetic susceptibility - NMR and electron paramagnetic resonance at low temperature - Nuclear magnetic properties - Mossbauer effect and other hyperfine properties at low temperature.

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Illustrate the basic concepts of low temperature physics
- CO2: Identify the properties of materials at low temperature.
- CO3: Apply the new techniques available to produce and measure low temperature.
- CO4: Measure the NMR and electron paramagnetic resonance at low temperature.
- CO5: Analyze the concept of specific heat and hyperfine properties.

Text Books:

1. Cornelis Jacobus Gorter, D. F. Brewer, Progress in Low Temperature Physics, Elsevier Ltd, 2011.
2. Christian E. and Siegfried H, Low Temperature Physics, Springer, 2005.

References:

1. Jack Ekin, Experimental Techniques for Low-Temperature Measurements, OUP Oxford, 2006.
2. Charles P. Poole Jr., Horacio A. Farach, Richard J. Creswick and Ruslan Prozorov, Superconductivity Elsevier Ltd, 2007.
3. John Wilks, Properties of Liquid and Solid Helium, Oxford University Press, 1967.
4. Jackson L.C., Low Temperature Physics, Methuen and Company, 1962.
5. Ching Wu Chu and J. Woollam, High Pressure and Low Temperature Physics, Plenum Press, 1978.

Web Sources:

1. <https://slideplayer.com/slide/13024029/>
2. <https://www.slideshare.net/AkelRidha/superconductivity-a-presentation>

	LASER PHYSICS	L	T	P	Credits
		4	0	0	4

Course Objective: To introduce the physical and engineering principles of laser operation and their applications.

UNIT I	Fundamentals of LASER	12
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Spontaneous emission – stimulated emission – metastable state – Population inversion – pumping – Laser Characteristics

UNIT II	Types of LASER	12
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Nd-YAG laser - Helium – Neon Laser – Ruby Laser – CO₂ Laser – Semiconductor Laser (homojunction and heterojunction)

UNIT III	Industrial Applications of LASER	12
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Laser cutting – welding – drilling – Hologram – Recording and reconstruction of hologram

UNIT IV Lasers in Medicine 12

Lasers in Surgery – Lasers in ophthalmology – Lasers in cancer treatment

UNIT V	Lasers in Communication	12
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Optic fibre communication- Total internal reflection – Block diagram of fibre optic communication system – Advantages of fibre optic communication

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Illustrate the fundamental and basic characteristics of laser.
CO2: Classify the types of laser and identify their applications.
CO3: Demonstrate solid knowledge of modern laser spectroscopic techniques.
CO4: Examine the medical applications using laser source of light.
CO5: Analyze the advantages of fibre optic communication using laser source.

Text Books:

1. N. Avadhanulu, An introduction to LASERS, S. Chand & Company, 2001

References:

1. William T. Silfvast, Laser fundamentals, Cambridge University Press – Published in South Asia by foundation books, 23, Ansari Road, New Delhi.
2. K. Thyagarajan and A. K. Ghatak, LASER Theory and Application, Mac millan, India Ltd.

Web Sources:

1. <https://nptel.ac.in/courses/115/102/115102124/>
2. <http://courseware.cutm.ac.in/courses/laser-technology/>
3. <https://nptel.ac.in/courses/104/106/104106122/>

	SOLAR TECHNOLOGY	L	T	P	Credits
		4	0	0	4

Course Objective: To learn the fundamentals of Solar Energy Technologies. To learn the solar thermal based energy systems. To learn basic principles and applications of Photovoltaic systems.

UNIT I Solar Radiation

12

Energy emitted by sun and energy that reaches the earth - Sun-Earth Geometry-Solar angles - Angles of incidence- Zenith angle - Azimuthal angle - Hour angle - Latitude and longitude - Solar Spectrum and Solar constant – Extraterrestrial characteristics - Measurement and estimation on horizontal and tilted surfaces.

UNIT II Solar Collectors

12

Solar Collector Basics - Flat plate collector – Evacuated tubular collectors - Concentrator collectors - Tracking systems - Compound parabolic concentrators - Parabolic trough concentrators - Concentrators with point focus.

UNIT II Solar Thermal Technologies

12

Solar heating and cooling system - Principle of working – Types - Design and operation - Thermal Energy storage - Types of thermal Energy Storage systems - Sensible Heat Storage – Liquids - Latent heat Storage - Thermo chemical storage - Solar thermal power plant - Solar Desalination - Solar cooker – Domestic - Community - Solar pond technology - Principle of working and description - Solar drying.

UNIT IV Solar Photovoltaic Fundamentals and Design

12

Semiconductor – Properties – Energy levels – P-N junction - Homo and Hetero junctions – Basic Silicon Solar cell - Efficiency limits – Variation of efficiency with band gap and temperature - Photovoltaic cell – Photovoltaic module – PV array - Solar cell array design concepts – PV system design - Hybrid and Grid connected system – System installation – Operation and maintenances

UNIT V Solar Passive Architecture

12

Passive heating concepts - Direct heat gain – Indirect heat gain - Thermal storage wall - Attached Greenhouse – Isolated gain and sunspaces – Passive cooling concepts - Evaporative cooling – Shading and ventilation - Radiative cooling – Green coupling - Application of wind - Water and earth for cooling – Paints and cavity walls for cooling – Roof radiation traps – Energy efficient landscape design.

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Interpret the fundamentals of solar energy technologies.
- CO2: Construct the solar heating and cooling system.
- CO3: Analyze the V-I characteristics of PV cells.
- CO4: Design the solar photovoltaic cells and study the installation process.
- CO5: Analyze the fundamental concepts of solar passive architecture.

Text Books:

1. Sukhatme S P and J K Nayak, Solar Energy, Principle of Thermal Storage and Collection, 3rdEdition, Tata McGraw Hill, 2008.
2. Chetan Singh Solanki, Solar Photovoltaics, Fundamentals, Technologies and Applications, PHI Learning Private Limited, 2011.

References:

1. Peter Würfel, Physics of Solar Cells: From Basic Principles to Advanced Concepts, Wiley-VCH, 2009.
2. Jeffrey M. Gordon, Solar Energy: The State of the Art, Earthscan, 2013.
3. Garg H. P. and Prakash J., Solar Energy Fundamentals and application, Tata McGraw- Hill Publishing, 7thReprint 2006.
4. Roger A. Messenger and Jerry Vnetre, Photovoltaic Systems Engineering, CRC Press, 2010.
5. Kalogirou S. A., Solar Energy Engineering: Processes and Systems, 2ndEdition, Academic Press, 2013

Web Sources:

1. <https://nptel.ac.in/courses/115/103/115103123/>
2. <https://nptel.ac.in/courses/115/107/115107116/>
3. <https://nptel.ac.in/courses/112/104/112104300/>

SYLLABUS
GENERIC ELECTIVE
COURSES

	BASIC PHYSICS	L	T	P	Credits
		3	0	0	3

Course Objective: To understand the basic concepts of Physics

UNIT I **9**

Mechanics Force – Weight – Work – Energy – Power – Horsepower – Centrifuge – Washing machine

UNIT II **9**

Heat Variation of boiling point with pressure – Pressure cooker – Refrigerator – Air Conditioner – Principle and their capacities – Bernoulli principle – Aero plane

UNIT III **9**

Sound and Optics Sound waves – Doppler effect – Power of lens – Long sight and short sight – Microscope – Telescope – Binocular – Camera

UNIT IV **9**

Geo Physics and Medical Physics Earthquake – Richter scale – thunder and lightning – Lightning arrestors – Cosmic showers – X-rays – Ultrasound scan – CT scan – MRI scan

UNIT V **9**

Space science and Communication Newton's law of gravitation – Weather forecasting and communication satellites – Indian satellites – Electromagnetic spectrum – Radio waves – AM and FM transmission and reception

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Analyze the basic concepts of physics.
- CO2: Demonstrate the working principle of Bernoulli and their applications.
- CO3: Make use of lens, microscope and telescope in optical systems.
- CO4: Analyze the properties and applications of X-rays.
- CO5: Construct the AM and FM transmission and reception circuit.

Text Book

1. The Learner's series – Everyday science – Published by INFINITY BOOKS, New Delhi
2. The Hindu speaks on Science, Vol I & II, Kasturi & Sons, Chennai

Reference

1. D. Halliday, R. Resnick and J. Walker, Fundamentals of Physics, 637th edition, Wiley, NY (2001).
2. D. Halliday, R. Resnick and K. S. Krane, Physics, Vols I, II, III, 4th Edition, Wiley, New York (1994).
3. R. P. Feynmann, R.B. Leighton & M. Sands, The Feynmann Lectures on Physics Vols I, II, III, Narosa, New Delhi (1998)

Web Sources:

1. <https://www.slideshare.net/tarunjoshi54/electromagnetic-spectrum-its-uses>
2. <https://www.slideshare.net/msdoni/satellites-launched-by-india>
3. <https://slideplayer.com/slide/7442788/>

	EVERYDAY PHYSICS	L	T	P	Credits
		3	0	0	3

Course Objective: To understand the working of things which we use in everyday life

UNIT I

9

Physics behind Home appliances – Light bulb – Fan – Hair drier – Television – Air Conditioners – microwave ovens – Vacuum cleaners – Dishwasher – Washing machines

UNIT II

9

How things work – Basic principles – Tape recorder – Taps – Lifts – Submarines – Jet planes – Helicopters – Rockets – fax machines – Pagers – Cellular phones

UNIT III

9

Demonstration – making a switch board with multiple points – wiring – one lamp controlled by one switch/Two switches – fixing a fuse – soldering – P.C.B Preparation

UNIT IV

9

Study of resistors, chokes, Capacitors and Transformers – multimeter – Basic principles – measurement of resistance, Voltage AC & DC

UNIT V

9

Study of astronomy and cosmology – Atmospheric physics – Global warming – Vibrations and waves –Musical sounds and noise pollution – Plasma Physics - Nuclear power plants - Biophysics- Application of the electromagnetic waves in medicine

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Identify the various circuitual components and their combinations in a circuit.
- CO2: Analyze the various electrical parameters and their significance involved AC and DC circuits.
- CO3: Identify the electrical symbols and circuits, applying it to power circuits.
- CO4: Utilize the resistors, chokes and capacitors in electrical and electronic devices.
- CO5: Demonstrate the hands-on learning of multimeter, voltmeter and ammeter.

Text Book

1. The Learner's series – Everyday science – Published by INFINITY BOOKS, New Delhi
2. The Hindu speaks on Science, Vol I & II, Kasturi Ranga Publishers, Chennai Books for

Reference:

1. D. Halliday, R. Resnick and J. Walker, Fundamentals of Physics, 637th edition, Wiley, NY (2001).
2. D. Halliday, R. Resnick and K. S. Krane, Physics, Vols I, II, III, 4th Edition, Wiley, New York (1994).
3. R.P. Feynmann, R.B. Leighton & M. Sands, The Feynmann Lectures on Physics Vols I, II, III, Narosa, New Delhi (1998).

Web Sources:

1. <https://nptel.ac.in/courses/108/105/108105053/>
2. <https://www.youtube.com/watch?v=5cr71HISw6k>
3. <https://www.youtube.com/watch?v=n-CYKFZKxX8>

	RENEWABLE ENERGY SOURCES	L	T	P	Credits
		3	0	0	3

Course Objective: To understand the concepts of renewable energy sources

UNIT-I 9

Fossil fuels - their limitations - need for renewable energy - non-conventional energy sources - solar energy - wind energy - wind mills - types - biomass - biochemical conversion - biogas generation - ocean thermal energy conversion - geothermal energy tidal energy - fuel cells.

UNIT-II 9

Solar energy - importance - storage of solar energy - solar pond - non-convective solar pond - applications of solar pond - applications of solar energy, solar water heater, flat plate collector - solar distillation - solar cooker, drier - solar greenhouses - solar cell - absorption air conditioning - LiBr-H₂O system

UNIT-III 9

General characteristics - Definitions - Methods of classifications – Thermal energy storage - Sensible heat storage - Liquids - Solids - Latent heat storage - Thermal and chemical storage

UNIT-IV 9

Performance analysis - Transmissivity of the cover system based on reflection - Refraction - Absorption - Transmissivity for diffuse radiation - Transmissivity - Absorptivity product

UNIT-V 9

Photovoltaic conversion - Principle and working of solar cells - Conversion efficiency - Single crystal silicon – Polycrystalline and amorphous silicon--Cadmium sulphide - Cadmium telluride

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Analyze the basic concepts of renewable energy sources.
- CO2: Interpret the environmental issues and sustainability of renewable energy sources.
- CO3: Demonstrate the various resources and technologies for Geothermal and Hydropower energy.
- CO4: Demonstrate the recent advancements in ocean energy applications.
- CO5: Analyze the various applications of solar energy process.

Books for study:

1. G.D. Rai, Non- Conventional Energy Sources, Khanna Publishers, 2011
2. D.P. Kothari, K.C. Singal & Rakesh Ranjan, Renewable energy sources and emerging Technologies, Prentice Hall of India Pvt. Ltd., New Delhi, 2008.

Web Sources:

1. <https://www.slideshare.net/nirajsolanki33/photovoltaic-power-conversion-systems>
2. https://www.slideshare.net/ms_optimisstic/solar-energy-7541878
3. <https://www.slideshare.net/saranraj107/solar-energy-storage-and-its-applications-ii>

	ENERGY PHYSICS	L	T	P	Credits
		4	0	0	4

Course Objective: (Employability)

To make the students to understand the present-day crisis of need for conserving energy and alternatives are provided.

UNIT I Conventional Energy Sources 12

Conventional Energy Sources - Coal – Oil – Gas – Agriculture and Organic Wastes – Water Power – Nuclear Power – thermal Power

UNIT II Non-Conventional Energy Sources 12

Non-Conventional Energy Sources - Solar Energy – Wind Energy – Energy from Bio Mass and Bio-Gas – Ocean Energy – Tidal Energy – Geo Thermal Energy – Advantages of Renewable Energy

UNIT III Solar Energy 12

Solar Radiation – Solar Constant – Solar Radiation Measurements – Pyrheliometers – Pyranometers – Estimation of Average Solar Radiation – Applications of Solar Energy

UNIT IV Wind Energy 12

The Nature of Wind – Power in The Wind – Wind Energy Conversion – Basic Components of a Wind Energy Conversion System (WECS)- Advantages and Disadvantages Of WECS.

UNIT V Energy from Biomass 12

Biomass Conversion Technologies – Wet Process – Dry Process – Photosynthesis – Bio Gas Generation – Bio Gas from Plant Wastes – Methods for Maintaining Biogas Production – Fuel Properties of Bio Gas

TOTAL HOURS: 60

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Illustrate the knowledge about conventional energy sources and the working of thermal and nuclear power plant.
- CO2: Demonstrate the general concepts of non-conventional energy sources and its types.
- CO3: Apply the knowledge of solar energy for domestic purposes.
- CO4: Illustrate the basic concept of wind energy and wind energy conversion system.
- CO5: Analyze the different types of biogas production technique.

Text Books:

1. G.D. Rai, Non- Conventional Energy Sources, Khanna Publishers, 2011
2. D.P. Kothari, K.C. Singal & Rakesh Ranjan, Renewable energy sources and emerging Technologies, Prentice Hall of India Pvt. Ltd., New Delhi (2008).

References:

1. Solar Energies of Thermal Processes, A. Duffie and W. A. Beckmann, John-Wiley, 1980.
2. F. Kreith and J. F. Kreider, Principle of Solar Engineering, McGraw-Hill, 1978
3. S.A. Abbasi and NasemaAbbasi, Renewable Energy sources and their environmental impact, PHI Learning Pvt. Ltd., New Delhi, 2008.

Web Sources:

1. <https://www.slideshare.net/qwertyuidhfjkdsjhnb/ppt-on-sources-of-energy>
2. <https://slideplayer.com/slide/8433535/>

SYLLABUS
ABILITY ENHANCEMENT
COMPULSORY COURSES

	COMMUNICATION SKILLS	L	T	P	Credits
		1	0	2	2

Course Objective:

- This course is to subject the students to practice the components in various units. To make students ready for placement interviews within campus.
- To infuse confidence to face job situations.

UNIT I		6
<ul style="list-style-type: none"> • Resume and CV Writing • Complaint Letter • Social Correspondence • Letter of Enquiry 		
UNIT II		6
<ul style="list-style-type: none"> • Short Essay Writing 		
UNIT III		6
<ul style="list-style-type: none"> • Explaining Proverbs 		
UNIT IV		6
<ul style="list-style-type: none"> • Use of Prepositions 		
UNIT V		6
<ul style="list-style-type: none"> • Synonymous Words 		

TOTAL HOURS: 30

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: To enhance learners' confidence level.

CO2: To make learners' feel the assimilation of skills.

CO3: To engage in a conversation with others to exchange ideas

CO4: To impart leadership qualities among the participants.

CO5: To express opinions to enhance their social skills.

Books Prescribed

- For Unit I – V Effective Communication For You – V. Syamala
Emerald Publishers, Chennai.
- Cameron, David. Mastering Modern English, Hyderabad: Orient Blackswan, 1978 (rpt. 1989, 1993, 1995, 1998).
- Freeman, Sarah. Written Communication in English, Hyderabad: Orient Blackswan, 1977 (21st Impression, 2007).
- Singh, Vandana R. The Written Word. New Delhi: Oxford university Press, 2003 (3rd Impression, 2007)
- Seely, John. Oxford Guide to Effective Writing and Speaking. New Delhi: Oxford University Press, 2000 (4th Impression, 2008)

Web Sources:

- <https://www.myperfectresume.com/career-center/resumes/how-to/write>
- <https://www.englishgrammar.org/>
- <https://www.thesaurus.com/browse/>

	ENVIRONMENTAL STUDIES	L	T	P	Credits
		2	0	0	2

Course Objective: (Skill Development)

To inculcate the importance of environmental pollution, preservation of nature and environmental management for human welfare.

UNIT I Multidisciplinary Nature of Environmental Studies, Natural Resources

6

Definition, scope and importance, need for public awareness.

Renewable and non-renewable resources - Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification - Role of an individual in conservation of natural resources- Equitable use of resources for sustainable lifestyles.

UNIT II Ecosystems, Biodiversity and its conservation

6

Concept of an ecosystem. - Structure and function of an ecosystem Producers, consumers and decomposers. - Energy flow in the ecosystem. Ecological succession. - Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Introduction–Definition, genetic, species and ecosystem diversity. Biogeographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels. India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT III Environmental Pollution

6

Definition, Cause, effects and control measures of a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards. Solid waste Management. Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management- floods, earthquake, cyclone and landslides.

UNIT IV Social Issues and the Environment

6

From Unsustainable to Sustainable development, Urban problems related to energy - Water conservation, rain water harvesting, watershed management- Resettlement and rehabilitation of people; its problems and concerns. Case Studies - Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. Waste land reclamation. Consumerism and waste products. Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act - Issues involved in enforcement of environmental legislation. Public awareness.

UNIT V Human Population and the Environment

6

Population growth, variation among nations. Population explosion – Family Welfare Programme. Environment and human health. Human Rights. Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Case Studies.

Field work - Visit to a local area to document environmental assets river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds, Study of simple ecosystems-pond, river, hill slopes, etc.

TOTAL HOURS: 30

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Identify the various natural resources and the problems associated.
- CO2: Interpret the basic concepts of ecosystems and their types.
- CO3: Analyze the different types of pollution and apply it to control the pollution in our environment.
- CO4: Analyze the concept of climate change and environmental protection act.
- CO5: Apply the knowledge of family welfare program and human rights.

Text Books:

1. De AK, Environmental Chemistry, Wiley Eastern Ltd.
2. Bharucha Erach, 2003. The Biodiversity of India, Mapin Publishing Pvt. Ltd, India.
3. Brunner RC, 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480pgs.
4. Clark RS, Marine Pollution, Clanderson Press, Oxofrd (TB).

Reference Books:

1. Agarwal KC, 2001. Environmental Biology, Nidi Publishers Ltd. Bikaner.
2. Gleick HP, 1993. Water in Crisis, Pacific Institute for Studies in Development, Environment and Security. Stockholm Environmental Institute, Oxford University Press, 473pgs.
3. Heywood VH, and Watson RT, 1995. global Biodiversity Assessment. Cambridge University Press 1140pgs.
4. Jadhav H and Bhosale VM, 1995. Environmental Protection and Laws. Himalaya Publishing House, Delhi 284pgs.
5. Mckinney ML and Schoch RM, 1996. Environmental Science Systems and Solutions. Web enhanced edition, 639pgs.
6. Miller TG, Jr. Environmental Science, Wadsworth Publishing CO. (TB)

Web Sources:

1. <https://www.slideshare.net/tanujanauiyal/environmental-pollution-49396262>
2. <https://www.slideshare.net/NayanVaghela/human-population-and-environment-chapter-2>
3. <https://www.slideshare.net/rajenderarutla1/biogeographical-classification-of-india>

SYLLABUS
SKILL ENHANCEMENT
COURSES

	SOFT SKILL - I	L	T	P	Credits
		2	0	0	2

Course Objective:

- To enable participants Business Communication Skills
- To enhance participants E-mail writing skills
- To impart Leadership and Team Bonding skills

UNIT I: EFFECTIVE COMMUNICATION SKILLS 6

Talking about your company – Making Polite requests – Introducing yourself and others – Socialising with others – Talking about work activities – Talking about your job– Communication practice – Role plays

UNIT II: WRITTEN BUSINESS COMMUNICATION 6

Essential Email writing skills – Formal and Informal E-mails – Usage of formal language – Report Writing – Writing project reports – Extended writing practice – Email Etiquette – Understanding Business E-mails

UNIT III: TELEPHONE ETIQUETTE 6

The basics of Telephone Etiquette – Customer Service – Being courteous – Making arrangements – Giving clear and concise information – Tone and Rate of speech – Pronunciations – Summarisation – Mock Telephonic Conversations

UNIT IV: LEADERSHIP SKILLS 6

Essential Leadership Skills – Interpersonal Skills – Team Building – Team work – Do's and Don'ts of Leadership skills – Importance of communication in Leadership – Delegating and Handling of Projects

UNIT V: LISTENING AND ANSWERING QUESTION 6

Listening for the main ideas – Listening for details – Listening for specific information – Predicting and listening for opinions – Recognising context – Listening for sequence – Understanding Pronunciation – Listening practice

TOTAL HOURS: 30

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: To enhance participant's Business Communication Skills
- CO2: To enhance the participant's Reading, Speaking, Listening and Writing capabilities
- CO3: To engage in a conversation with others to exchange ideas
- CO4: To impart leadership qualities among the participants
- CO5: To express opinions to enhance their social skills

Books Prescribed

- Raman, M. & Sangeeta Sharma. Technical Communication. OUP. 2008
- Taylor, Grant. English Conversation Practice. Tata McGraw Hill Education Pvt. Ltd. 2005
- Tiko, Champa & Jaya Sasikumar. Writing with a Purpose. OUP. New Delhi. 1979

Web Sources:

- <https://www.skillsyouneed.com/ips/communication-skills.html>
- <https://blog.smarp.com/top-5-communication-skills-and-how-to-improve-them>
- <https://blog.hubspot.com/service/phone-etiquette>

	SOFT SKILL - II	L	T	P	Credits
		2	0	0	2

Course Objective:

- To enable students to develop their communication skills effectively
- To enhance students Reading, Writing, Listening and Speaking skills
- To develop their self-confidence through communication

UNIT I: READING COMPREHENSION AND VOCABULARY

6

Reading Techniques – Types of Reading – Skimming – Scanning – Reading for detail – Identifying key words – Underlining unfamiliar key words – Vocabulary Building – Reading Comprehension practice

UNIT II: PRESENTATION SKILLS

6

Presentation Methods – Preparation and Practice – Organising content – Do's and Don'ts of a Presentation – Presentation Techniques – Mock Presentation

UNIT III: GROUP DISCUSSION

6

Introduction to Group Discussion – Preparation for GD – Structure of GD's – Do's and Don'ts – Tips and Strategies – Etiquette and Practice – Body Language and Posture – Sharing Ideas with respect – Understanding Opinions – Mock GD Practice

UNIT IV: CONVERSATIONAL SKILLS

6

Introduction to Small talk – How to start and end a conversation – Exchanging ideas – Expressing Interests – Giving Opinions – Social skills and Etiquette – Informal Conversations – Formal Meetings – Group Practice

UNIT V: SELF – INTRODUCTION AND ROLE PLAY

6

Introducing oneself – Exchange of Greetings – Appropriate Greetings – Usage of Vocabulary – Rapport Building – Handshakes and First Impressions – Basic Etiquette

TOTAL HOURS: 30

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: To get students to understand the importance of communicating in English

CO2: To understand effective communication techniques

CO3: To increase self-confidence through regular practice

CO4: To encourage active participation in their regular class

CO5: To enable participants to face large group of audience with confidence

Books Prescribed:

- English for Competitive Examinations by R.P.Bhatnagar & Rajul Bhargava Macmillan India Ltd. Delhi.
- Carnegie, Dale. The Quick and Easy Way to Effective Speaking. New York: Pocket Books, 1977.
- Kalish, Karen. How to Give a Terrific Presentation. New York: AMACOM, 1996

Web Sources:

- <https://www.skillsyouneed.com/ips/communication-skills.html>
- <https://venngage.com/blog/presentation-skills/>
- <https://gdpi.hitbullseye.com/Group-Discussion.php>

	SOFT SKILL - III	L	T	P	Credits
		2	0	0	2

Course Objective:

- To enable students to develop their soft skills and Body Language
- To enhance students Reading, Writing, Listening and Speaking skills
- To develop their self-confidence to excel at Interviews

UNIT I: SKILL ENHANCEMENT

6

Time Management – Planning and Organisation – Scheduling – Prioritization –Delegation – Task Management – Stress Management – Overcoming anxiety – Confidence Building – Body Language

UNIT II: RESUME / COVER LETTER WRITING

6

SWOT Analysis – Details and Resume Writing – Resume Examples – Building Resume using SWOT – Writing Resume – Writing Cover Letter – Resume Correction –Resume Feedback

UNIT III: INTERVIEW SKILLS

6

Interview Do's and Don'ts – First Impression – Grooming – Body Language –Frequently asked questions – Useful Language – Mock Interview

UNIT IV: QUANTITATIVE ABILITY

6

Permutation & Combinations – Probability – Profit & Loss – Ratio Proportions & Variations – Cubes – Venn Diagrams – Logical Reasoning – Critical Reasoning

UNIT V: REVISIONARY MODULES

6

Group Discussions – HR Process – Interview Process – Mock Group Discussions

TOTAL HOURS: 30

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: To develop participants social and professional skills
- CO2: To help participants manage time effectively
- CO3: To build a strong resume to suit corporate requirements
- CO4: To face interviews confidently
- CO5: To enhance their aptitude abilities

Books Prescribed:

- Meena. K and V.Ayothi (2013) A Book on Development of Soft Skills (Soft Skills: A Road Map to Success) P.R. Publishers & Distributors.
- Soft Skills – Know Yourself & Know the World, S.Chand & Company LTD, Ram Nagar, NewDelhi
- Prasad, H. M. How to Prepare for Group Discussion and Interview. NewDelhi: Tata McGraw-Hill Publishing Company Limited, 2001.
- Pease, Allan. Body Language. Delhi: Sudha Publications, 1998.

Web Sources:

- <https://www.skillsyouneed.com/ips/communication-skills.html>
- <https://www.businessnewsdaily.com/5836-top-interviewing-skills.html>
- <https://gdpi.hitbullseye.com/Group-Discussion.php>

	NATIONAL SERVICE SCHEME - I	L	T	P	Credits
		2	0	0	2

Course Objective: (Skill Development)

To aim of this course is to enable the students to utilize their knowledge in finding practical solutions to individual and community problems.

Unit -I: Introduction and Basic Concepts of NSS 6

- a) History, philosophy, aims & objectives of NSS
- b) Emblem, flag motto, song, badge etc.,
- c) Organizational structure, roles and responsibilities of various NSS Functionaries

Unit-II: NSS Programmes and Activities 6

- a) Concept of regular activities, special camping, Day Camps
- b) Basis of adoption of village/slums, Methodology of conducting Survey
- c) Financial pattern of the scheme
- d) Other youth prog./schemes of GOI
- e) Coordination with different agencies
- f) Maintenance of Diary

Unit-III: Understanding Youth 6

- a) Definition, profile of youth, categories of youth
- b) Issues, challenges and opportunities for youth
- c) Youth as an agent of social change

Unit-IV: Community Mobilization 6

- a) Mapping of community stakeholders
- b) Designing the message in the context of the problem and culture of the community
- c) Identifying methods of mobilization
- d) Youth – adult partnership

Unit -V: Volunteerism and Shramdan 6

- a) Indian Tradition of volunteerism
- b) Needs & Importance of volunteerism
- c) Motivation and Constraints of Volunteerism
- d) Shramdan as a part of volunteerism

TOTAL HOURS: 30

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Illustrate the community in which they work and their relation.

CO2: Demonstrate national integration and social harmony

CO3: Apply their knowledge in finding practical solutions to individual and community problems.

CO4: Identify the needs and problems of the community and involve them in problem-solving.

CO5: Develop capacity to meet emergencies and natural disasters.

Reference Books:

1. National Service Scheme Manual, Government of India.
2. Orientation Courses for N.S.S. Programme officers, TISS.
3. Case material as Training Aid for field workers, Gurmeet Hans.

Web Sources:

1. <http://www.igntu.ac.in/Download/aboutNSS.pdf>
2. <https://vikaspedia.in/education/childrens-corner/national-service-scheme>

	NATIONAL SERVICE SCHEME - II	L	T	P	Credits
		2	0	0	2

Objectives: The aim of this course is to enable the students to familiar and experience with various mechanical and electrical tools through hands-on mode

Unit-I: Importance and Role of Youth Leadership **6**

- a) Meaning and types of leadership
- b) Qualities of good leaders; traits of leadership
- c) Importance and role of youth leadership

Unit-II: Life Competencies **6**

- a) Definition and importance of life competencies
- b) Communication
- c) Inter Personal
- d) Problem – solving and decision-making

Unit-III: Social Harmony and National Integration **9**

- a) Indian history and culture
- b) Role of youth in peace-building and conflict resolution
- c) Role of youth in Nation building

Unit-IV: Youth Development Programmes in India **9**

- a) National Youth Policy
- b) Youth development Programmes at the National level, State Level and Voluntary sector
- c) Youth-focused and Youth –led organizations

Project work /Practical

Conducting Surveys on special theme and preparing a report thereof.

TOTAL HOURS: 30

COURSE OUTCOME

At the end of this course the students will be able to,

- CO1: Interpret the importance and role of youth leadership.
- CO2: Demonstrate national integration and social harmony
- CO3: Identify the approach of problem solving and decision making in a critical solution for an issue.
- CO4: Analyze the significance of national youth policy in India.
- CO5: Develop the knowledge about NSS and its role in the field of health so as to build a strong country.

Reference Books:

1. Training Programme on National Programme scheme, TISS.
2. National Service Scheme Manual, Government of India.
3. Orientation Courses for N.S.S. Programme officers, TISS.

Web Sources:

1. <http://www.igntu.ac.in/Download/aboutNSS.pdf>
2. <https://vikaspedia.in/education/childrens-corner/national-service-scheme>

	PHYSICS WORKSHOP SKILL	L	T	P	Credits
		3	0	0	3

Course Objective: The aim of this course is to enable the students to familiar and experience with various mechanical and electrical tools through hands-on mode

UNIT –I Introduction: Measuring units

9

Conversion to SI and CGS. Familiarization with meter scale, Vernier caliper, Screw gauge and their utility. Measure the dimension of a solid block, volume of cylindrical beaker/glass, diameter of a thin wire, thickness of metal sheet, etc. Use of Sextant to measure height of buildings, mountains, etc.

UNIT –II Mechanical Skill

9

Concept of workshop practice - Overview of manufacturing methods: casting, foundry, machining, forming and welding. Types of welding joints and welding defects Common materials used for manufacturing like steel, copper, iron, metal sheets, composites and alloy, wood - Cutting of a metal sheet using blade. Smoothing of cutting edge of sheet using file - Drilling of holes of different diameter in metal sheet and wooden block - Use of bench vice and tools for fitting. Make funnel using metal sheet.

UNIT –III Cathode Ray Oscilloscope

9

Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization - Specifications of a CRO and their significance.

UNIT –IV Introduction to prime movers

9

Mechanism - gear system - wheel - Fixing of gears with motor axel - Lever mechanism: lifting of heavy weight using lever - Braking systems, Pulleys - Working principle of power generation systems - Demonstration of pulley experiment.

UNIT –V Electrical and Electronic Skill

9

Use of Multimeter - Soldering of electrical circuits having discrete components (R, L, C, diode) and ICs on PCB - Making regulated power supply - Timer circuit, Electronic switch using transistor and relay.

TOTAL HOURS: 45

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Illustrate the various mechanical and electrical tools through hands-on mode.

CO2: Identify the functions of digital multimeter and CRO in the measurement of physical variables.

CO3: Demonstrate the use of different fitting tools like work holding, marking, cutting and miscellaneous.

CO4: Identify the use of safety equipment during workshop practice.

CO5: Demonstrate the basic concepts of timer circuit and electronic switch using transistor.

Reference Books:

1. B L Theraja, A text book in Electrical Technology, S. Chand and Company.
2. M.G. Say, Performance and design of AC machines, ELBS Edn.
3. K.C. John, Mechanical workshop practice, 2010, PHI Learning Pvt. Ltd.
4. Bruce J Black, Workshop Processes, Practices and Materials, 2005, 3rd Edn., Editor Newnes [ISBN: 0750660732]

Web Sources:

1. https://www.electronics-tutorials.ws/transistor/tran_4.html
2. <https://www.electricalengineeringinfo.com/2016/03/cathode-ray-oscilloscope-cro-construction-of-cathode-ray-oscilloscope-cro.html>

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Illustrate the basic concepts of personality development.

CO2: Identify the factors acting attitudes and values.

CO3: Demonstrate the positive and negative esteem.

CO4: Analyze the important of self-motivation.

CO5: Develop the qualities of successful leader.

Text Books:

1. Organisational Behaviour – S.P. Robbins – prentice – Hall of India Pvt. Ltd., New Delhi – 15th Edition, 2013.
2. Communicate to win – Richard Denny – Kogan page India private Ltd, New Delhi – 2009.
3. Essentials of business communication – Rajendra pal and J.S Korlhalli – Sultan Chand & Sons New Delhi, 1st edition, 2012

Reference Books:

1. Business Communication – K.K. Sinha – Galgotia Publishing Company, New Delhi. 4th edition, 2012
2. Media and communication management – C.S. Himalaya publishing
3. Business Communication – Dr S.V. Kadvekar, Prin. Dr. C.N Rawal and Prof. Ravindra Kothavade- Diamond Publications, Pune. 2009.
4. You can win – Shiv Khera – Macmillan India Ltd. 2012.
5. Group discussion and public Speaking – K. Sankaran and Mahendra kumar- MI publications, Agra. 2000.
6. Basic managerial Skills For all – Prentice – Hall of India Pvt. Ltd., New Delhi- 2011 – E.H. McGrath
7. Habits – Stephen Covey – Simon & Shusker Publisher- 2007 edition.
8. Management thoughts – Pramod Batra- HPB Publisher- 1st edition- 2006.
9. Produced By Prof. Rooshikumar Pandya – Creative Communication and Management Centre, Bombay- R & E Publisher kindle edition - 2012.
 - A) Assertive Training: Four Cassettes – Hannah Richards 2012
 - B) Self Hypnosis For Goal Achievement: Four Cassettes- kindle edition – ryan cooper - 2012

Web Sources:

1. http://www.nicurriculum.org.uk/docs/key_stage_3/areas_of_learning/personal_development/ks3_pd_powerofteachers.pdf
2. <https://personalexcellence.co/blog/skills-development/>