



# SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)  
(Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution & Accredited by  
NAAC with "A" Grade)

**(An Autonomous Institution)**

(As per UGC Regulations 2018)



Madagadipet, Puducherry - 605 107

## Department of Physics

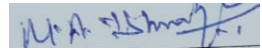
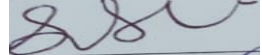


27.08.2020

### Minutes of Board of Studies

The first Board of Studies meeting of Department of Physics was held on 27th August 2020 at 2.30 PM in the Physics Lab, S & H Block, Sri Manakula Vinayagar Engineering College with BOS Chairman Physics in the Chair.

The following members were present for the BOS meeting

Sl.No	Name of the Member with Designation and official Address	Responsibility in the BoS	Signature
1	<b>Dr. T. Jayavarthanan</b> , M.Sc., M.Phil., Ph.D. Professor Department of Physics, SMVEC	Chairman	
<b>External Members</b>			
2	<b>Dr. B. J. Kalaiselvi</b> , M.Sc., M.Tech., Ph.D Professor, Department of Physics, Pondicherry Engineering College, Puducherry-605014	Pondicherry University Nominee	
3	<b>Dr. S. Senthilnathan</b> , M.Sc., M.Phil., Ph.D. Professor, Department of Physics University college of Engineering, Pattukottai	Academic Council Nominee	
4	<b>Dr. D. Manikandan</b> , M.Sc., M.Phil., Ph.D. Assistant Professor, Arignar Anna Govt Arts College, Villupuram	Academic Council Nominee	
5	<b>Mr. J. Bagairathan</b> , M.Sc., M.Tech Manager, L.G. balakrishnan & brothers Ltd	Industrial Nominee	
<b>Internal Members</b>			
1	Mr. K. Oudayakumar. M.Sc., M.Tech	Member	
2	Dr.T. Sivaranjani M.Sc., M.Phil., Ph.D.	Member	
3	Dr.D.Mohan Radheep M.Sc., M.Phil., Ph.D. PDF	Member	
4	Ms. C. Bavani M.Sc., M.Phil., M.Ed	Member	
5	Ms. S. Geetha M.Sc., M.Phil., B.Ed.	Member	

<b>Co-opted Members</b>			
1	Dr.M.A.Ishrath Jahan M.A., M.Phil., Ph.D	Member	
2	Dr. S. Savithri, M.Sc., M.Phil., Ph.D	Member	
3	Mr.Shanmugam, M.Sc., M.Phil., SET	Member	
4	Mr.K.Ganaesan,M.Sc.,M.Phil	Member	

### Agenda of the Meeting

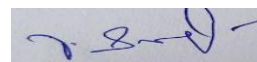
- 1) Discuss about the curriculum Structure of B.Sc – Physics
- 2) To discuss and approve the B.Sc. Degree Regulations 2020 (R-2020), Curriculum from I to VI semesters and syllabi for I to VI Semesters for the B.Sc – Physics and the students admitted in the Academic Year 2020-21. (First Year).
- 3) To discuss about the uniqueness of the Curriculum (R-2020)
- 4) To discuss and approve Evaluation Systems
- 5) To discuss about the Innovative Teaching / Practices Methodology adopted to handle the emerging. / Advanced Technological concept courses
- 6) To discuss and approve the Ph.D programme in Physics for the students admitted in the Academic Year 2020-21
- 7) Any other item with the permission of chair

## Minutes of the Meeting

Dr. T. Jayavarthanam, Chairman, BOS opened the meeting by welcoming and introducing the external members, to the internal and co-opted members and thanked them for accepting to become the member of the Board of Studies and the meeting thereafter deliberated on agenda items that had been approved by the Chairman.

Item:1	The Curriculum Structure of B.Sc – Applied Physics has been discussed
Item:2	University Expert Nominee Dr. B.J. Kalaiselvi agreed the curriculum structure without any changes.
Item:3	One of the External experts Dr. Sendhilnathan focused GATE/NET exams and discussed about the importance of the course and to include Classical, Statistical Dynamics and Electromagnetic theory topics in the curriculum. Further, BOS Chairman Dr. T. Jayavarthanam agreed to discuss with the members.
Item:4	One of the External Experts Dr. Manikandan, discussed about the application oriented topics at the end of all the syllabi. Further Industrial expert member Mr. Bagirathan proposed to design the elective, skill based elective courses as per industrial needs. BOS Chairman Dr. T. Jayavarthanam accepts both the above queries for discussion with internal members.
Item:5	Uniqueness of the Curriculum (R-2020) has been discussed and found satisfactory.
Item:6	Discussed on the Evaluation System in regulations 2020, recommended to academic council.
Item:7	Discussed about the Innovative Teaching / Practices Methodology adopted to handle the emerging / Advanced Technological concept courses and found satisfactory.
Item:8	<b>The above suggestions were incorporated in the curriculum 2020 and approved by the expert members and recommended to Academic council.</b>

The meeting was concluded at 4.00 PM with vote of thanks by **Dr. T. Jayavarthanam**, Professor, Department of Physics.



**Dr.T.Jayavarthanam**  
Professor / Physics  
Chairman –BOS



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**SCHOOL OF ARTS AND SCIENCE**

**BACHELOR OF SCIENCE  
IN  
PHYSICS**

**ACADEMIC REGULATIONS 2020  
(R-2020)  
CURRICULUM AND SYLLABI**

## COLLEGE VISION AND MISSION

### Vision

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

### Mission

#### M1: Quality Education:

To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

#### M2: Research and Innovation:

To foster value based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

#### M3: Employability and Entrepreneurship:

To inculcate the employability and entrepreneurial skills through value and skill based training.

#### M4: Ethical Values:

To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

## DEPARTMENT OF PHYSICS

### VISION AND MISSION

### Vision

To excel in quality based science education by igniting the young talented minds with novel ideas and to develop a scientific temper and a sense of social commitment in students.

### Mission

#### M1: Preeminent Education

To impart quality education both in theoretical and experimental physics through effective Teaching Learning process and to motivate students to pursue higher studies in Physics this will improve their career forecasts.

#### M2: Reach global standard

To reach global standards in production and value based living through an honest and scientific approach

#### M3: Ethical Responsibility

To create a sense of ethical responsibilities among the students

## STRUCTURE FOR UNDERGRADUATE PROGRAMME

Sl. No	Course Category	Breakdown of Credits
1	Modern Indian Language (MIL)	6
2	English (ENG)	6
3	Discipline Specific Core Courses (DSC)	73
4	Discipline Specific Elective Courses (DSE)	16
5	Inter-Disciplinary Courses (IDC)	20
6	Skill Enhancement Courses (SEC)	10
7	Employability Enhancement Courses (EEC*)	--
8	Ability Enhancement Compulsory Courses (AECC)	4
9	Open Elective (OE)	4
10	Extension Activity (EA)	1
<b>Total</b>		<b>140</b>

### SCHEME OF CREDIT DISTRIBUTION – SUMMARY

Sl.No	Course Category	Credits per Semester						Total Credits
		I	II	III	IV	V	VI	
1	Modern Indian Language (MIL)	3	3	-	-	-	-	6
2	English (ENG)	3	3	-	-	-	-	6
3	Discipline Specific Core Courses (DSC)	10	10	10	10	16	17	73
4	Discipline Specific Elective Courses (DSE)	-	-	4	4	4	4	16
5	Inter-Disciplinary courses (IDC)	4	6	5	5	-	-	20
6	Skill Enhancement Courses (SEC)	2	-	2	2	2	2	10
7	Employability Enhancement Courses (EEC*)	-	-	-	-	-	-	-
8	Ability Enhancement Compulsory Courses (AECC)	2	2	-	-	-	-	4
9	Open Elective (OE)	-	-	2	2	-	-	4
10	Extension Activity (EA)	-	1	-	-	-	-	1
<b>Total</b>		<b>24</b>	<b>25</b>	<b>23</b>	<b>23</b>	<b>22</b>	<b>23</b>	<b>140</b>

\* EEC will not be included for the computation of “total of credits” as well as “CGPA”

SEMESTER – I										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
<b>Theory</b>										
1	A20XXT101	Language - I *	MIL	3	0	0	3	25	75	100
2	A20GET101	General English I	English	3	0	0	3	25	75	100
3	A20PHT101	Mechanics and Properties of Matter	DSC	4	0	0	4	25	75	100
4	A20PHT102	Heat and Thermodynamics	DSC	4	0	0	4	25	75	100
5	A20PHD101	Allied Mathematics – I	IDC	3	1	0	4	25	75	100
<b>Practical</b>										
6	A20PHL101	Physics Practical – I	DSC	0	0	4	2	50	50	100
<b>Skilled Enhancement Courses</b>										
7	A20PHS101	Communication Skills lab	SEC	0	0	4	2	100	0	100
<b>Employability Enhancement Course</b>										
8	A20PHC101	MS office	EEC	2	0	0	0	100	0	100
<b>Ability Enhancement Compulsory Course</b>										
9	A20AET101	Environmental Studies	AECC	2	0	0	2	100	0	100
<b>First Semester Total</b>							24	475	425	900

\* Modern Indian Languages are to be selected from the list given in Annexure I

SEMESTER – II										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
<b>Theory</b>										
1	A20XXT202	Language - II*	<b>MIL</b>	3	0	0	3	25	75	100
2	A20GET202	General English II	<b>English</b>	3	0	0	3	25	75	100
3	A20PHT203	Electricity and Magnetism	<b>DSC</b>	4	0	0	4	25	75	100
4	A20PHT204	Optics	<b>DSC</b>	4	0	0	4	25	75	100
5	A20PHD202	Allied Mathematics II	<b>IDC</b>	3	1	0	4	25	75	100
<b>Practical</b>										
6	A20PHL202	Physics Practical II	<b>DSC</b>	0	0	4	2	50	50	100
7	A20PHD203	Statistics Laboratory	<b>IDC</b>	0	0	4	2	50	50	100
<b>Employability Enhancement Course</b>										
8	A20PHC202	Programming in C and C++	<b>EEC</b>	2	0	2	0	100	0	100
<b>Ability Enhancement Compulsory Course</b>										
9	A20AET202	Public administration	<b>AECC</b>	2	0	0	2	100	0	100
<b>Extension Activity</b>										
10	A20EAL201	National Service Scheme	<b>EA</b>	0	0	2	1	100	0	100
<b>Second Semester Total</b>							23	525	475	1000

\* Modern Indian Languages are to be selected from the list given in Annexure I



**Annexure – I**  
**Modern Indian Languages\***  
**(For those who are admitted from ay 2021-22)**

<b>Language - I Offered in First Semester</b>		
<b>Sl.No</b>	<b>Course Code</b>	<b>Course Title</b>
1	A20TAT101	Tamil - I
2	A20HNT101	Hindi - I
3	A20FRT101	French - I
<b>Language - II Offered in Second Semester</b>		
<b>Sl.No</b>	<b>Course Code</b>	<b>Course Title</b>
1	A20TAT202	Tamil - II
2	A20HNT202	Hindi – II
3	A20FRT202	French - II

## மொழித்தாள்

தமிழ்-I

(B.A., B.Sc., B.Com., B.B.A., & B.C.A., பாடப்பிரிவுகளுக்கமான பொதுத்தாள்)

A21TAT101

L T P C Hrs  
3 0 0 3 45

### பாடத்திட்டத்தின் நோக்கம்

- இரண்டாபிரம் ஆண்டுக்கால தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
- தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வாழ்வத்திலும் பெற்ற மாற்றங்கள், அதன் சிந்தனைகள், அடையாளங்கள் ஆகியவற்றைக் காலந்தோறும் எழுதப்பட்ட இலக்கியங்களின் வழியாகக் கூறுவதற்கு இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
- மொழியின் கட்டமைப்பை புரிந்து கொள்வதாக இப்பாடத்திட்டம் வாழ்வமைக்கப்பட்டுள்ளது.
- வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கூறுகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.
- சிந்தனை ஆற்றலைப் பெருக்குவதற்குத் தாய்மொழியின் பங்களிப்பினை உணர்த்த இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

### பாடத்திட்டத்தின் வெளிப்பாடுகள்

C01 - இலக்கியங்கள் காட்டும் வாழ்வியல் நெறிமுறைகளைப் பேணிநடத்தல்.

C02 - நமது எண்ணத்தை வெளிப்படுத்தும் கருவியாகத் தாய்மொழியைப் பயன்படுத்துதல்.

C03 - தகவல் தொடர்புக்குத் தாய்மொழியின் முக்கியத்துவத்தை உணர்த்தல்.

C04 - தாய்மொழியின் சிறப்பை அறிதல்.

C05 - இலக்கிய இன்பங்களை நுகரும் திறன்களை வளர்த்தல்.

### அலகு-1

(9 Hrs)

#### இக்காலக் கவிதைகள்-1

- பாரதியார் - கண்ணன் என் சேவகன்
- பாரதிதாசன் - தமிழ்ப்பேறு
- அப்துல் ரகுமான் - அவதாரம்
- மீரா - கனவுகள் + கற்பனைகள் = காசுதங்கள்
- து.நரசிம்மன் - மன்னித்துவிடு மகனே

### அலகு-2

(9 Hrs)

#### இக்காலக் கவிதைகள்-2

- ராஜா சந்திரசேகர் - கைவிடப்பட்ட குழந்தை
- அனார் - மேலும் சில இரத்தக் குறிப்புகள்
- சுகிர்தராணி - அம்மா
- நா.முத்துக்குமார் - தூர்

### அலகு-3

(9 Hrs)

#### சிறுநிலக்கியங்கள்

- கலிங்கத்துப் புராணி - பொருதடக்கை வான் எங்கே... (பாடல்-485)
- அழகர்கிள்ளைவிடு தூது - இதமாய் மனிதருடனே... (பாடல்-45)
- நந்திக் கலம்பகம் - அம்பொன்று வில்லொடிதெல்... (பாடல்-77)
- முக்கூடற் பள்ளு - பாயும் மருதஞ் செழிக்கவே... (பாடல்-47)
- குற்றாலக் குறவஞ்சி - ஓடக் காண்பதுமே... (பாடல்-9)

### காப்பியங்கள்

மணிமேகலை-உலகறவி புக்க காதை- 'மாகஇல் வால்ஒளி! - இந்நாள் போலும் இளங்கொடி கெடுத்தனை'. (28-அடிகள்)

### அலகு-4

(9 Hrs)

#### தமிழ் இலக்கிய வரலாறு

- சிறுநிலக்கியம்- தோற்றமும் வளர்ச்சியும்
- புதுக்கவிதை- தோற்றமும் வளர்ச்சியும்
- சிறுகதை -தோற்றமும் வளர்ச்சியும்
- புதினம் -தோற்றமும் வளர்ச்சியும்

5. உரைநடை – தோற்றமும் வளர்ச்சியும்

(9 Hrs)

**அலகு 5**

**மொழிப்பயிற்சி**

1. கலைச்சொல்லாக்கம்
2. அகரவரிசைப்படுத்துதல்
3. மரபுத்தொடர்/பழமொழி
4. கலை விமர்சனம்
5. நேர்காணல்

**உரைநடைப் பகுதி**

1. உ.வே.சாமிநாதையர் – சிவதருமோத்திரச் சுவடி பெற்ற வரலாறு.
2. தஞ்சாவூர் – சஜாவின் கோயம்.
3. இரா. பச்சியப்பன் – மாலல்ல மற்றையவை.

**பார்வை நூல்கள்**

1. கைலாசபதி, க., தமிழ் நாவல் இலக்கியம், குமரன் பதிப்பகம், வடபழனி, 1968.
2. சுந்தரராஜன், பே.கோ. சிவபாதசுந்தரம். சோ., தமிழில் சிறுகதை வரலாறும் வளர்ச்சியும், க்ரியா, சென்னை, 1989.
3. பரந்தாமனார், அ.கி., நல்ல தமிழ் எழுத வேண்டுமா, பாரி நிலையம், சென்னை, 1998.
4. பாக்கியமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, என்.சி.எச். பதிப்பகம், சென்னை, 2011.
5. வல்லிக்கண்ணன், புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும், அன்னம், சிவகங்கை, 1992.

**உரைநடை நூல்கள்**

1. சக்திவேல், சு., தமிழ் மொழி வரலாறு, மாணிக்கவாசகர் பதிப்பகம், சிதம்பரம், 1988.
2. சிற்பி பாலசுப்ரமணியம் மற்றும் நீலபத்மநாபன், புதிய தமிழ் இலக்கிய வரலாறு, தொகுதி-1, 2, 3, சாகித்திய அகாமி, புதுவெல்லி, 2013.
3. பாரதியார், பாரதியார் கவிதைகள், குமரன் பதிப்பகம், சென்னை, 2011.

**இணையத்தளங்கள்**

1. <http://www.tamilkodal.com>
2. <http://www.languagelab.com>
3. <http://www.tamilweb.com>

**Course Objectives**

- To recognize the rhythms, metrics and other musical aspects of poetry
- To read a variety of texts critically and proficiently
- To enable the students to enjoy the flair of literature through the work of great writer
- To make the students to know the functions of basic grammar and frame sentences without grammatical error.
- To enable them understanding the intrinsic nuances of writing in English language

**Course Outcomes**

*After the completion of this course, the students will be able to*

**CO1-**Comprehend and discuss the various facets of selected poems

**CO2-**Analyze and interpret texts written in English

**CO3-**Read drama with graduate-level interpretive and analytical proficiency

**CO4-**Improve the fluency and formation of grammatically correct sentence

**CO5-**Enhance the writing skills for specific purposes

**UNIT - I POETRY****(9 Hrs)**

1. John Milton: On His Blindness
2. William Wordsworth: Daffodils
3. Percy Bysshe Shelly: Ozymandias
4. Emily Dickinson: Because I could not stop for Death
5. Sarojini Naidu: The Queen's Rival

**UNIT - II PROSE****(9 Hrs)**

1. Francis Bacon: Of Love
2. Charles Lamb: A Dissertation upon Roast Pig

**UNIT - III DRAMA****(9 Hrs)**

1. Oscar Wilde: Lady Windermere's Fan

**UNIT - IV GRAMMAR****(9 Hrs)**

1. Parts of Speech
2. Tenses
3. Subject-Verb Agreement

**UNIT - V COMPOSITION****(9 Hrs)**

1. Essay Writing
2. Email

**Text Books**

1. James Barrett, "Brookside Musings: A Selection of Poems and Short Stories: Board of Editors", Orient Longman Limited, 2009.
2. Wilde Oscar, "Lady Windermere's Fan. Published in The Importance of Being Earnest and Other Plays" London: Penguin, 1940.
3. Wren & Martin, "High School English Grammar & Composition". Blackie ELT Books, 2017.

**Reference Books**

1. Lalitha Natarajan and Sasikala Natesan, "English for Excellence: Poetry", Anuradha Publications, 2015.
2. Charles Lamb, "Selected Prose", Penguin Classics. United Kingdom, 2013.

3. Usha Mahadevan, "Sunbeams: Empower with English", Emerald Publishers, Chennai. 2016.

### **Web References**

1. <https://www.englishcharity.com/of-love-by-francis-bacon-explanation/>
2. [https://www.poetry-archive.com/n/the\\_queens\\_rival.html](https://www.poetry-archive.com/n/the_queens_rival.html)
3. <https://www.gradesaver.com/lady-windermere-fan/study-guide/summary-act-i>
4. <https://www.english-grammar-revolution.com/parts-of-speech.html>
5. [https://www.internationalstudent.com/essay\\_writing/essay\\_tips/](https://www.internationalstudent.com/essay_writing/essay_tips/)

A20PHT101	<b>MECHANICS AND PROPERTIES OF MATTER</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Hrs</b>
		4	0	0	4	60

### Course Objectives

- To apply the concepts of dynamics to develop skills in analysis of both particles and rigid bodies.
- To learn the mathematical formulations of dynamics problems.
- To find center of mass and inertia of mechanical systems.
- To study the elastic behavior and analyse the expression for young's modulus.
- To understand the surface tension and viscosity of liquid.

### Course Outcomes

*After the completion of this course, the students will be able to*

**CO1**–Understand the concepts of dynamics.

**CO2**–Identify the concepts of rigid body motion.

**CO3** –Understand the Gravitational interaction and central field

**CO4** - Know about the principles of elasticity

**CO5** - Learn the properties of viscosity for liquids

### UNIT I - DYNAMICS

**(12Hrs)**

Projectile –range of horizontal and inclined plane- impulse – impact – Impulsive force – laws of impact – direct and oblique impact of smooth sphere – loss in kinetic energy - impact of smooth sphere on a smooth horizontal plane – motion of two interacting bodies – reduced mass.

### UNIT II - RIGID BODY MOTION

**(12Hrs)**

Rotational motion and moment of inertia - Theorem of perpendicular and parallel axes - calculation of Moment of inertia of ring - planer lamina( Disc) - Solid cylinder - solid cone - Spherical shell - Solid sphere - Hollow cylinder and sphere and Fly wheel - Acceleration of a body rolling down on an inclined plane - Compound Pendulum.

### UNIT III - GRAVITATIONAL INTERACTION AND CENTRAL FIELD

**(12 Hrs)**

Inertial and Gravitational mass- Gravitational potential - Potential and field due to a spherical shell and solid sphere - Gravitational self-energy - central forces - Angular momentum in central forces - Central motion as one body and two body problem, reduced mass - Principle of space flight and satellite (Geostationary).

### UNIT IV – ELASTICITY

**(12Hrs)**

Stress – Strain – Hooke's law – Relation between elastic constants – poisson's Ratio – Expression for poisson's ratio in terms of elastic constants – work done in twisting –torsional pendulum – determination of rigidity modulus – Young's modulus – determination – uniform – non-uniform bending - Bending of beam, Torsion of cylinder, Maxwell's Needle, Bending beam, Determination of  $\gamma$ ,  $\eta$  and  $\sigma$ .

### UNIT V – VISCOSITY

**(12Hrs)**

Poiseuille's formula for flow of liquid through a capillary tube, viscous resistance, combination of capillary tubes, effects of temperature and concentration on viscosity.

**Surface Tensions:** Molecular theory of surface tension, Excess of pressure inside a curved surface, Excess pressure inside a liquid drop and air and soap bubble, Wetting, vapour pressure and surface tension, Effect of temperature on surface tension, Jaeger's method of determination of surface tension.

### Text Books

1. D.S. Mathur. "Mechanics" S. Chand Publishing Company Limited, New Delhi
2. R.K.Shukla and AnchalSrivastava, "Mechanics", New age international Private Ltd.,
3. Brijlal Subramanian "Properties of Matter" by, S. Chand Publishing Company Limited

### **Reference Books**

1. University Physics FW sears, M.W Zemansky and H.D Young 13 e, 1986, Addison Wesley
2. Mechanics: Berkeley Physics Physics course Volume 1: Charles Kittel et.al, 2007, Tata McGraw Hill.
3. Physics – Resnick, Halliday and Walker 9 e, 2010 Wiley.

### **Web References**

1. <https://www.stem.org.uk/elibrary/resource/32028>
2. <https://physicstoday.scitation.org/doi/abs/10.1063/1.3057473?journalCode=pto>
3. [http://mppsc.nic.in/preliminary\\_exam/PHYSICS%20\(pre\).pdf](http://mppsc.nic.in/preliminary_exam/PHYSICS%20(pre).pdf)

A20PHT102

## HEAT AND THERMODYNAMICS

L	T	P	C	Hrs
4	0	0	4	60

### Course Objectives

- To demonstrate an understanding of the first and second laws of thermodynamics, and of the concept of entropy.
- To explain and derive the fundamental thermodynamic relation.
- To explain the concepts of entropy, enthalpy, reversibility and irreversibility.
- To understand the role of the internal energy, temperature, pressure and specific volume thermodynamic properties.
- To understand different form of pure substances and their boiling point

### Course Outcomes

*After the completion of this course, the students will be able to*

**CO1- Develop** the ideas of classical thermodynamics

**CO2** –Know the difference between the microscopic properties of individual atoms or other particles and the macroscopic properties of many-body systems

**CO3** - Demonstrate the power of statistical methods in physics

**CO4** - Learn the principles and properties of thermodynamics

**CO5**- Know the concepts of statistical thermodynamics

### UNIT I – TRANSMISSION OF HEAT

(12Hrs)

Thermal conductivity – good & bad conductors – Forbe’s method - Lee’s disc method– relationship between thermal and electrical conductivities - Wiedemann Franz’s law - Radiation- Prevost’s theory of heat exchanges - law of cooling – Black body radiation - Kirchhoff’s law - Wien’s laws of energy distribution in black body radiation - Wien’s displacement law- Rayleigh-Jean’s law -Plank’s law – pyrometry - solar constant – sources of solar energy & applications.

### UNIT II - KINETICTHEORY

(12 Hrs)

Expression for pressure - Transport phenomenon – expression for mean free path - thermal conductivity and diffusion of gases - distribution of molecular velocities – energy distribution function - Degrees of freedom - equipartition law of energy -  $C_p$  ,  $C_v$  and R of a gas - theory of Brownian motion – Langevin’s theory.

### UNIT III - GASSES AND LOW TEMPERATURE PHYSICS

(12hrs)

Molar heat capacities – Mayer’s relation reversible adiabatic and isothermal changes– equations – Clement and Desormers method of determining  $C_p$  /  $C_v$  – Andrew’s work on  $Co_2$ – regenerative cooling – the Linde process – Liquid air, oxygen, hydrogen and Helium – He I and He II – super fluidity - practical applications of low temperatures – refrigerating machines– electroflux refrigerator – Frigidaire – air conditioning machines – effects of  $CF_2$  and  $Cl_2$  on Ozone layer.

### UNITIV – THERMODYNAMICS

(12 Hrs)

Intensive and extensive variables – I & II laws of thermodynamics – reversible and irreversible processes – Heat engines – Otto and diesel engines – thermodynamic scale of temperature - entropy - change of entropy in reversible and irreversible processes – T-S diagram– entropy for a perfect gas - third law of thermodynamics.

### UNIT V – STATISTICAL THERMODYNAMICS

(12 Hrs)

First Latent heat equation (Clausius – Clapeyron equation), effect of pressure on melting and boiling point – second Latent heat equation - Maxwell’s Thermodynamical relations– derivations - Phase space – MB statistics



### **Text Books**

1. Brijlal and Subramanyam, "Heat and Thermodynamics", S. Chand & Co.,2000
2. Mathur D.S,"Heat and Thermodynamics", S. Chand, 2014.
3. Murugesan.R., "Thermal Physics", S. Chand & Co.,2009.

### **Reference Books**

1. Nelkon Parker, *Advanced Level Physics* (Vol 5), Arnold Publication, Berkely Series, 1995.
2. Dr. Ilangoan and Dr.D. Jayaraman,, *Thermal Physics*, S. Chand & Co.,2014.

### **Web References**

1. <https://www.livescience.com/50776-thermodynamics.html>
2. <http://hyperphysics.phy-astr.gsu.edu/hbase/Kinetic/kinthe.html>
3. <https://nationalmaglab.org/education/magnet-academy/learn-the-basics>

A20PHD101

**ALLIED MATHEMATICS – I**

L	T	P	C	Hrs
3	1	0	4	60

**Course Objectives**

- To understand the concept of types of Integration.
- To introduce Double and Triple Integration.
- To explore the expansion of  $\sin\theta, \cos\theta, \tan\theta$
- To learn the concept of inverse trigonometry functions.
- To introduce the concept of correlation and regression.

**Course Outcomes**

*After completion of the course, the students will be able to*

**CO1** - Understand the different types of integration.

**CO2**- Solve double and Triple integral problems.

**CO3** - Find expansion of trigonometric values and solution of trigonometric solutions.

**CO4** - Identify the different types of Inverse trigonometry.

**CO5** - Learns different methods in solve statistics.

**UNIT I DEFINITE INTEGRALS**

**(9 Hrs)**

Revision of all Integral models - Definite integrals – Integration by parts & Reduction formula.

**UNIT II MULTIPLE INTEGRALS**

**(9 Hrs)**

Multiple Integrals, change of order of integration and change of variables in double integrals (Cartesian to polar). Applications: Areas by double integration and volumes by triple integration (Cartesian and polar).

**UNIT III TRIGONOMETRY**

**(9 Hrs)**

Expansions of  $\cos n\theta, \sin n\theta$  – Expansion of  $\tan n\theta$  in terms of  $\tan \theta$  - Expansion of  $\tan(A+B+C+\dots)$  – Formation of Equations .Powers of sines and cosines of  $\theta$  in terms of functions of multiples of  $\theta$  – expansions of  $\sin \theta$  and  $\cos \theta$  in a series of ascending powers of  $\theta$

**UNIT IV INVERSE TRIGONOMETRY**

**(9 Hrs)**

Expansion of Inverse Circular Functions. Definition – Relation between Hyperbolic Functions – Inverse Hyperbolic Functions. Resolution into Factors – simple problems only -DeMoivre's Property on the Circle and Cote's Property on the Circle. Logarithm of complex quantities.

**UNIT V STATISTICS**

**(9 Hrs)**

Measures of central tendency – Arithmetic Mean, Median and Mode – Measures of dispersion and Standard deviation – Skewness and Measures of Skewness – Pearson's coefficient of Skewness – Moments – Correlation – Rank correlation and regression.

**Text Books**

- 1.S. Durai pandian and Laxmi Durai pandian (1984) *Trigonometry*. Emerald Publishers, Chennai.
- 2.N.P.Bali-Trigonometry-Year of Publication 1994.Krishna Prakasan Mandhir, 9, Shivaji Road, Meerut (UP)
3. Shanti Narayan, "Integral Calculus", S Chand & Co. New Delhi, 2001.

**Reference Books**

1. A. Singaravelu "Algebra and Trigonometry", Vol.-I Meenakshi Agency,Chennai (2003).
2. P.R.Vittal,"Trigonometry, Margham"Publications, Chennai.(2004)
3. P. Kandasamy, K. Thilagavathy, "Mathematics of B.SC", Vol I & II, S. Chand Company Ltd, New Delhi – 2004.

**Web References**

1. <https://nptel.ac.in/courses/111/105/111105122/>
2. <https://www.khanacademy.org/math/precalculus/x9e81a4f98389efdf:trig/x9e81a4f98389efdf:inverse-trig/v/inverse-trig-functions-arcsin>
3. <https://www.khanacademy.org/math/statistics-probability>

Choose any 8 experiments from the list given below

### Course Objectives

- To provide a practical understanding of some of the concepts learnt in the theory course on Physics.
- To evaluate the process and outcomes of an experiment quantitatively and qualitatively.
- To extend the scope of an investigation whether or not results come out as expected.
- To conduct an experiment collaboratively and ethically.
- To collect data and revise an experimental procedure iteratively and reflectively

### Course Outcomes

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

- CO 1** – Understand to know the moment of inertia. Capable of handling screw gauge, and vernier calliper
- CO 2** - Acquired basic knowledge about Potentiometer and magnetic field due to a current carrying coil.
- CO 3** – Gain the knowledge about the thermal conductivity behavior in good and bad conductors.
- CO 4** – Gain the knowledge about formal laboratory reports describing the results of experiments and to interpret the data from the experiments
- CO 5** – Know the practical knowledge to describe the experiments and to correlate the theoretical values

### LIST OF EXPERIMENTS

1. Compound pendulum - determination of  $g$ , radius of gyration and moment of inertia
2. Young's modulus - non-uniform bending – Pin and Telescope.
3. Spectrometer – Ordinary & Extraordinary rays.
4. Determination of moment of inertia – fly wheel method
5. Rigidity modulus - torsional oscillations without masses.
6. Thermal conductivity of a bad conductor- Lee's disc method.
7. Surface tension of a liquid and interfacial surface tension (water & kerosene) - method of drops.
8. Young's modulus –non- uniform bending – Scale and Telescope.
9. Specific heat capacity of a liquid and emissivity of a surface – newton's law of cooling.
10.  $Y$  - Searle's method for determining  $Y$ ,  $n$  and  $\eta$  of a material.

### Text Books

1. C.C Ouseph, V.J.Rao and V.Vijayendran “Practical Physics”
2. M.N. Srinivasan “Practical Physics”, Sultan son Pub.
3. D P Khandelwal, “Laboratory Manual of Physics” for UG classes (Vani Pub. House, NewDelhi)

### Reference Book

1. V Y Rajopadhye and V L Purohit, Text book of experimental Physics

### Web Resources

1. [https://www.niser.ac.in/sps/sites/default/files/basic\\_page/Compound%20pendulum\\_2017.pdf](https://www.niser.ac.in/sps/sites/default/files/basic_page/Compound%20pendulum_2017.pdf)
2. <https://www.iist.ac.in/departments/physics-lab>

**COURSE OBJECTIVES**

- To improve the skill of rapid reading and comprehending efficiently
- To decode the correspondence between sound and spelling in English
- To train students to organize, revise and edit ideas to write clearly and commendably
- To enhance the sense of social responsibility and accountability of the students
- To expound the significance of time and stress management

**COURSE OUTCOMES**

*After the completion of the course, the students will be able to*

**CO1** - Understand the pattern to communicate effectively

**CO2** - Impart Speaking skills with self-confidence

**CO3** - Use writing strategies to improve their drafting skills and comprehending of articles

**CO4** - Demonstrate leadership qualities to Participate in Group Discussion and Interview efficiently

**CO5** - Expertise in Managerial skills

**UNIT - I LISTENING SKILLS****(6Hrs)**

1. Negotiation and Persuasion
2. Leadership
3. Teamwork
4. Problem solving
5. Empathy
6. Decision making

**UNIT – II SPEAKING SKILLS****(6Hrs)**

1. Aspects of speaking
2. Process and techniques of effective speech
3. Presentations
4. Short speech
5. TED Talks
6. Self-Introduction

**UNIT – III READING SKILLS****(6Hrs)**

1. Phonetics
2. Reading Vocabulary
3. Reading Comprehension
4. Skimming and Scanning

**UNIT - IV WRITING SKILLS****(6Hrs)**

1. Descriptive
2. Narrative
3. Persuasive
4. Expository
5. Picture composition

**UNIT II SELF-MANAGEMENTSKILLS****(6Hrs)**

1. Time Management
2. Stress management
3. Perseverance

4. Resilience
5. Mind mapping
6. Self- confidence

### **Text Books**

1. Syamala. V, "Effective English Communication for you", Emerald Publishers, 1<sup>st</sup> Edition,2002.
2. Balasubramanian, "A Textbook of English Phonetics for Indian Students", Trinity Press, 1<sup>st</sup> Edition, 1981.
3. Sardana, C.K., "The Challenge of Public Relations", Har- Anand Publications, 1<sup>st</sup> Edition,1995.

### **Reference Books**

1. Murphy, John J, "Pulling Together: 10 Rules for High-Performance Teamwork", Simple Truths, 1<sup>st</sup>Edition,2016.
2. Sanjay Kumar, Pusph Lata. "Communication Skills". Oxford University Press. 1<sup>st</sup> Edition,2015.
3. Barun K. Mitra, "Personality Development and Soft skills", Oxford University Press, 1<sup>st</sup> Edition, 2016.

### **Web References**

1. <https://blog.dce.harvard.edu/professional-development/10-tips-improving-your-public-speaking- skills>
2. <https://corporatefinanceinstitute.com/resources/careers/soft-skills/management-skills/>
3. <https://zety.com/blog/how-to-introduce-yourself>
4. <http://blogs.placementindia.com/2010/04/23/exercise-to-improve-communicationskills/>
5. <http://www.businesscommunicationblog.com>

**Course Objectives**

- To gain knowledge on the importance of natural resources and energy
- To understand the structure and function of an ecosystem
- To imbibe an aesthetic value with respect to biodiversity, understand the threats and its conservation and appreciate the concept of interdependence
- To understand the causes of types of pollution and disaster management
- To observe and discover the surrounding environment through field work

**Course Outcomes**

*After the completion of this course, the students will be able to*

**CO1** - Realize the importance of natural resources and various energy resources

**CO2** - Learn about the biodiversity

**CO3** - Learn the different types of pollution and to prevent the pollution

**CO4** - know about the pollution Act and social issues

**CO5** - understand Human related issued and environment

**UNIT I INTRODUCTION TO NATURAL RESOURCES/ENERGY (6 Hrs)**

Natural Resources – Definition – Scope and Importance – Need for Public Awareness

Renewable and Non-renewable Resources: Natural resources and associated problems. Forest resources and over-exploitation – Water resources and over- utilization – Mineral resource extraction and its effects - Food resources - food problems and Modern agriculture - Energy resources and its future.

**UNIT II ECOSYSTEMS (6 Hrs)**

Concept of an ecosystem-structure and function of an ecosystem-producers, consumers and decomposers- ecological succession- food chains(any 2 Examples)- food webs(any 2 Examples)- ECOLOGICAL PYRAMIDS.

**UNIT III ENVIRONMENTAL POLLUTION /DISASTER MANAGEMENT (6 Hrs)**

Definition-causes, effects and control measures of Air, Water and Soil pollution- e- waste management- Disaster management: Natural and manmade- food/earthquake/cyclone, tsunami and landslides.

**UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT (6 Hrs)**

Sustainable development- Climate change: global warming, acid rain, ozone layer depletion and nuclear radiation- Environment Protection Act (any 2) air, water, wildlife and forest.

**UNIT V HUMAN POPULATION AND THE ENVIRONMENT (6 Hrs)**

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

**Text Books**

1. K. De, "Environmental chemistry" 9th Ed; New age international (P) Ltd, New Delhi, 2010.
2. K. RaghavanNambiar, "Text Book of Environmental Studies" 2ndEd, Scitech Publications (India) Pvt Ltd, India, 2010.
3. G. S. Sodhi, Fundamental concepts of environmental chemistry, I Ed, Alpha Science International Ltd, India, 2000.

**Reference Books**

1. B.K. Sharma, "Environmental chemistry" 11th Ed, Krishna Prakashan Media (P) Ltd, Meerut, 2009.
2. S.S.Dara, and D.D. Mishra "A text book of environmental chemistry and pollution control, 5th Ed, S.Chandand Company Ltd, New Delhi, 2012.
3. Richard T. Wright, Environmental Science: Toward a Sustainable Future, 10thedition, Prentice Hall, 2008

**Web Resources**

1. [www.ifpri.org/topic/environment-and-natural-resources](http://www.ifpri.org/topic/environment-and-natural-resources)
2. <https://www.iucn.org/content/biodiversity>
3. <http://www.world.org/weo/pollution>

## மொழித்தாள்

### தமிழ்-II

(B.A. B.Sc., B.Com. B.B.A., & B.C.A, பாட்பிரிவுகளுக்கும்மான வொதுத்தாள்)

L T P C Hrs  
3 0 0 3 45

A20TAT202

#### பாடத்திட்டத்தின் நோக்கம்

- இரண்டாயிரம் ஆண்டுகால தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
- தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்ற மாற்றங்கள், அதன் சிந்தனைகள், அடையாளங்கள் ஆகியவற்றைக் காலந்தோறும் எழுதப்பட்ட இலக்கியங்களின் வழியாகக் கவனத்திற்கு இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
- மொழியின் கட்டமைப்பைப் புரிந்து கொள்வதாகவும் பாடத்திட்டம் வடிவமைக்கப்பட்டுள்ளது.
- வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கருவிகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.
- சிந்தனை ஆற்றலைப் பெருக்குவதற்குத் தாய்மொழியின் பங்களிப்பினை உணர்த்த இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

#### பாடத்திட்டத்தின் வெளிப்பாடுகள்

CO1 -இலக்கியங்கள் காட்டும் வாழ்வியல் நெறிமுறைகளைப் பேணிநடத்தல்.

CO2 -நமது எண்ணத்தை வெளிப்படுத்தும் கருவியாகத் தாய்மொழியைப் பயன்படுத்துதல்.

CO3 -தகவல் தொடர்புக்குத் தாய்மொழியின் முக்கியத்துவத்தை உணர்தல்.

CO4 -தாய்மொழியின் சிறப்பை அறிதல்.

CO5 -இலக்கிய இன்பங்களை நுகரும் திறன்களை வளர்த்தல்.

#### அலகு-1

(9 Hrs)

##### எட்டுத்தொகை:

- குறுந்தொகை (பாடல்-130).
- நற்றிணை (பாடல்-27).
- அகநானூறு (பாடல்-86)
- ஐங்குறுநூறு (பாடல்-203)
- கலித்தொகை- பாலைத்திணை (பாடல்-9)
- புறநானூறு (பாடல்-235)

##### பத்துப்பாட்டு:

- சிறுபாணாற்றுப்படை (அடிகள்-126-143)
- முல்லைப்பாட்டு (6-21)

#### அலகு-2

(9 Hrs)

##### பதினெண் கீழ்க்கணக்கு:

- திருக்குறள்- வெகுளாமை (அதிகாரம்-31), காதல் சிறப்புரைத்தல் (அதிகாரம்-113)
- நாலடியார் - நல்லார் எனத்தான் (221)
- திரிகடுகம்- கோலஞ்சி வாழும் குடியும் (33)
- இனியவை நாற்பது- குழவி தளர்நடை (14)
- கார் நாற்பது- நலமிகு கார்த்திகை (26)
- களவழி நாற்பது-கவளங்கொள் யானை (14)

#### அலகு-3

(9 Hrs)

##### சைவம்- பன்னிரு திருமுறைகள்

- திருஞானசம்பந்தர் - வேயுறு தோளியங்கள் (இரண்டாம் திருமுறை)
- திருநாவுக்கரசர் - மனமெனும் தோணி (நான்காம் திருமுறை)
- சுந்தரர் - ஏழிசையாய் இசைப்பயனாய் (ஏழாம் திருமுறை)
- மாணிக்கவாசகர் - ஆதியும் அந்தமும் இல்லா (திருவெம்பாவை)
- திருமுலர் - அன்பு சிவம் இரண்டு (திருமந்திரம்)

##### வைணவம் - நாலாயிரத் திவ்வியப் பிரபந்தம்

- பேயாழ்வார் - திருக்கண்டேன் பொன்மேனி....
- பொய்யாழ்வார் - கருங்கண் தோகை மயிற் பீலி....
- தொண்டரடிப்பொடிஆழ்வார் - பச்சைமாமலை போல்....
- ஆண்டார் - கருப்பூரம் நாறுமோ? கமலப்பு....
- திருமங்கையாழ்வார் - வாடினேன் வாடி வருந்தினேன்....

**இஸ்லாமியம்**

சீறாப்பூராணம்- பாடல் நின்ற பிணை மானுக்குப்...5 பாடல்கள் (பாடல் எண்கள் 61-65)

**கிருத்துவம்**

இரட்சணய யாதாீகம்- கடைதிறப்புப் படலம் -5 பாடல்கள் (பாடல் எண்கள்: 3,9,10,15,16)

**அலகு - 4****(9 Hrs)****தமிழ் இலக்கிய வரலாறு**

1. சங்க இலக்கியங்கள்
2. நீதி இலக்கியங்கள்
3. பக்தி இலக்கியங்கள்
4. காப்பியங்கள்

**அலகு-5****(9 Hrs)****சிறுகதைகள்**

- |                      |   |                              |
|----------------------|---|------------------------------|
| 1. புதுமைபித்தன்     | - | அகலிகை                       |
| 2. நா. பிச்சமூர்த்தி | - | வேப்பமரம்                    |
| 3. அகிலன்            | - | ஒரு வேளைச்சோறு               |
| 4. ஜி.நாகராஜன்       | - | பச்சக் குதிரை                |
| 5. கி.ராஜநாராயணன்    | - | கதவு                         |
| 6. சா.கந்தசாமி       | - | தக்கையின் மீது நான்கு கண்கள் |

**பார்வை நூல்கள் :**

1. அரசு, வீ., இருபதாம் நூற்றாண்டு சிறுகதைகள் நூறு, அடையாளம் பதிப்பகம், திருச்சி, 2013.
2. அருணாச்சலம், பா., பக்தி இலக்கியங்கள், பாரி நிலையம், சென்னை, 2010.
3. தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை, 2000.
4. பாக்கியமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, என்.சி.பி.எச். பதிப்பகம், சென்னை, 2011.
5. பசுபதி, மா. வே., செம்மொழித் தமிழ் இலக்கண இலக்கியங்கள், தமிழ்ப் பல்கலைக்கழகம், 2010 .

**உரைநடை நூல்கள் :**

1. அன்பு, பா., மா.பொ.சி யின் ஒரு இலக்கிய நூல்கள் ஒரு மதிப்பீடு, உலக தமிழ் ஆராய்ச்சி நிறுவனம், சென்னை, 1983.
2. பிள்ளை, கே.கே., தமிழக வரலாறும் மக்களும் பண்பாடும், உலக தமிழ் ஆராய்ச்சி நிறுவனம், சென்னை, 2000
3. ஜெயமோகன், நவீன இலக்கிய அறிமுகம், உயிர்மெய் பதிப்பகம், சென்னை, 1995.

**இணையத்தளங்கள் :**

1. <http://www.tamilkodal.com>
2. <http://www.languagelab.com>
3. <http://www.tamilweb.com>



**Course Objectives**

- To recognize poetry from a variety of cultures, languages and historic periods
- To develop the intensive study of language by critical reading
- To identify the various genres and analyze the works of writers in English
- To expand the basic understanding of targeted grammatical structures
- To understand the conventions of writing in English

**Course Outcomes**

*After completion of the course, the students will be able to*

**CO1**-Understand and appreciate poetry as a literary art form

**CO2**-Comprehend and recognize relationship between ideas, events and facts

**CO3**-Learn to explore characters and their conflicts, dilemmas and extend their response to stories

**CO4**-Apply grammatical structures meaningfully and appropriately in oral and written form

**CO5**-Write effectively and coherently in English language

**UNIT I POETRY****(9 Hrs)**

1. Lord Byron - She Walks in Beauty
2. Robert Frost - Stopping by Woods on a Snowy Evening
3. Nissim Ezekiel - Night of the Scorpion
4. Rabindranath Tagore - Where the Mind is Without Fear
5. Dylan Thomas – Do not go gentle into that good night

**UNIT II PROSE****(9 Hrs)**

1. A.G. Gardiner - On Saying 'Please'
2. Martin Luther King - I have a Dream
3. M.K. Gandhi - Women, Not the Weaker Sex

**UNIT III SHORT STORIES****(9 Hrs)**

1. Frank R. Stockton – The Lady, or the Tiger
2. Ernest Hemingway - A Day's Wait
3. Anton Chekhov - The Lottery Ticket

**UNIT IV GRAMMAR****(9 Hrs)**

1. Voice
2. Conditionals
3. Coherence
4. Idioms and Phrase
5. Determiners
6. Connectors

**UNIT V COMPOSITION****(9 Hrs)**

1. Letter Writing
2. Report Writing

**Text Books**

1. Sharma, O.C "The Approach to Life: A Selection of English Prose", Orient Longman Publication, 1<sup>st</sup> Edition, 2009.
2. Dipankar Purkayastha & Dipendu Das & Jaydeep Chakrabarty, "Brookside Musings: A Selection of Poems and Short Stories", Orient Longman Publication, 1<sup>st</sup> Edition, 2009.
3. Wren & Martin, "English Grammar and Composition", Chand Publication, 18<sup>th</sup> Edition, 2017.

**Reference Books**

1. Lalitha Natarajan & Sasikala Natesan, "English for Excellence: Poetry", Anuradha Publications, 1<sup>st</sup> Edition, 2015.

2. Ernest Hemingway, "The Complete Short Stories of Earnest Hemingway", Simon and Schuster Publication, 1<sup>st</sup> Edition, 1998.
3. S.C.Gupta, "English Grammar & Composition", Arihant Publication, Old Edition, 2003.

**Web Reference**

1. <https://www.litcharts.com/poetry/lord-byron/she-walks-in-beauty>
2. <https://americanliterature.com/author/anton-chekhov/short-story/the-lottery-ticket>
3. <https://www.cliffsnotes.com/literature/p/pride-and-prejudice/book-summary>

**Course Objectives**

- To understand the phenomena of electricity and magnetism.
- To describe the electric field and potential and related concepts, for stationary charges.
- To understand the basic of electric circuits capacitors and resistors.
- To calculate electrostatic properties of simple charge distributions using Coulomb's law Gauss's law and electric-potential.
- To calculate the magnetic force act on moving charges and magnetic fields due to current

**Course Outcomes**

**CO1** - Develop a basic understanding of electric and magnetic fields in free space using the integral forms of Maxwell's laws.

**CO2** - Understand the chemical effects of electric current

**CO3** - Understand of growth and decay of current

**CO4** - Know the difference between ac and dc current

**CO5** - Know the magnetic properties of materials

**UNIT I – ELECTROSTATICS****(12 Hrs)**

Coulomb's law – electric intensity and electric potential – electrical images(any four examples)- electric intensity and potential due to an earthed conducting sphere applying the principle of electrical images- electric dipole – potential and intensity due to a dipole – capacity – capacitance of a spherical and cylindrical capacitor – energy of a charged capacitor – loss of energy due to sharing of charges

**UNIT II - CHEMICAL EFFECTS OF ELECTRIC CURRENT****(12 Hrs)**

Carey foster bridge - theory – Determination of temperature co-efficient of resistance – Calibration of voltmeter – Ammeter - Using Potentiometer - thermoelectricity- Peltier's coefficient – Thomson coefficient – application of thermodynamics to a thermocouple and connected relations- thermoelectric diagram and uses.

**UNIT III – TRANSIENT CURRENT****(12 Hrs)**

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 a LCR circuit – condition for the discharge to be oscillatory – frequency of oscillation.

**UNIT IV - A.C AND ELECTROMAGNETIC INDUCTION****(12 Hrs)**

Power in AC circuit – wattles current- choke coil construction and working of transformers- energy losses – AC motors – single phase, three phases – star and delta connection –electric fuses- circuit breakers.Inductances in series and parallel-Self-inductance of co-axial cylinders-energy stored in a magnetic field-time varying magnetic field-Single phase induction motor

**UNIT V- MAGNETIC PROPERTIES OF MATERIALS****(12 Hrs)**

Susceptibility- permeability- intensity of magnetization and the relation  $B = \mu(H+M)$ , M-H and B-H curves for a magnetic material using magnetometer method and ballistic galvanometer method – Terrestrial magnetism – magnetic elements- dip circle.

**Text Books**

1. MurugesanR“*ElectricityandMagnetism*”8<sup>th</sup>Edition,New Delhi, S. Chand & Co.,2006.
2. Brijlal and N. Subramanian,” *Electricity and Magnetism*”, Agra, Ratan & Prakash, 6<sup>th</sup>Edition.
3. Narayanamoorthy M & Nagarathnam N, *Electricity and Magnetism*, Meerut, National Publishing Co., 4<sup>th</sup>edition.

### Reference Book

1. David J Griffith, *Introduction to Electrodynamics*, 2<sup>nd</sup> Edition, New Delhi, Prentice Hall of India Pvt. Ltd,1997.
2. Sehgal D.L, Chopra K. L and Sehgal N. K, *Electricity and Magnetism*, New Delhi, Sultan Chand &Co.,
3. Brij Lal, Subramanian N and Jivan Seshan, *Mechanics and Electromagnetics*, New Delhi, Eurasia Publishing House Pvt .Ltd,2005.

### Web Resources

1. <https://www.britannica.com/science/physics-science/The-study-of-electricity-and-magnetism>
2. <https://www.materialstoday.com/electronic-properties/news/relationship-between-electricityand-magnetism>

**Course Objectives**

- To produce ray diagrams to predict the position and size of the image produced by simple lenses.
- To understand the behavior of light rays travelling in free space on reflective surfaces
- To measure the focal length of a simple convex lens by producing an image of a distant object.
- To understand the interference of two or more optical waves
- To calculate the focal length of a simple lens by making measurements of image and object distance and using the lens equation

**Course Outcomes**

*After the end of the course, the students will able to*

**CO1** – Understand the geometric optics and the use of ray diagrams using lenses and mirrors.

**CO2** – Operate how to analyze the simple optical instruments work.

**CO3** - know the principle and uses of interference

**CO4** - Understand the concept of diffraction

**CO5** - Learn the optical instruments and the concepts of polarization

**UNIT I- RAY OPTICS****(12 Hrs)**

Fermat's principle and its applications Principle of extreme path, Proof of laws of reflection and refraction, paraxial approximation, matrix method in paraxial optics, ABCD matrix.

**UNIT II - REFLECTION AND REFRACTION****(12 Hrs)**

Snell's law of reflection and refraction, reflection and refraction at spherical surfaces: formula for refraction at single spherical surface, sign convention. Thick lens: matrix methods in paraxial optics, basic ideas of unit planes and nodal planes, Cardinal points of an optical system, general relationship, combination of thin lenses. Aberration in images :chromatic aberrations; achromatic combination of lenses in contact and separated lenses. Monochromatic aberrations and their reduction. Properties of wavefront, Huygen's principle.

**UNIT III – INTERFERENCE****(12 Hrs)**

Interference of light: The principle of superposition; two slit interferences, coherence requirements for the sources, localized fringes in thin films, transition from fringes of equal thickness to those of equal inclination Michelson interferometer; its uses for determination of wavelength, wavelength difference and standardization of the meter. Intensity distribution in multiple beam interference; Fabry - Perot interferometer and concept of finesse.

**UNIT IV – DIFFRACTION****(12 Hrs)**

Fresnel diffraction: Half-period zones, circular apertures and obstacles, straight edge, explanation of rectilinear propagation. Cornu Spiral and its applications Babinet's Principle.

Fraunhofer diffraction: Diffraction at a single slit a circular aperture and a circular disc. Resolution of images; Rayleigh criterion, resolving power of a telescope and a microscope -Outline of phase contrast microscope (no derivations). Diffraction grating: Diffraction at N parallel slits; plane diffraction grating, resolving power of gratings and prisms.

**UNIT V- POLARIZATION OPTICS****(12 Hrs)**

Electromagnetic nature of light. Transverse nature of light waves. Plane polarized light – production and analysis. Circular and elliptical polarization. Double refraction, interference of polarized light, phase retardation plates (quarter wave and half wave plates).

### **Text Books**

1. Ajoy Ghatak, "Introduction to Modern Optics" (Tata McGrawHill)
2. Brijilal and Subramanian, "Optics" ((S.Chand &Co).
3. S.L. Kakani and H.C. Bhandrai, "Optics" (S.Chand &Co)

### **Reference Books**

1. Optics, K D Meller, (Oxford UniversityPress)
2. Optics, Smith and Thomson, (John Wiley and Sons,1980)
3. Optics, A.N.Matveev, (Mir Publishers1988)

### **Web Resourses**

1. <https://www.britannica.com/science/optics>
2. <https://www.learnbse.in/ray-optics-optical-instruments-cbse-notes-class-12-physics>
3. <https://www.student-baba.com/2020/01/ray-optics-importantce-for-board-and-handwritten-notes-pdf.html>.

**Course Objectives**

- To familiarize the concept of matrices.
- To introduce mathematical tools to solve first order differential equations.
- To learn linear differential equations of higher order with constant coefficients.
- To understand the concept of partial differentiation.
- To introduce the concepts of curl, divergence and integration of vectors in vector calculus.

**Course Outcomes**

*After completion of the course, the students will be able to*

**CO 1** - Find Eigen values and Eigen vectors, diagonalization of a matrix.

**CO 2** - Solve differential equations.

**CO 3** - Solve higher order differential equations.

**CO 4** - Solve different types of partial differential equation.

**CO 5** - Understand the use of vector calculus.

**UNIT I MATRICES****(12 Hrs)**

Rank of a Matrix- Consistency of system of equations. Eigen values and Eigen vectors of a real matrix - Characteristic equation - Properties of Eigen values and Eigen vectors. Cayley-Hamilton Theorem.

**UNIT II DIFFERENTIAL EQUATION****(12 Hrs)**

Exact equations, First order linear equations, Bernoulli's equation, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

**UNIT III HIGHER ORDER DIFFERENTIAL EQUATION****(12 Hrs)**

Linear differential equations of higher order with constant coefficients, the operator D, Euler's linear equation of higher order with variable coefficients, Solution by variation of parameter method.

**UNIT IV PARTIAL DIFFERENTIAL EQUATION****(12 Hrs)**

Partial derivatives, Total derivatives, Differentiation of implicit functions, Maxima and Minima of two variables. Partial differential equations of higher order with constant coefficients.

**UNIT V VECTOR CALCULUS****(12 Hrs)**

Gradient, divergence and curl - Directional derivative- Irrotational and Solenoidal vector fields - Gauss Divergence Theorem and Stoke's Theorem.

**Text Books**

1. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley, Tenth edition, 2019
2. B.V.Ramana, "Higher Engineering Mathematics", Tata McGraw-Hill, New Delhi, Sixth edition 2018.
3. N.P. Bali and Manish Goyal, "A Text Book of Engineering Mathematics", Lakshmi Publications, New Delhi, Ninth Edition, 2018

**Reference Books**

1. C W. Evans, "Engineering Mathematics", A Programmed Approach, 3th Edition, 2019
2. Singaravelu. A., "Engineering Mathematics - I", Meenakshi publications, Tamil Nadu, 2019
3. M.K. Venkataraman, "Engineering Mathematics (Third Year-Part A)", The National Publishing Company, Madras, 2016.

**Web References**

1. <http://www.yorku.ca/yaoguo/math1025/slides/chapter/kuttler-linearalgebra-slides-Systemsofquation-handout.pdf>
2. <https://nptel.ac.in/courses/111/105/111105122/>
3. <https://nptel.ac.in/courses/122/104/122104017/>

Choose any 8 experiments from the list given below

### Course Objectives

- To provide a practical understanding of some of the concepts learnt in the theory course on Physics.
- To evaluate the process and outcomes of an experiment quantitatively and qualitatively.
- To extend the scope of an investigation whether or not results come out as expected.
- To conduct an experiment collaboratively and ethically.
- To collect data and revise an experimental procedure iteratively and reflectively

### Course Outcomes

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

**CO 1** - Understand the concepts of light experiments

**CO 2** - Acquired basic knowledge about Potentiometer and magnetic field due to a current carrying coil.

**CO 3** – Acquired the knowledge about the purity of given solution.

**CO 4** – Gain the knowledge about laboratory reports describing the results of experiments and to interpret the data from the experiments

**CO 5** – Know the practical knowledge to describe the experiments and to correlate the theoretical values

### LIST OF EXPERIMENTS

1. Spectrometer- refractive index– Hollow prism.
2. Spectrometer – Grating-Determination  $n$  &  $\lambda$  (Normal incidence method).
3. Young's modulus - cantilever - pin & microscope.
4. Potentiometer - calibration of low range ammeter
5. Sonometer - determination of frequency of tuning fork
6. Laurent's Half Shade polarimeter – Determination of Specific rotation of an optically active substance.
7. P.O. Box - temperature coefficient of the material of a coil of wire.
8. Spring Balance – Variation of Periodic oscillations with mass and spring constant.
9. Stokes method of viscosity determination
10. Oscillations on a bifilar pendulum -verification of laws of parallel and perpendicular axes theorem

### Text Books

1. C Ouseph, V.J.Rao and V.Vijayendran “Practical Physics”
2. M.N..Srinivasan “Practical Physics”, Sultan son Pubs
3. D P Khandelwal, “Laboratory Manual of Physics” for UG classes (Vani Pub. House,(NewDelhi)

### Reference Book

1. V Y Rajopadhye and V L Purohit, Text book of experimental Physics

### Web Resources

1. [https://www.niser.ac.in/sps/sites/default/files/basic\\_page/Compound%20pendulum\\_2017.pdf](https://www.niser.ac.in/sps/sites/default/files/basic_page/Compound%20pendulum_2017.pdf)
2. <https://www.iist.ac.in/departments/physics-lab>



### Course Objectives

- To introduce the elements of public administration
- To help the students obtain a suitable conceptual perspective of public administration
- To introduce them the growth of institution devices to meet the need of changing times
- To instill and emphasize the need of ethical seriousness in contemporary Indian Public Administration

### Course Outcomes

*After completion of the course, the students will be able to*

**CO1**– Understand the concepts and evolution of Public Administration.

**CO2** – Understand what is happening in the Public Administration in the country

**CO3** – Know the Territory Administration in the State and the Centre

**CO4** – Gain the knowledge about the emerging issues in Indian Public Administration

### UNIT I INTRODUCTION TO PUBLIC ADMINISTRATION (6 Hrs)

Meaning, nature and Scope of Public Administration and its relationship with other disciplines- Evolution of Public Administration as a discipline – Woodrow Wilson, Henry Fayol , Max Weber and others - Evolution of Public Administration in India – Arthashastra – Colonial Administration upto 1947

### UNIT II PUBLIC ADMINISTRATION IN INDIA (6 Hrs)

Enactment of Indian Constitution - Union Government – The Cabinet – Central Secretariat – All India Services – Training of Civil Servants – UPSC – Niti Ayog – Statutory Bodies: The Central Vigilance Commission – CBI - National Human Rights Commission – National Women's Commission –CAG

### UNIT III STATE AND UNION TERRITORY ADMINISTRATION (6 Hrs)

Differential Administrative systems in Union Territories compared to States Organization of Secretariat: -Position of Chief Secretary, Functions and Structure of Departments, Directorates – Ministry of Home Affairs supervision of Union Territory Administration – Position of Lt.Governor in UT – Government of Union Territories Act 1963 – Changing trend in UT Administration in Puducherry and Andaman and Nicobar Island

### UNIT IV EMERGING ISSUES IN INDIAN PUBLIC ADMINISTRATION (6 Hrs)

Changing Role of District Collector – Civil Servants – Politicians relationship – Citizens Charter - Public Grievance Redressal mechanisms — The RTI Act 2005 – Social Auditing and Decentralization – Public Private partnership.

#### Text Books

1. Avasthi and Maheswari, "Public Administration", Lakshmi Narain Agarwal, 1<sup>st</sup> Edition, 2016.
2. Ramesh K.Arora, "Indian Public Administration: Institutions and Issues", New Age International Publishers, 3<sup>rd</sup> Edition, 2012.
3. Rumki Basu, "Public Administration: Concept and Theories", Sterling, 1<sup>st</sup> Edition, 2013.

#### Reference Books

1. Siuli Sarkar, "Public Administration in India", Prentice Hall of India, 2<sup>nd</sup> Edition, 2018.
2. M. Laxmikanth, "Public Administration", McGraw Hill Education, 1<sup>st</sup> Edition, 2011.
3. R.B.Jain, "Public Administration in India, 21st Century Challenges for Good Governance", Deep and Deep Publications, 2002.

#### Web References

1. <http://cic.gov.in/>
2. <http://www.mha.nic.in/>
3. <http://rti.gov.in/>

**Course Objectives**

- To introduce about various activities carried out by national service scheme
- To gain life skills through community service
- To gain awareness about various service activities performed in higher educational institutions.
- To give exposure about the use of technology to uplift the living standards of rural community.
- To induce the feeling of oneness through harmony of self and society

**Course Outcomes**

*After the end of the course, the students will able to*

**CO1** – recognize the importance of national service in community development.

**CO2** – convert existing skills into socially relevant life skills.

**CO3** – differentiate various schemes provided by the government for the social development

**CO4** – identify the relevant technology to solve the problems of rural community.

**CO5** – associate the importance harmony of nation with long term development

**UNIT I- INTRODUCTION TO NATIONAL SERVICE SCHEME****(6 Hrs)**

History and objectives, NSS symbol, Regular activities, Special camping activities, Village adaptation programme, Days of National and International Importance, Hierarchy of NSS unit in college. Social survey method and Data Analysis. NSS awards and recognition. Importance of Awareness about Environment, Health, Safety, Gender issues, Government schemes for social development and inclusion policy etc.,

**UNIT II-LIFE SKILLS AND SERVICE LEARNING OF VOLUNTEER****(6 Hrs)**

Communication and rapport building, problem solving, critical thinking, effective communication skills, decision making, creative thinking, interpersonal relationship skills, self- awareness building skills, empathy, coping with stress and coping with emotions. Understanding the concept and application of core skills in social work practice, Team work, Leadership, Event organizing, resource planning and management, time management, gender equality, understanding rural community and channelizing the power of youth.

**UNIT III-EXTENSION ACTIVITIES FOR HIGHER EDUCATIONAL INSTITUTIONS (6Hrs)**

Objective and functions of Red Ribbon Club, Swatchh Bharath Abhiyan, Unnat Bharat Abhiyan, Jal Shakti Abhiyan, Road Safety Club, Environmental club and Electoral literacy club.

**UNIT IV-USE OF TECHNOLOGY IN SOLVING ISSUES OF RURAL INDIA****(6 Hrs)**

Understanding community issues, economic development through technological development. Selection of appropriate technology, Understanding issues in agriculture, fishing, artisans, domestic animals, health and environment.

**UNIT V- NATIONAL INTEGRATION AND COMMUNAL HARMONY****(6Hrs)**

The role of Youth organizations in national integration, NGOs, Diversity of Indian Nation, Importance of National integration communal harmony for the development of nation, Indian Constitution, Building Ethical human Relationships, Universal Human Values, Harmony of self and Harmony of nation.

**Reference Books**

1. Joseph, Siby K and Mahodaya Bharat (Ed.), (2007), Essays on Conflict Resolution, Institute of Gandhian Studies, Wardha
2. Barman Prateeti and Goswami Triveni (Ed.), (2009), Document on Peace Education, Akansha Publishing House, New Delhi
3. Sharma Anand, (2007), Gandhian Way, Academic Foundation, New Delhi Myers G. Davi (2007).

**Web References**

1. <http://www.thebetterindia.com/140/national-service-scheme-nss/>
2. <http://en.wikipedia.org/wiki/national-service-scheme19=http://nss.nic.in/adminstruct>
3. <http://nss.nic.in/propexpan>