MANONMANIAM SUNDARANAR UNIVERISTY,
TIRUNELVELI-12

# SYLLABUS

## UG - COURSES – AFFILIATED COLLEGES

Course Structure for B. Sc. Physics
(Choice Based Credit System)
(with effect from the academic year 2024-2025 onwards )

| Semester-II | | | | |
|---|---|---|---|---|
| **Part** | **Subject Status** | **Subject Title** | **Subject Code** | **Credit** |
| I | LANGUAGE | TAMIL/MALAYALAM/HINDI | F1TL21/ F1MY21/ F1HD21 | 3 |
| II | ENGLISH | ENGLISH | F2EN21 | 3 |
| III | CORE | HEAT, THERMODYNAMICS AND STATISTICAL PHYSICS | FCPH21 | 5 |
| III | CORE | PHYSICS PRACTICAL II | FCPHP2 | 3 |
| III | ELECTIVE | ALLIED MATHEMATICS II – VECTOR CALCULUS AND FOURIER SERIES | FEMA21 | 5 |
| IV | SEC 2 | ASTROPHYSICS | FSPH21 | 1 |
| IV | SEC 3 | PHYSICS FOR COMPETITIVE EXAMINATIONS | FSPH22 | 1 |
| IV | | NAAN MUTHALVAN/ BASIC PHYSICS | | 2 |

**Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks**

A. **Scheme for internal Assessment**:
Maximum marks for written test: **20 marks**
**3 internal tests**, each of **I hour** duration shall be conducted every semester.
To the average of the **best two** written examinations must be added the marks scored in. The **assignment** for 5 marks.

The break up for internal assessment shall be:
Written test- 20 marks; Assignment -5 marks Total - 25 marks

**B. Scheme of External Examination**
**3 hrs.** examination at the end of the semester
A – Part : 1 mark question two - from each unit
B – Part : 5 marks question one - from each unit
C – Part : 8 marks question one - from each unit

- **Conversion of Marks into Grade Points and Letter Grades**

| S.No | Marks | Letter Grade | Grade point (GP) | Performance |
|---|---|---|---|---|
| 1 | 90-100 | O | 10 | Outstanding |
| 2 | 80-89 | A+ | 9 | Excellent |
| 3 | 70-79 | A | 8 | Very Good |
| 4 | 60-69 | B+ | 7 | Good |
| 5 | 50-59 | B | 6 | Above Average |
| 6 | 40-49 | C | 5 | Pass |
| 7 | 0-39 | RA | - | Reappear |
| 8 | 0 | AA | - | Absent |

- **Cumulative Grade Point Average (CGPA)**

$$\mathbf{CGPA} = \frac{\mathbf{\Sigma\,(GP \times C)}}{\mathbf{\Sigma C}}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

- **Classification**
  a) First Class with Distinction : CGPA $\geq$ 7.5*****
  b) First Class : CGPA $\geq$ 6.0
  c) Second Class : CGPA $\geq$ 5.0 and $<$ 6.0
  d) Third Class : CGPA $<$ 5.0

# PART I – TAMIL

# பொதுத்தமிழ் 2

## தமிழ் இலக்கிய வரலாறு 2

**அலகு 1: தமிழ் இலக்கிய, இலக்கண வரலாறு அறிமுகம்.**

1. சிற்றிலக்கியம்: குறவஞ்சி, கலம்பம், உலா, பரணி, பள்ளு, பிள்ளைத்தமிழ், தூது, அந்தாதி.
2. தனிப்பாடல் அறிமுகம்
3. இக்கால இலக்கியம்: கவிதை, சிறுகதை, நாடகம், உரைநடை, திராவிட இயக்கம் வளர்த்த தமிழ்

**அலகு 2 சிற்றிலக்கியமும், தனிப்பாடலும்**

**சிற்றிலக்கியம்:**

1. கலிங்கத்து பரணி-விருந்தினரும் வரியவரு நெருங்கி யுண்ணரும் - முதல் - கேட்பாரைக் காண்மின் காண்மின் - வரை
2. திருக்குற்றாலக் குறவஞ்சி - வானரங்கள் கனிகொடுத்து
3. முக்கூடற் பள்ளு - ஆற்று வெள்ளம் நாளை வரத்
4. அபிராமி அந்தாதி - கலையாத கல்வியும் குறையாத வயதும் (பதினாறு செல்வங்கள்)
5. திருவரங்கக் கலம்பம் - மறம் - பிள்ளைப் பெருமாள் ஐயங்கார்-பேசவந்த தூத செல்லரித்த ஓலை சொல்லுமோ
6. தமிழ்விடு தூது முதல் பத்து கண்ணிகள்

**தனிப்பாடல்**

1. வான்குருவி யின்கூடு - ஔவையார்
2. ஆமணக்குக்கும் யானைக்கும் சிலேடை: முதிருக்கும் கொம்பசைக்கும் மூரித்தண்டே-காளமேகப் புலவர்
3. இம்பார் வான் எல்லை இராமனையே பாடி - வீரராகவர்
4. நாராய் நாராய் முத்தப் புலவர்

**அலகு 3 இக்கால இலக்கியம் - 1**

1. பாரதியார் பாரத சமுதாயம் வாழ்கவே
2. பாரதிதாசன் - சிறுத்தையே வெளியில் வா
3. நாமக்கல் கவிஞர் - கத்தியின்றி
4. தமிழ் ஒளி - மீன்கள் (அந்தி நிலா பார்க்க வா)
5. ஈரோடு தமிழன்பன் - எட்டாவது சீர் (வணக்கம் வள்ளுவ)

**சிறுகதைகள்**

1. புதுமைப்பித்தன் - கடிதம்
2. ஜெயகாந்தன் - வாய்ச் சொற்கள் (மாலை மயக்கம் தொகுப்பு)
3. ஆர். சூடாமணி - அந்நியர்கள்

**உரைநடை :**

1. மு. வ கடிதங்கள் - தம்பிக்கு நூலில் முதல் இரண்டு கடிதங்கள்

**அலகு 4 இக்கால இலக்கியம் 2**

1. தந்தை பெரியார் - திருக்குறள் (மாநாட்டு) உரை
2. பேரறிஞர் அண்ணா - இரண்டாம் உலகத் தமிழ் மாநாட்டு உரை
3. கலைஞர் மு. கருணாநிதி - தொல்காப்பிய பூங்கா-எழுத்து-முதல் நூற்பா கட்டுரை

**நாடகம் /திரைத்தமிழ்**:

1. வேலைக்காரி - திரைப்படம்
2. ராஜா ராணி - சாக்ரடீஸ் - ஓரங்க நாடகம்

இதழியல் தமிழ்:

முரசொலி கடிதம்

1. செம்மொழி வரலாற்றில் சில செப்பேடுகள்

**அலகு 5 மொழிப் பயிற்சி**

சொல் வேறுபாடு / பிழை தவிர்த்தல்

வாசிப்பது - வாசிப்பாளர்

சுவர் - சுவரில்

வயிறு - வயிற்றல்

கோயில் - கோவில்

கரறுப்பு - கருப்பு

இயக்குநர் - இயக்குனர்

சில்லறை - சில்லரை

முறித்தல் - முரித்தல்

மனம் - மனசு - மனது

அருகில் - அருகாமையில்

அக்கரை - அக்கறை

மங்கலம் - மங்களம்

**பயிற்சி**:

1. பிழையான சொற்களை ஒரு பத்தியில் கொடுத்து அந்தந்தப் பிழையான சொற்களைச் சரியாக எழுதச் செய்தல்
2. சிறிய பத்தி ஒன்றை ஆங்கிலத்தில் கொடுத்து அதனைத் தமிழில் மொழிபெயர்க்க வைத்தல்

**Text Books**:

1. பிழையான சொற்களைச் சரியாக எழுதச் செய்தல்
2. சிறிய பத்தி ஒன்றை ஆங்கிலத்தில் கொடுத்து அதனைத் தமிழில் மொழிபெயர்க்க வைத்தல்

Reference Books:


- மு. வரதராசன், தமிழ் இலக்கிய வரலாறு, சாகித்ய அக்காதமி, புதுடெல்லி
- மது. ச. விமலானந்தன், தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை.
- தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை;.
- தமிழ் இளகிய வரலாறு - முனைவர் சிற்பி பாலசுப்ரமணியன், முனைவர்.சொ. சேதுபதி
- புதி யதமிழ் இலக்கிய வரலாறு - முனைவர் சிற்பி பாலசுப்ரமணியன, நீல. பத்மநாபன்


**Web Sources:**

- இணைய தமிழ் நூலகம் - சென்னை நூலகம் - Online Tamil Library - ChennaiLibrary.com
- முகப்பு - சிறுகதைகள் (sirukathaigal.com)
- www.tamilvirtualuniversity.org
- Buy tamil books online 10% to 50% discount, Tamil Novels, Tamil Audio Books online - Buy tamil books online - Established 2010 (noolulagam.com)
- www.katuraitamilblogspot.com

# MALAYALAM
# PAPER- II Office Communication Malayalam

**Learning Objectives**

- To give compressive view of communication and its scope and importance in official communication and business communication
- To recall the official writing styles
- To understand different kinds of letter drafting
- To Generalize office keeping and data management
- To differentiate the structural and content variations both official and non-official communication
- To compare the different style of letters based on domains
- To Conceptualize the different trends in computer network and social media

**UNITS I**

This unit introduces basic communication skills in Malayalam. Salutation, Discourse markers, formal and informal communication strategies, principles of communication, reading and analysis are also introduced

Language-oral and written-importance of languages-formal and informal – communication style in written communication-principles of written communication

Text-messages-Email-letter drafting- different types of letter drafting personal letters--Business letters Official letters—letter to the editor memorandums- Bio data-Reports-press conference-business proposal

**UNIT II**

This unit introduces - word processing and Editing text Auto correct spell check & grammar check, undo & redo Text formatting Changing case, drop caps, coloring & highlighting text, adding special characters, bullets & numbering

Document formation compositional and typographical ways. Advanced page layout in word Borders, box, shading, page fills & back ground Module and Table & columns Creating tables Inserting tables from the menu & tool bar, drawing tables Manipulating tables Selecting tables elements, inserting & deleting columns & rows, adjusting table properties, are introduced . This unit introduces the Printing word documents Using print preview. Practical knowledge in different fonts and Unicode

**UNIT III**

This Unit Introduces blog writing, technical writing, content editing, Proof reading, news making, advertisement writing (Writing for career)

**UNIT IV**

Official language- Malayalam

Detailed study-

1. Malayalam nammude mathru bhasha.- Bharana bhasha prasnangal- M.V.Thomas,State Institute of languages.
2. Bharanam janakeeya bhashayil- Bharana bhasha prasnangal M.V.Thomas-State Institute of languages
3. Deseeyodgrathanam pradesika bhashakaliloode -Bharana bhasha prasnangal M.V.Thomas,State Institute of languages
4. Bhasha samraajyam srishtikkum--- Bhashayum bharanabhashayum Dr.Ezhumattoor Raja raja Varmma ,State Institute of languages
5. Swathanthryathinte Kodiyadayalam- Bhashayum bharanabhashayum Dr.Ezhumattoor Raja raja Varmma, State Institute of languages
6. Bharanaghatana vyavasthakal- Bhashayum bharanabhashayum- Dr.Ezhumattoor Rajaraja Varmma, State Institute of languages
7. Malayala dinaghoshavum Bharanabhashavaraghoshavum Bhashayum bharanabhashayum-Dr.Ezhumattoor Rajaraja Varmma, State Institute of languages

**UNIT V**

This unit introduces Malayalam for Competitive Exams. Reading comprehension, reasoning , inferential comprehension, analogical creations( Competitive Malayalam) Malayalam for language Specific Exams for writing UPSC, PSC exams

**Reading List** (Print and Online)

1. Bharana bhasha prasnangal- M.V.Thomas-State Institute of languages
2. Business Communication for Success: Publisher: University of Minnesota Libraries Publishing
3. Vanijyaparamaya kathidapadukal,G.R.Pilla .State Institute of languages
4. Bhashayum bharanabhashayum-Dr.Ezhumattoor Rajaraja Varmma,

# HINDI
# Kahani, Ekanki aur Vyakran

## Course Objectives

The Main Objectives of this course are to:

- Introduction to Hindi fiction
- Teaching of social values through stories and skits
- Practical application of grammar

## Unit I

## Hindi Katha-Sahitya: Parichay

- Kahani ke Tatva
- Hindi ke Pramukh kahanikaro ka Parichay
- Ekanki ke Tattva
- Hindi ke Pramukh Ekankikaro ka Parichay

## Unit II

## Hindi Kahaniya

- Premchand – Bade Ghar ki Beti
- Malathi Joshi – Vo Tera Ghar Yah Mera Ghar
- Pita - Gyanranjan

## Unit III

## Hindi Ekanki

- Lakshmi ka Swagat – Upendranath Ashk
- Vibhajan – Vishnu Prabhakar
- Maa Baap – Sri Vishnu

## Unit IV

## Vyakaran

- Kriya Visheshan
- Sambandh Bodhak
- Samuchay Bodhak
- Vismayadi Bodhak aadi shabdo ka prayog

## Unit V

Pratiyogi Pariksha par aadharit Nimnalikhit Vishayo se sambandhit Prashikshan Karya

- Tamil Bhasha: Mahakavi Bharatiyar
- Sanket Vikas dwara Lekhan kala aur Kahani Lekhan ka Vikas
- Gadyansh dekhkar sahi Shirshak chunna
- Pathit Vyakaran par aadharit Vakya rachna
- Vibhinna Pratiyogi parikshao ke bare mein suchna pradan dena

**Reference Books**

1. Aath Ekanki Natak – Ed. Dr. Ramkumar Verma
2. Das Ekanki

**Related Online Contents** (MOOCs, SWAYAM, NPTEL, YouTube, Websites, etc.)

1. Lokpriya Kahaniya: https://www.hindwi.org/sangrahaalay/100-best-storiesin-hindii
2. Vo Tera Ghar Ye Mera Ghar: http://gadyakosh.org/gk/%E0%A4%B5%E0%A5%8B_%E0%A4%A4%E0%A5%87%E0%A4%B0%E0%A4%BE_%E0%A4%98%E0%A4%B0,_%E0%A4%AF%E0%A5%87_%E0%A4%AE%E0%A5%87%E0%A4%B0%E0%A4%BE_%E0%A4%98%E0%A4%B0_/_%E0%A4%AE%E0%A4%BE%E0%A4%B2%E0%A4%A4%E0%A5%80_%E0%A4%9C%E0%A5%8B%E0%A4%B6%E0%A5%80
3. https://hindistory.net/

# Part II English
# GENERAL ENGLISH - II

**Learning Objectives**

- To make students realize the importance of resilience
- To enable them to become good decision makers
- To enable them to imbibe problem-solving skills
- To enable them to use tenses appropriately
- To help them use English effectively at the work place.

**UNIT I**

**RESILIENCE**

**Poem**

1.1 Don't Quit – Edgar A. Guest

1.2 Still Here – Langston Hughes

**Short Story**

1.3 Engine Trouble – R.K. Narayan

1.4 Rip Van Winkle – Washington Irving

**UNIT II**

**DECISION MAKING**

**Short Story**

2.1 The Scribe – Kristin Hunter

2.2 The Lady or the Tiger - Frank Stockton

**Poem**

2.3 The Road not Taken – Robert Frost

2.4 Snake – D. H Lawrence

**UNIT III**

**PROBLEM SOLVING**

**Prose life Story**

3.1 How I taught My Grandmother to Read – Sudha Murthy

**Autobiography**

3.3 How frog Went to Heaven – A Tale of Angolo

3.4 Wings of Fire (Chapters 1,2,3) by A.P.J Abdul Kalam

**UNIT IV**

**Tenses**

4.1 Present

4.2 Past

4.3 Future

4.4 Concord

**UNIT V**

**English in the Workplace**

5.1 E-mail – Invitation, Enquiry, Seeking Clarification

5.2 Circular

5.3 Memo

5.4 Minutes of the Meeting

**Text Books** (Latest Editions)

**References Books**

1. Martin Hewings. Advanced English Grammar. Cambridge University Press, 2000
2. SP Bakshi, Richa Sharma. Descriptive English.Arihant Publications (India) Ltd., 2019.
3. Sheena Cameron, Louise Dempsey. The Reading Book: A Complete Guide to Teaching Reading. S & L. Publishing, 2019.
4. Barbara Sherman. Skimming and Scanning Techniques, Liberty University Press, 2014.
5. Phil Chambers. Brilliant Speed Reading: Whatever you need to read, however. Pearson, 2013.
6. Communication Skills : Practical Approach Ed.ShaikhMoula Ramendra Kumar. Stories of Resilience, Blue Rose Publications, 2020.

**Web Sources**

1. Langston Hughes. Still Here https://poetryace.com/im-still-here
2. R. K. Narayan. Engine Trouble http://www.sbioaschooltrichy.org/work/Work/images/new/8e.pdf
3. Washington Irving. Rip Van Winkle https://www.gutenberg.org/files/60976/60976-h/60976-h.htm
4. Frank Stockton. The Lady or the Tiger https://www.gutenberg.org/ebooks/396

# HEAT, THERMODYNAMICS & STATISTICAL PHYSICS

**COURSE OBJECTIVES**

- The course focuses to understand a basic in conversion of temperature in Celsius, Kelvin and Fahrenheit scales. Practical exhibition and explanation of transmission of heat in good and bad conductor. Relate the laws of thermodynamics, entropy in everyday life and explore the knowledge of statistical mechanics and its relation

**UNIT-I**

**CALORIMETRY**: Specific heat capacity – specific heat capacity of gases CP and CV– Meyer‘s relation – Joly‘s method for determination of CV.

LOW TEMPERATURE PHYSICS: Joule-Kelvin effect – Porous plug experiment – Boyle temperature – temperature of inversion – liquefaction of gas by Linde‘s Process.

**UNIT-II**

**THERMODYNAMICS-I:** Zeroth law and First law of thermodynamics – heat

engine –efficiency of heat engine – Carnot‘s engine, construction, working and efficiency of petrol engine and diesel engines.

**UNIT-III**

**THERMODYNAMICS-II:** Second law of thermodynamics – entropy of an ideal gas – entropy change in reversible and irreversible processes – T-S diagram – Maxwell‘s thermodynamical relations –Clasius- Clapeyron‘s equation (first latent heat equation) –Third law of thermodynamics.

**UNIT-IV**

**HEAT TRANSFER:** Modes of heat transfer: conduction, convection and radiation. Conduction: thermal conductivity –determination of thermal conductivity of a bad conductor by Lee‘s disc method. Radiation: black body radiation (Ferry‘s method) – distribution of energy in black body radiation – Wien‘s law and Rayleigh Jean‘s law – Planck‘s law of radiation – Stefan‘s law. Law.

**UNIT-V**

**STATISTICAL MECHANICS:** Definition of phase-space – micro and macro states – ensembles –different types of ensembles – classical and quantum Statistics – Maxwell-Boltzmann statistics – expression for distribution function –Fermi-Dirac statistics – expression for distribution function.

**TEXT BOOKS**

1. Brijlal and N. Subramaniam, 2000, Heat and Thermodynamics, S.Chand and Co.
2. Narayanamoorthy and Krishna Rao, 1969,Heat,Triveni Publishers, Chennai.
3. V.R.Khanna and R.S.Bedi, 1998 1st Edition, Text book of Sound, Kedharnaath Publish and Co, Meerut
4. Brijlal and N. Subramanyam, 2001, Waves and Oscillations, Vikas Publishing House, New Delhi.
5. Ghosh, 1996, Text Book of Sound, S.Chand and Co.
6. R.Murugeshan and Kiruthiga Sivaprasath, Thermal Physics, S.Chand and Co.

**REFERENCE BOOKS**

1. J.B.Rajamand C.L.Arora, 1976, Heat and Thermodynamics, 8th edition, S.Chandand Co. Ltd.
2. D.S.Mathur, Heat and Thermodynamics, Sultan Chand and Sons.
3. Gupta, Kumar, Sharma, 2013, Statistical Mechanics, 26th Edition, S. Chand and Co.
4. Resnick, HallidayandWalker,2010, Fundamentals of Physics, 6th Edition.
5. Sears, Zemansky, Hugh D. Young,Roger A. Freedman, 2021 University Physics with Modern Physics 15th Edition, Pearson.

# PRACTICAL 2

**COURSE OBJECTIVES**

- Apply their knowledge gained about the concept of heat and sound waves, resonance, calculate frequency of ac mains set up experimentation to verify theories, quantify and analyse, able to do error analysis and correlate results

**Minimum of Six Experiments from the list:**

1. Verification of Newton‘s Law of Cooling.
2. Determination of thermal conductivity of a bad conductor by Lee‘s disc method.
3. Determination of specific heat capacity of Liquid by Newton‘s Law of Cooling.
4. Determination of specific heat capacity of a solid by method of mixture.
5. Determination of specific heat of a liquid by Joule‘s electrical heating method
6. Determination of Latent heat of a vaporization of a liquid.
7. Determination of Stefan‘s constant for Black body radiation.
8. Verification of Stefan‘s-Boltzmans law.
9. Determination of thermal conductivity of a rubber tube.
10. Determination of velocity of sound using Helmholtz resonator.
11. Determnation of Velocity of sound through a wire using Sonometer.
12. Determination of velocity of sound using Kundt‘s tube.
13. Verification of the laws of transverse vibration using a sonometer.
14. Verification of the laws of transverse vibration using Melde‘s apparatus.
15. Comparison of the mass per unit length of two strings using Melde‘s apparatus.

# VECTOR CALCULUS AND FOURIER SERIES

**Objectives of the Course**

- To know the concepts of vector differentiation and vector integration.

**UNIT I**

Vector differentiation–Gradient–Divergence and curl.

**UNIT II**

Evaluation of double and triple integrals

**UNIT III**

Vector integration–Line, surface and volume integrals.

**UNITIV**

Green‟s, Stoke‟s and Divergence theorems (without proof)– Simple problems.

**UNIT V**

Fourier series–Even and odd functions–Halfrange Fourier series.

**Recommended Text**

1. S.Arumugamand A. Thangapandi Isaac,Allied Mathematics Paper-II, New Gamma Publishing House, Palayamkottai, 2012.
2. T.K.Manicavachagom Pillay, Calculus(VolII), S.Vishvanathan Printer and Publisher PVT.LTD, 2012.

**Reference Books**

1. S.Arumugam and others, Analytical Geometry 3D &Vector Calculus, New Gamma Publishing House, Palayamkottai, 2017.
2. J. C. Susan, Vector Calculus(4thEdition),Pearson Education, Boston, 2012.
3. Murray Spiegel, Vector analysis, Schaum Publishing company, NewYork, 2009.

**Website and e-Learning Source**

1. https://nptel.ac.in

# ASTROPHYSICS

**Learning Objective:**

- This course intends tointroduce principles of astrophysics describing the science of formation and evolution of stars and interpretation of various heavenly phenomena and provide an understanding of the physical nature of celestialbodies along with the instrumentation and techniques used in astronomical research

**UNIT-I**

**TELESCOPES:** Optical telescopes – magnifying power, brightness, resolving power and f/a ratio – types of reflecting and refracting telescopes – detectors and image processing – radio telescopes – Hubble space telescope.

**UNIT-II**

**SOLAR SYSTEM**:Bode‘s law of planetary distances – meteors, meteorites, comets, asteroids – Kuiper belt – Oort cloud – detection of gravitational waves.

**UNIT-III**

**ECLIPSES:** types of eclipses – solar eclipse – total and partial solar eclipse – lunar eclipse – total and partial lunar eclipse – transits.

THE SUN: physical and orbital data – solar atmosphere – photosphere – chromosphere – solar corona – prominences – sunspots – 11year solar cycle – solar flares.

**UNIT-IV**

**STELLAR EVOLUTION**: H-R diagram – birth and death of low mass, intermediate mass and massive stars – Chandrasekar limit – white dwarfs – neutron stars – pulsars – black holes – supernovae.

**UNIT-V**

**GALAXIES:** Our Milky Way - Galactic structure - Galactic rotation - Galaxy types - Galaxy formation; Cosmology: Expansion of the Universe - redshifts - supernovae - the Big Bang - history of the Universe.

**TEXT BOOKS**

1. Baidyanath Basu, (2001). An introduction to Astrophysics, Second printing, Prentice – Hall of India (P) Ltd, New Delhi
2. K.S.Krishnaswamy, (2002), Astrophysics – a modern perspective, New Age International (P) Ltd, New Delhi.
3. Shylaja, B.S. andMadhusudan, H.R.,( 1999), Eclipse: A Celestial Shadow Play, Orient BlackSwan,

# PHYSICS FOR COMPETITIVE EXAMINATIONS

**COURSE OBJECTIVES**

- The course focuses to understand a basic in conversion of temperature in Celsius, Kelvin and Fahrenheit scales. Practical exhibition and explanation of transmission of heat in good and bad conductor. Relate the laws of thermodynamics, entropy in everyday life and explore the knowledge of statistical mechanics and its relation

**UNIT-I**

**MECHANICS**

Centre of gravity - Centre of gravity of a solid hemisphere - Hollow hemisphere - Friction – Laws of friction - angle of friction - Impact - Laws of Impact - Direct and oblique impact - Impact between two spheres - Loss of Kinetic energy.

**UNIT-II**

**PROPERTIES OF MATTER**

Viscosity of liquids - Highly viscous liquids – Searle‘s method- Surface Tension - Method of drops - Surface tension of mercury - Laws of osmotic pressure and experimental determination of osmotic pressure.

**UNIT-III**

**HEAT AND THERMODYNAMICS**

Vanderwaal's equation - Critical constants and Vanderwaal‘s constant - Isothermal, adiabatic, isobaric, isochoric processes and entropy changes

**ELECTRICITY AND MAGNETISM**

Coulomb‘s law - Permittivity of free space - Relative permittivity - Electric field - Intensity of field due to a point charge - Gauss theorem and its application - Ohm's law - Resistivity and conductivity.

**UNIT-IV**

**OPTICS**

Snell‘s Law - Laws of reflection and refraction from Fermat‘s principle; Coherent and Incoherent sources, Scattering of light and polarization.

**SOUND**

Velocity of sound in solids and gases – Theory and experiment - Ultrasonics - properties and applications

**UNIT-V**

**NUCLEAR PHYSICS**

Properties of nucleus - size, charge, mass, angular momentum, parity and spin - Nuclear magnetic dipole moment - Binding energy - Packing fractions - Semi-empirical mass formula and applications; Nuclear fission and fusion

**TEXT BOOKS**


1. D.S.Mathur, Mechanics, Revised Edition 2012, S.Chand and Company Ltd.,
2. Brij Lal, N. Subrahmanyam, Properties of Matter, Eurasia Publishing House Limited, 1993.
3. Brij Lal, N. Subrahmanyam , Heat Thermodynamics and Statistical Physics, Revised Edition 2018, S.Chand and Company Ltd.,
4. R Murugeshan, Electricity and Magnetism, 2017, S.Chand and Company Ltd.,
5. Subrahmanyam. N, Brijlal and Avadhanulu. M.N, 2014, A textbook of optics, 25th Edition, S.Chand and Co.
6. N. Subrahmanyam, Brij Lal., A Textbook of Sound, Vikas Publishing House, 1985.
7. D. C. Tayal , Nuclear Physics ; 2009, Himalaya Publishing House.,


**REFERENCE BOOKS**


1. J.B.Rajamand C.L.Arora, 1976, Heat and Thermodynamics, 8th edition, S.Chandand Co. Ltd.
2. D.S.Mathur, Heat and Thermodynamics, Sultan Chand and Sons.
3. Gupta, Kumar, Sharma, 2013, Statistical Mechanics, 26th Edition, S. Chand and Co.
4. Resnick, HallidayandWalker,2010, Fundamentals of Physics, 6th Edition.
5. Sears, Zemansky, Hugh D. Young,Roger A. Freedman, 2021 University Physics with Modern Physics 15th Edition, Pearson.