C. Abdul Hakeem College (Autonomous), Melvisharam.

Affiliated to Thiruvalluvar University, Vellore.
Re-accredited by NAAC with 'A' Grade.
Hakeem Nagar, Melvisharam – 632 509, Vellore District.

BACHELOR OF SCIENCE | PHYSICS
DEGREE COURSE | UNDER CBCS
(with effect from 2018-2019)

Year / Semester	Part	Subjects	Subject Codes	Title of the Papers	Ins Hrs / Week	Credit	Exam Hrs	Max. Marks		
								Int	Ext	Total
I Year I SEM	I	Language I		Urdu - I / Tamil - I	6	4	3	25	75	100
	II	English I	U18FEN101	English - I	6	4	3	25	75	100
	III	Core I	U18MPH101	Properties of Matter and Acoustics	6	6	3	25	75.	100
	III	Core Practical		Volumetric Analysis	3	0				
	III	Allied I	U18AMA101	**(to choose any 1 out of 5)** 1. Physics – I 2. Botany – I 3. Zoology – I 4. Biochemistry – I **5. Mathematics – I**	4	4	3	25	75	100
	IV		U18CES101	Environmental Studies	2	2	3	25	75	100
				Total		**20**				**500**
I Year IISEM	I	Language II		Urdu - II / Tamil - II	6	4	3	25	75	100
	II	English II	U18FEN201	English - II	4	4	3	25	75	100
	III	Core II	U18MPH201	Thermal Physics and Statistical methods	6	5	3	25	75	100
	III	Core Practical - I	U18MMHP21	Volumetric Analysis	3	3		25	75	100
	IV	Allied I	U18AMA201	**(to choose any 1 out of 5)** 1. Physics – II 2. Botany – II 3. Zoology – II 4. Biochemistry – II **5. Mathematics – II**	4	6	3	25	75	100
	V		U18CSS201	Soft Skill	2	1	3	25	75	100
	VI		U18CVE201	Value Education	2	2	3	25	75	100
				Total		**25**				**800**

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Syllabus for B.Sc., Physics effective from the year 2018-2019

Year: I Year Subject Code : U18MPH101 Semester : I

Major - 1 Title: Properties of Matter and Acoustics

Credits: 6 Max. Marks. 75

Objectives:

To study the basics of elasticity, viscosity and surface tension of materials and the various methods to determine their parameters experimentally.

To study the concepts and properties of waves and oscillations.

To learn the production of ultrasonic waves, the concepts of acoustics and their applications.

UNIT – I : ELASTICITY I **18 Hours**

Hooke's law – stress-strain diagram – Elastic moduli – Poisson's ratio – Relation between elastic constants – Work done in stretching and twisting a wire – Twisting couple on a cylinder – Determination of Rigidity modulus by static torsion (Scale and telescope) – Rigidity modulus by torsional pendulum (with and without masses).

UNIT – II : ELASTICITY II **18 Hours**

Bending of beams – Expression for bending moment – Cantilever – Expression for depression at the loaded end – Young's modulus by cantilever depression – Theory of non-uniform bending – Determination of Young's modulus by non-uniform bending (pin and microscope) – Determination of young's modulus by Koenig's method – Uniform bending- Expression for elevation – Determination of Young's modulus by uniform bending (pin and microscope).

UNIT – III: FLUIDS **18 Hours**

Surface Tension: Molecular forces– Shape of liquid meniscus in capillary tube -surface energy– pressure difference across liquid surfaces - Excess of pressure — variation of surface tension with temperature – Jaegar's method.

Viscosity : Viscosity – Rate flow of liquid in a capillary tube – Poiseuille's formula – Determination of coefficient of viscosity of a liquid – Variations of a viscosity with temperature and pressure.

Physics of low pressure – production and measurement of low pressure – Rotary pump – Diffusion pump – Molecular pump – Detection of leakage.

UNIT – IV: WAVES AND OSCILLATIONS **18 Hours**

Longitudinal and Transverse Waves –– Superposition of wave – Interference of sound wave - Stationary waves – properties – Velocity of transverse waves along a stretched string - Simple harmonic motion (SHM).

Differential equation of SHM- Average kinetic energy of vibrating particle – Total energy of vibrating particle- SHM: Theory of Free damped and forced vibrations –Resonance.

UNIT – V: ACOUSTICS AND ULTRASONICS **18 Hours**

Intensity and loudness of sound – Decibels – Intensity levels – Reverberation time and its measurement - Sabine's formula – Derivation –Absorption coefficient and its determination – Factor affecting the acoustics of buildings.

Ultrasonic waves – Production – Piezo electric crystal method – Magnetostriction Method – Properties – Detection – Attenuation – Diffraction – Acoustic Grating – Velocity of ultrosonics in liquids –Application of ultrasonics : Medical, Industrial and scientific.

Books for Study:

1. Properties of Matter, Murugeshan R, S Chand & Co. Pvt. Ltd., New Delhi, 2013.
2. Properties of Matter, Brij Lal & Subramaniam N, Eurasia Publishing Co., New Delhi, 1989.
3. Text book of Sound, Brij Lal & Subramaniam N, Vikas Publishing House, New Delhi, 1982.
4. Text book of Sound, M N Srinivasan, Himalaya Publications, 1991.
5. Waves and Oscillations - Subrahmanyam N. & Brij Lal, Vikas Publishing House Pvt. Ltd., New Delhi, 1994.

Books for Reference:

1. Fundamental of General Properties Of Matter, H.R Gulat, R.Chand And Co, 1977.
2. The Physics of Waves and Oscillations, N.K Bajaj, Tata Mcgraw-Hill, 1988.
3. Oscillations and Waves, Satya Prakash and Akash Saluja, Pragati Prakashan, 2002.

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Syllabus for B.Sc., Physics effective from the year 2018-2019

Year: I Year Subject Code : U18MPH201 Semester : II

Major - 2 Title: Thermal Physics and Statistical methods

Credits: 5 Max. Marks. 75

Objectives:

- To study the nature and transmission of heat, thermometry, classical and quantum theory of radiation and the laws associated with them.
- To study the laws of thermodynamics and understand their applications.
- To understand the concepts of statistical thermodynamics and its applications.

UNIT I: TRANSMISSION OF HEAT 18 Hours

Thermal conduction - Thermal conductivity of a good conductor - Theory – Determination by Forbes method - Thermal conductivity of a poor conductor - Theory -Determination by Lees disc method.

Wiedmann-Franz's law - Practical applications of conduction of heat - Black body radiation – Stefan- Boltzmann's law - Determination of Stefan's constant - Laboratory method distribution of energy in the spectrum of a black body – Planck's quantum theory of radiation.

UNIT II: LIQUEFACTION OF GASES AND THERMOMETRY 18 Hours

Cooling by adiabatic expansion – Joule-Thomson expansion – Principle of regenerative cooling – Liquefaction of air by Lind's process – Liquefaction of hydrogen - Liquefaction of Helium by Onne's methods –Helium I & II – Properties of He II – Adiabatic demagnetization.

Thermometry – Types of thermometers - Platinum resistance thermometer - Callendar and Griffith's bridge – standardization and temperature scale - Low and high temperature measurement.

UNIT III: FIRST LAW OF THERMODYNAMICS 18 Hours

Thermodynamic system - Zeroth law and the concept of temperature – concept of heat - Internal energy - External work - Quasistatic process - First law of thermodynamics – First law of thermodynamics for closed system.
Application: Specific heats of a gas - Isothermal and adiabatic process - Gas equation during an adiabatic process – work done during Isothermal and adiabatic process.

UNIT IV: SECOND LAW OF THERMODYNAMICS 18 Hours

Reversible and irreversible processes - Second law of thermodynamics - Indicator diagram - Carnot's reversible engine - Carnot's cycles - Efficiency - Carnot's engine and refrigerator - Carnot's theorem.

Internal combustion engines - Otto engine and Diesel engine - Working and efficiency - Clausius inequality – Entropy - Change of entropy of a closed irreversible system - Change in entropy in an reversible and irreversible processes – Temperature - Entropy diagram.

UNIT V: STATISTICAL METHODS **18 Hours**

Phase space - Micro and Macro canonical ensembles - Different types of ensembles - Definition of Probability - Relation between entropy and probability - Degrees of Freedom - Classical Statistics - Maxwell-Boltzmann distribution law - Distribution of velocity - Derivation of Maxwell Boltzmann, Fermi Dirac and Bose Einstein statistics as the most probable distributions.

Books for study:

1. Heat Thermodynamics and Statistical Physics, Brijlal and N. Subramaniyam, S Chand & Co.
2. Thermal Physics R Murugeshan and Kiruthiga Sivaprasad, S Chand & Co., New Delhi.
3. Heat and thermodynamics, J B Rajam, S Chand & Co., New Delhi.

Books for Reference:

1. Heat and thermodynamics, D S Mathur, S Chand & Co., New Delhi.
2. Statistical Mechanics, Sathya Prakash and J P Agarwal, Kedar Nath & Ram Nath & Co., Meerut.

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Syllabus for B.Sc., Physics effective from the year 2018-2019

Year: I Year Subject Code : U18MPHP21 Semester : II

Practical Title: CORE PRACTICAL

Credits: 2 Max. Marks. 75

Objectives:

- To the learn the techniques of handling simple measuring instruments
- To measure certain mechanical, optical, electrical and magnetic properties of matter.

(Any 16 Experiments)

1. Young's modulus – Non-uniform bending – pin and microscope.
2. Young's modulus – Non-uniform bending – optic lever.
3. Rigidity modulus – Torsional pendulum – without masses.
4. Surface tension and interfacial surface tension – drop weight method.
5. Comparison of viscosities of two different liquids – Burette method.
6. Compound Pendulum – Determination of 'g' and 'k'
7. Specific heat capacity of a liquid by method of cooling.
8. Sonometer – Frequency of tuning fork.
9. Sonometer – AC frequency using steel wire.
10. Focal length – R and μ of a long focus concave lens, Combination Method and Auxiliary Lens Method.
11. Spectrometer – Hollow prism – Refractive Index of a liquid.
12. Spectrometer – Grating – Minimum deviation method.
13. Potentiometer – Calibration of low range voltmeter.
14. Potentiometer – Internal resistance of a cell.
15. Post Office box – Temperature coefficient of resistance of a coil.
16. Figure of merit – Table Galvanometer.
17. Comparison of E.M.F of cells using Ballistic Galvanometer (B.G.).
18. Comparison of capacitances using Ballistic Galvanometer (B.G.).
19. Construction of low range power pack – Bridge rectifier.
20. Characteristics of Zener diode.

Books for study:

1. A Text book of Practical Physics, M. N. Srinivasan, S. Balasubramanian and R. Renganathan, Sultan Chand & Sons, New Delhi, 2005.
2. C.C Ouseph, G.Rangarajan- A Text Book of Practical Physics- S. Viswanathan Publisher-Part I (1990) & II (1996).

Book for reference:

S.L Gupta and V.Kumar- Practical Physics- Pragati Prakashan – 25th Edition (2002)