MANONMANIAM SUNDARANAR UNIVERSITY -TIRUNELVELI
UG **PROGRAMMES**

OPEN AND DISTANCE LEARNING(ODL) PROGRAMMES

(FOR THOSE WHO JOINED THE PROGRAMMES FROM THE ACADEMIC YEAR 2023–2024)

B.Sc. Physics

Semester	Course	Title of the Course	Course Code	Course Type
I	Part I –Languages (Tamil)	Pothu Tamil-I-Tamil Ilakkiya Varalaru-I	J1TL11	Theory
	Part II – Languages (English)	General English–I	J2EN11	Theory
	Core I	Properties of Matter and Acoustics	JMPH11	Theory
	Core II	Physics Practical - I	JMPHP1	Practical
	Elective	Algebra and Differential Equation	JEMA11	Theory
	Skill Enhancement Course - I	Physics for everyday Life	JSPH11	Theory
	Foundation Course	Introductory Physics	JFPH11	Theory

3. PROPERTIES OF MATTER AND ACOUSTICS

UNIT	CONTENTS
I	**ELASTICITY:** Hooke's law – stress-strain diagram – elastic constants – Poisson's ratio – relation between elastic constants and Poisson's ratio – work done in stretching and twisting a wire – twisting couple on a cylinder – rigidity modulus by static torsion– torsional pendulum (with and without masses)
II	**BENDING OF BEAMS:** cantilever– expression for Bending moment – expression for depression at the loaded end of the cantilever– oscillations of a cantilever – expression for time period – experiment to find Young's modulus – non-uniform bending– experiment to determine Young's modulus by Koenig's method – uniform bending – expression for elevation – experiment to determine Young's modulus using microscope.
III	**FLUID DYNAMICS:** *Surface tension*: definition – molecular forces– excess pressure over curved surface – application tospherical and cylindrical drops and bubbles – determination of surface tension by Jaegar's method– variation of surface tension with temperature *Viscosity*: definition–streamline and turbulent flow–rate of flow of liquid in a capillary tube – Poiseuille's formula –corrections – terminal velocity and Stoke's formula– variation of viscosity with temperature
IV	**WAVES AND OSCILLATIONS:** Simple Harmonic Motion (SHM) – differential equation of SHM – graphical representation of SHM – composition of two SHM in a straight line and at right angles –Lissajous's figures-free, damped, forced vibrations –resonance and Sharpness of resonance. Laws of transverse vibration in strings –sonometer – determination of AC frequency using sonometer–determination of frequency using Melde's string apparatus
V	**ACOUSTICS OF BUILDINGS AND ULTRASONICS:** Intensity of sound – decibel – loudness of sound –reverberation – Sabine's reverberation formula – acoustic intensity – factors affecting the acoustics of buildings. *Ultrasonic waves*: production of ultrasonic waves – Piezoelectric crystal method – magnetostriction effect – application of ultrasonic waves
VI	**PROFESSIONAL COMPONENTS:** expert lectures –seminars — webinars – industry inputs – social accountability – patriotism.
TEXT BOOKS	
1	D.S.Mathur, 2010, Elements of Properties of Matter, S.Chand and Co.
2	Brij Lal and N.Subrahmanyam, 2003, Properties of Matter,S.Chand and Co
3	D.R.Khanna and R.S.Bedi,1969,Textbook of Sound, Atma Ram and sons
4	Brij Lal and N.Subrahmanyam,1995, A Text Book of Sound, Second revised edition, Vikas Publishing House.
5	R.Murugesan, 2012, Properties of Matter,S.Chand and Co.

4. PHYSICS PRACTICAL-1

Properties of Matter
Minimum of Eight Experiments from the list: 1. Determination of rigidity modulus without mass using Torsional pendulum. 2. Determination of rigidity modulus with masses using Torsional pendulum. 3. Determination of moment of inertia of an irregular body. 4. Verification of parallel axes theorem on moment of inertia. 5. Verification of perpendicular axes theorem on moment of inertia. 6. Determination of moment of inertia and g using Bifilar pendulum. 7. Determination of Young's modulus by stretching of wire with known masses. 8. Verification of Hook's law by stretching of wire method. 9. Determination of Young's modulus by uniform bending – load depression graph. 10. Determination of Young's modulus by non-uniform bending – scale and telescope. 11. Determination of Young's modulus by cantilever –load depression graph. 12. Determination of Young's modulus by cantilever – oscillation method 13. Determination of Young's modulus by Koenig's method – (or unknown load) 14. Determination of rigidity modulus by static torsion. 15. Determination of Y, n and K by Searle's double bar method. 16. Determination of surface tension and interfacial surface tension by drop weight method. 17. Determination of co-efficient of viscosity by Stokes' method – terminal velocity. 18. Determination of critical pressure for streamline flow. 19. Determination of Poisson's ratio of rubber tube. 20. Determination of viscosity by Poiseullie's flow method. 21. Determination of radius of capillary tube by mercury pellet method. 22. Determination of g using compound pendulum.

5. ALGEBRA AND DIFFERENTIAL EQUATIONS

UNIT	CONTENTS
I	Theory of Equations – Formation of Equations – Relation between roots and coefficients – Reciprocal equations.
II	Transformation of Equations – Approximate solutions toequations –Newton's method and Horner's method.
III	Matrices – Characteristic equation of a matrix – Eigenvalues and Eigen vectors – Cayley Hamilton theorem and simple Problems.
IV	Differential equation of first order but of higher degree – Equations solvable for p, x, y – Partial differential equations –formations –solutions –Standard form Pp+Qq=R.
V	Laplace transformation–Inverse Laplace transform.
RecommendedText	
1	Dr.S.Arumugam & Isaac – Allied Mathematics Paper- I, New Gamma Publishing House (2012), Palayamkottai.

6. PHYSICS FOR EVERY DAY LIFE

UNIT	CONTENTS
I	**MECHANICAL OBJECTS: s**pring scales–bouncing balls–roller coasters – bicycles – rockets and space travel.
II	**OPTICAL INSTRUMENTS AND LASER:** vision corrective lenses – polaroid glasses – UV protective glass – polaroid camera – colour photography – holography and laser.
III	**PHYSICS OF HOME APPLIANCES:** bulb–fan–hair drier– television – air conditioners – microwave ovens – vacuum cleaners.
IV	**SOLAR ENERGY:** Solar constant –General applications of solar energy – Solar water heaters – Solar Photo – voltaic cells – General applications of solar cells.
V	**INDIAN PHYSICIST AND THEIR CONTRIBUTIONS:** C.V.Raman, Homi Jehangir Bhabha, Vikram Sarabhai, Subrahmanyan Chandrasekhar, Venkatraman Ramakrishnan, Dr. APJ Abdul Kalam and their contribution to science and technology.
Recommended Text	
1	The Physics in our Daily Lives, Umme Ammara, Gugucool Publishing, Hyderabad, 2019.
2	For the love of physics, Walter Lawin, Free Press, New York, 2011.

7. INTRODUCTORY PHYSICS

UNIT	CONTENTS
I	Vectors, scalars –examples for scalars and vectors from physical quantities–addition, subtraction of vectors – resolution and resultant of vectors – units and dimensions– standard physics constants.
II	Different types of forces–gravitational, electrostatic, magnetic, electromagnetic, nuclear –mechanical forces like, centripetal, centrifugal, friction, tension, cohesive, adhesive forces.
III	Different form soft energy – conservation laws of momentum, energy– types of collisions – angular momentum– alternate energy sources– real life examples.
IV	Types of motion – linear, projectile, circular, angular, simple harmonic motions – satellite motion – banking of a curved roads – stream line and turbulent motions – wave motion – comparison of light and sound waves – free, forced, damped oscillations.
V	Surface tension – shape of liquid drop – angle of contact – viscosity – lubricants – capillary flow – diffusion – real life examples– properties and types of materials in daily use - conductors, insulators – thermal and electric.
VI	**PROFESSIONAL COMPONENTS: E**xpert lectures –seminars – ebinars – industry inputs – social accountability – patriotism
Recommended Text	
1	D. S. Mathur, 2010, Elements of Properties of Matter, S.Chand and Co
2	BrijLalandN.Subrahmanyam,2003,PropertiesofMatter, S.Chand and Co.