SARVAJANIK UNIVERSITY

SARVAJANIK COLLEGE OF ENGINEERING AND TECHNOLOGY

BACHELOR OF TECHNOLOGY

B. Tech.	1	Semester	1 / 2	Teaching Scheme				Evaluation Scheme	
Subject Name	Physics-Introduction to Mechanics and Thermodynamics			**L**	**T**	**P**	**Credits**	**CCE**	**SEE**
Subject Code	BTAS21108			2	0	0	2	50	50
Type of course	BSC: Basic Science Course			CCE: Continuous and Comprehensive Evaluation SEE : Semester End Evaluation					
Prerequisite	Basic understanding of Maths, Physics and Chemistry								
Rationale	The basic science - physics course is to prepare students for careers in engineering program where physics principles can be applied to the advancement of technology. This education at the intersection of engineering and physics will enable students to seek employment in engineering upon graduation while, at the same time, provide a firm foundation for the pursuit of graduate studies in engineering.								

Course Outcomes (COs): At the end of the course, students will be able to		**Marks % Weightage**
CO – 1	Recall and interpret classical mechanics principles including forces, motion, momentum, and energy conservation.	23 %
CO – 2	Apply stress-strain relationships, elasticity, and motion in non-inertial frames.	23 %
CO – 3	Analyse fluid mechanics problems using concepts like pressure, buoyancy, and Bernoulli's theorem.	27 %
CO – 4	Apply thermodynamic principles to assess energy transfer, entropy, and efficiency in thermal systems.	27 %

Course Contents

Unit	**Content**	**Tentative Teaching Hours**	**Tentative Unit Weightage**
1	**Unit 1: Basic Concepts of Mechanics** • Forces in Nature; Newton's laws and its completeness in describing particle motion. • Form invariance of Newton's Second Law • Impulse and Momentum • Conservative and Non-Conservative Forces. • Work, Energy, and Power	7	23 %
2	**Unit 2: Properties of Matter and Elasticity** • Stress, Strain, and Hooke's Law	7	23 %

	• Modulus of elasticity, Poisson's ratio and its limiting value. • Elastic constants and their relationships. • Bending of a beam and cantilever • Moments of Inertia • Non-inertial frames of reference • Centripetal and Coriolis accelerations		
3	**Unit 3: Fluid Mechanics** • Fluid Statics and Dynamics • Pressure and Buoyancy • Bernoulli's Theorem and its Applications • Viscosity and its effect on Fluid Flow	**8**	**27 %**
4	**Unit 4: Thermal Physics** • Thermodynamic variables and Laws of thermodynamics • Carnot theorem, Carnot engine and its efficiency • Entropy, change in entropy in reversible and irreversible process. • Clausius formula. Thermal conductivity • Black body radiation, Planck radiation formula (No derivation).	**8**	**27 %**

Suggested Specification table with Marks

% Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
30	40	30	--	--	--

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels **(Revised Bloom's Taxonomy)**

Recommended Reference Books

1. J. L. Meriam and L. G. Kraige, Engineering Mechanics: Dynamics, 9th ed. Hoboken, NJ, USA: Wiley, 2021. ISBN: 978-1118133133.
2. R. C. Hibbeler, Mechanics of Materials, 10th ed. Boston, MA, USA: Pearson, 2017. ISBN: 978-0134444195.
3. F. M. White, Fluid Mechanics, 8th ed. New York, NY, USA: McGraw Hill, 2020. ISBN: 978-0077422417.
4. B. R. Munson and D. F. Young, Fundamentals of Fluid Mechanics, 7th ed. Hoboken, NJ, USA: Wiley, 2020. ISBN: 978-1119489489.
5. R. W. Fox and A. T. McDonald, Introduction to Fluid Mechanics, 8th ed. Hoboken, NJ, USA: Wiley, 2020. ISBN: 978-1119134315.
6. J. M. Gere and S. P. Timoshenko, Introduction to Mechanics of Solids, 1st ed. New Delhi, India: CBS Publishers, 2018. ISBN: 978-8123909071.
7. F. P. Beer and E. R. Johnston, Mechanical Properties of Solids, 3rd ed. New York, NY, USA: McGraw Hill, 2021. ISBN: 978-0071223740.

8. D. F. Young and B. R. Munson, Engineering Fluid Mechanics, 9th ed. Hoboken, NJ, USA: Wiley, 2022. ISBN: 978-1119444708.

CO-PO-Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO – 1	3	3	1	1	-	-	-	-	-	-	-	3
CO – 2	3	1	3	1	3	-	-	-	-	-	3	-
CO – 3	3	1	3	3	3	-	-	-	-	-	-	-
CO – 4	3	1	1	1	-	-	3	-	-	-	-	3

List of Open Source/learning website/Other Details if any:

1. https://archive.nptel.ac.in/courses/115/106/115106123/
2. https://archive.nptel.ac.in/courses/115/103/115103115/