C. U. SHAH UNIVERSITY, WADHWAN CITY.

Faculty of: **Science & Life Sciences**
Course: **Bachelor of Science (Physics)**
Semester**: I**
Subject Code**: PHM202-1C**
Subject Name: **Mechanics-II**

Sr. No	Category	Subject Code	Subject Name	Teaching hours/ Week			Credit hours	Credit Points	Evaluation Scheme/ Semester								Total
									Theory				Tutorial / Practical				
									Continuous and Comprehensive Evaluation		End Semester Exams		Internal Assessment		End Semester Exams		
				Th	Tu	Pr			Marks	Marks	Marks	Duration	Marks	Duration	Marks	Duration	
2	MAJOR-2	PHM202-1C	Mechanics - II	3	-	2	5	4	10 10 05	Assignment MCQ Attendance	50	2	25	1	-	-	100

AIM :

- Aware students of the history of physics and its scope.
- Acquaint the basic concept of physics as a subject.
- Basic concepts related to classical mechanics.
- Learn laboratory skills for handling instruments.

COURSE CONTENTS

Course Outline for Theory

UNIT	COURSE CONTENT	TEACHING HOURS
I	**Wave Motion** Introduction, Types of waves, difference between Transverse and Longitudinal waves, Transverse waves on a string, Travelling and standing waves on a string, Normal Modes of a string, Melde's experiment, Group velocity, Phase velocity, Plane waves, Spherical waves, Wave intensity, Examples. **Fluid Motion** Kinematics of Moving Fluids: Poiseuille's Equation for Flow of a Liquid through a Capillary Tube.	15
II	**Oscillations** SHM: Simple Harmonic Oscillations. Differential equation of SHM and its solution. Kinetic energy, potential energy, total energy and their time-average values. Damped oscillation. Forced oscillations: Transient and steady states; Resonance, sharpness of resonance; power dissipation and Quality Factor. **Non-Inertial Systems** Non-inertial frames and fictitious forces. Uniformly rotating frame. Laws of Physics in	15

	rotating coordinate systems. Centrifugal force. Coriolis force and its applications. Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems.	
III	**Special Theory of Relativity** Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity, frequency and wave number. Relativistic addition of velocities. Variation of mass with velocity. Massless Particles. Mass-energy Equivalence. Relativistic Doppler effect. Relativistic Kinematics. Transformation of Energy and Momentum. Energy-Momentum Four Vector.	**15**

Course Outline for Practical

Sr. No.	Course Contents
1	Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, (d) Capacitances, and (e) Checking electrical fuses.
2	To study Melde's experiment.
3	Verify Poiseuille's Law
4	To study the characteristic of CE transistor.
5	To determine the frequency of an electrically maintained tuning fork by Melde's experiment and to verify λ^2-T law.
6	To study the PN junction diode characteristic and calculate resistance. And to study LED Characteristic.
7	To study the PN junction diode as a half wave/ Full wave and Bridge rectifier.
8	To study the V-I characteristic of Zener diode.
9	To study the characteristic of a Photo diode.
10	To study Zener diode as a voltage regulator.
	Total Hours - 30

TEACHING METHODOLOGY:
- Conventional method (classroom blackboard teaching)
- ICT Techniques+
- Teaching through the classroom, laboratory work
- Variety of learning styles and tools (PowerPoint presentations, audio-visual resources, e-resources, seminars, workshops, models)
- Teaching through laboratory work

LEARNING OUTCOME:
After the successful completion of the course, students will be able to have knowledge about wave motion, Melde's Experiment, oscillations, Non-inertial systems, basics of fluids and special theory of relativity.

Arrangement of lectures duration and practical session as per defined credit numbers:

Units	Lecture Duration (In Hrs.)		Calculation of Credits (In Numbers)		Total Lecture Duration	Credit Calculation
	Theory	Practical	Theory	Practical	Theory+ Practical	Theory+ Practical
Unit – 1	15					
Unit – 2	15	30	3	1	45 + 30	3
Unit – 3	15					
TOTAL	45	30	3	1	75	1

Evaluation

Theory Marks	Practical Marks	Total Marks
75	25	100

REFERENCE BOOKS:

1. 'B. Sc. Practical Physics', **C. L. Arora**, *S. Chand and Company Ltd*.
2. 'Advanced Practical Physics', **M. S. Chauhan and S. P. Sing**, *Pragati Prakashan*.
3. 'Experimental Physics', **University Granth Nirman Board**, (Gujarati Medium).
4. 'Physics through experiments Vol. I & II', **B. Saraf et al.**, *Vikas Publishing House*.
5. 'Advanced Practical Physics', **S. L. Gupta and V. Kumar**,*Pragati Prakashan*.
6. 'An advanced course in practical Physics', **D. Chattopadhyay and P. C. Rakshit**,*New Central Book Agency Pvt. Ltd.*
7. 'Electronic Laboratory Primer', **Poorna Chandra and Sasikala**,*S. Chand and Company Ltd*.
8. 'Advanced Practical Physics for Students', **B. L. Wosnop and H. T. Flint**,*Asia Publishing House*.
9. 'Advanced Level Physics Practicals', **Michael Nelson and Jon M. Ogborn**, 4th Ed., *Heinemann Educational Publishers*.
10. 'Engineering Practical Physics', **S. Panigrahi and B. Mallick**, *Cengage Learning India Pvt. Ltd*.
11. 'A Text Book of Practical Physics', **Indu Prakash and Ramakrishna**, 11th Ed., *Kitab Mahal*.
12. 'A Laboratory Manual of Physics for Undergraduate Classes', **D. P. Khandelwal**, *Vani Publication*.
13. 'Basic Electronics: A Text Lab Manual, **P. B. Zbar, A. P. Malvino and M. A. Miller**, *McGraw Hill*.