C. U. SHAH UNIVERSITY, WADHWAN CITY.

Faculty of: **Science & Life Sciences**
Course: **Bachelor of Science(Microbiology)**
Semester**: II**
Subject Code**: PHE202-1C**
Subject Name: **Elements of Physics - II**

Sr. No	Category	Subject Code	Subject Name	Teaching hours/ Week			Credit hours	Credit Points	Evaluation Scheme/ Semester								
									Theory				Tutorial / Practical				Total
									Continuous and Comprehensive Evaluation		End Semester Exams		Internal Assessment		End Semester Exams		
				Th	Tu	Pr			Marks		Marks	Duration	Marks	Duration	Marks	Duration	
3	MINOR	PHE202-1C	Elements of Physics - II	3	-	2	5	4	10 10 05	Assignment Quiz 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 Mechanics and Electronics.
- Learn laboratory skills for handling instruments.

COURSE CONTENTS

Course Outline for Theory

UNIT	COURSE CONTENT	TEACHING HOURS
I	**Semiconductor Diodes** Introduction to Metal, Insulator and Semiconductor, Intrinsic and Extrinsic Semiconductors, Effect of temperature on Intrinsic semiconductor, Doping, p- and n- type semiconductors, Barrier formation in p-n junction diode, qualitative idea of current flow mechanism in forward and reverse biased diode, p-n junction and its characteristics, static and dynamic resistance, Advantages, Disadvantages and application of p-n junction diode, types of P-n junction diode, principle and structure of (1) LEDs (2) Photodiode (3) Solar Cell, Examples	**15**
II	**Transistors** Introduction to transistor structure, working action of transistor, Relation between currents in a transistor and parameters, transistor amplifying action, transistor configurations, Transistor characteristics, common emitter configuration, current relations, relation between alpha and beta, Input and output common emitter characteristics, BJT and FET differentiation, Applications of transistors, Examples.	**15**

III	**Special Theory of Relativity** Constancy of speed of light, Postulates of Special Theory of Relativity, Length contraction, Time dilation, Relativistic addition of velocities. **Electromagnetic Induction** Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils, Energy stored in magnetic field, transformer. **Circuit Analysis & Network Theorems** Network terminology, Network analysis by mesh currents (two & three mesh network) Circuit analysis by Node-pair voltages (one & two node pair voltage method), Constant voltage source, Constant current source, Maximum power transfer Theorem, Voltage divider theorem, Thevenin's theorem, Norton's theorem, Superposition theorem, Chassis and ground, Multimeter, transformer.	**15**

Course Outline for Practical

Sr. No.	Course Contents
1	To use a multimeter for measuring (a) Resistances (b) AC and DC Voltages (c) DC current and (d) Checking electrical fuses.
2	To study of a transformer.
3	To verify the Thevenin and Norton theorem.
4	To verify the superposition and maximum power transfer theorem.
5	To determine the self-inductance by Maxwell's bridge.
6	To study the characteristic of CE transistor.
7	To study the PN junction diode characteristic and calculate resistance. And to study LED Characteristic.
8	To study the V-I characteristic of Zener diode.
9	To study the characteristic of a Photo diode.
10	To study the PN junction diode as a half wave/ Full wave and Bridge rectifier.
	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 semiconductor diodes, transistors and their characteristics and applications 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	30	3	1	45+30	4
Unit – 2	15					
Unit – 3	15					
TOTAL	**45**	**30**	**3**	**1**	**75**	**4**

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*.