SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar, Gujarat

(Reaccredited with 'A' Grade by NAAC (CGPA-3.11)

Syllabus with effect from the Academic Year 2024-2025

Bachelor of Science
B.Sc. Physics Semester III

Course Code	US03SEPHY02	Title of the Course	Instrumentation skills in Physics
Total Credits of the Course	02	Hours per Week	04

Course Objectives:	1. The aim of this course is to enable the students to acquire the knowledge of design of simple electrical circuits and experience with various electrical, electronic and optical tools. 2. To understand the basic concept of electricity and digital electronics. 3. Gain the knowledge of various phenomena using hands on experiments.

Description	Weightage (%)
1. Identifying resistance and capacitance from color code/item code and compare the values using digital multimeter. Series, parallel combination and its value measurement. 2. Use soldering iron to secure an electrical connection joint. 3. Determine the characteristics (frequency, peak to peak voltage, rms voltage) of a continuous signal using CRO/ DSO. 4. Designing electrical circuits having discrete components (R, L, C, diode) 5. To investigate logic behavior of AND, OR and NOT gates. 6. Comparison of absorption coefficients of liquids. 7. Comparison of threshold voltages of color LEDs. 8. Characteristics of photo conductive materials. 9. Refractive index of liquid lens. 10. Charging and discharging of RC circuit. (Theoretical)	100 %

Note:

[1] To provide flexibility, up to the maximum of 20% of total experiments can be replaced/added by college to this list prepared by the Board of Studies.

[2] A minimum of 80% experiments must be performed in practical course.

[3] To maintain uniformity in assessment of practical examination the below mentioned marks distribution pattern is followed:

Sr. No.	Work done	Weightage as per 50 Marks
1.	Writing Principle / Statement/ Formula with explanation of symbols and units	08 Marks
2.	Diagram/Circuit Diagram / Expected Graph	08 Marks
3.	Setting up of the experiment + Tabular Columns + taking readings	14 Marks
4.	Calculations (explicitly shown) + Graph	10 Marks
5.	Accuracy of results with units	04 Marks
6.	Round the year Performance/ Records (to be valued at the time of practical Examination through oral viva)	06 Marks
	Total for Practical	**50 Marks**

Note:
Wherever explicit setting up of experiments does not exist like in the case of spectral charts or pre–acquired data is involved, the marks for setting up of experiment may be provided for additional graphs and formulae.

Teaching Learning Methodology	Direct Teaching through Chalk-Walk and Talk ICT enabled teaching Question-Answer Class discussion led by teacher/students Case Studies Literature review Problem solving activities Debate Collaborative and Co-operative Learning Think Pair Share Jigsaw Inquiry Based Learning Panel Discussion Project Based Learning Flipped Classroom Blended Learning designs

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: On the successful completion of the course, the students will be able to

1. Apply the various procedures and techniques for the experiments.
2. Use different measuring devices and meters to record the data with precision.
3. Apply the mathematical concepts/equations to obtain quantitative results.
4. Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results.

Suggested References	
Sr. No.	References
1.	B.Sc. Practical Physics C L Arora S. Chand & Co. Ltd., New Delhi (2018)
2.	A text book in Electrical Technology; B L Theraja, S. Chand & Co. Ltd., New Delhi
3.	Electronic Devices and Circuits; S. Salivahanan & N. S.Kumar, Tata Mcgraw Hill
4.	Electrical Measurements And Measuring Instruments; R.K. Rajput, (S. Chand)
5.	Basic Electronics; J.B. Gupta, S.K. Kataria & Sons

On-line resources to be used if available as reference material
On-line Resources:
https://www.electronics-tutorials.ws/
https://www.electronicshub.org/tutorials/
http://www.allaboutcircuits.com/
https://nptel.ac.in/courses/115/105/115105110