

**Physics (Skill Enhancement Course) - 2 credits**

**Course code: USPHSEC1**

**Title: - Basic Instrumentation skills and Basic Mathematical Skills for Physics**

| Sr. No. | Course Objective                                                                                  | Course Outcome                                                                       |
|---------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1.      | Generate awareness among students about handling different laboratory instruments scientifically. | Accomplish desired skills to handle different laboratory instruments scientifically. |
| 2.      | Develop concepts of accuracy precision, resolution, range and errors/uncertainty in measurement.  | Acquire knowledge about precision and accuracy in measurements.                      |
| 3.      | Understand various types of electronic components and devices so as to construct simple circuits  | Develop basic electronic circuit using different techniques.                         |
| 4.      | Expose students to systematic of scientific calculator.                                           | Develop confidence to use scientific calculator systematically.                      |
| 5.      | Illustrate necessary mathematical concepts to develop corresponding skills                        | Apply mathematical tools to understand theoretical concepts of physics.              |
| 6.      | Develop the problem solving among learners                                                        | Demonstrate problem-solving skills for all the topics covered.                       |

This course is designed for learners to get exposure with various aspects of instruments and their usage through hands-on mode.

**Unit 1: Basic Instrumentation skills**

**(30 Lectures)**

- 1.1. Study and use of Vernier Callipers & Micrometer Screw Gauge
- 1.2. Study and use of Travelling Microscope.
- 1.3. Study and use of Spectrometer.
- 1.4. Study and determination of Focal length of a convex lens.
- 1.5. Fundamentals of Electronic Component- Resistor, potentiometer, Capacitor, Inductor, Diode, Transistor, LED, Zener diode.
- 1.6. Use of Multimeter (analog, Digital), Voltmeter, Ammeter.
- 1.7. Use of CRO - voltage ( AC, DC), Frequency and Phase measurement.
- 1.8. Different types of power supplies.
- 1.9. Logic gate IC Testing.
- 1.10. Soldering electronic circuits.
- 1.11. Study and use of Thevenin's theorem.
- 1.12. Building Electronic Circuits using Breadboard.
- 1.13. Graph plotting - plotting of graphs and finding slope and intercept.
- 1.14. Graph plotting - semi log graph paper.
- 1.15. Theory of errors and calculating-Error for given data

**Unit 2: Basic Mathematical Skills**

**(30 Lectures)**

- 2.1 Use of scientific Calculator
- 2.2 Basic trigonometry and its applications in physics
- 2.3 Concept of logarithm and its application to Physics
- 2.4 Concept of derivatives and its application to Physics

2.5 Concept of integration and its application to Physics

2.6 Concept of differential equations(1<sup>st</sup> order) and its application to Physics

**F.Y.B. Sc. Physics Evaluation pattern and Question paper pattern for Semester End (SEC) Practical Examination**

| <b>Internal Continuous Assessment:<br/>40% (20 Marks)</b>                                            | <b>Duration of semester End<br/>examination (Internal)</b> |
|------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Viva/ assignment/ objective question test<br>(15 Marks), Overall performance (5 Marks)<br>= 20 Marks | 1 Hr                                                       |

| <b>External Semester End Examination:<br/>60% (30 Marks)</b> | <b>Duration of semester End<br/>examination (External)</b> |
|--------------------------------------------------------------|------------------------------------------------------------|
| As per paper pattern                                         | 2 Hr                                                       |

**Continuous Evaluation through: Practical**

**Format of Question Paper:**

**Major Practical: 2 credits**

**Practical of 2 credits, Duration: 60 Hrs , Total marks: 50**

**(30 Marks for External Practical Exam + 20 Marks for Internal Practical Exam.)**

**Paper Pattern for 30 marks External Semester End Practical Examination:**

**Duration** - This examination shall be of **Two hours** duration in laboratory

| <b>Sr.<br/>No.</b> |                          | <b>Total 30 Marks</b> |
|--------------------|--------------------------|-----------------------|
| 1                  | Experimental performance | 20 Marks              |
| 2                  | Journal                  | 05 Marks              |
| 3                  | VIVA                     | 05 Marks              |

**Paper Pattern for 20 marks Internal Semester End Practical Examination:**

Duration - This examination shall be of **One hour** duration in laboratory

| Sr.<br>No. |                                             | <b>Total 20 Marks</b> |
|------------|---------------------------------------------|-----------------------|
| 1          | Practical/Theoretical/ Combined Performance | 15 Marks              |
| 2          | Overall Performance                         | 05 Marks              |