

PHY652: Physics Lab 3**4 CH (P180+T20)**

Nature of the course: Practical

Full Marks: 100

Pass Marks: 50

Course Description:

Physics lab 3 consists of two sections: (a) General Experiments and (b) Electronics experiments, each of two credit hours, as follows:

Course Code	Course Title	Credit Hour	Practical hour
PHY652a	General Experiments	2	P90+T10
PHY652b	Electronics Experiments	2	P90+T10

Students are required to perform at least 5 experiments in each course from the list.

Course Objectives

- To provide students with skill in the experimental methods.
- To make them able to apply knowledge to practical applications.
- To make them capable of presenting their results/conclusions in a logical order.
- To make them to interpret results by performing error propagation, analysis and interpretation.

PHY652a: General Experiments**2 CH (P90+T10)**

Nature of the course: Practical

Full Marks: 50

Pass Marks: 25

The general experiments consist in four labs: (a) General Experiments (b) Optical Experiments, (c) Nuclear Experiments and (d) Computational Experiments. In the fourth semester, students perform important physics experiment and learn the result through detailed analysis. During this semester, students have to perform at least 5 experiments in 90 working hours in order to fulfill 2 CH. Students are required to perform 6 hours laboratory work every week. **One credit hour lab work requires 3 hours lab work per week throughout the semester.** In addition, there will be 10 hours tutorial classes in order to learn the method of data and error analysis using suitable software. Students need to write a laboratory report on each experiment they perform and get them duly checked and signed by the concerned teacher. They should write their reports in a separate sheet, and to keep them neat and properly filed. Students are required to perform at least 6 experiments from the list (given below). The marking scheme is as follows:

1. Day to day evaluation - 40%
2. Final Examination - 60%

Course Contents:

1. Study the Frank-Hertz Experiment to study the quantum nature of the substances.
2. Study the half life of the given radioactive substance.
3. Study the Cauchy's constants for given prisms (i) crown glass (ii) flint glass and hence compare them.
4. Study the Pyranometer to measure the solar radiation flux density (W/m^2). Also use it as a detector.

5. Use Febry-Perrot interferometer to study the Zeeman effect.
6. Study the forbidden gap of the given materials by using four probe methods.
7. Study the Fourier series and Transform by using Oscilloscope.
8. Study the damped harmonic oscillator to find damping constant, frequency, under damping, over damping and critical damping.

PHY652b: Electronics Experiments

2 CH (P90+10T)

Nature of the course: Practical

Full Marks: 50

Pass Marks: 25

The electronic experiments consist in three labs: (a) General Electronic Experiments (b) Oscilloscope Experiments (c) Computational Experiments. In fourth semester, students develop skill of designing physics experiment and discuss the results through error propagation, analysis and interpretation. During this semester, students have to perform at least 5 experiments in 90 working hours in order to fulfill 2 CH. Students are required to perform 6 hours laboratory work every week. **One credit hour lab work requires 3 hours lab work per week throughout the semester.** In addition, there will be 10 hours tutorial classes in order to learn the method of data and error analysis using suitable software. Students need to write a laboratory report on each experiment they perform and get them duly checked and signed by the concerned teacher. They should write their reports in a separate sheet, and to keep them neat and properly filed. Students are required to perform at least 6 experiments from the list (given below). The marking scheme is as follows:

- | | | |
|--------------------------|---|-----|
| 1. Day to day evaluation | - | 40% |
| 2. Final Examination | - | 60% |

Course Contents:

1. Design and use Op-amp to generate (i) Square (ii) Triangular (iii) Saw-tooth & (iv) Sine wave signals.
2. Design and study AM circuit.
3. Design and study D/A & A/D converter.
4. Design and study pulse amplifier.
5. Construct a dynamo circuit. By changing the speed of the motor, generate the ac signal and measure its frequency using Lisajous pattern.
6. To perform given program by using 8085 microprocessor : (a) Hexadecimal addition of two 8-bit hexadecimal numbers (neglecting the carry), (b) Decimal addition of two 8-bit decimal numbers (the result should not be greater than 99), (c) Addition of two 16-bit hexadecimal numbers (neglecting the carry)

7. To perform given program by using 8085 microprocessor : (a) Addition of 8-bit number series (neglecting the carry), (b) Separation of hexadecimal number into two digits, (c) Combination of two hex nibbles to form one byte number.
8. To perform given program by using 8085 microprocessor : (a) Identification of odd or even parity of given hex number, (b) Multiplication by two, employing bit rotation, (c) Multiplication of two 8-bit hex numbers without neglecting carry

Evaluation Scheme:

1. PHY652a and PHY652b will be examined separately for the duration of six hours in two different sessions. The external examiner(s) will be appointed by the Dean Office. The HoD or program coordinator will appoint internal examiner(s).
2. The final practical exam (60%) will be graded on the basis of the following marking scheme:

Record file:	20%	Experiment:	50%
Error Analysis:	10%	Viva:	20%