

PHYS 107 & 127

LABORATORY COURSE OUTLINE

COURSE NUMBER: PHYS 107 & 127
COURSE TITLE: Modern General Physics Lab II
CREDITS: (0-3-1)
PREREQUISITES: PHYS 102 (Concurrent) or PHYS 122, PHYS 105 or PHYS 125

Catalogue Description: Experiments in the basics of electric circuits with emphasis on analysis and overall understanding of some basic aspects of electromagnetism.

LEARNING & TEACHING METHODS

- There will be a three-hour experimental session, session-A, per fortnight and a three-hour session-B in the following week for data analysis, interpretation of results, preparation and submission of the lab report in its final form.
- At the beginning of session-A a shot test will be conducted to assess the preparation level of student.
- Six experiments from the following list of ten (listed below), or a combination of these, will be performed by each student, in group of 2 to 3.
- All the work performed in session-A must be recorded in a prescribed "lab notebook". Before the student leaves session-A, his/her lab notebook will be assessed for the diligence with which the experimental work is performed. This covers: collected data, tables, sketch graphs, sketch of the experimental setup, etc. These components should be presented in the form of brief preliminary report.
- The active participation and diligence shown by students in handling instruments and performing the practical work, as well as the degree of leadership in the group work, will be assessed by the instructor through observation and communication.

- In the first week of each semester orientation workshop will be held for students.

OBJECTIVES

1. To enhance the understanding level of concepts in electricity, magnetism and simple electrical circuits.
2. To become acquainted with the related instrumentations and experimental techniques.
3. To develop skills in communication and ability to work in groups.
4. To enhance ability in experimental design, data and error analysis and report writing.

LEARNING OUTCOMES

Upon the completion of the laboratory course students should be able to

1. Acquire knowledge of experimental techniques related to the concepts of electricity, magnetism and simple electrical circuits.
2. Gain experience in proper data collection methods graphical representation of data, data analysis and interpretation of results.
3. Develop analytical and critical thinking abilities.

RESOURCES

1. Laboratory manual.
2. An introduction to Error Analysis, The Study of Uncertainties in Physical Measurements (2nd Edition, 1997), John R. Taylor (Publisher: University Science Books).
3. University Physics (11th Edition, 2005), Freedman & Young (Publisher: Addison Wesley).

LABORATORY SESSIONS

Experiment	Essential Physical Concepts
1. Ohmic & non-Ohmic circuit elements.	I-V characteristics of resistors, tungsten filaments and diode.
2. Parallel & series connection of resistors (Kirchoff Law).	Equivalent circuits and Kirchoff Law.
3. RC circuit.	Charging and discharging of a capacitor including variation of voltage, current and power.
4. RL circuit.	Study of the relation between the total input signal and the sum of the voltages across the resistor and the inductor including the phase shift.
5. e/m ratio.	Concept of the magnetic force on a moving charged particle in a magnetic field.
6. Spectrum of Hydrogen atom	Measurement of wavelength of the emitted spectra and calculation of Planck constant.

LABORATORY REPORT SUBMISSION

Lab reports must be submitted **at the end of session-B** (or by the indicated deadline). Penalties will be imposed for late submissions as follows: **deduction of 10%** of the lab marks for each late day up to a maximum of 3 days. No late lab report, for which no extension has been granted, will be accepted after 3 days past the deadline.

ASSESSMENT OF LAB REPORTS

The evaluation components for each experiment will be:

Preparation test:	15%
Lab notebook: (In Class)	15%
Active participation:	10%
Lab report (Final):	60%

Lab reports should consist of 6 elements in the following order: Statement of Objectives, Summary, Theory, Data and Analysis of results, Discussion and Conclusion & References.

Evaluation of the lab reports will be carried out according to the criteria stated in the laboratory Report Assessment Form.

ATTENDANCE REQUIREMENTS

Attendance in all lab sessions is mandatory. The assigned marks for attendance will be deduced from the grade of any lab session skipped by the students.

PLAGIARISM

Plagiarism is a serious academic offense. Put simply plagiarism is an action where a person claims the work or ideas of other people as his won with the intention to deceive. Examples of plagiarism are:

- The use of published or unpublished work of others either as whole or in parts (such as paragraphs or sentences), which includes books, journal articles, theses, websites, etc. without proper acknowledgment or referencing or without the use quotation marks.
- Paraphrasing closely the work of others either as a whole or in parts without proper referencing.

- Copying computer files without proper acknowledgments.
- Use or submission of computer programs written by others without authorization.
- Claiming as your own work executed for you by other person or agency.
- Scattering one's own comments through a text that has been substantially lifted from another source.