SAINT LOUIS UNIVERSITY
MADRID

PHYS 1340 M36: Physics II Laboratory
Spring 2018

Class Days and Time: M, 16:00-18:20
Classroom: PAH-21
Prerequisite(s): PHYS-1310. Must enroll also in PHYS-1330.
Credit(s): 1
Instructor: Francisco Prieto
Instructor's Email: francisco.prieto@slu.edu
Instructor's Campus Phone: 91 554 58 58, ext. 250
Office: PAH-203
Office Hours: M, 14:00-15:00

Course Description:
This course is an introduction to the basic principles of electromagnetism and optics through hands-on practices in the laboratory. You will learn how to use laboratory equipment (such as a voltage generator, an oscilloscope), about electric currents, resistance, capacitance and simple DC circuits, as well as some magnetism and elementary optics. The lab complements and helps you to consolidate the knowledge acquired in the theoretical class.

Course Goals and Student Learning Outcomes:
The laboratory constitutes a link between the ideas developed in the "theory" subject and reality. In this sense the student complements and consolidates the knowledge acquired in the theoretical class due to the work developed in the laboratory. This course introduces students to the fundamentals of electromagnetism and optics through the detailed consideration of the basic laws governing them.

At the end of the course, students will:

Physics Program Objectives

A. Students will understand the principles of physics and apply these principles to problems of fundamental and practical interest.
B. Students will design and conduct experiments and analyze and interpret data.
C. Students will collaborate effectively on teams.
D. Students will communicate effectively and professionally in oral and written formats.
E. Students know about contemporary issues in science and technology.
F. Students will understand the numerical formulation of scientific problems and be able to solve such problems utilizing at least one programing language or environment.

Student Learning Outcomes

Program Objectives	Student Learning Outcomes	Assessment Method
A	A.1. Calculate the error associated to a measurement. A.2. Apply the technique of error propagation.	Mid-term and Final Exam - Conceptual questions - Problems

	A.3. Relate the data measured in the experiments to the theoretical equations. A.4. Calculate the electric force between charged objects using Coulomb's law. A.5. Relate the equipotential surfaces to the electric field lines of a dipole and capacitor configuration. A.6. Calculate the effect of dielectrics in a parallel-plate capacitor. A.7. Calculate the resistivity of conductors. A.8. Apply Kirchhoff's laws to simple electric circuits consisting of resistors, capacitors and DC sources. A.9. Calculate the magnetic force due to a magnetic field on a current. A.10. Calculate the Earth's magnetic field. A.11. Apply Faraday's law to calculate the induced voltage in a coil. A.1. Apply Snell's law.	
B	B.1. Use a variety of measuring devices: oscilloscope, function generator, multimeter, DC voltage sources, voltage and magnetic field sensors. B.2. Verify Coulomb's law. B.3. Prove experimentally the relationship between equipotential surfaces and electric field lines. B.4. Measure the permittivity constant of a dielectric. B.5. Prove experimentally the laws of conservation of energy for rotating and non-rotating systems. B.6. Prove experimentally the principle of conservation of linear momentum for elastic and inelastic collisions. B.7. Measure the resistivity of conductors and prove Ohm's law. B.8. Prove Kirchhoff's laws. B.9. Measure the magnetic force on carrying-current conductors. B.10. Measure the Earth's magnetic field. B.11. Prove experimentally Faraday's law. B.12. Measure the index of refraction of glass. B.13. Measure the focal length of lenses. B.14. Prove experimentally Malus' law. B.15. Measure the wavelength of a laser light. B.16. Verify the validity of the experimental results using data acquisition software, and graphing and data analysis software. B.17. Keep a well-organized and complete lab notebook. B.18. Communicate effectively in written reports. B.1. Write a well-structured and clear lab report using the standard scientific format.	Lab Notebook Lab Report
C	C.1. Work effectively in a team environment when working in the lab.	Team-work rubric
D	D.1. Keep a well-organized and complete lab notebook. D.2. Communicate effectively in written reports. D.3. Write a well-structured and clear lab report using the standard scientific format	Lab Notebook Lab Report

Saint Louis University - Madrid Campus is committed to excellent and innovative educational practices. In order to maintain quality academic offerings and to conform to relevant accreditation requirements, the Campus regularly

assesses its teaching, services, and programs for evidence of student learning outcomes achievement. For this purpose anonymized representative examples of student work from all courses and programs is kept on file, such as assignments, papers, exams, portfolios, and results from student surveys, focus groups, and reflective exercises. *Thus, copies of student work for this course, including written assignments, in-class exercises, and exams may be kept on file for institutional research, assessment and accreditation purposes.* If students prefer that Saint Louis University - Madrid Campus does not keep their work on file, they need to communicate their decision in writing to the professor.

Required Texts and Materials:
Physics II Laboratory Sessions Handbook.

Attendance Policy:

- **It is mandatory to do all the lab experiments**. If due to a reasonable excuse a lab is missing, the student will have to make it up.
- **Make up exams are not given**. Students who legitimately miss an exam, due to a doctor's visit or family emergency must provide written documentation of the circumstances. A letter from the university counselor is accepted. Exams that are missed illegitimately result in a score of F. Grades for these students will be based on the remaining exams. Missing more than one exam results in an F grade.
- Useful information of the course can be found in Blackboard: https://myslu.slu.edu

Course Requirements and Grading Rationale/System:

Grading system: The grade will be obtained from the following areas:

	1st Mid-Term Grade	**Final Grade**
Attendance	10%	10%
Lab Notebook	20%	15%
Lab Report	35%	30%
Pre-lab questions	5%	5%
Exam	30%	40% (20% 1st Mid-Term + 20% Final)
TOTAL GRADE	**100%**	**100%**

Grading Scales:
93% < A < 100%,
90% <A- < 93%
87% < B+ < 90%
83% < B < 87%
80% < B-< 83%
77% < C+ < 80%
73% < C < 77%
70% < C- < 73%
60% < D < 70%
F < 60%

E-mail: Campus and course announcements will often be handled by e-mail. Students should check their "@slu.edu" e-mail regularly.

University Statement on Academic Integrity: Academic integrity is honest, truthful and responsible conduct in all academic endeavors. The mission of Saint Louis University is "the pursuit of truth for the greater glory of God and for the service of humanity." Accordingly, all acts of falsehood demean and compromise the corporate endeavors of teaching, research, health care and community service via which SLU embodies its mission. The University strives to prepare students for lives of personal and professional integrity, and therefore regards all breaches of academic integrity as matters of serious concern.

The governing University-level Academic Integrity Policy can be accessed on the Provost's Office website. Additionally, SLU-Madrid has posted its academic integrity policy online: http://www.slu.edu/madrid/academics. As a member of the University community, you are expected to know and abide by these policies, which detail definitions of violations, processes for reporting violations, sanctions and appeals.

The professor will review these matters during the first weeks of the term. Please direct questions about any facet of academic integrity to your faculty, the chair of the department of your academic program, or the Academic Dean of the Madrid Campus.

University Title IX Statement: Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of sexual misconduct (e.g. sexual assault, sexual harassment, stalking, domestic or dating violence), we encourage you to report this to the University. If you speak with a faculty member about an incident of misconduct, that faculty member must notify SLU's Title IX deputy coordinator, Marta Maruri, whose office is located on the ground floor of Padre Rubio Hall, Avenida del Valle, 28 (mmaruri@slu.edu; 915-54-5858, ext. 213) and share the basic fact of your experience with her. The Title IX deputy coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

If you wish to speak with a confidential source, you may contact the counselors at the SLU-Madrid's Counseling Services on the third floor of San Ignacio Hall (counselingcenter-madrid@slu.edu; 915-54-5858, ext. 230) or Sinews Multipletherapy Institute, the off-campus provider of counseling services for SLU-Madrid (www.sinews.es; 917-00-1979). To view SLU-Madrid's sexual misconduct policy and for resources, please visit the following web address: http://www.slu.edu/Documents/Madrid/campus-life/SLUMadridSexualMisconductPolicy.pdf.

Students with Special Needs: In recognition that people learn in a variety of ways and that learning is influenced by multiple factors (e.g., prior experience, study skills, learning disability), resources to support student success are available on campus. Students who think they might benefit from these resources can find out more about:

- Course-level support (e.g., faculty member, departmental resources, etc.) by asking your course instructor.
- University-level support (e.g., tutoring/writing services, Disability Services) by visiting the Academic Dean's Office (San Ignacio Hall) or by going to https://www.slu.edu/madrid/academics/student-resources.

Students with a documented disability who wish to request academic accommodations must contact Disability Services to discuss accommodation requests and eligibility requirements. Once successfully registered, the student also must notify the course instructor that they wish to access accommodations in the course. Please contact Disability Services at disabilityservices-madrid@slu.edu or +915 54 58 58, ext. 230 for an appointment. Confidentiality will be observed in all inquiries. Once approved, information about the student's eligibility for academic accommodations will be shared with course instructors via email from Disability Services. For more information about academic accommodations, see "Student Resources" on the SLU-Madrid webpage.

Note: Students who do not have a documented disability but who think they may have one are encouraged to contact Disability Services.

Spring 2018 Course Schedule:

Class date	Lab Session
Jan. 15	Presentation
Jan. 21	Last Day to Drop a Class Without a Grade of W and /or Add a Class, choose Audit (AU) or Satisfactory/Unsatisfactory (S/U) Options
Jan. 22	Lab 1 Coulomb's law
Jan. 29	Lab 2 Electric Potential
Feb. 5	Lab 3 Capacitor
Feb. 12	Lab 4 Multimeter
Feb. 14	Registration for Summer 2018 Begins
Feb. 19	Lab 5 Oscilloscope
Feb. 26	**First Mid Term Exam**
Feb. 27	Professors' Deadline to Submit Midterm Grades
March. 5	Lab 6 Ohm's law
March 9	Last Day to Drop a Class and Receive a Grade of W
March. 12	Lab 7 DC circuits
March 15	Last Day to Submit Transfer Application for Fall Semester
March. 19	Lab 8 Magnetic force
March. 26	**Holiday**
April 2	Lab 9 Magnetic field
April. 4	Registration for Fall 2018 Semester Begins
April 9	Lab 10 Magnetic induction
April 16	Lab 11 Optics I
April 23	Lab 12 Optics II
April 30	**Final Exam**
May 11	University Housing Move-out Date
May 12	Commencement
May 13	Professors' deadline to submit spring 2018 final grades

Final Exam Schedules Spring 2018

	4 May (Fr)	**7 May** (Mn)	**8 May** (Tu)	**9 May** (Wd)	**10 May** (Th)
08:30-11:30	Mn classes that meet at 9:00 & 9:30	Mn classes that meet at 10:00	Mn classes that meet at 11:00 & 11:30	Tu classes that meet at 9:30	Tu classes that meet at 8:00
12:00-15:00	Tu classes that meet at 11:00	Mn classes that meet at 13:00	Tu classes that meet at 14:30	Mn classes that meet at 12:00 & 12:30	Tu classes that meet at 12:30
15:30-18:30	Mn classes that meet at 14:30	Tu classes that meet at 17:00 & 17:30	Mn classes that meet at 16:00	Tu classes that meet at 16:00	Mn classes that meet at 17:30
19:00-22:00	---	---	Mn classes that meet at 18:30 & 19:00	Tu classes that meet at 19:00	---