

PHYS 101L: General Physics 1 Laboratory

KOÇ UNIVERSITY Fall 2017

College of Sciences

COURSE INFORMATION

Laboratory Coordinator	Nazmi Yılmaz (Sci 136)
Laboratory Assistants	TBA
First Laboratory	Monday, September 18, 2017
Office Hours	Laboratory Coordinator: Mondays B4 (13:00-14:15); and by appointment in SCI 136. Teaching Assistants: TBA
Laboratory Manual and Required Materials	<i>General Physics I Laboratory Manual, 2017</i> <i>Laboratory Notebook</i> <i>Graph Paper Notebook</i> <i>Non-programmable calculator, Ruler, Protractor</i>
Prerequisites	N/A
Grading	Laboratory 6x12% (Lab Report 80%, Lab Quiz 20%) Laboratory Final 28%

Tentative Laboratory Schedule General Physics I Laboratory/PHYS 101 Lab Fall 2017		
Week1	Sep.18	Laboratory Orientation
Week2	Sep.25	Exp1: Accelerated Motion on an Inclined Plane
Week3	Oct.02	Exp1R: Report Writing: Accelerated Motion on an Inclined Plane
Week4	Oct.09	Exp2: Projectile Motion
Week5	Oct.16	Exp2R: Report Writing: Projectile Motion
Week6	Oct.23	Exp3: Dynamics of Motion
Week7	Oct.30	Exp3R: Report Writing: Dynamic of Motion
Week8	Nov.06	Exp4: Conservation of Linear Momentum
Week9	Nov.13	Exp4R: Report Writing: Conservation of Linear Momentum
Week10	Nov.20	Exp5: Rotational Motion
Week11	Nov.27	Exp5R: Report Writing: Rotational Motion
Week12	Dec.04	Exp6: Physical Pendulum
Week13	Dec.11	Exp6R: Report Writing: Physical Pendulum
Week14	Dec.18	Laboratory make ups
	Dec.27-Jan.07	Lab Final Exam

Laboratory Course Outline

Experiment1: Accelerated Motion on an Inclined Plane

In this experiment, the relationships between an object's position, velocity, and acceleration, when the object is moving in an inclined plane will be investigated when there is a constant force due to gravity acting on the object.

Experiment2: Projectile Motion

This experiment studies the motion in two dimensions. The ball fired from the Projectile Launcher is a projectile, an object with a certain initial velocity that moves under the effect of gravitational force. If air resistance is neglected, the motion of a projectile is influenced only by the constant gravitational acceleration, which is directed towards the planet Earth and does not depend on the velocity.

Experiment3: Dynamics of Motion

The purpose of this experiment is to verify Newton's 2nd law by measuring the acceleration of a cart while subject to varying net applied forces. You will do this by measuring the acceleration of the cart, calculating the mass using the Newton's 2nd law, and then comparing the mass obtained with that measured directly from a scale. In this experiment, you will also find a value for the coefficient of friction μ between the cart and the track using two different methods. In the first part, the total mass in the system will be kept constant, while various net forces are applied. In the second part, the total mass will be changed and various net forces will be applied.

Experiment4: Conservation of Linear Momentum

In this experiment, the momentum and kinetic energy of two carts before and after an elastic or inelastic collision are investigated. The linear momentum of an object is the product of its mass and velocity. Newton's second law tells us that when the vector sum of the external forces acting on a system of objects is equal to zero, the total linear momentum of the system remains constant.

Experiment5: Rotational Motion

In this experiment, using the relation between the torque and the rotational acceleration, we will determine the moment of inertia of a disk around its symmetry axis using the measured acceleration of a mass hanged by a rope on the rim of the disk.

Experiment6: Physical Pendulum

In this experiment, acceleration due to gravity using will be calculated using a physical pendulum, and moment of inertia of a physical pendulum will be determined from the period of oscillation of a physical pendulum.

Laboratory Attendance

Students are required to attend all scheduled laboratory experiments. Makeup laboratories are very reluctantly given only with a university approved medical excuse, and if given, will always be harder than the original laboratory experiments. Students should not plan to take makeup laboratory experiments.

Before the Laboratory Experiment

Students should bring the laboratory manual, laboratory notebook, graph papers, and a scientific calculator to the laboratory. Anyone who does not have the manual as well as the laboratory notebook will not be allowed to perform the experiment. Students should read the manual before coming to the laboratory to do the experiment. Students are expected to collect enough knowledge about the experiment by reading the introduction and theory sections to have the necessary theoretical background of the experiment. The students should read the procedure section in order to familiarize themselves with the experiment, before coming to the laboratory.

Laboratory Quiz

There is going to be a 10 minute quiz about the theoretical background and procedure of the experiment in the beginning of each laboratory session. The quiz grade constitutes 1/5 of the laboratory grade.

During the Laboratory Experiment

Students have to come to the laboratory on time. Anyone who fails to come to the laboratory within the first 15 minutes will be assumed absent. The time determined for each experiment is 75 minutes. Students are expected to complete all laboratory work within this determined time. If this time does not suffice for the laboratory work, the students will not be given additional time.

Students are expected to check the instruments and components needed for the experiment and report anything missing or unusual. After the experiment starts, they will be responsible from the experimental set-ups. During the experiments, the students must take all the necessary data and perform all the calculations to analyze the experiment. They should answer the questions, which are asked in the laboratory manual, in the experimental report.

After the Laboratory Experiment

The students should get their data checked and confirmed by the laboratory instructor, before leaving the laboratory. After completing the experiment, students should clean up the experimental setup and properly turn off all the electronics and the computer. Students should leave the instruments and components in good condition. All instruments must be turned off and disconnected. The table should be left in good order. The students should show the laboratory assistant, that there is no missing equipment. The students are not allowed to leave, before the assistant's approval. Taking equipment out of the laboratory is an offense and may result in disciplinary action. Moreover, the students will be financially responsible to replace all the missing equipment.

Laboratory Reports

Each Student should submit a report of the experiment biweekly.

Introduction, theory and experimental set up sections of laboratory report, should be hand written on a clear A4 paper as a preliminary work and should be handed to the laboratory instructor with the laboratory quiz before starting the experiment.

Data analysis, discussion and conclusion sections of laboratory report will be written on your laboratory notebook a week after the experiment.

Students are not allowed to use pencil in any characters, figures, drawings, etc.

Students are not allowed to remove their laboratory notebooks from the laboratory.

Figures and tables must have figure and table numbers and captions.

Late reports will not be accepted.

Laboratory Report Format

The laboratory report should include the following sections in scientific format:

Introduction (5 %)

In this section, state your reason of performing this experiment. Write down your hypothesis, your prediction of the answer to the problem that will be investigated in the experiment.

Theory (5 %)

Theory section should include the theoretical background and the equations related to the experiment.

Experimental setup and procedure (5 %)

This section should include the explanation of the set up and the brief procedure of the experiment.

Data analysis (35 %)

Data analysis section should include the data in tabular form and the plots with suitable titles, units, and scales on both coordinate axes.

Discussion (40 %)

Discussion section should include detailed answers to the questions.

Conclusion (10 %)

In this section, write the conclusions drawn from the experiment. State whether your hypothesis was correct or not and summarize what you have learned in the experiment.

Physics Laboratory Safety

By following the rules in the physics lab, you can make the lab safe not only for yourself but also for all those around you.

1. Never work in the lab unless an instructor is present and aware of what you are doing.
2. Prepare for the lab activity or experiment by reading the laboratory manual first. Ask questions about anything that is unclear to you. Note any cautions that are stated.
3. Dress appropriately for a laboratory. Avoid wearing overly bulky or loose-fitting clothing or dangling jewelry. Pin or tie back long hair, and roll up loose sleeves.
4. Keep the tabletops free of any books and materials not needed for the lab you are working on.
5. Never throw anything in the laboratory.
6. Use the apparatus only as outlined in the laboratory manual or by your instructor. If you wish to try an alternative procedure, get your instructor's approval first.
7. When working with electric circuits, be sure that the current is turned off before making adjustments in the circuit.
8. If you are connecting a voltmeter or ammeter to circuit, have your instructor approve connections before you turn the current on.
9. Do not connect the terminals of a dry cell or battery to each other with a wire. Such a wire can become dangerously hot.
10. Report any injuries, accidents, or breakage to your laboratory instructor immediately. Also report anything you suspect may be malfunctioning.
11. Work quietly so that you can hear any announcements concerning cautions and safety.
12. Know the locations of fire extinguishers, fire blankets, and the nearest exit.
13. When you have finished your work, check that the electric circuits are disconnected. Return all materials and apparatus to the places designated by your instructor. Follow your instructor's directions for disposal of any waste materials. Tidy your work area.

Koç University
Statement on Academic Honesty
with Emphasis on Plagiarism

Koç University expects all its students to perform course-related activities in accordance with the rules set forth in the Student Code of Conduct (<http://vpaa.ku.edu.tr/academic/student-code-of-conduct>). Actions considered as academic dishonesty at Koç University include but are not limited to cheating, plagiarism, collusion, and impersonating. This statement's goal is to draw attention to cheating and plagiarism related actions deemed unacceptable within the context of Student Code of Conduct:

All individual assignments must be completed by the student himself/herself, and all team assignments must be completed by the members of the team, without the aid of other individuals. If a team member does not contribute to the written documents or participate in the activities of the team, his/her name should not appear on the work submitted for evaluation.

Plagiarism is defined as 'borrowing or using someone else's written statements or ideas without giving written acknowledgement to the author'. Students are encouraged to conduct research beyond the course material, but they must not use any documents prepared by current or previous students, or notes prepared by instructors at Koç University or other universities without properly citing the source. Furthermore, students are expected to adhere to the Classroom Code of Conduct (<http://vpaa.ku.edu.tr/academic/classroom-code-of-conduct>) and to refrain from all forms of unacceptable behavior during lectures. Failure to adhere to expected behavior may result in disciplinary action.

There are two kinds of plagiarism: Intentional and accidental. Intentional plagiarism (Example: Using a classmate's homework as one's own because the student does not want to spend time working on that homework) is considered intellectual theft, and there is no need to emphasize the wrongfulness of this act. Accidental plagiarism, on the other hand, may be considered as a 'more acceptable' form of plagiarism by some students, which is certainly not how it is perceived by the University administration and faculty. The student is responsible from properly citing a source if he/she is making use of another person's work. For an example on accidental plagiarism, please refer to the document titled "An Example on Accidental Plagiarism".

If you are unsure whether the action you will take would be a violation of Koç University's Student Code of Conduct, please consult with your instructor before taking that action.

An Example on Accidental Plagiarism

This example is taken from a document prepared by the City University of New York.

The following text is taken from Elaine Tyler May's *Myths and Realities of the American Family*:

“Because women's wages often continue to reflect the fiction that men earn the family wage, single mothers rarely earn enough to support themselves and their children adequately. And because work is still organized around the assumption that mothers stay home with children, even though few mothers can afford to do so, child-care facilities in the United States remain woefully inadequate.”

Below, there is an excerpt from a student's homework, who made use of May's original text:

“As Elaine Tyler May points out, “women's wages often continue to reflect the fiction that men earn the family wage” (588). Thus many single mothers cannot support themselves and their children adequately. Furthermore, since work is based on the assumption that mothers stay home with children, facilities for day care in this country are still “woefully inadequate.” (May 589)”.

You may think that there is no plagiarism here since the student is citing the original author. However, this is an instance of accidental plagiarism. Although the student cites May and uses quotation marks occasionally, the rest of the sentences, more specifically the following section: “Thus many single mothers cannot support themselves and their children adequately. Furthermore, since work is based on the assumption that mothers stay home with children, facilities for day care in this country are still “woefully inadequate.” (May 589)” almost exactly duplicates May's original language. So, in order to avoid plagiarism, the student either had to use quotation marks for the rest of the sentences as well, or he/she had to paraphrase May's ideas by using not only his/her own words, but his/her own original ideas as well. You should keep in mind that accidental plagiarism often occurs when the student does not really understand the original text but still tries to make use of it. Understanding the original text and understanding why you agree or disagree with the ideas proposed in that text is crucial both for avoiding plagiarism and for your intellectual development.

Reference(s):

Avoiding and Detecting Plagiarism: A Guide for Graduate Students and Faculty. The Graduate Center. City University of New York, 2012. Web. <http://www.gc.cuny.edu/CUNY_GC/media/CUNY-Graduate-Center/PDF/Publications/AvoidingPlagiarism.pdf>