

# *Physics Lab for Students of the Faculty of Computer and Information Sciences*

This Lab is designed especially for students of computer and information sciences faculty to serve the two courses Phys. 111 and Phys. 112. Each of the two parts contains 12 experiments devoted to topics taught in the corresponding course. In the first part the topic is Classical Mechanics. Experiments to study linear motion down an incline using air track with wonderful design (due to Pasco) and another one for an object moving in the field of gravity (free falling designed by Leybold) can be found. Student can enjoy studying oscillatory motion by the three available experiments, one for a point object (simple pendulum), the second for extended object (physical pendulum) and the third for highly symmetric object (torsion pendulum). Experiment to study linear motion in resistive medium (glycerin) also exists in the Lab. Propagation of waves in air is one of the interesting experiments that equipped with precise function generator and long glass tube so that he/she can measure the velocity of sound in air accurately. Propagation of mechanical waves on a stretched string forming standing waves upon reflection at the ends looks beautiful and can be used to measure the density of the string. Computer simulation experiment to study many types of motion is also available to encourage student to understand phenomena related to motion correctly in a real atmosphere.

The second part of the Lab is devoted to electricity and magnetism and physical optics that are the subjects of the spring semester course. All the components of each experiment are connected according to the circuit diagram and fixed on a wooden board so that the student can give his/hers attention to Physics concepts only without losing a time to connect the experiment components which is a risky deal. Handling experiment with this designed is very easy for students due to the correct arrangement of different parts of the experiment. Student really enjoys learning physics in this Lab.

The availability of well qualified assistances is helpful for the student to complete his/hers work safely, correctly and within the time of each Lab session.



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Physics  
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# LABORATORY MANUAL

## Phys.112

For Students of

*Faculty of Science*

Academic Year 2008-2009

# Dear Student

Welcome to the Freshman Lab. hoping for you valuable and interesting work and by the end of the semester success in the course. Enjoy Learning Physics just as you enjoy your life. The following are our regulations you have to follow during the semester.

**Before attending** your laboratory section, you should always read the experiment you are going to do. Be aware that the pre-Lab. reading enables you to understand well basics of the experiment and while attending the class you can do the experiment correctly. Information given in the first few Labs will be much more detailed than that of the next subsequent Labs; many of the laboratory techniques you learn will be used repeatedly in other Lab. sessions. The only acceptable way to demonstrate your experimental results in graphical form is that by “Excel” computer program. In the first Lab. session a discussion about the Excel and how to use the most common tools of your experiments, namely the oscilloscope, Function generator and the Multimeter, will be given. As you perform the Labs, your laboratory skills will improve and you should be less dependent on exact instruction from the Lab. Manual.

Student attending the Lab. late by more than 10 minutes will **Loose** the corresponding two marks. Student late by more than 20 minutes can not attend the Lab. and he/she will be considered **Absent**. Absence of 25 % of the Lab. sessions during semester may prevent you from attending the final exam. In such a case your final grade of the Lab. work can be zero.

Be aware that **Cheating** during Exams. and submitting experimental results which is not yours will be strongly punished according to the university regulations.

Be sure that organizing your work will save you a great deal of time and frustration. The 2 hours Lab. time can be subdivided according to the next proposal:

|                  |   |
|------------------|---|
| <b>15-20 min</b> | <b>General discussion</b>                   |
| 50-60 min        | Practical work                              |
| <b>10-13 min</b> | <b>Drawing graph by Excel</b>               |
| 10-13 min        | Answer questions                            |
| <b>10-14 min</b> | <b>Experiment Correction and evaluation</b> |

**Before leaving** the Lab. you have to correct and evaluate your work by the assistant. Be sure that your grade, in addition to the assistant name signature and date of attending the Lab., have been recorded in your manual and in the files of the Lab. Six marks out of 10 marks for each experiment (A sum of 100 marks for the 10 experiments of the Lab.) are given for the experimental work including **Performance, Lab. attitude** and **Accuracy**. Two marks are given for the **attendance** and other two marks are given for **solving correctly questions** that can be found at the end of each experiment sheet. The total grad will be considered during the final course evaluation. You have to ask about the experiment you have to do in the next Lab. session in order to follow the exact way to do the experiment correctly.

A Mid-Term Exam., covering materials of experiments the student did during the first five weeks will be organized. Time and date of exam. will be announced in the proper time. In addition, student should be ready for Quick Quizzes during all the Lab. sections.

Using Lab. equipment in a correct way is your responsibility. You have to think twice before connecting power to the experiment. Damage of any of the experiment components should be substituted without delay by the student. Attending the Lab. with food or drinks is not allowed. Please keep the Lab. table clean and in order.

### **By performing this Lab., you will learn:**

Characteristics of different types of transistors and their uses,  
How to use transistors in amplifier circuits,  
How to increase the current, voltage and power gain using the feedback,  
How to analyze simple logic circuits

**Finally:** We are constantly trying to improve the quality and instructional utility of your Labs. If you can think of any modification to the equipment or clarification to the Lab. manual please let us know. Your feedback is extremely important to us so, please do not hesitate to submit your suggestions to your instructor or assistant.

**Study of Electronic Circuits in this Lab. will be enjoyed,  
Good Luck**



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## Photos Showing Some Experiments Taught in this Lab

Neon Lamb



Wheatstone Bridge

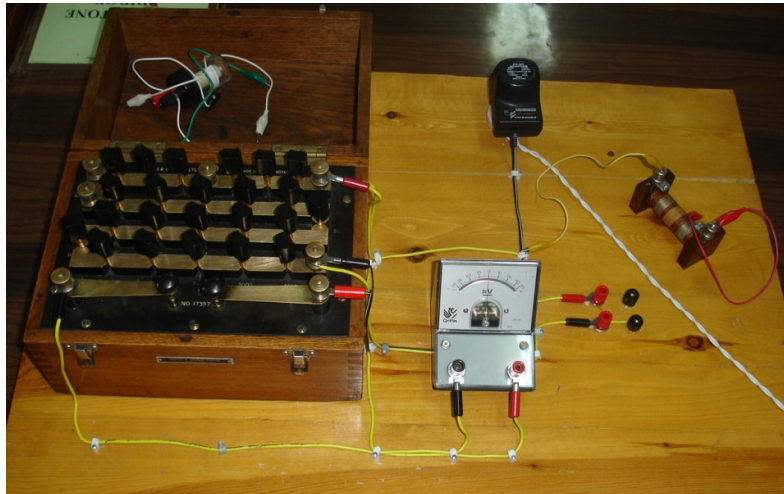


Photo-conductive cell



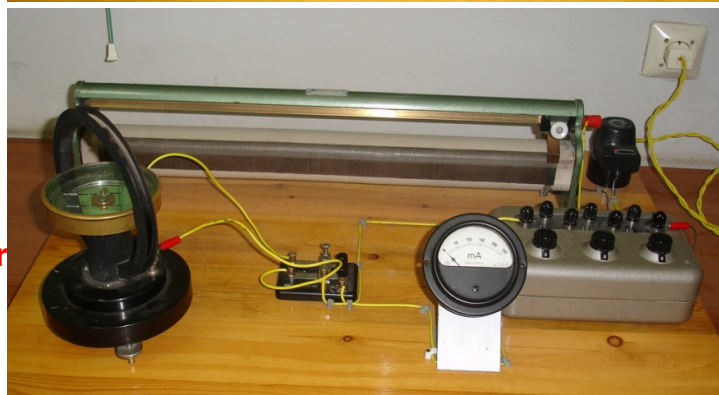
**Galvanometer Sensitivity**



**Inductive Reactance**



**Tangent Galvanometer**



**RLC circuit**







