

Rhodes College
Department of Physics
Physics 112L - Fundamentals of Physics Laboratory

General Information and Instructions
Physics 111L - 112L

The two semester laboratory course 111L-112L accompanying the lecture courses Physics 111 and Physics 112 is intended to acquaint you with some of the methods and tools of experimental physics. The laboratory experience will be used to introduce new ideas as well as to reinforce concepts addressed in the lecture course.

The experiments to be performed during the two semesters cover topics in statics and dynamics, sound, electricity and magnetism, and optics. The equipment employed ranges from that primarily intended to illustrate a physical principle to that which will enable a precise measurement to be obtained. Much of the equipment is expensive, and most, delicate; all is worthy of care in use. If you do not understand how to carry out a measurement or are uncertain how to manipulate an apparatus, contact either the instructor or the laboratory assistant for help.

This packet contains the descriptions and procedures for the experiments to be performed in the first semester. The experiments were developed here at Rhodes or modified to fit our educational goals and the available laboratory equipment. **The procedures are intended as guidelines only; thoughtful innovation is strongly encouraged.** A semester's supply of cover and backing sheets is also included.

1. Generally, you will work in teams of two persons, and carry out one experiment per laboratory session. Be sure to equally share manipulation and recording efforts, so that you both learn how to handle the apparatus and both derive maximum benefit from the experiment.
2. There will be one lab report from each pair of partners for each experiment, with both partners receiving the same grade.
3. You must read about the day's experiment before coming to class.
4. It is recommended that you bring your calculator and the textbook used for the lecture course to lab.

After introductory comments concerning the experiments by the laboratory assistant and/or instructor, you and your partner will carry out the assigned experiment, sharing tasks equally.

Record the data neatly, using the space provided on the experiment sheets. You may additionally print a data page from within one of the computer programs that you

will be using. Use care in presenting significant figures for the data and results. Before you leave the laboratory the instructor or the laboratory assistant should approve your data. Curves representing data trends should reflect least-squares fits and means and standard deviations computed for data sets.

No smoking, food or drink is permitted in the laboratory. Coats, bags, etc. should not be placed on the lab tables; a coat rack and storage bins beneath the tables are provided.

Laboratory Reports

The experiments are designed to provide you with enough time to perform the experiment and to prepare a final laboratory report before you leave class. The report shall consist of a cover sheet, the completed Laboratory Report section, additional data sheets (if required), answered questions and any figures or graphs (as required). Each lab report should end with a statement of CONCLUSIONS. Here you should describe (1) the goal of the experiment, (2) any modifications you made to the procedure, (3) how your results compare to accepted values, theory, and your own expectations, (4) identify sources of error in the experiment, and estimate their impact on your results, (5) any interesting observations or insights.

All work in the laboratory and reports should be pledged.

Each laboratory report will be graded and returned to you. Grades will reflect the degree to which you and your partner; (1) understood the principles of the experiment, (2) demonstrated resourcefulness in conducting the experiment, (3) performed measurements with appropriate care and accuracy, and (4) produced a neat and organized report.

Late laboratory reports will be reduced one letter grade below their score. No laboratory reports will be accepted after the start of the second scheduled laboratory session following the experiment performance. In the event of an excused absence from a laboratory session, missed work must be completed within one week of the scheduled session.

Overall grades for the laboratory courses 111L and 112L are issued separately from grades for the associated lecture courses. Final grades will be determined from the average grade for all laboratory reports.

NOTE: You must be enrolled in Fundamentals of Physics lecture in order to be enrolled in Fundamentals of Physics Laboratory.

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Experiment Schedule

January 9, 10	No Meeting	
January 14, 15, 16, 17	Experiment: The Coefficient of Linear Expansion	Page 5
January 21, 22, 23, 24	No Meeting (Martin Luther King Holiday)	
January 28, 29, 30, 31	Experiment: Specific Heats of Metals	Page 13
February 4, 5, 6, 7	Tutorial: Electric Charge	
February 11, 12, 13, 14	Tutorial: Electric Fields and Flux	
February 18, 19, 20, 21	Experiment: Electric Fields and Equipotentials	Page 23
February 25, 26, 27, 28	Experiment: Joule Heat	Page 31
March 3, 4, 5, 6	No Meeting (Spring Recess)	
March 10, 11, 12, 13	Experiment: Multiloop Circuits: Kirchhoff's Rules	Page 37
March 17, 18, 19, 20	No Meeting (Easter Recess)	
March 24, 25, 26, 27	Experiment: Magnetic Field Measurements	Page 51
March 31, April 1, 2, 3	Tutorial: Electromagnetic Waves	
April 7, 8, 9, 10	Experiment: Spherical Mirrors and Lenses	Page 59
April 14, 15, 16, 17	Experiment: Measuring the Wavelength of Light with a Ruler	Page 79
April 21, 22, 23, 24	Experiment: TBD	

Notes: