Lab Syllabus Fall 2018

Physics 180L - Engineering Physics Lab
Fall – 2018

Syllabus

General Information
Instructor: Di Xiao
Email: dxiao@unr.edu
Office: LP SB15
Lab Director: Dr. Bernhard Bach
Email: bbac2@unr.edu
Office: LP 227
Office hours: by appointment
Email is recommended
Lab meeting time: Th 8:00am-10:00am (section 1005), Tu 8:00am-10:00am (section 1012)
Lab manuals webpage:
https://www.unr.edu/physics/student-resources/fall-2018-labs

Class Description and Objectives:

The purpose of the physics laboratory is to allow students to witness the concepts and physical laws that are introduced in lecture. You will also be exposed to elementary laboratory techniques. Every class will have a short lecture introducing the procedures, concepts, formulas and instructions relevant to the experiment. The lecture will also cover what is expected in your lab-report; don’t be late. Attendance and participation is mandatory. Experiments will usually be performed in groups, but each student will turn in an individual lab report.

Course Prerequisites: Math 181
Corequisite:

Student Learning Outcomes:

The purpose of the course is to provide the practical knowledge necessary for a well-rounded understanding of the physical world. This laboratory experience partially satisfies the Silver Core Objective CO4: Physical & Natural Phenomena. Students that successfully complete this course should be able to:

i. The student will demonstrate problem solving skills in various types of problems in physics using quantitative reasoning, critical thinking and appropriate mathematical techniques.

ii. The student will demonstrate the ability of use scientific methods to understand and explain concepts in physics.

iii. The student will be able to connect physics concepts and problems to their world experience.

iv. The student will demonstrate skills in collection and interpretation of data from laboratory experiments.
v. Properly use and read: scales, calipers, digital voltmeters, micrometer and balances.

vi. Develop proper habits that minimize uncertainty in physical measurements.

vii. Set up and solve problems related to the propagation of errors and uncertainties.

viii. Understand and properly use significant figures.

ix. Plot and fit experimental data to a given mathematical model.

x. Proficiency in troubleshooting, problem-solving and interpreting the results of physical measurements.

xi. Develop effective written and verbal communications skills to ensure accurate transfer of technical information.

Course Requirements: Lab notebook (see bookstore for required notebook), and copy of lab to be performed.

Lab Etiquette:
• No FOOD/DRINKS/SMOKING/APPLYING of COSMETICS in the labs.
• Please turn off your cell phone.
• You and your partners must clean up and shut off equipment after you are finished with your lab. Failing to leave your station complete, organized and working can affect your grade.
• Please report all damaged equipment so it can be replaced.

The Ground Rules:
• Students are allowed to drop their lowest lab grade. For example, if ten labs are performed during the semester, the T.A. will use the nine best lab grades to calculate a student’s final grade.
• Students that must miss their assigned lab section can arrange to take the lab in a different lab section (during the same week); if the student receives permission from both T.A.s It is the student’s responsibility to make prearrangements to turn in their lab report to their normal TA.
• Labs reports are due at the end of each class period. Students that complete labs outside their normally scheduled lab section must make prearrangements with their regular TA, to turn in their report, (see above). Late labs are not accepted.
• Make sure you know where your TA’s mailbox is located!! The department cannot guarantee that anything, placed in the wrong mailbox or some other “novel” location, will make it to the proper instructor for grading.
• You are expected to read the lab experiments before class and have a copy of the lab with you in the class.
• Students will keep and maintain an individual lab notebook. All notebook entries must be in ink.
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Lab reports:
• The objective and theory section of your lab report should be completed prior to class.
• Your original data must be recorded clearly (in table, with units) in your lab notebook, it is the student’s responsibility to make sure that the original data is signed or initialed by the instructor, before leaving the lab. This signature will be counted as attendance. Lack of signature on original data is grounds for a grade of zero.
• Your lab reports should show data analysis, calculations and error analysis.
• A conclusion should be made at the end of your lab reports.
• You also need to finish problems on the lab manual.
• Lab reports are due at the end of each class period. Students will turn in individual reports.
• Lab reports are due at the end of the class period; late labs will not be accepted without good cause and prior permission from the instructor.
• Lab reports that contain copied and or plagiarized material will be given a zero. Lab reports that are not written in your own words will be given a zero. Lab reports for lab experiments the student did not perform will be given a zero.
• The first lab report that contains copied or plagiarized material will be given a grade of zero. The second occurrence will drop your final grade by one letter grade. The third lab that contains copied or plagiarized material will get you an F for the class.
• Neatly, hand-written lab reports are accepted. Illegible lab reports are unacceptable and will be given a grade of zero.
• Follow the rubric when writing up lab reports. This format can be found on the lab manual website. Lab reports that do not follow the rubric will be graded down.

Attendance:
You are required to attend all the classes. If you must miss a lab due to a justifiable excuse (you must document your; illness, emergency, court date...) or pre-arranged your absence. you should arrange to make up the lab during a different lab session that week (the week of your absence). You must contact both instructors before attending another lab section. No more than three labs may be made up in another section. If you are missing or fail to turn in three or more lab reports you will receive a failing grade for the lab. Lab reports that are turned in for experiments which you did not attend/perform will be given a grade of zero. There are no mulligans, rewrites or do-overs. You are expected to be in class (in body and mind) on time.

Laboratory safety:
Experimental work can expose one to various kinds of hazards (electric shocks, burns, cuts, defenestration…), every person working in the laboratory should maintain “situational awareness” of their surroundings, so as to avoid possible injury. Be aware and reduce the risk of injury and/or damaging the equipment. Report any accident immediately.

http://www.realclearscience.com/lists/worst_lab_accidents_in_history/
# Lab Syllabus Fall 2018

## Schedule:

### Physics Lab Manuals and Room Schedule Fall 2018

<table>
<thead>
<tr>
<th>Week</th>
<th>Month/date</th>
<th>Physics 151L</th>
<th>Physics 180L</th>
<th>Physics 152L</th>
<th>Physics 181L</th>
<th>Physics 182L</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>9/3</td>
<td>Orientation Format of Lab Reports (DMS 208)</td>
<td>Orientation Format of Lab Reports (DMS 212)</td>
<td>Orientation Format of Lab Reports (DMS 209)</td>
<td>Orientation Format of Lab Reports (DMS 210)</td>
<td>Orientation Format of Lab Reports (DMS 201/203)</td>
</tr>
<tr>
<td>3</td>
<td>9/10</td>
<td>Accuracy Of Measurements (DMS 208)</td>
<td>Normal Distribution (DMS 212)</td>
<td>Oscilloscope, and DMM (DMS 209)</td>
<td>Oscilloscope, and DMM (DMS 210)</td>
<td>Introductory Optics System (DMS 201/203)</td>
</tr>
<tr>
<td>4</td>
<td>9/17</td>
<td>Force Table (DMS 208)</td>
<td>Understanding Motion I &amp; II (DSM212)</td>
<td>Mapping Electric Fields (DMS 209)</td>
<td>Gas Law (DMS 210)</td>
<td>Introductory Optics System (DMS 201/203)</td>
</tr>
<tr>
<td>5</td>
<td>9/24</td>
<td>Understanding Motion I &amp; II (DMS212)</td>
<td>Force Table (DMS 208)</td>
<td>Electrostatics (DMS 209)</td>
<td>Heat of Fusion (DMS 210)</td>
<td>Interferometer Systems and Accessories (DMS 201/203)</td>
</tr>
<tr>
<td>6</td>
<td>10/1</td>
<td>Equilibrium of Non-concurrent Forces (DMS 208)</td>
<td>Acceleration on an Air Track (DMS 212)</td>
<td>Ohm’s Law (DMS 210)</td>
<td>Electrostatics (DMS 209)</td>
<td>Electron Diffraction (DMS 201/203)</td>
</tr>
<tr>
<td>7</td>
<td>10/8</td>
<td>Conservation of Momentum (DMS 212)</td>
<td>Scalar Product (DMS 208)</td>
<td>EMF Source RC Circuits (DMS 209)</td>
<td>Thermal Expansion (DMS 210)</td>
<td>h/e Apparatus (DMS 201/203)</td>
</tr>
<tr>
<td>9</td>
<td>10/22</td>
<td>No labs the week of Oct 22nd</td>
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<tr>
<td>10</td>
<td>10/29</td>
<td>Archimedes’ Principle (DMS 208)</td>
<td>Uniform Circular Motion (DMS 210)</td>
<td>e/m Experiment (DMS 209)</td>
<td>EMF Source (DMS 212)</td>
<td>The Balmer Series of Hydrogen Spectrum (DMS 201/203)</td>
</tr>
<tr>
<td>11</td>
<td>11/5</td>
<td>Gas Law (DMS 210)</td>
<td>Torque (DMS 212)</td>
<td>Refraction (DMS 208)</td>
<td>e/m Experiment (DMS 209)</td>
<td>Emission Spectroscopy Lab (DMS 201/203)</td>
</tr>
<tr>
<td>13</td>
<td>11/19</td>
<td>No labs the week of Nov 19th</td>
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<td></td>
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</tr>
<tr>
<td>14</td>
<td>11/26</td>
<td>Linear Harmonic Motion (DMS 210)</td>
<td>Standing Wave in Air (DMS 212)</td>
<td>Double-Slit Diffraction (DMS 209)</td>
<td>RC/RCL Circuit (DMS 208)</td>
<td>No Labs</td>
</tr>
</tbody>
</table>
Grading and percentage of total reports:
A: 90 -100 B: 80 - 89 C: 70 - 79 D: 60 - 69 F: Below 60

A- represents outstanding distinction and excellence. 90-100%. These are not impossible to achieve but are rare and difficult to come by.

B -signifies levels of solid accomplishment and goodness. 80- 89%. Good is more common than excellent but more rare than average. While there is merit to hard work and long hours, it does not always guarantee success. Goodness refers to the combined results not just the effort.

C -signifies "average- simple, common, adequate but ordinary 70-79%. Average is not usually an appealing rank to artists who strive for extraordinary and unique. C is however a very respectable point. Recognize what more is needed; plan to move ahead, improve and grow.

D- represents results less than standard and/or mediocre- just passable 60-69%.
Perhaps priorities about school or life have not been established. Recognize however, that a D can also mean that you truly do not understand what is expected. You should make an office appointment to discuss how you might take action on your future and upcoming assignment.

Class Absence Policy:
The university’s absence policy is found at http://www.unr.edu/administrative-manual/3000-3999-students/3020-class-absence-policy

Disability Statement: Any student with a disability needing academic adjustments or accommodations is requested to speak with me or the Disability Resource Center as soon as possible to arrange for appropriate accommodations http://www.unr.edu/drc

Statement for Academic Success Services: Your student fees cover usage of the University Math Center (775) 784-4433, University Tutoring Center (775) 784-6801, and University Writing Center (775) 784-6030. These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student."
Statement on Academic Dishonesty: For example, "Cheating, plagiarism or otherwise obtaining grades under false pretenses" constitute academic dishonesty according to the code of this university. Academic dishonesty will not be tolerated and penalties can include canceling a student's enrollment without a grade, giving an F for the course or for the assignment. For more details, visit http://www.unr.edu/administrative-manual/6000-6999-curricula-teaching-research/instruction-research-procedures/6502-academic-standards

Statement on Audio and Video Recording: Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded. http://www.unr.edu/Documents/provost/provosts-office/forms/BoR_Title_4_Chop_12_Sect_5_6.pdf

The University of Nevada, Reno is committed to providing a safe learning and work environment for all. If you believe you have experienced discrimination, sexual harassment, sexual assault, domestic/dating violence, or stalking, whether on or off campus, or need information related to immigration concerns, please contact the University’s Equal Opportunity & Title IX Office at 775-784-1547. Resources and interim measures are available to assist you. For more information, please visit: http://www.unr.edu/equal-opportunity-title-ix.

Standard Lab format:

Lab Partner’s Name:
TA’s Name:
Date:
Title of the Experiment
(1 point or 2% for proper heading)
Objective (2 points or 4%): A concise statement (a sentence or two, in your own words*) that summarizes the objective of the experiment. This section must be completed prior to class.
Theory (8 points or 16%): Summarize in your own words*, the theory of the physics involved in the experiment (a couple of paragraphs), as well as an outline of the procedures. Explain, in your own words*, any terms which are relevant or specific to the lab. This section must be completed prior to class.
4 points for summarizing the theory
4 points for outlining procedures
Notes and Computations (3 points or 6%): You should be recording notes from the discussion before the experiment, as well as any observations or questions you have. Any calculations should also appear in your notebook. Think of these notes as a reference for
you to look back at. Record what will help you later and structure it however works best for you, but keep them neat and legible. Though this is not necessarily a contiguous “section,” these notes should be clearly separated from and not mixed in any other section.

Equations (2 points or 4%): Present the key/working equations. Define all variables and provide their units.
1 point for expressing relevant equations
1 point for defining variables and proper units

Data (9 points or 18%): An orderly display of the data, preferably in tabular format. Your original data sheet must be signed by the TA. All entries should be clearly identified and include their proper units.
1 point for a data section
2 points original data (signed by instructor)
2 points for proper/clear labeling of data
2 points for proper units of data
2 points for numerical results

Questions (25 points or 50%): There are typically five questions each correctly answered question is worth 5 points

Grade = (total points earned / total point available) X 100

Note: Your instructor will consider the above format important when grading your lab report. The following may be taken into consideration (Worth ≈ 10%)
1. Neatness
2. Composition
3. Grammar
4. Spelling
5. Thought and originality in performing and presenting the lab
6. Behavior that is disruptive to the labs (which includes but not limited to: being late to class, not leaving a clean work area for the following class…)
7. Ability to follow instructions.

In your own words*: this means in your own words! Labs that contain material copied or plagiarized from the lab instruction or elsewhere will be given a grade of zero.

Bonus point will be given for finding and reporting errors in lab manual not all labs will conform exactly to the lab report format, given above. Some labs may not require a certain section of the lab format. While another lab may require an additional section be added to the write-up. For nonconforming labs, check with the instructor as to what they expect for a write up.