PHYS 151 SYLLABUS Spring 2019

PHYS 151 Labs: Section A Mon 9-10:50; Section B Mon 13-14:50; FR 235
(PHYS 150 Lecture Course: Section 1 Mon 12:00-12:50; LaT 200)

COURSE: Physics Laboratory at Northern Illinois University
Catalog Description: PHYS 151 - Physics Laboratory (1 credit)
Selected experiments designed to accompany PHYS 150. One two-hour
laboratory per week.
Requisites: CRQ: PHYS 150
Credit hours: 1 credits. One two-hour laboratory per week.
Method of delivery: Laboratory (hands-on).
Remarks: The combined four credits of this PHYS 151 (1 credits) and the co-
requisite lecture course PHYS 150 (3 credits) are equivalent to the NIU
course labeled PHYS 150A (4 credits) which was offered until the 2016
Spring semester.
Failing this lab course PHYS 151 does NOT affect to the grades of PHYS
150 course. However, dropping out of PHYS 150 lecture (a required co-
requisite for this course) will mean that the registrar will automatically
drop you from PHYS 151 lab.

CLASS MEETINGS: Every Monday. Lab Sections: A: 9:00-10:50 AM, B: 1:00-2:50 PM
@Faraday Hall (FR) 235
Text and materials: Lab modules – available on Blackboard or course website.
Lecture Instructor: Carol Thompson, LaTourette Hall 207, 815-753-1772, cthompson@niu.edu
Laboratory TA: Daniel Faia, Z1726445@students.niu.edu
Office Hours: Thompson: Wednesday 10-11am and by appointment. (just contact me!)
Faia: may often be available in lab Monday after section B is completed

A. Preparing for the Laboratory session

[Pre-lab] Note that most labs have a posted “Prelab” set of exercises that must be completed and
handed in to the TA at the beginning of the lab period to receive the indicated points.

[Lab handout] Students should read the lab handout prior to lab class. (Handout will be available on
Blackboard) or the course web page). Please bring a printed version to the lab session as it has the
instructions and steps for successfully completing the lab, as well as data tables, charts, and a variety
of questions that document the results and observations during the lab session.

[Preliminary Observations] Most labs will have a page of Preliminary observations that should be
turned in immediately at the end of the class session or are signed by the TA and will count for 5 points
of the laboratory report credit.

[What to bring to class] Printout of the current class lab module). A notebook for notes, and a copy
of the Phys 150 text book is useful! a USB drive/memory stick, and calculator. If a set of lab partners
do not have access to a smartphone (for taking the required photos for the methods sections), please
discuss with the TA how to get photos taken during a lab. Before leaving lab, make sure that you and
your partner have copies of the photos taken for the lab methods section.
B. Submission of Lab Reports (Weekly – via SafeAssign on Blackboard)

Students have 1 week to complete their lab reports after doing a lab experiment. Turning in the lab report entails the following:

1) Students must upload an electronic version (pdf or word file) of their lab report to Blackboard’s SafeAssign system.
2) You may NOT upload a ‘scanned’ copy of the report as this does NOT meet the requirements for using SafeAssign. Handwritten reports are not acceptable.
   a) We suggest using an NIU computer since an equation editor and Excel is installed on all of them.
   b) Graphs must be done using Excel or Libreoffice or similar graphing program.
3) There are three sections in the Phys 150 lab report where student prose is used to assess their own understanding of the concepts and the activities of the lab. These are the Theory/Background section, explanatory materials in the Results section, and answers to questions in the Discussion section. The TA/instructor may choose to not accept a report due to plagiarism. If you feel that the SafeAssign plagiarism report is in error, please discuss with the TA/instructor.
4) If you feel there was an error in the grading of a lab report, discuss your specific questions promptly with your TA or instructor.

C. Course Grading

If a student is absent for a laboratory or activity, their score for lab or activity will be zero. There are no makeup laboratories sessions available. In the final course grading, the lowest scoring lab or activity will be dropped.

**IMPORTANT: Student must achieve 50% or more of the total points possible for the lab modules (#01-#10) or they will automatically receive an F for the course.**

Final grade is calculated from percentage of total possible points as follows:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
</tr>
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<tbody>
<tr>
<td>100 – 88%</td>
<td>A</td>
</tr>
<tr>
<td>87 - 84%</td>
<td>A-</td>
</tr>
<tr>
<td>83 – 79%</td>
<td>B+</td>
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<tr>
<td>78 – 75%</td>
<td>B</td>
</tr>
<tr>
<td>74 – 71%</td>
<td>B-</td>
</tr>
<tr>
<td>70 – 66%</td>
<td>C+</td>
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<tr>
<td>65 – 62%</td>
<td>C</td>
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<tr>
<td>61 – 50%</td>
<td>D</td>
</tr>
<tr>
<td>&lt;49%</td>
<td>F</td>
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</table>

<table>
<thead>
<tr>
<th>Lab Modules (#01, #02, ... #10)</th>
<th>Activities (A, B, C, D)</th>
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<tbody>
<tr>
<td>70 points total per Laboratory</td>
<td>20 to 40 points total per Activity</td>
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<tr>
<td><strong>10 points:</strong> Pre-Lab exercise (must be completed and turned in BEFORE lab session begins).</td>
<td><strong>10 points</strong> for the Pre-Activity exercise (must be completed and turned in BEFORE session begins) Not all activities have a Pre-Activity sheet.</td>
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<td><strong>10 points:</strong> Credible answers to Preliminary Questions</td>
<td><strong>10 points</strong> for participation (being part of the discussions, being active in the activity, etc). This may also be documented via handouts during the activity.</td>
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<tr>
<td><em>The following MUST be turned in electronically using SafeAssign</em></td>
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<tr>
<td><strong>50 points:</strong> Lab Report (due 1 week after lab)</td>
<td><strong>20 points:</strong> Activity Report (usually due 1 week although it also may be due at end of the lab session)</td>
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<tr>
<td>1 day to 1 week late - 25% deduction</td>
<td>1 day to 1 week late - 25% deduction</td>
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<tr>
<td>1 to 2 weeks late - 50% deduction</td>
<td>1 to 2 weeks late - 50% deduction</td>
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<tr>
<td>More than 2 weeks late - 100% deduction</td>
<td>More than 2 weeks late - 100% deduction</td>
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</tbody>
</table>
D. Detailed outline and order of sections of the Lab Report

(Note the sections marked * should have a labeled section heading in the report.)

1) **Identification Section (Name block)** (Missing any of these 4 items will result in a deduction of 5 points!)
   a) Your name and Zid
   b) Date (the date when you did the lab, include month, day, year)
   c) Names of all your lab partners (correct spelling of first and last names required)
   d) Lab section ID (e.g. “A, 9:00 AM Monday”, etc.)

2) **Title** (Missing a title will be a deduction of 5 points!)
   a) Name of the Lab Experiment
   b) You may use the title as given in the lab handout or you may be creative as long as your title describes the lab accurately and helps distinguish it from the other reports

3) **[10 points] *Theory and/or Background**  
   a) State in your own words(!) the connection between the lab activities and the physics concepts that are being explored.
   b) State in your own words(!) the physics theory, and formulas that are explored in this lab.
   c) Comment on how the results of your experiment compare to the expected objective of the lab or matched the theory.
   d) One paragraph is sufficient.

4) **[5 points] *Equipment and Methods**
   a) An unobstructed photograph(s) or schematic drawing of the apparatus or tools that are used in the experiment, and
   b) A Photograph of yourself and your lab partners in front of the lab apparatus (caption with names).

5) **[15 points] *Results**
   a) The lab handout section “Data Observations” gives guidance in tables and graphs that will be required for any particular laboratory.
   b) Data Tables must have a
      i. Descriptive title (what is the table about?)
      ii. Columns/rows labeled (e.g., and appropriate units given (meters, seconds, etc.).
      iii. Use Excel to produce all graphs - Graphs must have
   c) Descriptive title (what is this graph about?)
      i. Labels and units on the axes
      ii. In the text or in the caption of graphs and tables, please show and describe all equations that are used to produce the tables and graphs.

6) **[20 points] *Discussion***
   a) The lab handout section “Observations” (at end of lab handout) has a set of numbered questions for discussion.
      i. Answer each question listed in the section labeled “Observations”. Be sure to include your justifications in your answer.
      ii. Each answer should be a paragraph in length, and each paragraph numbered to match the questions in the lab manual for the experiment.
      iii. Failure to write complete paragraphs with a justification for your answer will result in point deductions.
      iv. Each question that is skipped will result in point deductions.
E. Lab Policies include:

1) Be respectful of each other (this applies to Instructors, TA’s and students). Some specifics include:
   a) Follow the TAs instructions and the equipment setup described in the Lab Experimental document.
      i. TAs can deduct points if students carelessly break lab equipment, don’t follow instructions or are disruptive.
      ii. TA’s can assign and change seat and partner assignments to facilitate lab management.
   b) Use of cell phones/ tablets/ computers during lab is limited to lab related activities (such as taking photographs of the experimental setup and emailing it to lab partners, writing drafts of the report.

2) Lab partners and working together: You should work together with your lab partners in taking and analyzing data, and you will find that discussing the experiment with your partners helps you to understand the results.
   a) However, you should record your own data, and the lab reports that you turn in must be your own work in your own words.
   b) You cannot copy or paraphrase ANY portion of your partner's reports, doing so will be considered plagiarism. Please refer to the section on Academic Misconduct in the NIU Student Code of Conduct for potential sanctions.

3) The instructor and the university reserve the right to modify, amend, or change the lab syllabus (course requirements, grading policy, etc.) as the curriculum and/or program require.

4) ACCESSIBILITY: Northern Illinois University is committed to providing an accessible educational environment in collaboration with the Disability Resource Center (DRC). Any student requiring an academic accommodation due to a disability should let his or her faculty member know as soon as possible. Students who need academic accommodations based on the impact of a disability will be encouraged to contact the DRC if they have not done so already. The DRC is located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 (V) or drc@niu.edu.

5) For an event that knocks the stuffing out of a student during the semester (for example; death in immediate family, sudden change in health of child/parent/sibling/significant other for whom they are primary caregiver, an emotional/physical traumatizing event, or serious health issue arising) please contact instructor as soon as practical so we can figure out and implement an accommodation of the situation. Don’t tough it out and don’t ghost the course.
**F. Schedule of labs and class meetings: Phys 151 Spring 2018**

**PHYS 151 Labs:** Section A Mon 9-10:50; Section B Mon 13-14:50; FR 235

*(PHYS 150 Lecture Course: Section 1 Mon 12:00-12:50; LaT 200)*

**Lecture Instructor:** Carol Thompson, LaTourette Hall 207, 815-753-1772, cthompson@niu.edu

**Laboratory TA:** Daniel Faia, Z1779842@students.niu.edu

<table>
<thead>
<tr>
<th>WEEK #</th>
<th>(Phys 151 Laboratory)</th>
<th>Harcopy due at beginning of lab</th>
<th>(Phys 150 Lecture Topics)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>10 Hands-on Laboratory Modules (#1, ...)</td>
<td></td>
<td>Hewitt textbook (Conceptual Physics) is designed for a 2-semester course, so we will only be covering selected sections.</td>
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<tr>
<td></td>
<td>2 Supporting Laboratory Modules (#A, #B, #C)</td>
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<td></td>
<td>1 Laboratory Enrichment Modules (#α)</td>
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**Week 1**

**Assessment pre-Testing (Force Concept Inventory)**

Activity #A Orientation & Graphing, problem solving introduced (due next lab session)

**Chapter 2 through 5. Newton’s three laws of motion**

**Week 2**

**MLK Holiday (Monday)**

**Chapter 2 through 5. Newton’s three laws of motion**

**Week 3**

**Lab #01 Motion & Push / Pull Forces**

(those students who missed the FCI pretest should also stay to take it at end of lab).

**Pre-lab #01 Activity A work**

**Chapter 2 through 5. Newton’s three laws of motion**

**Week 4**

**Activity #B Lab report writing guidance (Lab #01 used to demonstrate)**

**Pre-activity B**

**Chapter 6 and 7. Momentum, work, energy, and power**

**Week 5**

**Lab #02 Velocity, Acceleration, 2d Motion**

**Pre-lab #02**

**Chapter 6 and 7. Momentum, work, energy, and power**

**Week 6**

**Lab #03 Newton’s 3rd Law**

**Pre-lab #03**

**Chapters 15, 16 and 18. Temperature, heat, and first two laws of thermodynamics**

**Week 7**

**Lab #04 Friction**

**Pre-lab #04**

**Chapters 15, 16 and 18. Temperature, heat, and first two laws of thermodynamics**

**Week 8**

**Lab #05 Specific Heat**

**Pre-lab #05**

**Chapters 19, 20. Vibrations and Waves and Sound**

**Week 9**

**SPRING BREAK**

**SPRING BREAK March 11-15, 2019**

**Week 10**

**Lab #06 Static Electricity / Coulomb’s Law**

**Pre-lab #06**

**Chapters 19, 20. Vibrations and Waves and Sound**

**Week 11**

**Lab #07 Ohm’s Law**

**Pre-lab #07**

**Chapters 22 through 24. Electrostatics, Currents, Circuits and Ohm’s Law, Magnetism**

**Week 12**

**Lab #08 Simple Harmonic Motion (springs) & Energy**

**Pre-lab #08**

**Chapters 22 through 24. Electrostatics, Currents, Circuits and Ohm’s Law, Magnetism**

**Week 13**

**Lab #09 Reflection, Refraction, Dispersion**

**Pre-lab #09**

**Chapters 22 through 24. Electrostatics, Currents, Circuits and Ohm’s Law, Magnetism**

**Week 14**

**Activity #C Simulation and demonstration of Interference of Waves (sound and light)**

**Pre-Activity C**

**Chapter 26 through 29. Properties of light, colors, reflection and refraction, light waves**

**Week 15**

**Lab #10 TBD (probably on colors)**

**Pre-lab #10**

**Chapter 26 through 29. Properties of light, colors, reflection and refraction, light waves**

**Week 16**

**Activity #D - Q and A with Grad students presenting on their research and how their experimental skills were acquired! (also - Assessment post-Testing (Force Concept Inventory)**

**Pre-Activity D**

**Chapter 26 through 29. Properties of light, colors, reflection and refraction, light waves**

**Finals**

Labs do not meet during Finals week

**Phys 150 Final Exam**