

P151 SYLLABUS Fall 2017 (version 2a)

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)
Lab TA: Kamal Chapagain Z1622255@students.niu.edu

COURSE: **Physics Laboratory**
ALL course information is posted on BlackBoard or course website

TEXT/Materials: Lab manuals – available on Blackboard or course website.
 Bring a memory stick (USB key) to all laboratories. (In order to download your data and plots created during laboratory).

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).

Remark: The combined four credits of this PHYS 151 (1 credits) and the co-requisite lecture course PHYS 150 (3 credits) are equivalent to PHYS 150A (4 credits) offered until the 2016 Spring semester.

CLASS MEETINGS: Every Monday. Lab Sections: A: 9:00-10:50 AM, B: 1:00-2:50 PM
 @Faraday Hall (FR) 235

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

Lab TA: Kamal Chapagain, Faraday 214, Z1622255@students.niu.edu

Office Hours: Thompson: Monday 3:30-5:30 and by appointment
 Chapagain: TBA

The Following is the schedule of Lab and lab activities by week. The schedule of Lecture course Phys 150 is also included for reference.

WEEK #	(Phys 151 Laboratory 10 Hands-on Laboratory Modules (#1, ...) 2 Supporting Laboratory Modules (#A, #B) 2 Laboratory Enrichment Modules (# α , # β)	Pre-lab assignments noted	Spring 2017 Phys 150 Lecture Topics Hewitt textbook (<i>Conceptual Physics</i>) is designed for a 2 semester course, so we will only be covering selected sections.
Week 1	MLK Holiday (Monday)		Chapter 2 through 5. Newton's three laws of motion
Week 2	Activity #A Orientation & Graphing, problem solving Assessment pre-Testing (Force Inventory Concepts)		Chapter 2 through 5. Newton's three laws of motion
Week 3	Lab #1 Motion & Push/ Pull Forces	Pre-lab #1	Chapter 6 and 7. Momentum, work, energy, and power
Week 4	Activity #B Lab report writing orientation (Lab #1 used		Chapter 6 and 7. Momentum, work, energy, and power

	to demonstrate)		
Week 5	Lab #2 Velocity, Acceleration, 2d Motion	Pre-lab #2	Chapters 15, 16 and 18. Temperature, heat, and first 2 laws of thermodynamics
Week 6	Lab #3 Newton's 3rd Law	Pre-lab #3	Chapters 15, 16 and 18. Temperature, heat, and first 2 laws of thermodynamics
Week 7	Lab #4 Friction	Pre-lab #4	Chapters 22-25. Electricity, magnetism, light waves, radio waves, microwaves, and electricity generation
Week 8	Lab #5 Specific Heat	Pre-lab #5	Chapters 22-25. Electricity, magnetism, light waves, radio waves, microwaves, and electricity generation
Week 9	SPRING BREAK		SPRING BREAK March 9- 13, 2017
Week 10	Lab #6 Static Electricity / Coulomb's Law	Pre-lab #6	Chapters 22-25. Electricity, magnetism, light waves, radio waves, microwaves, and electricity generation
Week 11	Lab #7 Ohm's Law	Pre-lab #7	Chapter 26,28-29. Properties of light, reflection and refraction, light waves
Week 12	Lab #8 Simple Harmonic Motion (springs) & Energy	Pre-lab #8	Chapter 26,28-29. Properties of light, reflection and refraction, light waves
Week 13	Lab #9 Reflection, Refraction, Dispersion	Pre-lab #9	Chapter 30. Light emission from sun, tungsten bulbs, lasers and LEDs
Week 14	Lab #10 Light Intensity	Pre-lab #10	Chapters 33 and 34. Theory of the atom, nuclear energy, and electrical power generation
Week 15	Enrichment Activity Alpha - Demonstration lab from advanced labs modules e.g., Photoelectric effect		Chapters 33 and 34. Theory of the atom, nuclear energy, and electrical power generation
Week 16 (Spring)	Enrichment Activity Beta – Q and A with Graduate students presenting on their research. (also - Assessment post-Testing (Force Inventory Concepts)		Chapters 33 and 34. Theory of the atom, nuclear energy, and electrical power generation
Finals Week	No labs meet during Finals week		Phys 150 Final Exam

A. Lab Handouts - Available on Blackboard.

Students must print them out, read them and bring them to each lab session. Note that most labs have a "Prelab" that must be **completed and handed in at the beginning** of the lab period to receive the indicated points.

B. Submission of Lab Reports (Weekly)

Students will have 1 week to complete their lab reports after doing a lab experiment.

Turning in a lab report entails the following:

1. Students must upload a pdf or word file of their lab report to Blackboard's **SafeAssign** system.
2. Instructions are provided on Blackboard for how to do the SafeAssign submission.)
3. Print out the first page of the resulting SafeAssign report.

4. Students must print out a paper copy of the entire lab report and attach the first page of the SafeAssign report to the paper copy.
5. Turn in this completed document to their TA at the beginning (or before) the next lab meets.

C. Passing this course

You must receive a minimum of **50%** of the total possible points of the hands-lab reports. Grading of the lab reports is noted in section D. The lowest laboratory report score of the Hands-on laboratories will be dropped in calculating the percent score. **There are no makeup labs or activities.**

Please contact the TA and the Lecturer as soon as possible in event of serious illness, hospitalization, etc that affects your ability to complete all the laboratories.

Failing this lab course PHYS 151 does NOT affect to the grades of PHYS 150 course. However, dropping out of PHYS150 (a corequisite for this course) will automatically drop you from PHYS 151.

Copies of the reports are due ONE week after the lab session and must be handed in to your TA at the START of the lab session. Please see above for details as the reports must also be submitted electronically via the SafeAssign function in Blackboard.

Late reports will have points deducted as follows:

- .. Up to 1 week late - 25% deduction
- .. From 1 to 2 weeks late - 50% deduction
- .. More than 2 weeks late - 100% deduction

Missing the lab will result in 0 points.

SCHEDULE OF TESTS: No written tests for this lab course.

Grading Scale (this includes :

100 – 88%	A
87 - 84%	A-
83 - 79%	B+
78 – 75%	B
74 - 71%	B-
70 - 66%	C+
65 – 62%	C
61 - 50%	D
<49%	F

COURSE NOTEBOOK: Students are strongly encouraged to keep a separate Course Notebook (Lab notebook) of key materials from that of PHYS 150/151. Materials include (must be current): Syllabus, lab instruction (manual)(printed from Blackboard with room to take notes), student's class notes, data.

WHAT TO BRING TO CLASS: Lab manual (printed from Blackboard), Notebook, text book (of PHYS 150), graphing paper, USB drive/memory stick, and calculator

D. Grading of Laboratory assignments and Lab reports

Hands-on Experimental Lab - 55 total possible points for each lab module
Missing the lab (not showing up or not participating) will result in 0 points.

Please see **section F** for explanation of Lab Report sections.

The Following two items are turned in separately before the Lab Report

- 10 points for Pre Lab Exercise that you must complete and hand in at the beginning of your Lab session. (zero credit for pre-labs that are turned in after lab begins).
- 5 points for the Preliminary Observations that you must complete and hand in by the end of the lab. (These are in a section near the beginning of the lab handout and are labeled, "Preliminary Observations").

The Following items describe the scoring of the sections of the Lab Report

- 5 points for THEORY (or BACKGROUND) section
- 5 points for APPARATUS AND METHODS section
- 15 points for RESULTS section
- 15 points for DISCUSSION section written in your lab report
- Missing information in IDENTIFICATION SECTION is a penalty of 5 points, Missing a TITLE is a penalty of 5 points.

Laboratory Activity Sessions - 20 total possible points for each session depending on requirements of activity.

- 5 points for Pre Lab Exercise (if it was provided with the activity) that you must complete and hand in at the beginning of your Lab session. (zero credit for pre-labs that are turned in after lab begins). 0 points for Participation (doing the actual lab)
- 10 points for participation (doing the actual lab)
- 5 points for Results (writing up the data you gathered in your lab report)
- 5 points for Discussions written in your lab report

E. Lab Report Rules

1. Academic Honesty
 - a. 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.
 - b. However, you should record your own data, and the lab reports that you turn in must be your own work in your own words. *You cannot copy or paraphrase ANY portion of your partner's reports, doing so will be considered plagiarism.*
2. Please refer to the section on Academic Misconduct in [the NIU Student Code of Conduct](#).
3. No hand written lab reports will be accepted. (Electronic versions (PDF or Word) are submitted via the SafeAssign in Blackboard, and a printed copy with a printed copy of the 1st page of the SafeAssign report is also turned into the TA.
4. We suggest using an NIU computer since an equation editor is installed on all of them.
5. Graphs must be done using Excel.
6. Lab reports for the hands-on laboratories consist of an Identification section, Title, and sections labeled Theory (or Background), Equipment and Methods, Results, Discussion. If lab reports are

requested for the Lab Activity Modules, they will consist of an Identification section, Title, and sections labeled Theory (or Background), and Observations.

F. Lab Report Format (Note the sections marked * should have a section heading in the report.)

1. Identification Section (Name block)

- a. Your name and Zid
- b. Date (the date when you did the lab, include month, day, year)
- c. Names of your lab partners (correct spelling of first and last names required)
- d. Lab section (e.g. "A, 9:00 AM Monday", etc.)

2. Title

- a. Name of the Lab Experiment
- b. You may use the title as given in the lab manual

3. *Theory and/or Background << (you may choose to call this section either name)

- 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. *Equipment and Methods

- a. An unobstructed photograph(s) or schematic drawing of the apparatus used in the experiment, and a photograph of yourself and your lab partners in front of the lab apparatus.

5. *Results

The lab handout section "Data Observations" gives guidance in tables and graphs needed for any particular laborator.

- a. Data Tables must have a
 1. Descriptive title (what is the table about?)
 2. Columns/rows labeled (e.g., and appropriate units given (meters, seconds, etc.).
- b. Use Excel to produce all graphs - Graphs must have
 1. Descriptive title (what is this graph about?)
 2. Labels and units on the axes
- c. 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. *Discussion

The lab handout section "Observations" (at end of lab handout) has a set of numbered questions for discussion.

- a. Answer each question listed in the section labeled "Observations". Be sure to include your justifications in your answer.
- b. Each answer should be a paragraph in length, and each paragraph numbered to match the questions in the lab manual for the experiment.
- c. Failure to write complete paragraphs with a justification for your answer will result in point deductions.
- d. Each question that is skipped will result in point deductions

G. 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. Note: TAs can deduct points if students break lab equipment, don't follow instructions or are disruptive.
 - b. Use of cell phones/ tablets/ computers during lab is limited to lab related activities.
2. TA's can assign and change seat assignments to facilitate lab management.
3. Be aware of the policies and procedures regarding your rights as well as responsibilities that are published in [the NIU Student Code of Conduct](#). It is available on line at
4. 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.
5. If you feel there was an error in the grading of a lab report, discuss your specific questions with your TA.
6. **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.

H. Goals and outcomes

Course Goals:

- Develop an understanding of basic scientific concepts, principles and laws of physics *through laboratory activities*. (Gen Ed Goal 1d)
- Develop critical thinking skills and a scientific approach to problem solving *through laboratory activities*. (Gen Ed Goal 2d)
- Develop basic physical measurement and quantitative analysis skills and methods *through laboratory activities*. (Gen Ed Goal 1c)
- Develop the awareness of relationship between physics and everyday life. (partially Gen Ed Goal 3 & 4)

Student Learning Outcomes:

- demonstrate critical, creative, and independent thought.
- use and combine appropriate quantitative and qualitative reasoning skills to address questions and solve problems.
- synthesize knowledge and skills relevant to one's major or particular field of study and apply them creatively to develop innovative outcomes.
- describe measurements of physical quantities and use those measurements to describe the basic physical concepts of motion, work, energy and conservation of energy, heat, electricity and magnetism
- correlate and use the above practical, engaged laboratory experiences to the contents of the co-requisite course PHYS 150.