

Physics 111 – Physics I: General Physics-Mechanics and Thermodynamics

Course Description & Syllabus– Fall 2018

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Course Website: We will use Moodle – <http://moodle.lafayette.edu>. “PHYS 111.01-Fall 2018 General Physics” or “PHYS 111.01-Fall 2018 General Physics” should be in your list of current courses. The syllabus, interesting links, etc, can all be accessed from this site. Announcements about class or homework logistics will be emailed to you through Moodle so make sure you are receiving emails from it.

Course Location and Times:

Class: Hugel Science Center 100

Section 01: Monday, Wednesday, Friday; 11:00 – 11:50 AM

Section 02: Monday, Wednesday, Friday; 1:10 - 2:00 PM

Office Hours (tentative): Monday: 2:00 – 4:00 PM
Tuesday: 10:00 - 12:00 PM

If you cannot make it to office hours email me to set up a meeting. Please walk in with smaller questions whenever I am in my office. Always feel free to knock.

Classes on Snow Days, Kaiju Attacks and Other Emergencies: If I am unable to make it to class/class is cancelled or changed, I will send an email message via Moodle.

Description: This course is a non-calculus-based introduction to the foundations of physics, designed primarily for students in science who do not require a calculus-based physics course. Topics will include kinematics, dynamics, conservation laws for linear momentum, angular momentum, and energy, mechanical oscillations, and thermodynamics. Recognizing and applying physical ideas is stressed; there will also be emphasis on problem solving.

Goals & Student Learning Outcomes: The main goal of this course is to help you understand, identify, and apply the fundamental principles of physics in a variety of situations. You should be able to use both qualitative reasoning and quantitative problem-solving skills in applying those principles. A second goal is to help introduce you to the process of doing physics, including skills such as developing and testing models, interpreting experimental data, solving problems, and communicating results. Specifically, upon successful completion of this course, you should be able to

- Apply Newton's laws to analyze static and dynamic physical situations;
- Apply the laws of conservation of energy, momentum, and angular momentum to appropriate systems;
- Solve physical problems involving multiple concepts and equations;
- Describe and predict the behavior of oscillating systems; and
- Apply the three laws of thermodynamics.

In addition to the outcomes listed above, this course (particularly the lab component) will promote the following outcomes from the Natural Sciences section of the Common Course of Study:

- NS 1 Employ the fundamental elements of the scientific method in the physical and natural world.
 - NS 1a Identify and/or formulate a testable scientific hypothesis.
 - NS 1b Generate and evaluate evidence necessary to test and/or revise a hypothesis.
- NS 2 Create, interpret, and evaluate descriptions and representations of scientific data including graphs, tables, and/or models.
- NS 3 Understand how scientific uncertainty informs the evaluation of hypotheses.

Text book: *College Physics: A Strategic Approach Technology Update*, third edition, by Randall D. Knight, Brian Jones, and Stuart Field, ISBN-13: 978-0-13-416783-1, along with its online homework component Mastering Physics. The book is an older edition (significantly cheaper than the latest one) and it is easiest to order it online. Used copies usually do not come with a key for the online component, but you can sign up for that at www.masteringphysics.com for approximately \$70 (see sign up details below).

Physics 111 - Laboratory Manual is available in the bookstore.

Grade breakdown

Homework:	20%
Tests (see details below):	40%
Lab:	20%
Final exam	20%

Homework Problems: Homework problems will be a combination of **online Mastering Physics problems** and **written problems**. Your lowest homework grade will be dropped at the end of the semester. All assignments and other relevant course information will be available on Moodle. The **Mastering Physics course IDs (and course titles)** respectively are:

PHYS11101AHMED2018 (PHYS111.01.AHMED.2018) for the 11:00 am section

PHYS11102AHMED2018 (PHYS111.02.AHMED.2018) for the 1:10 pm section

You will need these IDs when you sign up.

Online homework for the week will usually be due the following week's Wednesday morning before class while the written one will be due in class on Wednesday.

Online homework will go up Wednesday late afternoon and the corresponding written part will go up on Moodle at the same time. Homework is a significant part of your grade so please make sure you do them.

Tests: There will be three hour-long in-class tests on the dates marked on the syllabus. The lowest scoring test will be worth 10% and the rest will be worth 15%. There will also be a cumulative final.

Attendance: Make sure to attend class regularly and participate in class discussions. Asking questions during class is highly encouraged, not just for your own benefit but for the benefit of your classmates. Looking over/skimming the relevant chapters from the book *before* the class lecture is highly advised. Foreknowledge of where things are going aids greatly in understanding the material.

Supplemental Instruction (details of SI sessions will be discussed in class):

SI Leaders

TBA

Ethos for grading written material: What I am looking for is your understanding of the material. If you show me your steps and thought processes clearly, and assuming those are correct, you will get most of the points. The actual final answer has minimal impact.

Academic Honesty: Discussing homework and collaborating with others is encouraged but make sure that the work you hand in is yours. Discussing concepts with others is always a great way to gain new perspectives but you must also truthfully demonstrate your own abilities. Cheating and other forms of academic dishonesty hurts no one but you in the long run.

Laboratory: You are responsible for completing all the assigned experiments at the scheduled times. **If you can't make it to your scheduled lab, please try to attend another lab session and email your lab instructor about the change (this is a last resort solution, please attend your own lab at all times).** You can't count on the equipment being available outside of the scheduled lab times.

Diversity, Inclusion and Equity Statement: Students should view this classroom as an inclusive space and safe haven for the free exchange of ideas. As your instructor one of my primary goals is to assure that the background, perspective and beliefs of each student are respected and appreciated regardless of race, ethnicity, gender, social class, sexual orientation, religion, political affiliation, ability level or learning style. Accordingly, I am committed to creating an atmosphere conducive to learning that respects diversity and inclusion and further promotes equity by removing educational barriers. As we work together to build this community of scholars, consider the following actionable points:

- Be open to the views of others.
- Feel free to share your own unique experiences.
- Honor and be enriched by the uniqueness of your classmates.
- View your classmates as respected resources of information and knowledge.
- Appreciate the opportunity to learn from classmates who may possess skill sets that complement your own.

Meeting Federal Credit Hour Standards: The student work in this course is in full compliance with the federal definition of a four-credit hour course.

Moodle & Privacy: Moodle contains student information that is protected by the Family Educational Right to Privacy Act (FERPA). Disclosure to unauthorized parties violates federal privacy laws. Courses using Moodle will make student information visible to other students in this class. Please remember that this information is protected by these federal privacy laws and must not be shared with anyone outside the class. Questions can be referred to the Registrar's Office.

Date	Topics	Chapter	HW due
Aug 27	Introduction	Ch. 1	
Aug 29	Motion in a straight line	Ch. 1:1-4	
Aug 31	Constant acceleration	Ch. 2:5	
Sep 3	Applications; Free fall	Ch. 2:6-7	
Sep 5	Vectors; Adding vectors	Ch. 3:1-4	HW #1
Sep 7	Projectiles	Ch. 3:6-7	
Sep 10	Forces	Ch. 4:1-5	
Sep 12	Newton's Laws	Ch. 4:6-7	HW #2
Sep 14	Applying Newton's Laws	Ch. 5:1-4	
Sep 17	Springs	Ch. 8:3	
Sep 19	Review		HW #3
Sep 21	Hour Exam I		
Sep 24	Friction	Ch. 5:5	
Sep 26	Interacting Objects	Ch. 5:7-8	
Sep 28	Circular Motion	Ch. 6:2-1	
Oct 1	Apparent Forces	Ch. 6:3-4	
Oct 3	Gravity and Orbits	Ch. 6:5-6	HW #4
Oct 5	Rotational Motion	Ch. 7:1-2	
Oct 8	<i>Fall Break</i>		
Oct 10	Torque & Moment of Inertia	Ch. 7:3-5	HW #5
Oct 12	Newton's Second Law; Rolling Motion	Ch. 7:6-7	
Oct 15	Conservation of Momentum	Ch. 9:1-4	
Oct 17	Collisions	Ch. 9:5-6	HW#6
Oct 19	Angular Momentum	Ch. 9:7	
Oct 22	Work and Energy	Ch. 10:1-4	
Oct 24	Review		HW #7
Oct 26	Hour Exam II		
Oct 29	Conservation of Energy	Ch. 10:5-6	
Oct 31	Collisions; Power	Ch. 10:7-8	
Nov 2	Energy; First Law	Ch. 10:5-6	
Nov 5	Engines; Second Law	Ch. 11:7-8	
Nov 7	Ideal Gas Processes	Ch. 12:1-3	HW #8
Nov 9	Expansion; Specific Heat	Ch. 12:4-5	
Nov 12	Material Properties; Heat Transfer	Ch. 12:4-5	
Nov 14	Review		HW #9
Nov 16	Hour Exam III		
Nov 19	Fluids; density, pressure, buoyancy	Ch. 13:1-4	
Nov 21	<i>Thanksgiving Break</i>		
Nov 23	<i>Thanksgiving Break</i>		
Nov 26	Fluid dynamics	Ch. 13:1-4	
Nov 28	Oscillations	Ch. 14:1-3	HW # 10
Nov 30	Energy; Applications	Ch. 14:4-5	
Dec 3	Damped Oscillations	Ch. 14:6	
Dec 5	Resonance	Ch. 14:7	HW #11
Dec 7	Final Review		
Final Exam (Scheduled by Registrar)		Cumulative	