

PHY 151/161 – Introductory Physics I/Fundamentals of Physics I
4/5 Credit Hours
Fall 2013

Instructor: Brad Roth

E-mail: roth@oakland.edu

Office: 166 Hannah Hall

Office phone: 248-370-4871

Class: MWF 8:00-9:07 am, 190 HHS

Office hours: MWF 10:00-11:00 am

Suppl. Instr: MWF 9:15-10:15 am, 203 DHE

Section number (CRN): 45280/45281

Topics:

Classical Mechanics: motion in one and two dimensions, Newton's laws of motion, energy, momentum, rotational motion, gravity, oscillations, waves, fluid mechanics.

Thermodynamics: Temperature, kinetic theory of gases, thermal energy and heat, the first law of thermodynamics, the second law of thermodynamics.

Course Prerequisites: recommended MTH 154 (Calculus I) or equivalent. You should be familiar with exponents, algebra, geometry, trigonometry, vectors, scientific notation, and elementary calculus.

General Education Learning Outcomes:

PHY 151 (5 credits with lab) satisfies the university's general education requirement in Natural Science and Technology Knowledge Exploration Area.

PHY 161 (4 credits, no lab) does not satisfy any general education requirement.

Course Goals and Objectives: The goals of this course include:

- learning basic concepts and principles of mechanics and thermodynamics
- analyzing physical problems using mathematics
- applying physics to our daily world

Upon completion of this course, you will be able to:

- Use general methods of problem solving to sharpen critical thinking skills.
- Convert between units and use these as an aid in problem solving.
- Add and subtract vectors graphically and resolve them into components.
- Describe the motion of an object moving in one dimension.
- Analyze the motion of an object along a trajectory in two dimensions.
- Construct free-body diagrams.
- Understand Newton's laws of motion.
- Predict the motion of a satellite in a circular orbit.
- Explain the conservation of energy and conservation of momentum.
- Describe rotation using angular velocity and angular momentum.
- Understand the concepts of torque and moment of inertia.
- Describe the oscillation of a mass-spring system and a pendulum.
- Compare concepts of pressure and density in solids, liquids, and gases.
- Convert temperature readings from one scale to another.
- Apply the concepts of specific heat and latent heat.
- Analyze the behavior of gases using the ideal gas law.
- State and understand the first law of thermodynamics
- Appreciate the importance of the second law of thermodynamics.
- Calculate the efficiency of different heat engines.

Textbook: Serway/Jewett: Principles of Physics – 5th Edition, Hybrid, packaged with:
- Enhanced WebAssign Access Card
- Enhanced WebAssign Start Smart Guide
- Access to the electronic book (e-book)

Cengage Publishing – ISBN: 978-1-133-11093-4 [Required]

Students in PHY 151 may need an additional book for the laboratory.

- You may purchase the ‘bundle’ at
 - Campus bookstore – Barnes & Noble – at the Oakland Center
 - Textbook Outlet – 2592 N. Squirrel Road (at Squirrel and Walton)
- You may purchase the materials online, directly from the publisher.
The direct link to the Hybrid version with Enhanced WebAssign is:
www.cengagebrain.com/shop/isbn/9781133110934
Several other options listed on the publisher’s webpage are
 - e-Book
 - e-Chapters
- WebAssign is required. If you need to purchase access to WebAssign alone, you can
 - Order it online as you login to WebAssign.net. See page 4 of this syllabus.
 - Purchase it at the bookstore.

Equipment: scientific calculator.

Pre-Class Assignment: Before class you should read the assigned chapter in the textbook.

Supplemental Instruction: Supplemental Instruction (free group tutoring) is provided after the lecture. The SI leader will discuss problems, review concepts, and answer questions, but will not do your homework for you. Attendance is not mandatory, but is encouraged.

Homework: The main purpose of the homework is to prepare for the exams. You may work together on the homework, and get help from others. However, you cannot simply submit someone else’s work that you have not contributed to. The online program WebAssign will be used for entering and automatic grading of the homework. The homework for each chapter can be submitted up to 5 times. The assignments are due at 11 pm on the specified date. I will grant an extension only for emergencies.

Laboratories: PHY 151 includes a laboratory introducing you to the scientific method. Your laboratory grade is assigned by your laboratory instructor, and will be one-fifth of your total grade.

Exams: There will be a total of five exams, plus a comprehensive exam. Your final exam on Monday December 9 (8-11 am) will consist of two parts (exam 5 and the comprehensive exam). Each exam may include both problems and conceptual questions. All exams will be closed-book, no notes, no equation sheet. A scientific calculator may be used. The comprehensive exam will consist of questions taken cut-and-paste from exams 1-4.

Add/Drops: We will follow the university’s add/drop policy.

Disability: Students with a documented learning or physical disability must contact the Office of Disability and Support Services (121 North Foundation Hall, 248 370-3266) and tell me of any special needs during the first week of classes. For more information, visit www.oakland.edu/dss.

Academic Misconduct: We will follow the university's regulations for academic misconduct. If I suspect a student of cheating I will report it to the Dean of Students and, thereafter, to the Academic Conduct Committee for adjudication. Anyone guilty of academic misconduct may receive a course grade of 0.0 in addition to any penalty assigned by the Academic Conduct Committee. Students found guilty of academic misconduct by the Academic Conduct Committee may face suspension or dismissal. The policy on academic misconduct is in the General Information section of the Undergraduate Catalog.

Excused Absence: You can have an excused absence when participating as an athlete, manager, or student trainer in NCAA intercollegiate competitions, or when representing Oakland University at academic events and artistic performances, when approved by the university. For the excused absence policy, see <http://www.oakland.edu/?id=6850&sid=175>.

Make-up Policy: If you miss an exam due to an unavoidable emergency or excused absence contact me beforehand, or as quickly as possible afterwards.

Grading:	<u>151</u>	<u>161</u>		
Laboratory	20%			
Homework	10%	12.5%		
Exam 1	12%	15%	Chapters 2, 3, 4	Sept 23
Exam 2	12%	15%	Chapters 5, 6, 7	Oct 9
Exam 3	12%	15%	Chapters 8, 10, 11 (skip 9)	Oct 25
Exam 4	12%	15%	Chapters 12, 13, 14, 15	Nov 15
Exam 5	12%	15%	Chapters 16, 17, 18	Dec 9
Comprehensive Exam	10%	12.5%		Dec 9

Grading scale:

- A (3.6 - 4.0) 90 - 100 %
- B (3.0 - 3.5) 80 - 89 %
- C (2.0 - 2.9) 70 - 79 %
- D (1.0 - 1.9) 60 - 69 %

I reserve the right to make the grading scale more generous than this, but not more demanding.

WebAssign: How to Get Started

To Register

1. Go to webassign.net.
2. Click on 'I have a Class Key'
3. Enter the Class Key: **oakland 7397 9930** (this allows me to see your homework grades)
4. Click on 'I need to create a WebAssign account'
5. Enter the login information

Retain a copy of your Username, Institution code & Password.

6. Once you Login, you need to enter the WebAssign Access Code.
 - If you purchased a new textbook, the Access Code card is inside the book.
 - If you purchased a used book, you may choose to purchase the Access Code online.

There is a 14 day grace period, starting from the first day of classes, during which you can use WebAssign without an access code.

7. Once you have logged in, you will see the Homepage.
 - I suggest you click on Guide (upper right corner) and read the Student Guide.
 - For Technical Support click on Help or go to www.webassign.net/user_support/admin/

To Access the Homework:

1. Go to webassign.net (I suggest you Bookmark this page)
2. After you Login, click on 'My Assignments'.
 - You may save your work without grading by clicking on 'Save Work' at the end of the question. Next time you access the assignment, your work will still be available.
 - WebAssign will not automatically submit your answer if you only 'Save' your work. Make sure you 'Submit' it before the due date and time.
 - You may also choose to 'Submit New Answers to Question xx' or 'Submit All New Answers'.
 - There is a maximum of 5 submissions for each problem.

Schedule:

1	W	Sept 4	Introduction	
2	F	Sept 6	Chapter 2	Motion in one dimension
3	M	Sept 9	Chapter 2	Motion in one dimension
4	W	Sept 11	Chapter 3	Motion in two dimensions
5	F	Sept 13	Chapter 3	Motion in two dimensions
6	M	Sept 16	Chapter 4	Laws of motion
7	W	Sept 18	Chapter 4	Laws of motion
8	F	Sept 20	Chapter 5	More applications of Newton's laws
9	M	Sept 23	Exam 1	Chapters 2-4
10	W	Sept 25	Chapter 5	More applications of Newton's laws
11	F	Sept 27	Chapter 6	Energy of a system
12	M	Sept 30	Chapter 6	Energy of a system
13	W	Oct 2	Chapter 7	Conservation of energy
14	F	Oct 4	Chapter 7	Conservation of energy
15	M	Oct 7	Chapter 8	Momentum and collisions
16	W	Oct 9	Exam 2	Chapters 5-7
17	F	Oct 11	Chapter 8	Momentum and collisions
18	M	Oct 14	Chapter 10	Rotational motion
19	W	Oct 16	Chapter 10	Rotational motion
20	F	Oct 18	Chapter 11	Gravity and planetary orbits
21	M	Oct 21	Chapter 11	Gravity and planetary orbits
22	W	Oct 23	Chapter 12	Oscillatory motion
23	F	Oct 25	Exam 3	Chapters 8-11 (skip 9)
24	M	Oct 28	Chapter 12	Oscillatory motion
25	W	Oct 30	Chapter 13	Mechanical waves
26	F	Nov 1	Chapter 13	Mechanical waves
27	M	Nov 4	Chapter 14	Superposition and standing waves
28	W	Nov 6	Chapter 14	Superposition and standing waves
29	F	Nov 8	Chapter 15	Fluid mechanics
30	M	Nov 11	Chapter 15	Fluid mechanics
31	W	Nov 13	Chapter 16	Temperature and the kinetic theory of gasses
32	F	Nov 15	Exam 4	Chapters 12-15
33	M	Nov 18	Chapter 16	Temperature and the kinetic theory of gasses
34	W	Nov 20	Chapter 17	Energy in thermal processes
35	F	Nov 22	Chapter 17	Energy in thermal processes
36	M	Nov 25	Chapter 17	Energy in thermal processes
37	W	Nov 27	Chapter 18	heat engines, entropy
	F	Nov 29	Thanksgiving	
38	M	Dec 2	Chapter 18	heat engines, entropy
39	W	Dec 4	Chapter 18	heat engines, entropy
40	F	Dec 6	Conclusion	
	M	Dec 9	Exam 5 (Chapters 16-18) and Comprehensive Final Exam	