

## PHYSICS 410

### Mechanics of Solids & Fluids

*Physics 410 is a calculus-based introduction to the principles of kinematics, dynamics, statics, energy, momentum, circular and rotational motion, simple harmonic motion, and fluids. It is intended for physics, chemistry, pre-medical and engineering students.*

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**Office Hours:**  
 M, W: 8-8:50am  
 or by appointment

**Textbook:** University Physics Volume 1 from OpenStax, ISBN 978-1-947172-20-3  
 ([www.openstax.org/details/university-physics-volume-1](http://www.openstax.org/details/university-physics-volume-1))

**Prerequisite:** Calculus I (MATH 400) with a grade of "C" or better

**Corequisite:** Calculus II (MATH 401).

**Course Website:** Canvas: <https://canvas.losrios.edu>  
 \*The complete course syllabus is in this course's Canvas site. Students are required to read the entire syllabus prior to the second day of class.

#### Course Topics:

week 1	units, unit conversion, significant figures, describing 1-D motion
week 2	motion with constant velocity or acceleration, vectors
week 3	describing 2-D and 3-D motion
week 4	projectile motion and circular motion
week 5	<b>exam 1</b> ; inertia, forces, Newton's laws
week 6	applications of Newton's laws
week 7	2-D forces and motion, radial forces and circular motion
week 8	<b>exam 2</b> ; conservation laws, work, energy, different types of energy
week 9	center of mass, energy conservation, work done by friction and springs, power
week 10	momentum, momentum conservation, collisions, impulse
week 11	<b>exam 3</b> ; rotational motion, rolling without slipping
week 12	<i>spring break</i>
week 13	rotational inertia, rotational energy, torque, angular momentum
week 14	statics
week 15	<b>exam 4</b> ; universal gravitation
week 16	fluids, simple harmonic motion
week 17-18	<i>final exams</i>

***Final Exam: Monday, May 18, 8:00 –10:00 am***

**Course Evaluation:**

Your grade in this course is a combination of homework, laboratory work, in-class activities, and exams. The points for each are listed here:

Midterm Exams	There will be 4 midterm exams, worth 200 points each.	800
Final Exam	The final exam is worth 200 points.	200
Homework	There are 19 homework assignments, worth 15 points each.	285
Lab Activities	There are 10 lab activities, worth 15-20 points each.	175
Problem Solving	There are 26 in-class problem solving activities, worth 10 points each.	260
Other Assignments	There are 2 other assignments, with 5 points each.	10

**Total: 1730**

In general, your letter grade will be assigned using the following scale:

90 – 100 %	A
80 – 89 %	B
70 – 79 %	C
60 – 69 %	D
less than 60 %	F

**HOWEVER**, if you fail to complete all the required work, (turn in homework only once in a while, skip labs, come to class only once in a while, leave early, etc...), then your letter grade will be determined by the instructor based on an evaluation of your overall performance in class.

This is a college-level course, so you are expected to be in class on time, work hard, ask questions, participate in the class, be responsible for your own work, present all your work in a professional manner, keep high ethical standards, do your own work without copying from others, and behave as an adult with both your instructor and classmates.

**Exam Policy:**

The concepts covered in the first two midterm exams are essential for success in this course, as well as in later courses. Therefore, students getting scores of 60% or lower on either of those exams are required to meet with Dr. Simpson within two days of getting the exam back to discuss ways to improve their mastery of those concepts.

**Student Learning Outcomes:**

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

- test the validity of a hypothesis using the scientific method.
- identify the basic physical principles that apply in a particular situation (such as Newton's laws, energy conservation and momentum conservation).
- evaluate conceptual problems requiring the application of mechanics.
- solve problems requiring the application of physics and mathematics up through calculus.
- interpret the results of physics calculations.
- define common physics terms and physical laws.
- compose a well-organized and complete lab report.