

# PHYS 1307 – General Physics I (Mechanics)

Fall 2019

**Instructor:** Professor Joel Meyers ([jrmeyers@smu.edu](mailto:jrmeyers@smu.edu))

**Lectures:** TuTh 11:00 AM - 12:20 PM, Fondren Science Building 158

**Instructor Office Hours:** TuTh 12:30 – 1:30 PM, Wed 11:00 AM – 12:00 PM, or by appointment, Fondren Science Building 209

**Textbook:** *Fundamentals of Physics, 11th Edition* (WileyPlus with e-book), by David Halliday, Robert Resnick, Jearl Walker, ISBN: 978-1-119-30685-6 (WileyPlus registration is required)

## Required Materials and Registrations:

- You will need a simple scientific calculator (laptops and phones cannot be used as substitute).
- Registration for WileyPlus is required to complete assignments.
- Use of Poll Everywhere (on a phone, tablet, laptop, etc.) is required for in-class activities.

**Teaching Assistant:** Lucas Kotz ([lkotz@mail.smu.edu](mailto:lkotz@mail.smu.edu)), Office Hours and Location TBD

## Course Overview:

For life science majors. Covers vector kinematics, Newtonian mechanics, rotational motion, oscillations, waves, fluids, with examples from the life sciences. Pre or co- requisite: MATH 1337 (Calculus I). PHYS 1307 is an active-learning course that implements teaching strategies developed from physics education research. Students can expect to prepare before class and participate in group work during every class.

## UC “tags” and Student Learning Outcomes:

Together with the PHYS 1105 lab course, satisfies a Level I Pure & Applied Science Pillar, or a Science and Engineering Breadth requirement (UC16), and a Quantitative Reasoning Proficiency & Experience.

## Learning Outcomes:

### Science and Engineering:

- 1) Students will demonstrate basic facility with the methods, approaches of scientific inquiry, hypothesis development, and/or problem solving.
- 2) Students will explain how the concepts, advancements, and findings of physics shape our world.

### Quantitative Reasoning:

- 1) Students will apply symbolic systems of representation.
- 2) Students will formulate structured and logical arguments.
- 3) Students will communicate and represent quantitative information or results numerically, symbolically, aurally, visually, verbally, or in writing.

Date	Topic	Reading & Checkpoints	Objectives
27-Aug	Measurement	1.1-1.3	Understand and use dimensions, units, and significant figures
29-Aug	Straight Line Motion I	2.1-2.2	Understand and use distance, displacement, velocity, speed in one dimension

3-Sep	<b>(Q) Straight Line Motion II</b>	2.3-2.5	Understand acceleration in one dimension and apply to constant acceleration
5-Sep	<b>Straight Line Motion III</b>	2.6-2.7	Apply kinematics to free fall, Use graphical integration to analyze motion
10-Sep	<b>(Q) Vectors</b>	3.1-3.2	Understand vector components, apply vector addition dot and cross product
12-Sep	<b>Motion in 2D &amp; 3D</b>	4.1-4.4	Understand and use vector kinematics in two and three dimensions
17-Sep	<b>(Q) Force and Motion I</b>	5.1-5.2	Understand Newton's first 2 laws, apply to gravity, tension & normal forces in 1D
19-Sep	<b>Force and Motion II</b>	5.3	Understand Newton's 3rd law, apply all three laws to two dimensions and/or bodies
24-Sep	<b>(Q) Force and Motion III</b>	6.1-6.2	Apply Newton's laws to examples with resistive force
26-Sep	<b>Force and Motion IV</b>	4.5 & 6.3	Apply Newton's laws to examples with circular motion
1-Oct	<b>(Q) Kinetic Energy &amp; Work I</b>	3.3 & 7.1-7.3	Apply kinetic energy and work to constant forces
3-Oct	<b>Kinetic Energy &amp; Work II</b>	7.4-7.6	Apply kinetic energy and work to non-constant forces, and power
8-Oct	<b>(Q) Potential and Conserved Energy I</b>	8.1-8.3	Understand potential energy and apply conservation of mechanical energy
10-Oct	<b>Potential and Conserved Energy II</b>	8.4-8.5	Analyze systems subject to external and nonconservative forces
15-Oct	<b>Fall Break</b>		
17-Oct	<b>MIDTERM EXAM - all prior topics</b>		
22-Oct	<b>Linear Momentum I</b>	9.1-9.3	Understand CoM, Newton's 2nd law, linear momentum for motion of systems
24-Oct	<b>Linear Momentum II</b>	9.4-9.8	Apply impulse and conservation of linear momentum to collisions
29-Oct	<b>(Q) Oscillations I</b>	15.1-15.2	Apply mechanics to Simple Harmonic Motion
31-Oct	<b>Oscillations II</b>	15.6-15.7	Understand concepts of damped and forced oscillations
5-Nov	<b>(Q) Transverse Waves</b>	16.1	Understand concepts of transverse wave displacement, speed, and energy
7-Nov	<b>Sound Waves I</b>	17.1-17.2	Understand concepts of sound wave displacement and speed
12-Nov	<b>(Q) Sound Waves II</b>	17.4 & 17.7	Apply sound waves concepts to intensity and to frequency
14-Nov	<b>Fluids I</b>	14.1-14.2 & 14.4-14.5	Understand pressure effects of ideal fluids at rest
19-Nov	<b>(Q) Fluids II</b>	14.6-14.7	Understand and apply equations of Bernoulli and Continuity to moving ideal fluids
21-Nov	<b>Rotational Motion I</b>	10.1-10.3	Understand angular displacement, velocity, acceleration about a fixed axis
26-Nov	<b>(Q) Rotational Motion II</b>	10.4 – 10.7	Extend and apply laws of mechanics to rotation (rotational inertia, torque)
28-Nov	<b>Thanksgiving</b>		
3-Dec	<b>Rotational Motion III</b>	3.3 & 11.4-11.8	Extend and apply laws of mechanics to angular momentum
5-Dec	<b>Equilibrium</b>	12.1-12.2	Apply mechanics to systems in equilibrium (balance)
14-Dec	<b>FINAL EXAM 11:30 AM - 2:30 PM</b>		

### Grading Policy:

- Pre-class readings and reading quizzes – 10%
  - Due by 10:45 AM each class day. Late submissions not accepted. Lowest 2 scores dropped. Submitted through WileyPlus.
- Attendance and participation in class – 5%

- At discretion of instructor, based in part on in-class Poll Everywhere submissions. Includes engagement in group work during class.
- Homework (numerical response + worked solutions) - 25%
  - Due by 10:45 AM of assigned due date (typically Thursdays). Lowest 1 score dropped. Numerical responses submitted in WileyPlus; scanned worked solutions submitted through Canvas. Late submissions will be accepted up to 48 hours after deadline at 50% credit.
- Quizzes – 25%
  - In class on dates indicated with (Q). Lowest 1 score dropped. No make-ups allowed without prior arrangement.
- Midterm Exam – 10%
  - Given in class on October 17, covering all topics up to that point.
- Final Exam – 25%
  - Cumulative exam given on December 14.

### **Pre-Class Readings and Reading Quizzes:**

You are required to spend time before each class reading in WileyPlus the textbook sections indicated on the syllabus and complete a short quiz on WileyPlus. Submit by 10:45 am on the due date for credit – no exceptions!

For this initial reading of the material, you may skip reading the Learning Outcomes and Key Ideas and you are not required to complete any other Questions or Examples embedded in the chapter. There are short Video Mini-Lectures available in WileyPlus that you may find helpful. Additionally, there are video lectures linked to most topics in Canvas with more details and examples. There is a time limit on the quizzes, so you are encouraged to read the material and take notes before attempting to answer the questions.

*Recommended Time Burden = 1 – 2 hours per class*

### **Class Group Work:**

In every class you will be assigned to a small group and asked to discuss and work on questions and problems together. Group work in class is central to the teaching strategy for this course, and so credit is given for your participation (not simply attendance).

### **Homework:**

Practice for quantitative problem solving is assigned in WileyPlus each week and due by 10:45 AM on the assigned due date, typically the following Thursday. There are two components which must be submitted for each homework: 1) numerical responses submitted online in WileyPlus and 2) scanned versions of worked solutions uploaded to Canvas (scans/photos of work must be legible and of good quality). One problem (or a few) from each homework will be chosen at random and assessed in detail for problem-solving methods, while others receive a cursory check. The WileyPlus responses and scanned worked solutions will be given equal weight in determining the score. If you are finding the

homework problems initially too difficult, try some of the relevant problems in ORION to build your proficiency. There are also short Video Mini-Lectures for each sub-topic available in WileyPlus and longer video lectures for most topics linked in Canvas that you may find helpful if the reading is not enough.

*Recommended Time Burden = 2 - 4 hours per Homework*

### Quizzes:

For each class marked with a (Q) in the schedule above, there is a 25-minute in-class quiz on the material from the previous few lectures. If you have understood the material covered by the practice problems and have participated in class, you should be prepared for the quizzes. You may use only the standard formula sheet provided and your own calculator. All data are provided in the questions.

### Exams:

The midterm and final exams will consist of a conceptual part (multiple choice) and a problem-solving part. Partial credit will be given for clear working of problems. You may use only the standard formula sheet provided and your own calculator. All data are provided in the questions.

### Letter Grades:

Grades are assigned according to the following chart based on the numerical scores calculated with the rubric above without rounding (e.g. 79.7% is a C+).

A	>94%
A-	90-94%
B+	87-90%
B	84-87%
B-	80-84%
C+	77-80%
C	74-77%
C-	70-74%
D+	67-70%
D	64-67%
D-	60-64%
F	<60%

**Disability Accommodations:** Students needing academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit <http://www.smu.edu/Provost/SASP/DASS> to begin the process. Once approved and registered, students will submit a DASS Accommodation Letter to faculty through the electronic portal DASS Link

and then communicate directly with each instructor to make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

**Religious Observance:** Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. ([See University Policy No. 1.9](#))

**Excused Absences for University Extracurricular Activities:** Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (See [2018-2019 University Undergraduate Catalogue](#))

**Attendance:** Pursuant to SMU policy governing student wellbeing, attendance will be monitored and, if you are absent from class frequently or for more than one week, I will enquire by email whether everything is OK. If I do not receive a response within 1 week or receive a response which I am concerned about, I will forward those concerns to the Dean of Student life. If I do not receive a response within 1 week and your grades are below passing level, I will administratively drop you from the class.