PHYS 1307 General Physics I (Mechanics) Spring 2019

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 flipped classroom that implements teaching strategies developed from physics education research. Students can expect to prepare before class and participate in group work during every class.

Instructor Biography

Prof. Dalley has been teaching physics courses at SMU from non-science majors to graduate students since 2006. Prof. Dalley has received both an Outstanding Professor Rotunda Award and the Provost's Teaching Recognition Award. At SMU he also directs science outreach programs and professional development courses for high-school physics teachers.

Benefits of taking this course

- Acquire UC tags and satisfy your major's requirements
- Retake to improve your grade
- Gain transferable skills in problem solving
- Take advantage of this semester's smaller class size
- Take advantage of an active-learning style course

UC "tags" and Student Learning Outcomes

Together with 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

1) demonstrate basic facility with the methods of scientific inquiry and problem-solving
2) explain how the concepts and findings of physics shape our world
3) develop quantitative models as related to the course subject matter
4) apply symbolic systems of representation
5) formulate structured and logical arguments

Class Meeting: Tu/Th 11:00 a.m. – 12:20 p.m.

Instructor: S. Dalley, Room 207 Fondren Science, sdalley@smu.edu
Office Hours: Tu/Th 10-11 am or 4-5 pm or by appointment
Text: **Fundamentals of Physics** 11th Edition (WileyPlus with e-book), by David Halliday, Robert Resnick, Jearl Walker **ISBN: 978-1-119-30685-6**

Website **http://www.physics.smu.edu/sdalley/1307S19/1307home.htm**

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Date	Class Topic	Reading & Checkpoints	Objectives
Tu 1/ 22	**Measurement**	**1.1-1.3**	Understand and use dimensions, units, and significant figures
Th 1/24	**Straight Line Motion I**	**2.1-2.2**	Understand and use distance, displacement, velocity, speed in one dimension
Tu 1/29	**Straight Line Motion II** (Q)	**2.3-2.5**	Understand acceleration in one dimension and apply to constant acceleration
Th 1/31	**Straight Line Motion III**	**2.6-2.7**	Apply kinematics to free fall, Use graphical integration to analyse motion
Tu 2/5	**Vectors** (Q)	**3.1-3.2**	Understand vector components, apply vector addition dot and cross product
Th 2/7	**Motion in 2D & 3D**	**4.1-4.4**	Understand and use vector kinematics in two and three dimensions
Tu 2/12	**Force and Motion I** (Q)	**5.1-5.2**	Understand Newton's first 2laws, apply to gravity, tension & normal forces in 1D
Th 2/14	**Force and Motion II**	**5.3**	Understand Newton's 3rd law, apply all three laws to two dimensions and/or bodies
Tu 2/19	**Force and Motion III** (Q)	**6.1-6.2**	Apply Newton's laws to examples with resistive force
Th 2/21	**Force and Motion IV**	**4.5 & 6.3**	Apply Newton's laws to examples with circular motion
Tu 2/26	**Kinetic Energy & Work I** (Q)	**3 .3 & 7.1-7.3**	Apply kinetic energy and work to constant forces
Th 2/28	**Kinetic Energy & Work II**	**7.4-7.6**	Apply kinetic energy and work to non-constant forces, and power
Tu 3/5	**Potential and Conserved Energy I** (Q)	**8.1-8.3**	Understand potential energy and apply conservation of mechanical energy
Th 3/7	**Potential and Conserved Energy II**	**8.4-8.5**	Analyze systems subject to external and non-conservative forces
SPRING BREAK			
Tu 3/19	**MID-TERM EXAM - all prior topics**		
Th 3/21	**Linear Momentum I**	**9.1-9.3**	Understand CoM, Newton's 2nd law, linear momentum for motion of systems
Tu 3/26	**Linear Momentum II**	**9.4-9.8**	Apply impulse and conservation of linear momentum to collisions
Th 3/28	**Oscillations I**	**15.1-15.2**	Apply mechanics to Simple Harmonic Motion
Tu 4/2	**Oscillations II** (Q momentum)	**15.6-15.7**	Understand concepts of damped and forced oscillations
Th 4/4	**Transverse Waves**	**16.1**	Understand concepts of transverse wave displacement, speed, and energy
Tu 4/9*	**Sound Waves I** (Q oscillations)	**17.1-17.2**	Understand concepts of sound wave displacement and speed
Th 4/11	**Sound Waves II**	**17.4 & 17.7**	Apply sound waves concepts to intensity and to frequency
Tu 4/16	**Fluids I** (Q)	**14.1-14.2 & 14.4-14.5**	Understand pressure effects of ideal fluids at rest
Th 4/18	**Fluids II**	**14.6-14.7**	Understand and apply equations of Bernoulli and Continuity to moving ideal fluids
Tu 4/23	**Rotational Motion I** (Q)	**10.1-10.3**	Understand angular displacement, velocity, acceleration about a fixed axis
Th 4/25	**Rotational Motion II**	**10.4 – 10.7**	Extend and apply laws of mechanics to rotation (rotational inertia, torque)
Tu 4/30	**Rotational Motion III** (Q)	**3.3 & 11.4-11.8**	Extend and apply laws of mechanics to angular momentum
Th 5/2	**Equilibrium**	**12.1-12.2**	Apply mechanics to systems in equilibrium (balance)
Fr 5/10	**FINAL EXAM 11:30 am - 2:30 pm**		

Quiz In class, shown with a (Q), on topics covered in prior week unless stated otherwise

Reading Due 10:45 am every class day

GENERAL COURSE POLICIES

- The course webpage contains all information
- You will need any simple scientific calculator. Laptops/phones may not a substitute for this.
- You will need to register for WileyPlus to complete outside-class assignments.
- Communication via any method (phones, tablets, laptops, speech, gestures, writing, sharing, etc.) is not allowed within, from, or to the classroom during any graded in-class assessment. If you need to take or make an emergency call, please leave the room.
- This course operates a policy of zero tolerance toward **Academic Dishonesty** in any form in any graded assessment. It will usually result in an F grade for the course and a filing with the Dean of Student Life (Honor Code Violation).

GRADING POLICY

26 Pre-class readings with Checkpoint questions **10%** of grade.
Lowest 2 scores are dropped for any reason. Late submissions cannot be credited.

Participation in class group work **5%** of grade.
At discretion of instructor. This is NOT just an attendance grade.

27 Post-class Practice Problem sets (numerical response) **25%** of grade.
Lowest 2 Problem set scores are dropped for any reason. Late submissions are credited at 50%.

11 in-class Quizzes based on Practice Problems and Concept work, **25%** of grade
Lowest quiz score dropped, no make-up quizzes

Mid-term Exam: Quantitative Problems **6%** of grade, Conceptual Questions **4%** of grade

Final Exam: Quantitative Problems **15%** of grade, Conceptual Questions **10%** of grade

In determining the course grade, if the overall score on problems in the exams is better than the quiz score, the average of these two will be used for the overall quiz score.

Grade Boundaries

A > 90% > A - > 85% > B + > 80% > B >75% > B - >70% > C+ > 65% > C > 60% > D > 50% > F.

What you have scored is what determines your grade; not rounding up, effort, attendance, grades in other courses, scores of other students, scholarship requirements, my opinion, your opinion, your desired career path, the orbit of Venus, etc.

ASSESSMENT

PRE-CLASS READINGS & CHECKPOINTS

The classroom is flipped so you are required to spend time ***before*** class reading in WileyPlus the textbook sections indicated on the syllabus and complete only the Checkpoint questions at the end of each assigned section. Submit by 10:45 am on the due date for credit – no exceptions!

For this first pass over the material, you could skip reading the Learning Outcomes and Key Ideas and you don't have to complete any other Questions or Examples embedded in the chapter. There are also short Video Mini-Lectures available in WileyPlus that you may find helpful if the reading is not enough for particular sub-topics.

Recommended Time Burden = 1 – 2 hours per class

CLASS GROUP WORK

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

POST-CLASS PRACTICE PROBLEMS

Practice for quantitative problem solving is assigned in WileyPlus after each class and due by 10:45 am the next class. Late submissions will receive 50% credit.

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 that you may find helpful if the reading is not enough.

Recommended Time Burden = 1 - 2 hours per problem set

QUIZZES

At the beginning of each week there is a 25-min in-class quiz on the material from the previous week (unless otherwise stated on the schedule). Most of the credit for free response problems is given for clear working. If you mastered the practice problems yourself, rather than searching for solutions online, and participated meaningfully in class, you should be prepared for the quiz. You may use only the standard formula sheet provided and your own calculator. All data are provided in the questions.

EXAMS

The mid-term and final exams are multiple choice; no credit is given for working. They each consist of problem-solving part and conceptual part (the latter questions are closely related to those done in class). You may use only the standard formula sheet provided and your own calculator. All data are provided in the questions.

ACCOMODATIONS

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/ALEC/DASS to begin the process. Once registered, students should then schedule an appointment with the professor as early in the semester as possible, present a DASS Accommodation Letter, and 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. (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.