Syllabus for "Introductory Mechanics"

PHYS 1307

INTRO MECHANICS DR. DURDANA BALAKISHIYEVA

Textbooks and online homework system:

Primary textbook: Fundamentals of Physics Halliday, David, Robert Resnick, and Jearl Walker. 10th edition New York: John Wiley & Sons.

Online homework system: **WileyPlus.com**

It is mandatory to purchase an online access code for an online homework submission. This code will give also an access to an electronic version of the textbook.

Alternate textbook 1 (self learning, not for homework submission): Knight, Randall D*. Physics for Scientists & Engineers: A Strategic Approach with Modern Physics*. Boston, MA: Addison-Wesley.

Alternate textbook 2 (self learning, not for homework submission): Serway, Raymond A., and John W. Jewett, Jr. *Physics for Scientists and Engineers with Physics Now and InfoTrac*. New York: Brooks/Cole.

Course description

Introductory Mechanics is a calculus-based college-level physics course for pre-engineering, pre-med, and would-be science majors. Students finishing this course should have a strong conceptual understanding of physics and well-developed skills in performing and analyzing laboratory activities. This course utilizes guided inquiry and student-centered learning to foster the development of critical thinking skills.

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)

Student Learning Outcomes

This is a calculus based course which will include some basic integration, differentiation, and discussion of the use of differential equations. Students will learn about the following topics: space and time, kinematics, forces, energy and momentum, conservation laws, rotational motion, torques, simple harmonic motion, waves.

Students are expected to come to class having done the assigned reading ahead of the class period in which it will be used, so that class time can be utilized effectively by learning application methods of the new material and general problem solving skills.

In addition to classroom time, students are expected to dedicate to this course a minimum of 8 hrs/week outside the classroom.

Upon completing this course, students will:

1. Be able to analyze and explain the components of linear and rotational motion (displacement, velocity, acceleration) including graphs

2. Be able to apply different forces and calculate work done by various forces, including fundamental force of gravity and Newton's laws

3. Be able to classify different forms of energy and use the conservation of energy principle and work- energy theorem problems

4. Be able to define impulse, momentum and solve collision problems
5. Explain simple harmonic motion and waves including their properties.

Teaching strategies

Every weekday classes will start at 9 am - 10:50 am. The first 60 - 65 minutes are devoted to lectures and demonstrations. Here, a concept is presented to emphasize practical/real-life applications, stressing important definitions and limitations. The rest of the class is devoted to solving a set of problems and question-answer sessions, the students are guided in a discussion (whole class or small group) to develop solutions to the problems. Weekly online homework and online quizzes will be assigned.

There will be daily office hours from 3 pm -4 pm in room 049 of Fondren Science Building.

Tuesday, May 30 2023 is the first day of classes.

Material to be covered in the course : Motion in 1D

2 weeks

Basic math, Fundamental Units, Measurements Vectors Graphing, Representations, 1D Motion

1D Motion cont, Relative Motion

Motion in 2D

2 weeks

2D Motion,

Uniform Circular Motion Rotational Motion

3 weeks

Force

Force Fields, Newton's 3 Laws

Free Body Diagrams,

Force Applications Resistive & Centripetal Forces

Work Energy Theorem

2 weeks

Kinetic Energy, Potential Energy

Conservation of Mechanical Energy,

Conservation of Total Energy, Energy Diagrams,

Work, Energy, & Power

Rolling and Rotation

3 weeks

Momentum, Impulse, and Angular Momentum Collisions,

Center of mass, Rotational Inertia

Torque, Rolling

SHO and Waves

2 weeks

Simple harmonic motion, Springs, Pendulums

Wave Properties, Wave Interactions

Final Exam (Cumulative)

Grading

All of the homework assigned on WileyPlus.com will be graded by WileyPlus software and those grades will be kept on WileyPlus.com website. Above mentioned grades will not be transferred onto Canvas site but taken into account at the end for final grade calculation.

"Final Grade" will be calculated as follows: 10% Participation in class + 30% Online Quizzes + 30% Homework + 30% Final Exam Grade

Letter grade breakdown:

"A" : [93%-100%] ,

"A-" : [89%-92%] ,

"B+" : [83%-88%] ,

"B" : [78%-82%] ,

"B-" : [73%-77%] ,

"C+" : [69%-72%] ,

"C" : [64%-68%] ,

"C-" : [61%-63%] ,

"D" : [50%-60%] ,

"F" < 50%

There is no grade curving in this course

Final Exam: Final exam will be held on the last day of classes, June 28 2023 at 9 am - 12 pm in class.