Syllabus for "Introductory Mechanics"

PHYS 1303

INTRO MECHANICS DR. D 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

30 - 35 minutes are devoted to lecture 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 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.

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

2 weeks

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

Quiz 1 due on Jan 28, 2017

1D Motion cont, Relative Motion

HW 1 due on Feb 4 2017

Motion in 2D

2 weeks

2D Motion,

HW 2 due on Feb 11 2017

Quiz 2 due on Feb 11 2017

Uniform Circular Motion Rotational Motion

HW 3 due on Feb 18 2017

Quiz 3 due on Feb 18 2017

Exam 1 (1D, 2D, Circular Motion)

3 weeks

Force

Force Fields, Newton's 3 Laws

Free Body Diagrams,

HW 4 due on March 4 2017

Quiz 4 due on March 4 2017

Force Applications Resistive & Centripetal Forces

HW 5 due on March 11 2017

Quiz 5 due on March 11 2017

Spring Break

Exam 2 (Forces)

Work Energy Theorem

2 weeks

Kinetic Energy, Potential Energy

HW 6 due on March 25 2017

Quiz 6 due on March 25 2017

Conservation of Mechanical Energy,

Conservation of Total Energy, Energy Diagrams,

Work, Energy, & Power

HW 7 due on April 1 2017

Quiz 7 due on April 1 2017

Test 3 (Total Energy, Energy conservation, Work-Energy theorem)

Rolling and Rotation

3 weeks

Momentum, Impulse, and Angular Momentum Collisions,

HW 8 due on April 8 2017

Quiz 8 due on April 8 2017

Center of mass, Rotational Inertia

HW 9 due on April 15 2017

Quiz 9 due on April 15 2017

Torque, Rolling

HW 10 due on April 22 2017

Quiz 10 due on April 22 2017

Test 4 (Momentum, Collisions, Impulse, Torque, Rolling)

SHO and Waves

2 weeks

Simple harmonic motion, Springs, Pendulums

HW 11 due on April 29 2017

Quiz 11 due on April 29 2017

Wave Properties, Wave Interactions

HW 12 due on May 6 2017

Quiz 12 due on May 6 2017

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 following:
"Final Grade" will be calculated as following: 3x15% Tests + 15% Online Quizzes + 20% Homework + 20% 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

One lowest Test grade (excluding Final Exam) and one lowest online Quiz grade will be dropped.

Tests and Final Exam will not have extra credit problems. There is no makeup test or exam.

Students will take 4 tests and after lowest grade will be dropped 3 equally weighted (15% each) tests grades will remain.

Final Exams: Please, refer to Academic calendar at http://smu.edu/registrar/ academic_calendar.asp

If your class is on Tu/Thur at 9:30 am, then your final exam is on Thursday, May 11, 2017 at 8 am -11 am

If your class is on MWF at 9:00 am, then your final exam is on Friday, May 12, 2017 at 8 am -11 am

TEST Schedule for Tue/Thur classes

TEST 1	Feb 21 2017	at 9:30 am -10:20 am in class
TEST 2	Mar 21 2017	at 9:30 am -10:20 am in class
TEST 3	Apr 04 2017	at 9:30 am -10:20 am in class
TEST 4	Apr 25 2017	at 9:30 am -10:20 am in class

TEST Schedule for MWF classes

TEST 1	Feb 20 2017	at 9:00 am - 9:50 am in class
TEST 2	Mar 20 2017	at 9:00 am - 9:50 am in class
TEST 3	Apr 03 2017	at 9:00 am - 9:50 am in class
TEST 4	Apr 24 2017	at 9:00 am - 9:50 am in class