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. 11th 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.

The WileyPlus learning system is the primary automated way in which you will access the course textbook and provide answers to homework problems. It is your responsibility to become familiar with this system. Failure to do so will create artificial roadblocks to your learning process.

The reason we utilize the WileyPlus system is that it is backed by a large team of people who can help you in the system when problems arise. If you have followed my advice and purchased the WileyPlus bundle that includes the full electronic textbook and the course learning system, you have the following at your fingertips:

1. The complete textbook for all semesters, including video demonstrations of concepts and examples of how to solve physics problems. In addition, you can print (either to paper or to a format like PDF) whole sections and chapters from the book and carry them around with your (e.g. in a folder or binder, or on a mobile device).

2. An extensive catalog of study problems to augment those assigned by me for homework and other learning exercises.

3. A built-in student help system for when you have any technical problems, allowing you to speak to a Wiley system expert if there are issues with account access, problems with written or video material, etc.

Please note that if your problem(s) are not easily resolved by the Wiley staff via their system help options, you should then report the problem to me and I will contact our institutional Wiley representative. They have supervisory authority and can solve even the most difficult problems with the system. Their whole job is to make our learning experience easier, but we must use them wisely and you must always seek help through the normal WileyPlus student help system first before coming to me.
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.

Prior to each test DASS student should contact DASS office and request an accommodation for a particular test. DASS office requires 7 days early warning for the midterm test. They will be proctoring the test. Extended time will not be offered in class.

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)

COVID-19 safety strategies

If a student will chose to attend the class in person, he/she will have to wear a face covering that will cover nose and mouth. Students will have to maintain 6 ft distance from other students. Those that refuse to follow this policy will not be allowed to stay in the classroom and will be asked to leave.

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

1D Motion cont, Relative Motion

HW 1

Motion in 2D

2 weeks

2D Motion,

Quiz 2

HW 2

Uniform Circular Motion Rotational Motion

Quiz 3

HW 3

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

Force

3 weeks

Force Fields, Newton's 3 Laws

Free Body Diagrams,

Quiz 4

HW 4

Force Applications Resistive & Centripetal Forces

Quiz 5

HW 5

Work Energy Theorem

2 weeks

Kinetic Energy, Potential Energy

Quiz 6

HW 6

Conservation of Mechanical Energy,

Conservation of Total Energy, Energy Diagrams,

Work, Energy, & Power

Quiz 7

HW 7

Exam 2 (Forces, Total Energy, Energy conservation, Work-Energy theorem) in class

Rolling and Rotation

3 weeks

Momentum, Impulse, and Angular Momentum Collisions,

Center of mass, Rotational Inertia

Quiz 8

HW 8

Torque, Rolling

Quiz 9

HW 9

Rotation in the context of energy, conservation of energy and work

Test 3 (Momentum, Collisions, Impulse, Torque, Rolling) in class

SHO and Waves

2 weeks

Simple harmonic motion, Springs, Pendulums

Quiz 10

HW 10

Wave Properties, Wave Interactions

HW 11

Quiz 11

1 week

Overall review

Final Exam (Cumulative) 3 hrs long

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

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: 2x20% Tests + 20% 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 3 tests and after lowest grade will be dropped 2 equally weighted (20% each) tests grades will remain.