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# Syllabus for “Introductory Mechanics”

**PHYS 1303**

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INTRO MECHANICS DR. D BALAKISHIYEVA

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## **Textbooks and online homework system:**

*Primary textbook: Fundamentals of Physics* Halliday, David, Robert Resnick, and Jearl Walker. 12th edition New York: John Wiley & Sons.

**Online homework system: WileyPlus.com**

*It is mandatory to purchase an online access code for online homework submission. This code will give also access to an electronic version of the textbook. You should use Wiley Resources link on CANVAS home page for the class.*

*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 6 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 the 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, and momentum and solve collision problems
5. Explain simple harmonic motion and waves including their properties.

## Teaching strategies

30 - 35 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.

**Office Hours will be held every weekday at 4 pm in my Fondren Science office 049**

## 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)**

# 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 the lowest grade will be dropped 2 equally weighted (20% each ) test grades will remain.

**Final Exams:** Please, refer to the Academic calendar at [http://smu.edu/registrar/academic\\_calendar.asp](http://smu.edu/registrar/academic_calendar.asp)