Fall 9-1-2016

PHSX 215N.01: Fundamentals of Physics with Calculus I

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Physics 215 Fundamentals of Physics with Calculus I Fall 2016

Overview:

Instructor:	Dan Reisenfeld
Office:	CH Clapp Bldg. Office 121
Phone:	243-6423
Text:	*Fundamentals of Physics*, Halliday and Resnick 10e with WileyPlus Access Purchase *iclicker* and bring it to class every day
Optional Text:	*Quick Calculus*, Ramsey and Kleppner 2e
Lecture:	M, T, W, Th, 1:00 – 1:50 PM. CHCB Room 131
Office Hours:	We will figure out my office hours (4 a week) during the first week.
Course Website:	Moodle. https://moodle.umt.edu
Homework Site:	WileyPLUS http:// www.wileyplus.com/class/536268

Homework:
7-10 problems per chapter will be assigned through the WileyPlus course page. Complete solutions to these problems will be provided after the due date of the assignment. **No late homework** will be accepted but I will drop your lowest 10 question scores (the equivalent of a single homework assignment). In addition, further problems and solutions will be posted for practice.

Exams:
There will be 4 mid-term exams during the semester: given on Wednesday evenings from 6-8 PM. There will be a help session the evening before, also from 6-8 PM. Since each new topic will build on all previous concepts, a general working knowledge of previous material will be expected on all exams. The exams will be closed book except for a calculator and one 3×5 index card of notes that each student must prepare for her/himself prior to the exam. Solutions to the exams will be posted on the Moodle course website. Make-up exams will be given only in extreme situations and must be arranged IN ADVANCE. The **final exam** is comprehensive and will be held on Friday Dec. 16th, from 1:10pm to 3:10pm.

Participation/Attendance:
Several questions will be posed during most lectures to gauge student understanding of the topics being discussed and answers will be supplied using your *iclicker*. Some credit will be given for participation in this process and additional credit will be given for correct answers to these questions.

Laboratory:
Each student must also register for PHSX 216, a separate 1- credit hour laboratory course that meets once a week. The exception is if a student has taken PHSX 216 in a previous year and wishes to keep her/his original grade. Lab sections are held M, Tu and W, 3:10 – 5:00 pm in room CHCB 229.

General Remarks:
This will be an intensive course; we will cover 16 chapters in 14.5 weeks. Be sure to keep up on reading assignments and problem assignments. **Drop/Add** can be performed online until **September 19th**, and with the instructor's and advisor's signatures until **October 31st**. No drop petitions will be signed after this date without written verification of extreme circumstances. Prerequisite to this course is a working knowledge of college algebra, trigonometry, and pre-calculus. Co-requisites to this course are Math 171 (Calculus I), and Physics 216 (Physics Laboratory) or equivalents.

Grading:
This course can only be taken for a traditional grade (A,A-,B+, etc.), and cannot be taken Credit/No Credit.

Mid-term Exams:	50%	(4 at 12.5% each)
Homework:	20%	
Participation/Attendance:	10%	
Final Exam:	20%	

Physics 215 Weekly Schedule, Fall 2016

Week	Chapters	Topics	Notes	Exams
Week 1 8/29 – 9/2	Ch. 1 Ch. 2	Introduction 1 – D Kinematics		
Week 2 9/6 – 9/9	Ch. 2 Ch. 3	 Vectors	Labor Day: No Class Monday	
Week 3 9/12 – 9/16	Ch. 4	Projectiles		
Week 4 9/19 – 9/23	Ch. 5	Force & Motion I		Exam 1: 6-8 pm Wed. Sept 20
Week 5 9/26 – 9/30	Ch. 6	Force & Motion II		
Week 6 10/3 – 10/7	Ch. 7	Kinetic Energy & Work		
Week 7 10/10 – 10/14	Ch. 8 Ch. 9	Cons. of Energy Collisions		
Week 8 10/17 – 10/21	Ch. 9 Ch. 10	Linear Momentum Rotation		Exam 2: 6-8 pm Wed. Oct 19
Week 9 10/24 – 10/28	Ch. 10	Torque		
Week 10 10/31 – 11/4	Ch. 11	Rolling & Angular Momentum		
Week 11 11/7 – 11/11	Ch. 12 Ch. 13	Equilibrium Gravitation	Election Day: No Class Tuesday	Exam 3: 6-8 pm Wed. Nov 9
Week 12 11/14 – 11/18	Ch. 13 Ch. 14	 Fluids		
Week 13 11/21 – 11/25	Ch. 14, Ch. 15 ***Thanksgiving Wk***	Oscillations	No Class Wed - Thurs	
Week 14 11/28 – 12/2	Ch. 15 Ch. 16	Oscillations Waves		
Week 15 12/5 – 12/9	Ch. 16	Waves Final Review		Exam 4: 6-8 pm Wed. Dec 7
Week 16 12/12 – 12/16		Finals Week	Last Day of Class Monday	Final Exam Friday. Dec. 16 1:10 – 3:10 pm

Student Conduct Code

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://www.umt.edu/vpsa/policies/student_conduct.php

Disability Modification

Students with disabilities will receive reasonable modifications in this course. Your responsibilities are to request them from me with sufficient advance notice, and to be prepared to provide verification of disability and its impact from Disability Services for Students. Please speak with me after class or during my office hours to discuss the details. For more information, visit the Disability Services for Students website at http://www.umt.edu/disability

LEARNING OUTCOMES:
The overarching objectives of this course are to enable the student to:

1. Demonstrate a comprehension of the physical world by understanding how fundamental physical principles underlie the huge variety of natural phenomena and their interconnectedness.
2. Build critical thinking and quantitative skills by gaining insight into the thought processes of physical approximation and physical modeling, and by practicing the appropriate application of mathematics and calculus to the description of physical reality.
3. Comprehend the physical interpretation of mathematical results.

SPECIFIC LEARNING OUTCOMES:
It is expected that the student will:

Kinematics
Apply knowledge of the relationships between time, displacement, distance, velocity, speed and acceleration to situations involving objects in one and two dimensions

Vectors
Perform vector analysis in one and two dimensions

Forces
Solve problems involving the force of gravity
Analyze situations involving the force due to friction
Solve problems that involve application of Newton's laws of motion in one and two dimensions

Energy
Perform calculations involving work, force, and displacement
Analyze the relationship between work, kinetic and potential energy, with reference to the law of conservation of energy
Solve problems involving power and efficiency

Linear Momentum
Apply the concept of momentum, impulse, and conservation of linear momentum in one and two dimensions

Rotation
Understand the relation between angular acceleration, rotational inertia and torque
Apply the concept of kinetic energy and work to rotation

Angular Momentum
Apply the concept of angular momentum to problems involving rotation and torque, with reference to the law of conservation of angular momentum

Equilibrium
Use knowledge of force, torque, and equilibrium to analyze various situations

Gravitation
Analyze the gravitational attraction between masses
Apply Kepler's laws and Newton's Law of Universal Gravitation to the motion of planets and satellites

Fluids
Understand the nature of compressible and incompressible fluids through a study of their density and pressure
Apply and Archimedes' Principle and Pascal's Principle to understand the forces and pressures exerted by fluids
Understand fluid flow by using the equation of continuity and Bernoulli's Principle

Oscillations and Waves
Apply the principle of Simple Harmonic Motion to the periodic motion of springs, pendulums and other oscillatory systems
Become familiarized with the nature of standing and traveling waves, and the Principle of Superposition