

Spring 2013

## PHY 114 Mechanics

Judy Donnelly  
Office: Room C272  
Office Hours T, W, Th 1-2 PM  
jdonnelly@lasertechonline.org

### Course Description

This course is designed to introduce you to the basic principles of Newtonian (classical) mechanics. Even more important, it will give you a chance to work on important critical thinking and problem solving skills, necessary whether you are going right into the workforce or on to further education. Physics is the basis of technology and the most basic of the sciences. Knowing physics will help you understand a lot about the world you live in.

The best way to learn physics is to learn by doing. Since we meet twice a week for 2.5 class hour blocks, we can do a lot of hands-on experiments, simulations and demonstrations. Getting ready for these by doing the homework will really enhance your learning.

The department syllabus is attached. The following is in addition to the department syllabus.

### Attendance Policy

Students are expected to attend all classes, be on time and be prepared. Obviously, if you miss classes you will be at a disadvantage. **It is up to you to find out what you missed** and make up assignments. Because a lot of our work will be done in teams, it's important that you contact me if you are absent.

### Tests, Homework: how the course works

The course is divided roughly into 5 parts lasting about 3 weeks each. Homework will be assigned on a regular basis but will not be collected unless it appears that students are not completing it. Then some assignments will be collected at random and count as one test.

There will be five tests, each will have a short in-class conceptual part and a longer more thought-provoking take-home problem part. The conceptual test answers will come from your brain, but you may collaborate on the take-home problems. Ability to work in teams is another skill that industry values.

The labs will count 25% of your grade and the tests 75%. You must pass the lab to pass the course so please don't plan on skipping lab and making off with a C.

### COMMUNICATIONS

Class communications are by email. Please check your email frequently. No I will not send you a text message; email is still industry's method of communication so get used to it. While you're at it, be sure you have a professional email address. And speaking of communications, **turn off cell phones and pagers during class. Multitasking doesn't work. Really.**

Students with Disabilities

If you have a disability that may affect your progress in this course, please meet with a Disability Service Provider (DSP) as soon as possible. Please note that accommodations cannot be provided until you provide written authorization from a DSP.

<b>TRCC Disabilities Service Providers</b>	
Counseling & Advising Office Room A-119	
<b>Matt Liscum</b> (860) 383-5240	Physical Disabilities Sensory Disabilities Medical Disabilities Mental Health Disabilities
<b>Chris Scarborough</b> (860) 892-5751	Learning Disabilities ADD/ADHD Autism Spectrum

Spring 2013

(Departmental syllabus)

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Course Number/Title: PHY 114 Mechanics

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Lecture 3 hrs Laboratory 2 hrs Credit 4 hrs Contact 5 hrs

Course Description: This course deals with the fundamental principles of classical mechanics. Topics covered include vectors, kinematics, translational and rotational equilibrium, torque, Newton's laws of motion, gravitation, work, power, energy, impulse, momentum and rotational motion.

Method: Lecture/demonstration/computer simulation/problem solving. Lab experiments performed and analyzed by students.

Text: College Physics, Wilson and Buffa 7th ed. Prentice-Hall Publishers; Departmental Lab Experiment Book for Mechanics.

Prerequisites: High School Algebra or MATH 095 Co-Requisites: MATH 137

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COURSE TOPICS/CONTENT		HOURS
1.	MEASUREMENT Metric and English Systems Dimensional Analysis Math/Trig Review if Needed	4
2.	VECTORS Vector Components Vector Addition	4
3.	UNIFORM MOTION Translational Motion Free Fall Projectile Motion	8
4.	NEWTON'S LAWS OF MOTION Forces Mass vs. Weight Law of Inertia - Equilibrium with Concurrent Forces Friction Action - Reaction	10
5.	TORQUE AND ROTATIONAL EQUILIBRIUM Center of Gravity Equilibrium with Non-Concurrent Forces	4
6.	POWER - WORK - ENERGY Work - Energy Theorem Kinetic Energy and Gravitational Potential Energy	6
7.	IMPULSE AND MOMENTUM Conservation of Momentum Elastic and Inelastic Collisions	3
8.	CIRCULAR MOTION Centripetal Acceleration and Force Newton's Law of Gravitation Moment of Inertia	6

Angular Momentum and its Conservation

9. Application of Mechanics to Technology

TOTAL HOURS

45

LAB EXPERIMENTS

	HOURS
1. Measurement	2
2. Graphing	2
3. Vectors	2
4. Velocity in One Dimension	2
5. Projectiles - Spring Gun	2
6. Newton's Second Law - Air Track	2
7. Newton's Second Law - Atwood's Machine	
8. Friction	
9. Force Equilibrium (The Bird on the Wire)	
10. Static Moment Equilibrium	
11. Energy Conservation (Freefall)	2
12. Momentum Conservation	2
13. Rotational Motion	2
14. Rotational Kinetic Energy	2
<i>Additional Laboratory Experiments</i>	
1. The Baseball Lab (Projectiles)	1
2. Energy Conservation - The Pendulum	1

Date: January 6, 2011

Prepared By: R.B. Niedbala

Program Coordinator: R.B.Niedbala

Department Chairperson: J. Copeland