

Spring 2012

PHY 114 Mechanics

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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, prized skills by industry. The course has a lecture/lab format but we may do labs or simulations or something other than lecture during scheduled lecture time- so be prepared! The department syllabus is attached. What follows 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. Please contact me as soon as possible after an absence so you will not be behind.

Exams, Homework, Paper: how the course works

The course is divided roughly into 5 parts lasting 8-10 weeks each. Homework will be assigned on a regular basis but will not be collected unless it appears that it's not being done. 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 are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact the Disabilities Counseling Services at 383-5240. To avoid any delay in the receipt of accommodations, you should contact the counselor as soon as possible. Please note that I cannot provide accommodations based upon disability until I have received an accommodation letter from the Disabilities Counselor.

THREE RIVERS COMMUNITY COLLEGE COURSE OUTLINE

Course Number/Title: PHY 114 Mechanics

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

COURSE TOPICS/CONTENT		HOURS
1. MEASUREMENT		4
Metric and English Systems		
Dimensional Analysis		
Math/Trig Review if Needed		
2. VECTORS		4
Vector Components		
Vector Addition		
3. UNIFORM MOTION		8
Translational Motion		
Free Fall		
Projectile Motion		
4. NEWTON'S LAWS OF MOTION		10
Forces		
Mass vs. Weight		
Law of Inertia - Equilibrium with Concurrent Forces		
Friction		
Action - Reaction		
5. TORQUE AND ROTATIONAL EQUILIBRIUM		4
Center of Gravity		
Equilibrium with Non-Concurrent Forces		
6. POWER - WORK - ENERGY		6
Work - Energy Theorem		
Kinetic Energy and Gravitational Potential Energy		
7. IMPULSE AND MOMENTUM		3
Conservation of Momentum		
Elastic and Inelastic Collisions		
8. CIRCULAR MOTION		6
Centripetal Acceleration and Force		
Newton's Law of Gravitation		
Moment of Inertia		
Angular Momentum and its Conservation		
9. Application of Mechanics to Technology		
TOTAL HOURS		45

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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

Additional Laboratory Experiments

1. The Baseball Lab (Projectiles)	1
2. Energy Conservation - The Pendulum	1

Date: January 6, 2011

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