COLBY COMMUNITY COLLEGE

Syllabus

Course Information

Course Number/Title: PH 208 – University Physics I
Semester: Fall 2012
Credit Hours: 5
Department: Physical Science
Class Time/Location: Lecture: MW 10:50 AM – 12:05 PM, Thomas Hall, Room 411
Lab: T 10:50 AM – 1:30 PM, Thomas Hall, Room 409
Course Placement: Sophomore
Prerequisite: MA 220 – Analytical Geometry & Calculus I
Required Textbook: **Physics for Scientists and Engineers with Modern Physics with MasteringPhysics** (3rd Edition) by Randall D. Knight
ISBN-13: 9780321736086

Contact Information

Instructor: Brent Wilson
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Phone: 785-460-5420
Office: Thomas Hall – Faculty Complex
Office Hours: Posted on office window.

Required Course Materials

1) Textbook: **Physics for Scientists and Engineers with Modern Physics with MasteringPhysics** (3rd Edition) by Randall D. Knight (ISBN-13: 9780321736086)
2) MasteringPhysics access code for homework. If you buy a new version of the textbook, a code is already given to you in the cover of the book. Otherwise, you will need to purchase an access code by going to www.masteringphysics.com, click "Register as student," and select "No, I need to purchase access online now."
3) A scientific calculator is required. A graphing calculator such as the TI-83 or TI-89 is highly recommended.

Course Rationale

This course will provide an opportunity for students to explore the laws of physics that govern the universe. Students will develop the ability to describe and interpret physical phenomena using mathematical skills, and will practice scientific methods of investigation from which general relationships are derived and explored. Students should have an adequate preparation in analytical geometry and calculus.

Course Description

Three hours of lecture and three hours of laboratory per week are included. Using calculus as a tool, students learn fundamental principles of physics, including vectors, motion, forces, gravitation, energy, momentum, rotation motion, equilibrium, periodic motion, elasticity, fluids, thermal expansion, heat transfer, gases, thermodynamics, waves and sound.

Assessment

Colby Community College assesses student learning at several levels: general education, program, and course. The goal of these assessment activities is to improve student learning. As a student in this course, you will participate in various assessment activities. An example of your work, a paper, some test questions, a presentation, or other work may be selected for assessment. This process will not affect your grade, will not require you to do additional work and your evaluation will be confidentially handled. Results of these activities will be used to improve teaching and learning at Colby Community College.

Student Learning Objectives and Competencies Assessed

By the end of this course, the student will demonstrate the following:

1. Introduce and describe fundamental concepts of motion, and understand the proper use of significant figures.
2. Learn how to solve problems about motion in a straight line.
3. Learn how vectors are represented and used through graphical addition and subtraction of vectors, unit vectors, and vector components.
4. Learn how to solve problems about motion in a plane including projectile motion and circular motion.
5. Understand and establish a connection between force and motion.
6. Learn how to solve linear force-and-motion problems through equilibrium, dynamics, mass and weight, and friction and drag.
7. Use Newton's third law to understand how objects interact through action/reaction pairs, ropes, and pulleys.
8. Learn how to solve problems about motion in a plane including dynamics of circular motion, dynamics in a plane, and orbits.
9. Understand and apply the concepts of impulse and momentum.
10. Introduce and describe the concept of energy and the basic energy model through conservation of mechanical energy and energy diagrams.
11. Develop a more complete understanding of energy and its conservation through the energy equation, work, potential energy, kinetic energy, thermal energy, and power.
12. Understand the physics of rotating objects including rigid bodies, torque, and conservation of angular momentum.
13. Use Newton's theory of gravity to understand the motion of satellites and planets.
14. Understand systems that oscillate with simple harmonic motion including springs and pendulums.
15. Understand macroscopic systems that flow or deform via fluids and elasticity.
16. Learn the characteristics of macroscopic systems including temperature, phase changes, and ideal gases and their processes.
17. Develop and apply the first law of thermodynamics, energy transfers, thermal properties of matter, and heat transfer.

18. Learn the basic properties of traveling waves, and understand and use the idea of superposition.
19. Demonstrate basic experimental skills by the practice of setting up and conducting an experiment with due regards to minimizing measurement error via thoughtful discussion and interpretation of data, as well as demonstrate the ability to write a formal scientific lab report using quantitative and qualitative conclusions.
20. Demonstrate the qualitative and quantitative skills needed to succeed in an introductory physics course.

Course Outline

Lecture Schedule

Week	Date	Lecture Topic	Reading/Assignments Due
1	Aug 22	Syllabus, Lab, Units	Chapter 1
2	Aug 27	Kinematics in One Dimension: Position, Velocity, Acceleration	Chapter 2
	Aug 29	Kinematics in One Dimension: Free Fall, Motion on an Inclined Plane, Instantaneous Acceleration	HW 0 Due Aug 29 HW 1 Due Sep 2
3	Sep 3	**No Class – Labor Day**	
	Sep 5	Vectors and Coordinate Systems	Chapter 3 HW 2 Due Sep 9
4	Sep 10	Kinematics in Two Dimensions: Acceleration, Projectile Motion	Chapter 4
	Sep 12	Kinematics in Two Dimensions: Uniform Circular Motion	HW 3 Due Sep 16
5	Sep 17	Forces, Newton's First and Second Laws, Free-Body Diagrams	Chapter 5
	Sep 19	**Exam 1: Chapters 1-4**	HW 4 Due Sep 23
6	Sep 24	Dynamics I: Motion Along a Line Equilibrium, Using Newton's Second Law	Chapter 6
	Sep 26	Dynamics I: Motion Along a Line Friction, Drag	HW 5 Due Sep 30
7	Oct 1	Newton's Third Law	Chapter 7
	Oct 3	Dynamics II: Motion in a Plane Uniform Circular Motion	Chapter 8 HW 6 Due Oct 7
8	Oct 8	Dynamics II: Motion in a Plane Circular Orbits, Fictitious Forces	
	Oct 10	Momentum, Impulse	Chapter 9 HW 7 Due Oct 14
9	Oct 15	Conservation of Momentum, Collisions	
	Oct 17	Energy: Kinetic Energy, Gravitational Potential Energy	Chapter 10 HW 8 Due Oct 21
10	Oct 22	Energy: Restoring Forces, Hooke's Law	
	Oct 24	**Exam 2: Chapters 5-9**	HW 9 Due Oct 28
11	Oct 29	Work, Potential Energy	Chapter 11

	Oct 31	Conservation of Energy, Power	HW 10 Due Nov 4
12	Nov 5	Rotational Motion: Torque, Static Equilibrium, Angular Momentum	Chapter 12
	Nov 7	Newton's Theory of Gravity: g, G, Gravitational Potential Energy, Satellite Orbits	Chapter 13 HW 11 Due Nov 11
13	Nov 12	Oscillations: Simple Harmonic Motion, Pendulum	Chapter 14
	Nov 14	Dynamics of Simple Harmonic Motion, Oscillations	HW 12 Due Nov 18
14	Nov 19	Fluids, Pressure, Buoyancy, Elasticity	Chapter 15
	Nov 21	**No Class – Thanksgiving Break**	HW 13 Due Nov 25
15	Nov 26	Solids, Liquids, Gases, Atoms, Moles, Temperature, Phase Changes, Ideal Gases	Chapter 16
	Nov 28	Heat, First Law of Thermodynamics, Calorimetry, Heat-Transfer Mechanisms	Chapter 17 HW 14 Due Dec 2
16	Dec 3	Traveling Waves: Sinusoidal Waves, Waves in 1D, 2D, and 3D, Sound and Light, The Doppler Effect	Chapter 20
	Dec 5	Superposition, Standing Waves, Standing Waves on a String, Standing Sound Waves, Interference, Beats	Chapter 21
17	Dec 10	**Exam 3: Chapters 10-17, 20-21**	
Finals	Dec 14	**Final Exam: 1:00 to 3:00 pm**	

Lab Schedule

Week	Date	Lab Topic
1	Aug 21	**No Lab!**
2	Aug 28	Lab 1: Graphical Analysis
3	Sep 4	Lab 2: Vector Addition
4	Sep 11	Lab 3: Motion: Position and Velocity
5	Sep 18	Lab 4: Motion: Acceleration
6	Sep 25	Lab 5: Newton's Laws
7	Oct 2	Lab 6: Centripetal Force
8	Oct 9	Lab 7: Work, Energy, and Power
9	Oct 16	Lab 8: Momentum and Collisions
10	Oct 23	Lab 9: Static Equilibrium
11	Oct 30	Lab 10: Pendulum Motion
12	Nov 6	**No Lab – Spring 2013 Registration Day**
13	Nov 13	Lab 11: Simple Harmonic Motion
14	Nov 20	Lab 12: Buoyancy and Archimedes' Principle
15	Nov 27	Lab 13: Waves
16	Dec 4	Lab 14: Specific Heat
17	Dec 11	**No Lab – Finals Week**

Method of Instruction

The lecture portion of this course will be taught through lectures, demonstrations, and solving example problems. The lab portion of this course will include students executing experiments, collecting and analyzing data, forming conclusions, and writing formal scientific lab reports.

Method of Evaluation

Students will be assessed for the course by the following weighted averages:

Homework	20%
Lab	20%
Exam 1	10%
Exam 2	10%
Exam 3	10%
Final Exam	30%

Final letter grades will be assigned by the following percentages:

A	90 – 100
B	80 – 89.99
C	70 – 79.99
D	60 – 69.99
F	0 – 59.99

Lab grades (worth 20% of the final grade) will be determined by the following weighted averages:

Weekly Lab Reports	70%
6 Quizzes	30%

A student that fails the lab portion of the course will automatically fail the entire course.

Assignment Policy

Homework:

Homework is designed to help you learn the material. In order to understand the material in a physics course, you have to practice (i.e., do homework problems). Each homework assignment (10-15 problems) will be given through the MasteringPhysics system on a weekly basis. You can access MasteringPhysics online at www.masteringphysics.com. During setup of your MasteringPhysics account, you will need the access code that comes with your textbook. You will be asked to provide a Course ID in order to join the course. The Course ID for this course is **MPWILSON14610**. You will also be asked to enter your Student ID. Enter your Student ID as 000-xxx-xxx.

Each homework assignment is due online via MasteringPhysics before 10 pm on the Sunday after that week's lectures (see lecture schedule). Late homework and make-ups will not be allowed. Your lowest homework score will be dropped.

Working together with classmates on homework is encouraged, but copying the homework of another is considered cheating. Also, please remember that copying your classmate's solution will not increase your knowledge and you won't learn what you need to know for the exams.

Labs:
Each week's lab will consist of a hands-on group experiment. During the experiment, the students will be asked to record data and observations, perform calculations, and give quantitative and qualitative conclusions pertaining to that week's experiment. Students will then use their data to complete a formal scientific lab report. Each student is responsible for turning in an individual lab report. Although group members may share data, no group reports will be accepted. Reports should be neatly hand-written in ink and free of blotches, smudges, and excessive corrections. If I can't read your report, I can't grade it and you will be given a zero for any portion ineligible.

The format of your lab reports should include the following:

- Fill out the cover sheet with name, experiment, and lab partners provided by the instructor.
- Complete the pre-lab questions from lab manual before lab.
- Complete a written introduction detailing the background and motivation of experiment with appropriate terms and equations before lab.
- Present experimental results and graphs with analysis and calculations section.
- Complete a written discussion to provide an interpretation of your results and support your conclusions using the data from your experiment. The significance of your results should be discussed.
- Complete a section of questions from the lab manual.
- Complete a written conclusion section, summarizing the results and conclusions derived from your data.

Labs will take place on Tuesday. In order to allow students extra time to write up their lab report, lab reports are due any time before Thursday at 4:00 pm. You may turn it into me personally or slide it under the door of my office. Your lab reports will be graded for accuracy, completeness, evidence of understanding, reasoning, and effective communication. No make-up labs will be allowed. Each lab report is worth 20 points. Your lowest lab report score will be dropped.

There will be six quizzes over the course of the semester, given at the beginning of the lab period. You will be given approximately 15 minutes to complete the quiz consisting of multiple choice questions concerning recent topics in lecture and lab. No additional time will be allowed for students arriving late for the quiz. No make-up quizzes will be allowed. Each quiz is worth 20 points. Your lowest quiz score will be dropped.

Exam Policy

There will be three exams and one comprehensive final exam. All exams will be closed book and closed notes; fundamental constants and formulas will be provided by the instructor. Students are allowed to use their calculator for exams, but no other electronics such as cell phones, laptops, or iPods are allowed. No make-up exams will be allowed.

Attendance Policy

Students are expected to attend all lectures and should come to class prepared with the assigned reading already done. You should expect to have difficulty with completing assignments if you don't attend class regularly. If you are absent from class, it is your responsibility for the material presented in the lecture, reading assignments, homework, and to check on announcements made while you were away. It is usually expected that students will spend approximately 2 hours of study time outside of class

for every one hour in class. Since this is a 5 unit course, you should expect to study an average of 10 hours outside of class each week.

Students are expected to be on time and prepared for each lab. If a student misses three or more labs, they will automatically fail the lab portion of the course, therefore failing the entire course.

Academic Integrity Policy

Colby Community College defines academic integrity as learning that leads to the development of knowledge and/or skills without any form of cheating or plagiarism. This learning requires respect for Colby's institutional values of quality, service and integrity. All Colby Community College students, faculty, staff, and administrators are responsible for upholding academic integrity.

Cheating is giving, receiving, or using unauthorized help on individual and group academic exercises such as papers, quizzes, tests, and presentations through any delivery system in any learning environment. This includes impersonating another student, sharing content without authorization, fabricating data, and altering academic documents, including records, with or without the use of personal and college electronic devices.

Plagiarism is representing or turning in someone else's work without proper citation of the source. This includes unacknowledged paraphrase, quotation, or complete use of someone else's work in any form. It also includes citing work that is not used and taking credit for a group project without contributing to it.

The following procedure will be used for students who violate the policy:

- First Offense – Students will receive a zero for the assignment and the student will be reported to the Dean of Academic Affairs.
- Second Offense – The student will be reported to the Dean of Academic Affairs and removed from the class.
- Third Offense – The student will be reported to the Dean of Academic Affairs and dismissed from the college.

Any questions about this policy may be referred to the Dean of Academic Affairs.

Syllabus Information Disclaimer

I reserve the right to change any information contained in this document, when necessary, with adequate notice given to the student. Notice shall be given in the classroom during class. No other notice is required. It is the students' responsibility to stay current with any changes, modifications, adjustments or amendments that are made to this document.

Accommodations for Students with Disabilities

According to the Americans with Disabilities Act, it is the responsibility of each student with a disability to notify the college of his/her disability and to request accommodation. If a member of the class has a documented learning disability or a physical disability and needs special accommodations, he/she should contact Student Support Services, which is located in the Student Union.