University Physics I
PHYS 2203

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General Information

Course: University Physics I, 3 credits (4 hours lecture, 3 hours corequisite laboratory)
Semester: Fall 2007
Lecture: 07/FA PHYS 2203.21
Laboratory: 07/FA PHYS 2201.xx (various sections are available: see WebAdvisor)

Prerequisite: Calculus is recommended. At a minimum, it must be taken concurrently.
Corequisite: MATH 2201, Calculus I, and PHYS 2201, Physics Laboratory I.
Requirement: Students must have an FDU WebMail account and access to WebCampus/Bb.

Class times: Mon & Wed, 11:00 am to 12:50 pm in Becton 205
Lab times: Various sections are available: see WebAdvisor

Instructor: Prof. David Flory
Office: Becton Hall, Room 111 (In the basement)
Mail Stop: H-BEC2-03
Office Hours: Mon & Wed 1:00-2:00 pm, Tue 2:30-3:30 pm.
Other times by appointment.
Telephone: 201-692-7064
Email: mailto:flory@fdu.edu

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Course Description
The first semester of calculus-based physics: mechanics, heat and sound.
This course sequence satisfies the physics requirement for curricula that require a year of calculus-based physics with a laboratory. This includes most pre-professional options.

Texts and Materials
Main Text: Understanding Physics, First Edition
Authors: Karen Cummings, Rensselaer Polytechnic Institute, Southern Connecticut State Univ.
Priscilla W. Laws, Dickinson College
Edward F. Redish, Univ. of Maryland
Patrick J. Cooney, Millersville Univ.
Publisher: John Wiley & Sons (2004)
Web Sites: WebCampus/Bb and Student Companion Site

The primary required text for University Physics. This text is designed for a calculus-based physics course at the beginning university and college level. It is written with the expectation that students have either taken or are currently taking a beginning course in calculus. From the publishers description:

- **A narrative style that supports student learning** - Rather than fragmenting the text with sidebars, extraboxes, and examples, this text presents a smooth expository flow that facilitates understanding. Critical examples (sample problems) are positioned as Touchstone Examples.

- **Emphasis on observation and experimentation** - The experimental evidence for many of the physical laws and relationships discussed in the narrative have been presented in graphical form.

- **Incorporates active learning** -- The story line is reinforced by the use of Reading Exercises that help students focus on thoughtful reading of the text sections in each chapter.

- **Alternative problem selections** - Based on the authors' knowledge of research on student learning difficulties, these new problems require careful qualitative reasoning and explicitly connect conceptual understanding to quantitative problem solving. In addition, estimation problems, video analysis problems, and 'real life' problems add to student understanding.

- Presentations that are known to be associated with common student confusions have been rewritten and clarified. Some topics have been rearranged (especially the introduction of the New Mechanics Sequence) to provide a more pedagogically coherent learning path and story line.
Supplement: *Physlet® Physics, 1/e*
Authors: Wolfgang Christian
Mario Belloni
both of Davidson College
Publisher: Pearson/Prentice Hall (2004).
ISBN: 0-13-101969-4

This book and CD package furnishes students with a host of interactive, computer-based exercises and study resources that span the entire introductory physics curriculum. Using a practical yet engaging structure, Physlet Physics presents a wide spectrum of “media-focused” critical thinking and problem-solving exercises, and provides students with an interactive visual representation of the physical phenomena they see in introductory physics textbooks.

[Math: *Mathematics for Physics with Calculus*]
Author: Biman Das, SUNY Potsdam
Publisher: Pearson/Prentice Hall (2004).
ISBN: 0-13-191336-0

Designed for students who plan to take or who are presently taking calculus-based physics courses. This book will develop necessary mathematical skills and help students gain the competence to use precalculus, calculus, vector algebra, vector calculus, and the statistical analysis of experimental data. Students taking intermediate physics, engineering, and other science courses will also find the book useful—and will be able to use the book as a mathematical resource for these intermediate level courses. The book emphasizes primarily the use of mathematical techniques and mathematical concepts in Physics and does not go into their rigorous developments.

Laboratory: *Physics Laboratory Manual I, PHYS 2201*
Authors: Physics Staff
Publisher: School of Natural Sciences
University College
Fairleigh Dickinson University

Course Requirements

Students are required to obtain an FDU Webmail account. This allows access to FDU’s Webcampus and the Blackboard web site for the course. The email facilities of Blackboard will be used to communicate with students and the material on the site is highly recommended. Students who do not wish to use or check their FDU email can set up auto-forwarding to another email address of their choice.

Each student in University Physics must register for a section of laboratory. The laboratory is a mandatory co-requisite.

Attendance in lecture is required. Students are expected to arrive on time for all classes. Cell phones and pagers must be turned off at all times in lab and lecture. For further information, refer to the University Attendance Policy.

There will be six examinations, one every other Wednesday at 12:00 noon. Each exam will cover the previous two week’s work. The exams will be multiple choice. They will emphasize understanding of the material covered. Practice exams will be available on Web Campus. The exams will be closed book. A calculator is mandatory. The course grade will be determined from the average of the grades from the exams. The University has a formal Grade Appeal Procedure for appealing a course grade.

Fairleigh Dickinson University has an Academic Integrity Policy that each student must read and understand. It can be found in the Academic Regulations section of the Metropolitan Campus Student Handbook on the FDU web site.

Course Objectives

The overall objectives of University Physics are to present in a quantitative format the primary laws of physics that underlay all of the other sciences.

[Under construction].

- Show the way science progresses from observation and classification of phenomena through model building to the development of comprehensive theories that can explain and predict and that can be tested by experiment.
- Discuss the criteria for a successful scientific theory and apply those criteria to the real world.
- Apply the methods and procedures of science through elementary laboratory exercises and observation. Analyze simple experiments and discuss whether they support or confront a theoretical prediction.

Teaching Methods

University Physics is taught as a formal lecture supplemented with some demonstrations and audio/visual materials. Questions are welcomed. Homework will be assigned using the WileyPLUS/Blackboard Web Campus system. The homework will be marked and graded for completeness but not for correctness. Problems that proved difficult will be solved in class.
The student is expected to read the text along with the lectures. The lectures will be easier to understand if you read the text first. There are also several supplements to the text that are available. In particular, the Student Companion Site is recommended. It duplicates some of the material available on the WebCampus/Bb site.

Questions to the instructor about the course and its content are to be asked in class, during office hours, or using the WebCampus/Bb Discussion Board for the section. This will allow all members of the class to benefit from the answers. Email should be reserved for private questions involving items like individual grades.

Course Outline

Part One
Introduction
1. Measurement
2. Motion Along a Straight Line
3. Forces and Motion Along a Line
4. Vectors
5. Forces and Motion in Two Dimensions
6. Combined Forces
7. Translational Momentum
8. Extended Systems
9. Kinetic Energy and Work
11. Rotation
12. Complex Rotations

Part Two
13. Equilibrium and Elasticity
14. Gravitation
15. Fluids
16. Oscillations
17. Waves-I
18. Waves-II
20. The Kinetic Theory of Gases