Cedar Crest College

PHYSICS 101

(4 credit hours)

Summer Semester, 2010

Instructor Mr. William L. Landis
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Class Periods Science Building, Room 139, Monday, Wednesday, and Friday, 9:00a.m -12:00

Laboratory Miller Building, Room 21, Tuesday and Thursday; 9:00a.m -12:00 noon.

Office Hours By Appointment

Text Book *College Physics* -Giambattista, Richardson, Richardson;
3rd edition (with connect access code)
Physics 101 Laboratory Manual -A. Verbalis

Welcome to Physics 101. The subject matter in this course is known as classical mechanics. This will help us to describe and understand the laws that govern the motion of objects. Motion (or its absence) is a very important aspect of the world that we can see and also of the submicroscopic world that we cannot see. By extending the principles discovered on a macroscopic level, classical mechanics provides a starting point for the basic understanding of microscopic natural phenomena.

Historically, classical mechanics is where physics began, and its originator, Sir Isaac Newton, is sometimes called the first physicist. Today there is a more general theory of mechanics called relativity, which was formulated by Albert Einstein. It is important to note that this development does not invalidate the theory of classical mechanics unless speeds approach the speed of light. Relativity does not contradict the results of classical mechanics in the realm of more ordinary speeds.

In the 20th century, study of microscopic phenomena has produced a more general theory called quantum mechanics. It too reduces to the simpler Newtonian mechanics for objects larger than molecules but is absolutely required to account for behavior on the atomic scale. Today classical mechanics is but one of many branches of physics. Whatever branch, physics remains true to its origin in trying to understand the workings of the material world (matter and energy), at its most basic levels.

While there is, of course, more to life than just the material world, it would be foolish to ignore it. Physics is one very important type of inquiry into the nature of the world in which we find ourselves and often serves as a model for other sciences. In addition, it is the basis for a wide variety of careers in our technological society. I hope to convey to you that classical physics is a remarkable intellectual achievement and that it is both useful and enjoyable to have a clearer understanding of the laws governing the behavior of matter and energy.

COURSE OBJECTIVES

As a result of the study necessary to complete this course, students should gain an increased conceptual understanding of the laws that govern motion with an attendant decrease in common misconceptions. They will increase their ability to apply these laws in their quantitative forms to obtain insight and solutions to problems involving matter and energy. These problems will often be of practical interest with relevance to other sciences. In other cases they may be relevant to the theoretical understanding of basic physical concepts. In the laboratory it is intended to increase the student's skill and confidence in performing careful measurements and interpreting the meaning of results obtained.

OUTCOMES AND ASSESSMENT

The successful achievement of the objectives stated above is intended to result in the outcomes of greater critical thinking ability, quantitative reasoning skills, and scientific literacy. The means for assessing success at achieving these outcomes will be testing involving verbal explanations of concepts and quantitative problem solutions involving these concepts. The laboratory experience will be assessed by evaluating a series of written reports on various laboratory topics.

GRADING POLICIES

Grading will be based on tests, homework, laboratory grades, and a comprehensive final exam. The number of points that could be earned in each category will be apportioned as follows:

Tests	300 points
Laboratory	200 points
Homework Assignments	100 points
Final exam	100 points
Total	700 points

The final grade will be determined by the percentage of total points actually earned by the student of the total possible points that could have been earned (usually 700). There will not be any opportunities for earning extra credit.

In assigning letter grades to the final percentages, the percentages for the boundaries between higher and lower letter grade categories will be at most: A-B, 90%; B-C, 81%; C-D, 72%; D-F, 65%.

In the normal course of events, everyone is required to take the final exam. The final will be a take home test. The final exam will be distributed on Friday June 26 and collected in the final class on Monday, June 29.

In order to understand the concepts of physics, much emphasis will be placed on solving quantitative problems based on those concepts. Therefore, the problem assignments are an important part of the course. They, however, will not be collected and graded. I will be available for questions at various times throughout the week. Being able to do the assigned questions and problems will be crucial for being able to do well on the tests and final exam. Assignments will generally be due on the lecture day after the assignment was made. There may be special assignments. These assignments will be assigned a due date and will be graded.

The written tests will be about 60 - 90 minutes long and worth 50 points apiece. They will be given on a weekly basis, and generally during the Friday class period. If a test is missed and the student can provide a valid excuse, the test can be made up if it is done in a timely manner.

The subject matter of the tests can be in the form of quantitative problems, questions requiring verbal explanation, and multiple-choice questions. The material will be drawn explicitly from the topics covered in class or lab the week of the test and implicitly from material previous to that. The test will contain quantitative problems and conceptual questions. The problems will frequently be based on the problems assigned for homework but not identical with them. In addition, the problems and questions can be based on examples worked out in lecture and also based on the laboratory exercises. For the tests and final exam, an equation list will be supplied. Physics is not about memorization. What is important are concepts and how they are applied and interrelate.

The laboratory experiences are intended to reinforce the concepts discussed in class. They are also intended to demonstrate the essential connection between theoretical prediction and empirical verification, which is of crucial importance in all of the sciences. The grade for each lab exercise (20 points maximum) will be based on the written report and can also depend on the instructor's assessment of a student's performance in the laboratory. Any absence must be excused, and in that case, the number of possible points that a student can earn (700 points) will be reduced by 20 points. An unexcused absence forfeits the 20 points with no change in the maximum total of 700 points. There will be no makeup laboratories.

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The final examination will be cumulative and based on lectures and laboratories. There will be additional emphasis on concepts discussed near the end of the semester, which occurred too late to be the subject of test questions.

LABORATORY WORK

The laboratory is an important and integral part of the course. It is the place where we come into direct contact with physical reality. It is central to the philosophy of physics in that laboratory experiments are the final judge of what will be accepted as physical law. For students laboratory work can be greatly useful in understanding accepted physical theories and their implications.

Discussion between students during an experiment in the laboratory is encouraged, but during the preparation of the lab report, each student must express her own ideas based on her own understanding. Most lab reports can be completed during the laboratory period. However, if additional time is needed to complete the analysis and questions, lab reports can be turned in as late as Monday of the following week. It is strongly encouraged to do as much work in the lab as possible. **The grading of each report will depend on the instructor's evaluation of the student's performance in the lab as well as what appears in the report.**

ACADEMIC STANDARDS AND CLASSROOM PROTOCOL

I will follow the guidelines on *Community Standards for Academic Conduct, Classroom Protocol, and Honor Philosophy* and will expect compliance by all students.

In addition, I would like to emphasize certain aspects of policy in regards to classroom protocol. I place great weight on behavior that enhances and does not detract from the learning environment in the classroom. Once class starts I expect a minimum of distraction from conversation, coming to class late, habitual leaving and re-entering the classroom for no compelling reason, or leaving the classroom before the class has ended. If you know that you will need to leave before the end of the class period, the proper procedure is to notify me of this before the class starts; and when the time comes to leave, raise your hand so that I may excuse you. If I experience problems in this regard, I reserve the right to make deductions from the student's point total, depending on the severity and persistence of the problem.

However, any of the above should not be construed as reasons to be inhibited from asking questions during class about the subject matter. **I welcome such questions.** It is inevitable that your understanding at times will not keep pace with the rate at which I proceed despite my intention to the contrary. At those times it makes good sense for you to ask questions to be able to understand the concepts. In that way you will be prepared to understand additional material based on those concepts and keep confusion to a minimum. Also, if at any point in class you think that I am making a mistake in a calculation, please inform me.

Finally, I am committed to helping you to learn physics. It will require hard work, but please be aware that nothing would please me more than the success of every single student in this class.

Community Standards for Academic Conduct

Academic integrity and ethics remain steadfast, withstanding technological change. Cedar Crest College academic standards therefore apply to all academic work, including, but not limited to, handwritten or computer-generated documents, video or audio recordings, and telecommunications.

As a student at Cedar Crest College, each student shall:
• Only submit work which is his/her own.
Adhere to the rules of acknowledging outside sources, as defined by the instructor, never plagiarizing or misrepresenting intellectual property.
• Neither seek nor receive aid from another student, converse with one another when inappropriate, nor use materials not authorized by the instructor.
• Follow the instructions of the professor in any academic situation or environment, including taking of examinations, laboratory procedures, the preparation of papers, properly and respectfully using College facilities and resources, including library and computing resources to ensure that these resources may be effectively shared by all members of the College community.
• Abide by the Cedar Crest Computer Use Policy.
• If a student perceives a violation of the Academic Standards, he/she will go to their instructor.
• If you are unable to resolve the problem with the instructor, you should go to the chair of the depa4ment. If you need thither assistance after consultation with the instructor and the chair, you should see the Provost.

Classroom Protocol

Appropriate classroom behavior is defined and guided by complete protection for the rights of all students and faculty to a courteous, respectful classroom environment. That environment is free from distractions such as late arrivals, early departures, inappropriate conversations and any other behaviors that might disrupt instruction and/or compromise students' access to the Cedar Crest College education.

Honor Philosophy

The Cedar Crest College Honor Philosophy states that students should uphold community standards for academic and social behavior in order to preserve a learning environment dedicated to personal and academic excellence. Upholding community standards is a matter of personal integrity and honor. Individuals who accept the honor or membership in the Cedar Crest College community of scholars pledge to accept responsibility for their actions in all academic and social situations and for the effect their actions may have on other members of the College community.

SCHEDULE AND READING ASSIGNMENTS : Revised 2009

Week of	**Reading Assignment**		**New Topics**
May 17	1.1-1.9		Units, Mathematics and Graphs
	2.1-2.4	HW #1	Forces, Vectors, Law of Inertia
	Test 1, Friday		
May 24	3.1-3.3, *2.5-2.9*	HW#2	Velocity, Acceleration, Force Diagrams,Equilibrium
	Test 2, Friday		
(NO CLASS May 31)			
June 1	3.4-3.5	HW#3	Newton's Second Law, Mass, Relative Velocity
	4.1-4.6	HW#4	Accelerated Motion, Air Resistance
	5.1-5.5	HW#5	Circular Motion
	Test 3, Friday		
June 7	6.1-6.4	HW#6	Work, Conservation of Mechanical Energy
	6.6-6.8	HW#7	Springs, Forces and Potential Energy, Power
	7.1-7.8	HW#8	Conservation of Momentum, Collisions
	Test 4, Friday		
June 14	8.1-8.5, 8.7-8.8	HW#9	Rotational Inertia, Torque, Rigid Equilibrium
	9.1-9.6	HW#10	Fluid Pressure, Archimedes Principle
	9.7-9.10, 10.1-10.4	HW#11	Fluid Flow and Viscosity, Solid Deformation
	Test 5, Friday		
June 21	10.5-10.10		Oscillations
	11.1-11.4	HW#12	Oscillations and Wave Motion
	11.6-11.10, 12.1	HW#13	Standing Waves, Sound Waves
	12.7-12.8	HW#14	Doppler Effect
	Test 6, Friday		
June 28	**Final test turned in**		