

The Mechanical Universe

Physics 205

Gustavus Adolphus College - Spring 2017

Instructor: Dr. Charles F. Niederriter

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Textbooks: *Physics For Scientists and Engineers*, Serway and Jewett, 9th Edition,

Course Policy and Evaluation

- 1. Objectives:** As the second class in the sequence for science and engineering students at Gustavus, this course shares several objectives with the rest of the physics program. It is hoped that when students have completed *The Mechanical Universe* they will have learned some basic problem solving skills, some computer and calculation skills, some quantitative and empirical reasoning skills, and, of course, some physics, specifically mechanics, waves, thermodynamics, and oscillations.
- 2. Expectations:** Students in *The Mechanical Universe* are expected to have a solid background in differential and integral calculus (Calc I). They are also expected to be concurrently enrolled in Calculus II if they have not already successfully completed a college level course in it. The instructor will discuss the calculus involved in this course as necessary, but it is important that the students also see it in another course setting. In addition, all students are required to be concurrently enrolled in PHY206L, *The Mechanical Universe Laboratory*.
- 3. Disability Services:** Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (1990) work together to ensure "reasonable accommodation" and non-discrimination for students with disabilities in higher education. A student who has a physical, psychiatric/emotional, medical, learning, or attentional disability that may have an effect on the student's ability to complete assigned course work should contact the Disability Services Coordinator in the Advising Center (x6286). No accommodations can be made without review by the Disability Services Coordinator.
- 4. Academic Honesty:** The instructor is bound to abide by the College's Honesty Policy and therefore must report all incidents of academic dishonesty (cheating, copying, etc.) to the Dean's Office. In the spring of 2003, the College adopted an academic honesty policy and honor code system, which is printed in the Academic Bulletin and in the Gustavus Guide. All students will be required to abide by the policy and write the following honor code on every examination and graded assignment:
"On my honor, I pledge that I have not given, received, nor tolerated others' use of unauthorized aid in completing this work."
Not all components of this course are subject to the Honor Code. The instructor will clearly identify to which items the Code applies. But the student is responsible for requesting clarification if necessary.
- 5. Learning Styles:** Recognizing that students learn science in a variety of ways, the instructor will take advantage of many different techniques, including collaborative learning, to maximize the overall effectiveness of this course. Although collaborative efforts will be encouraged for solving in-class problems, assigned homework, labs, and some quizzes, they are **not allowed** for most quizzes and all exams. The instructor will make it clear which quizzes are to be group efforts and which are not to be.

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6. **Class Meetings and Reading Assignments:** The class will meet five days a week (M-F) for lecture, discussion, homework review, quizzes, and exams. Quizzes and exams are indicated on the following schedule. The student will be responsible for reading the text before coming to class and completing the multiple choice questions.
7. **Homework:** Problems will be assigned on a weekly basis. Problems will be graded and returned to the student. Homework should be neat and orderly. Late homework will be accepted at the discretion of the instructor with some loss of points. In addition, there will be a brief writing assignment each week which will be turned in electronically.
8. **Group Activities:** A number of group activities, including problem solving and simulations, will be done throughout the semester. These activities will not be scheduled and may be used to test students' knowledge of old material or to introduce new material.
9. **Attendance:** Regular attendance at all lectures is expected and excessive absenteeism will result in some reduction of final grade.
10. **Quizzes and Exams:** There will be four one-hour exams and a two-hour final exam as scheduled below. There will be ten to fifteen minute quiz almost every week that there is no exam.
11. **Missed Exams:** Students are expected to arrange in advance to take an exam at other than the announced time. Permission to make up a missed exam after the fact will be at the discretion of the instructor
12. **Incompletes:** A grade of incomplete will be given only for work not completed due to circumstances beyond the control of the student.
13. **Physics Tutors:** Limited tutoring for this course will be available at times announced in the departmental tutoring schedule.
14. **Office Hours, etc.:** My scheduled office hours are 1st and 2nd hours every day. I will make every effort to be available during these times for individual assistance and advising. I will also be available at other times by appointment. Don't be afraid to ask for help.
15. **Email:** You may contact me by electronic mail; **chuck@gac.edu**. I will respond as soon as I can to any questions that you might have.
16. **Evaluation:**

Hour Exams	40%	A	94 - 100	C+	74 - 78
Final Exam	15%	A-	90 - 94	C	70 - 74
Homework	20%	B+	86 - 90	C-	66 - 70
Quizzes	15%	B	82 - 86	D+	62 - 66
Group Problems		B-	78 - 82	D	58 - 62
& Participation	10%	F	< 58		

Assignment of final letter grades will also take into account the instructor's subjective evaluation of the student's attendance, initiative, class participation, preparation (particularly quantity and quality of homework), and evidence of improvement.

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Course Schedule

<u>Week Beginning</u>	<u>Chapter</u>	<u>Subject</u>	<u>Reading Assignment</u>
February 6	2-5	Review Kinematics – Newton’s Laws	Chapter 6
February 10	****	Quiz 1 on Chapters 2-4 ***	
February 13	6	Applications of Newton’s Laws & Dealing with Uncertainties	Chapter 7
February 14	****	Quiz 2 on Newton’s Laws ***	
February 20	7 & 8	Energy of a System & Conservation of Energy	Chapter 8
February 22	****	Exam 1 on Chapters 1-6 ***	
February 27	8	Conservation of Energy & Probability Distributions and Uncertainties	Chapter 9
March 1	****	Quiz 3 Chapter 7 ***	
March 6	9	Linear Momentum and Collisions	Chapter 10 & 11
March 8	****	Quiz 4 on Chapter 8 ***	
March 15	10 & 11	Rotation and Angular Momentum	Chapter 12
March 16	***	Exam 2 on Chapters 7-9 ***	
March 22	12	Static Equilibrium	Chapter 14
March 24	****	Quiz 5 on Chapters 10 & 11 ***	
March 25 – April 2	*****	Spring Break *****	
April 3	14	Fluid Mechanics	Chapter 15
April 7	****	Quiz 6 on Chapter 12 ***	
April 10	15	Oscillatory Motion & Chi Square	Chapter 16 & 17
April 13	****	Exam 3 on Chapters 10 -12 & 14 ***	
April 14 – 17	*****	Easter Recess *****	

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Course Schedule (Continued)

<u>Week Beginning</u>	<u>Chapter</u>	<u>Subject</u>	<u>Reading Assignment</u>
April 17	16 & 17	Waves and Sound Waves	Chapter 17 & 18
April 20	**** Quiz 7 on Chapter 15 ***		
April 24	17 & 18	Superposition and Standing Waves	Chapter 20
April 27	*** Quiz 8 on Chapters 16 & 17 ***		
May 1	20 & 21	The First Law and Kinetic Theory of Gases	Chapter 21 & 22
May 4	*** Exam 4 on Chapters 15 - 18 ***		
May 8	21 & 22	Heat Engines, Entropy, and the Second Law	
May 11	**** Quiz 9 Chapters 20 & 21 ***		
May 15	Review		
May 16	**** Quiz 10 Chapters 22 ***		
May 20 8:00 AM	*** Final Exam – Chapters 20 – 22 & Comprehensive ***		