PHYS S211: General Physics I

Fall 2024

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Class hours: MWF 10:45 am – 11:45 am

Lab hours: J01, T 8:45 am – 11:45 am
J02, T 1:15 pm – 4:15 pm

Office hours: MWF 12:00 pm – 1:00 pm, or by appointment

Website: A course website will be maintained on Blackboard (http://classes.alaska.edu). Check for assignments, handouts, grades, and messages.

Prerequisites: MATH S251

Textbook: Physics for Scientists and Engineers: A Strategic Approach with Modern Physics (5^{th} ed.) by Knight. Be sure to purchase a version of the book that comes with an access card for MasteringPhysics, which you will use for homework submissions.

The cheapest option, which is available through the MBS page, is to purchase the MasteringPhysics with Pearson eText package (ISBN-13: 978-0-13-680847-3).

To access MasteringPhysics, follow the link from the course Blackboard site and click "Open MyLab and Mastering". From there you will need to enter the access code that you received when you purchased the textbook.

Other materials: A basic, simple scientific calculator with trigonometric, exponential, and logarithmic functions. Calculators can be used during exams.

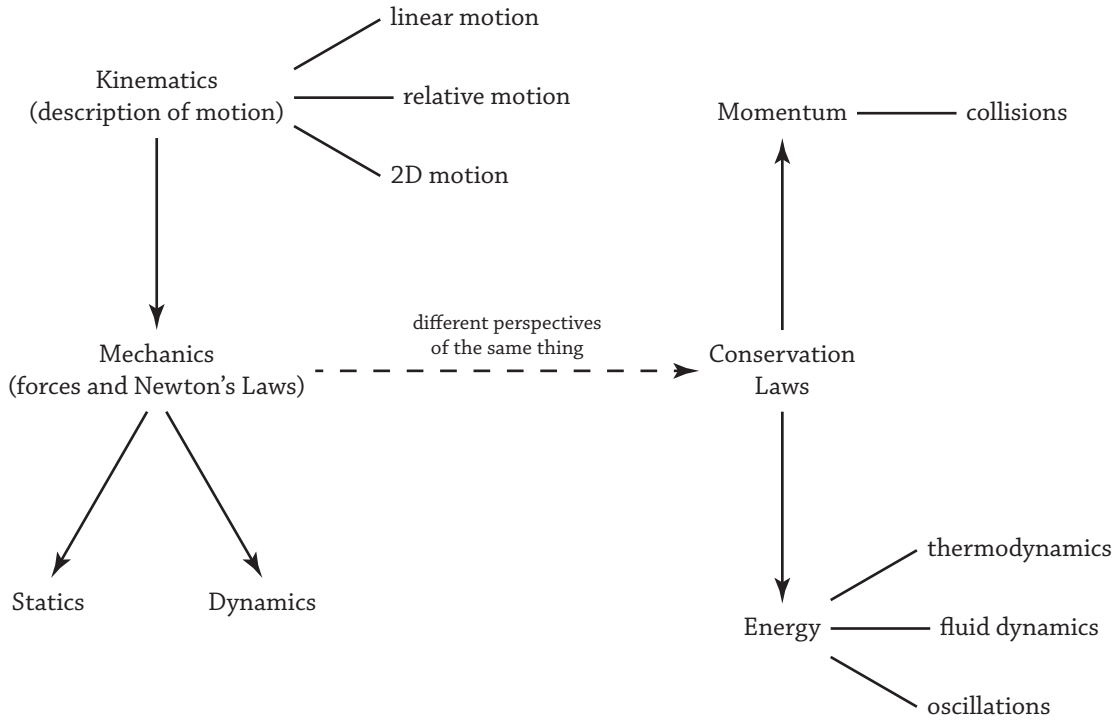
Student Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Describe basic physics principles, including motion, energy, waves, and thermodynamics
2. Solve analytical problems using calculus and basic physics principles
3. Test basic physics principles through experimentation and computer analysis of laboratory data

Physics is the study of matter and its motion through space and time. In PHYS S211 we will cover the field of classical mechanics, which pertains to "large" objects that are moving much slower than the speed of light.

Concepts



Grading

Homework assignments	20%
Informal lab reports (8)	20%
Formal lab reports (2)	15%
Exams (3)	45%

Homework

There will be 10 homework assignments consisting of roughly 10 problems each. You will submit your solutions through MasteringPhysics. Late assignments will only be accepted for extenuating circumstances.

Why use MasteringPhysics?

- It gives you wrong-answer feedback and hints for solving problems.
- It provides me with diagnostics on what types of problems are giving you the most trouble.
- The "study area" includes some nice material that complements what we will discuss in class and labs.

A few suggestions for working through the homework:

- Work through your answers slowly and be sure to check for significant figures before entering your solution. You might consider solving all of the problems before entering your answers so that you don't get frustrated right away.
- If you feel confident in your answer, but MasteringPhysics tells you that your answer is incorrect and doesn't give you useful feedback, send me an e-mail. View this as an opportunity to figure out what you did wrong and correct your mistake before the due date.
- I view the homework as training for the exams, and in that sense the homework grade is essentially participation. I'm happy to help you work through problems all the way to the final solution if you are having trouble.
- I reserve time in class each week to address questions related to the homework, so come with questions!

Lab reports

There will also be 10 laboratory exercises during the semester. You will be expected to turn in informal reports for eight of the labs and formal reports for the other two. For the informal reports you may submit a group report (no more than three people in a group) but are not required to do so. For the formal reports I expect you to submit an individual report. More details to follow. You may submit physical or electronic copies of your reports; if you choose to submit a report electronically you should do so by uploading it to Blackboard.

Lab reports will not be considered late up until the point that I grade them; afterwards they will be docked by 50%. This late policy is designed to (1) encourage you to finish your reports even if they were not completed before the due date and (2) simplify my grading. I don't like taking off points for late work, especially if I am slow at grading it, but it is also much easier to grade everybody's work at once. I think this policy is a good compromise.

Exams
You will be given three exams during the semester, including the final exam. The exams will focus on the material that was covered over the previous third of the semester, but they are cumulative in the sense that everything that we do in physics will be built up from the same core principles. The exams will be proctored in the Learning Center. You will have several days to complete them. The exam scores will be curved.

Grading Scale

A	93–100%
A-	90–92%
B+	87–89%
B	83–86%
B-	80–82%
C+	77–79%
C	73–76%
C-	70–72%
D+	67–69%
D	63–66%
D-	60–62%
F	<60%

Student Ratings of Instruction
During the last three weeks of class, you will have an opportunity to complete an online rating questionnaire on course instruction, how the course aided in your skill development, effectiveness of technology and equipment used, and adequacy of library resources and services used during the course. You will receive notification in your UAS email account when the rating questionnaire is available. Please make use of this opportunity to provide feedback on what worked for you and what did not. Your input is used to assess methods and services in order to provide the best educational experience possible.

Disabilities
If you experience a disability and would like information about support services, please contact Disability Services, located at the Student Resource Center in the Mourant building. They can be reached at 796-6000. For more information, please see http://www.uas.alaska.edu/dss/index.html.

Title IX/Sexual Misconduct
All students have the right to be free from all forms of gender and sex-based misconduct (sexual harassment, dating violence, domestic violence, sexual assault, or stalking). Please report any incidence of sex or gender-based discrimination to the UAS Title IX Office: `https://uas.alaska.edu/equity-and-compliance/titleix/index.html`

Schedule (subject to change)
I have one day of field work that I need to do during the fall that is very weather dependent. I may need to cancel one class at fairly short notice if it looks like there won't be many options for getting out to the field on days that I'm not teaching.

Monday	Tuesday	Wednesday	Friday
8/26 Course overview: why physics?	8/27 No lab	8/28 1.1–1.6: Introduction to kinematics	8/30 2.1–2.5: Kinematic equations
9/2 No class	9/3 Lab #1: Measurements and motion	9/4 4.1–4.2: Motion in two dimensions **HW #1 due**	9/6 4.3 Projectile motion
9/9 2.6: Motion on inclined planes	9/10 Lab #2: Acceleration **Lab #1 due**	9/11 4.3: Relative motion	9/13 4.4–4.6, 12.1: Circular and rotational motion
9/16 5.1–5.7, 7.1–7.3: Newton's Laws	9/17 Lab #3: Forces **Lab #2 due**	9/18 5.2, 6.3: Types of forces, I **HW #2 due**	9/20 6.4–6.5, 7.4: Types of forces, II
9/23 6.5, 9.4: Types of forces, III	9/24 Review for exam #1 **Lab #3 due**	9/25 8.2–8.4: Centripetal force **HW #3 due**	9/27 **Exam #1** No class
9/30 12.5–12.7: Torque	10/1 Lab #4: Circular motion (formal report)	10/2 12.5–12.7: Torque, II	10/4 12.8 Static equilibrium
10/7 14.6: Equilibrium and elasticity	10/8 Lab #5: Torque **Lab #4 due**	10/9 11.1: Impulse and momentum **HW #4 due**	10/11 No class
10/14 11.2–11.5: Conservation of momentum	10/15 Lab #6: Statics **Lab #5 due**	10/16 12.10: Vector description of torque **HW #5 due**	10/18 12.11: Angular momentum

Monday	Tuesday	Wednesday	Friday
10/21 9.1–9.3: Introduction to energy	10/22 Lab #7: Momentum and energy **Lab #6 due**	10/23 9.1–9.3: Work and energy **HW#6 due**	10/25 10.1–10.8: Work and energy, II
10/28 10.1–10.8: Work and energy, III	10/29 Review for exam #2 **Lab #7 due**	10/30 19.1, 19.4: Introduction to thermodynamics **HW #7 due**	11/1 **Exam #2** No class
11/4 19.5–19.6: Latent and specific heat	11/5 Lab #8: Springs (formal report)	11/6 19.8: Heat transfer	11/8 18.6–18.7, 19.2, 19.7: Thermodynamics of gases
11/11 14.1–14.3: Introduction to fluids	11/12 No lab	11/13 14.4: Archimedes' principle **HW #8 due**	11/15 14.5: Fluid dynamics, I
11/18 14.5: Fluid dynamics, II	11/19 Lab #9: Pendulums **Lab #8 due**	11/20 15.1–15.6: Oscillations **HW #9 due**	11/22 15.7–15.8: Driven and damped oscillations
11/25 16.1–16.2: Introduction to waves	11/26 Lab #10: Sound **Lab #9 due**	11/27 No class Fall break	11/29 No class Fall break
12/2 16.3: Traveling waves	12/3 Review for exam #3 **Lab #10 due**	12/4 17.1–17.8: Wave superposition and sound	12/6 Course summary **HW #10 due**
12/9 Final exam week - - -	12/10 - - - - - - - - - - - - - - -	12/11 - - - - - - - - - - - - - - -	12/13 - - - - - - - - - - - - - - >