

PHY 203: Principles of Physics III (Spring 2020, CRN 21124)

Instructor: Dr. Eric Edlund

SUNY Cortland, Physics Department

Course Meeting Times

Lecture: MWF 10:20 – 11:10

Contact Info

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Preferred contact method is email.

Standing Office Hours

Monday 9:00 AM – 10:00 AM

1:00 PM – 2:00 PM

Wednesday 9:00 AM – 10:00 AM

Thursday 3:00 PM – 4:00 PM

Friday 12:30 PM – 1:30 PM

Or by appointment:

If you are unable to attend these standing office hours or would like to speak privately about a specific matter, you are encouraged to make an appointment.

Course Catalog Description

Fundamental principles of thermodynamics, optics and sound, using methods of calculus. Topics include heat, work, and energy of thermodynamic systems, wave motion, geometrical and physical optics, and sound. This course has a prerequisite of PHY 202.

Scope of Course

This is the third course in a series of three introductory, calculus-based physics courses. The subject matter of this course will be roughly divided into three sections:

Part I: oscillations & waves

Part II: geometrical optics & diffraction

Part III: thermodynamics

Assessment Weighting

Homework	25%
Project	25%
Midterm #1	25%
Final Exam	25%

Course Grade Scale

76.7% ≤ C+ ≤ 79.9%
93.4% ≤ A ≤ 73.4% ≤ C ≤ 76.7%
90.0% ≤ A- ≤ 93.3% 70.0% ≤ C- ≤ 73.3%
86.7% ≤ B+ ≤ 89.9% 66.7% ≤ D+ ≤ 69.9%
83.4% ≤ B ≤ 86.6% 63.4% ≤ D ≤ 66.6%
80.0% ≤ B- ≤ 83.3% 60.0% ≤ D- ≤ 63.3%
E ≤ 59.9%

Required Materials

1. *University Physics 3rd Edition, Volumes I & II*, by Wolfson.

** Both volumes of the textbook are available at the library reserve desk under items #17 & #18.

2. A dedicated notebook.

Expectations

Physics 203 builds on the foundational concepts from PHY 201 & PHY 202, and regularly uses the method of calculus. This means that you are expected to be:

- comfortable with the core concepts from PHY 201, including kinematic relationships (linear and rotational), force analysis and related concepts of energy, momentum, etc., and
- adept at calculating derivatives and integrals, and using associated techniques such as the chain rule, product rule, u-substitution, and integration by parts.

Student Learning Outcomes

Mastery of this material, required to earn a grade of A in this course, will require you to attend class, complete the homework yourself (no Chegg), work problems until you understand them, review your notes, and fully read each chapter in the textbook. It is likely that this will take many hours per week. The pedagogical principles (student learning objectives) that define the primary goals of this course are:

- to understand how forces on physical systems result in oscillations, and be able to represent, interpret, and explain solutions to the differential equations describing these systems;
- to understand the wave nature of sound and light, and be able to draw on the understanding of descriptions of waves to explain phenomena such as diffraction and interference;
- to be able to calculate optical properties, using the principles of geometric optics, for arrangements of lenses and mirrors; and
- to know the relationships between thermodynamic variables for ideal gases, to be able to calculate energy balance for the four fundamental thermodynamic processes, to be able to explain the functioning of devices such as engines and refrigerators in terms of fundamental thermodynamic processes and thermodynamic efficiencies.

Course Policies

Attendance: Your attendance at lecture will be recorded: each unexcused absence will deduct 1% from your final score. If you arrive late it is your responsibility to make sure that your attendance was properly accounted.

Project: We will be conducting a term project that is a joint experience with students from the Art & Art History department. Your main work for this project will be to (1) write a technical report that describes some phenomenon and (2) communicate with the art students.

Homework: Your homework is your practice for the exams, so you are encouraged to take it seriously and abstain from using services like Chegg, for which it is now well-established only serves to hurt your final grade. If you use Chegg (or any other service/source) then you must cite it in your work. Failure to do so is grounds for an academic misconduct violation. You are free, and encouraged, to collaborate with your peers, as long as the submitted work is truly your own.

Exams: You will have two midterm exams, each covering material from about one third of the course, and a comprehensive final exam. You may create and bring your own equation sheet to the exams as long as it contains only general equations and not worked solutions to problems. You will not be permitted to use the restroom or leave the room during the exam, so please take care of any personal matters before the exams begin. Exams will be closed-book: no notes, books, calculators or other aids will be allowed. No late exams will be permitted without a valid reason, as outlined in the university catalog.

Important Dates

Friday 1/31	End of the add/drop period
Friday 5/15	Final Exam, 10:20 AM – 11:20 AM

Course Schedule

Note that this is a tentative schedule and is subject to change as necessary.

Week	Dates	Topic	Chapter	P-Set
1	1/27 to 1/31	Differential equations, oscillators	13	
2	2/3 to 2/7	Oscillations, damping, resonance	13	#1
3	2/10 to 2/14	Wave equation and 1D waves	14	#2
4	2/17 to 2/21	More wave analysis	14	#3
5	2/24 to 2/28	Waves in 2D, sound waves	14	#4
6	3/2 to 3/6	Wave interference	32	#5
7	3/9 to 3/13	Diffraction Midterm #1	32	#6
8	3/16 to 3/20	SPRING BREAK WEEK 1	---	---
9	3/23 to 3/27	SPRING BREAK WEEK 2	---	---
10	3/30 to 4/3	Geometric optics	30	#7
11	4/6 to 4/10	Optical Instruments	31	#8
12	4/13 to 4/17	Temperature & heat	16	#9
13	4/20 to 4/24	Thermal properties of matter	17	#10
14	4/27 to 5/1	Heat, work & thermodynamic processes	18	#11
15	5/4 to 5/8	Heat, work & thermodynamic processes	18	#12
16	5/11 to 5/15	Entropy and reversibility	19	---

Final Exam on May 15 @ 10:20 AM

The last column lists the due-date for the stated problem set, which will be assigned the week prior. This course covers 11 chapters from the textbook at a pace of about 1.5 sections per day, on average.

SUNY Cortland Policies and Statements

Academic Integrity Statement: All students are expected to uphold academic integrity standards. Plagiarism is defined as taking the ideas of others and using them as one's own without due credit. Students who cheat in examinations, course assignments, or plagiarize in this course may be disciplined in accordance with university rules and regulations. SUNY Cortland College Handbook, Chapter 340.

Disability Statement: As part of SUNY Cortland's commitment to a diverse, equitable, and inclusive environment, we strive to provide students with equal access to all courses. If you believe you will require accommodations in this course, please place a request with the Disability Resources Office at disability.resources@cortland.edu or call 607-753-2967. Please note that accommodations are generally not provided retroactively so timely contact with the Disability Resources Office is important. All students should consider meeting with their course instructor who may be helpful in other ways. SUNY Cortland College Handbook, Chapter 745.

Diversity Statement: SUNY Cortland is dedicated to the premise that every individual is important in a unique way and contributes to the overall quality of the institution. We define diversity broadly to include all aspects of human difference. The College is committed to inclusion, equity, and access and thus committed to creating and sustaining a climate that is equitable, respectful and free from prejudice for students, faculty and staff. We value diversity in the learning environment and know that it enhances our ability to inspire students to learn, lead and serve in a changing world. We are committed to promoting a diverse and inclusive campus through the recruitment and retention of faculty, staff and students. As a community, we hold important the democracy of ideas, tempered by a commitment to free speech and the standards of inquiry and debate. To this end, we are dedicated to developing and sustaining a learning environment where it is safe to explore our differences and celebrate the richness inherent in our pluralistic society. SUNY Cortland College Handbook, Chapter 130.

Inclusive Learning Environment Statement: SUNY Cortland is committed to a diverse, equitable and inclusive environment. The course instructor honors this commitment and respects and values differences. All students enrolled in this course are expected to be considerate of others, promote a collaborative and supportive educational environment, and demonstrate respect for individuals with regard to ability or disability, age, ethnicity, gender, gender identity/expression, race, religion, sex, sexual orientation, socio-economic status or other aspects of identity. In an environment that fosters inclusion, students have the opportunity to bring their various identities into conversation as they find helpful, but are not expected to represent or speak for an entire group of people who share aspects of an identity. If you have any questions or concerns about this statement, contact the Institutional Equity and Inclusion Office at 607-753-2263. <http://www2.cortland.edu/about/diversity/>

Title IX Statement: Title IX, when combined with New York Human Rights Law and the New York Education Law 129-B, prohibits discrimination, harassment and violence based on sex, gender, gender identity/expression, and/or sexual orientation in the education setting. The federal Clery Act and NY Education Law 129-B provide certain rights and responsibilities after an incident of sexual or interpersonal violence. When a violation occurs, victims and survivors are eligible for campus and community resources. Where the College has jurisdiction, it may investigate and take action in accordance with College policy. If you or someone you know wishes to report discrimination based in sex, gender, gender identity/expression, and/or sexual orientation, or wishes to report sexual harassment, sexual violence, stalking or relationship violence, please contact the Title IX Coordinator at 607-753-4550, or visit <http://www2.cortland.edu/titleix> to learn about all reporting options and resources.

Updated by SUNY Legal on February 1, 2018.