

PHY 201: Principles of Physics I (Spring 2020, CRN 22207)

Instructor: Dr. Eric Edlund

SUNY Cortland, Physics Department

Course Meeting Times

Lecture: MWF 11:30 – 12:20

Recitation: W 12:40 – 1:30

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

Contact Info

Email: eric.edlund@cortland.edu

Phone: 753-5697

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Preferred contact method is email.

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 motion and dynamics using methods of calculus. Topics include motion in one, two and three dimensions, mechanical equilibrium, momentum, energy, rotational motion and dynamics, periodic motion, gravitation, fluid dynamics, and conservation laws. This course has a pre/co-requisite of MAT 135 or MAT 121.

Scope of Course

This is the first course in a series of three introductory, calculus-based physics courses. We will discuss how to do calculus in this course in a few simple rules, which are not difficult, but it is up to you to learn these rules so that you can apply them. The subject matter of this course will be roughly divided into three sections:

Part I: mathematical foundations and kinematics

Part II: force analysis

Part III: work, energy, momentum, equilibrium, and the universal law of gravitation

Assessment Weighting

| | |
|-------------|-----|
| Homework | 15% |
| Lab Reports | 25% |
| Quizzes | 25% |
| Math Exam | 10% |
| Midterm #1 | 15% |
| Final Exam | 15% |

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 with Mastering Physics 3rd Edition* by Wolfson.

** The textbook will be available at the library reserve desk under item #17.

2. A bound notebook (i.e. not loose-leaf or a 3-ring binder) for lab reports.

Expectations

Physics 201 is the foundational course for all other physics courses. While not a mathematics course, the language of physics is math and this course relies on calculus (derivatives and integrals). This means that you are expected to be:

- comfortable with basic mathematical concepts including algebra, geometry, trigonometry, graphing, and logarithmic and exponential functions.
- bring a willingness to do some hard work to this class and an enthusiasm for learning.

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 be able to describe the trajectory of objects in one, two and three dimensions in terms of mathematical functions and graphs;
- to understand the fundamental relationships between position, velocity, and acceleration (for both linear and rotating systems) in the language of calculus;
- to be able to perform force analysis, use vectors, and interpret the motion described by solutions to the differential equations that arise from analysis of Newton's law of motion;
- understand and be able to apply related concepts such as work, energy, and momentum to a wide range of problems;
- understand how to represent the universal law of gravitation and be able to include this in the general procedure for force/energy analysis.

Course Policies

Attendance: Attendance in lab is mandatory. Each unexcused absence in lab will incur a 5% penalty to your course grade.

Lab Reports: You will conduct 8 labs, for which a complete lab report is required. Incomplete, not submitted, or unacceptable lab reports will incur a penalty of 10% to your course grade. Late lab reports will be marked with a 50% penalty.

Homework: Your homework is your practice for the exams, so you are expected to take it seriously and abstain from using services like Chegg, for which it is now well-established only serves to hurt your understanding and 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 encouraged to collaborate with your peers as long as the submitted work is your own.

Quizzes & Exams: You will have weekly (approximately) quizzes that are more conceptual in nature and draw from the reading. You will have three sectional exams and a comprehensive final exam. You will not be permitted to use the restroom or leave the room during any exam, so please take care of all 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.

GE Category 2 Learning Outcomes

1. An understanding of the methods of science.
2. Knowledge of the principles of physics.
3. The ability to apply scientific data, concepts, models, and technology to modern life.

The required 5 pages of written text (total) will be completed in your lab reports.

Important Dates

Friday 1/31 End of the add/drop period
Friday 5/15 Final Exam, 11:30 AM – 12:30 PM

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 | Course intro, math review, calculus | 1 | |
| 2 | 2/3 to 2/7 | Motion in 1 dimension | 2 | #1 |
| 3 | 2/10 to 2/14 | Motion in 2 & 3 dimensions | 3 | #2 |
| 4 | 2/17 to 2/21 | Newton's Laws, Math Exam | 4 | #3 |
| 5 | 2/24 to 2/28 | Friction and other forces | 5 | #4 |
| 6 | 3/2 to 3/6 | Forces & circular motion | 5 | #5 |
| 7 | 3/9 to 3/13 | Forces, Midterm #1 | 5 | #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 | 1 st half review | 5 | #7 |
| 11 | 4/6 to 4/10 | More force analysis (springs & friction) | 5 | #8 |
| 12 | 4/13 to 4/17 | Work-energy theorem | 6 | #9 |
| 13 | 4/20 to 4/24 | Conservation of energy | 7 | #10 |
| 14 | 4/27 to 5/1 | Systems of particles | 9 | #11 |
| 15 | 5/4 to 5/8 | Rotational motion | 10 | #12 |
| 16 | 5/11 to 5/15 | Equilibrium | 12 | --- |

Final Exam on May 15 @ 11:30 AM

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.