

**Physics 211 (Fall 2020)**

**(4 Credit Hours)**

**General Physics II**

**Syllabus available on BlackBoard**

**<http://webcourses.niu.edu/>**

**under Course information**

- **Name:** Prof. Omar Chmaissem (sh-my-sim)
- **Email:** Chmaissem@niu.edu **Preferred method**
- **Fax:** (815) 753-8565

- **Course scheduled Meetings:**  
**Tuesday and Thursday from 11 AM to 12:15 PM**

**Labs: Multiple 2hr 50min long sessions. You must be enrolled in one of these sessions.**

- **Office hours:**  
**During the online meeting times. More sessions could be added as needed, or by appointment.**

# Lab Sections

- Labs, tests, and recitations will all take place during the lab sessions.
- Separate Lab Rules and instructions will be covered by your TA's.
- Main lab related questions and issues need to be sorted out with your TA's. Please see me when you couldn't resolve your issue with your TA or if he/she are irresponsive.

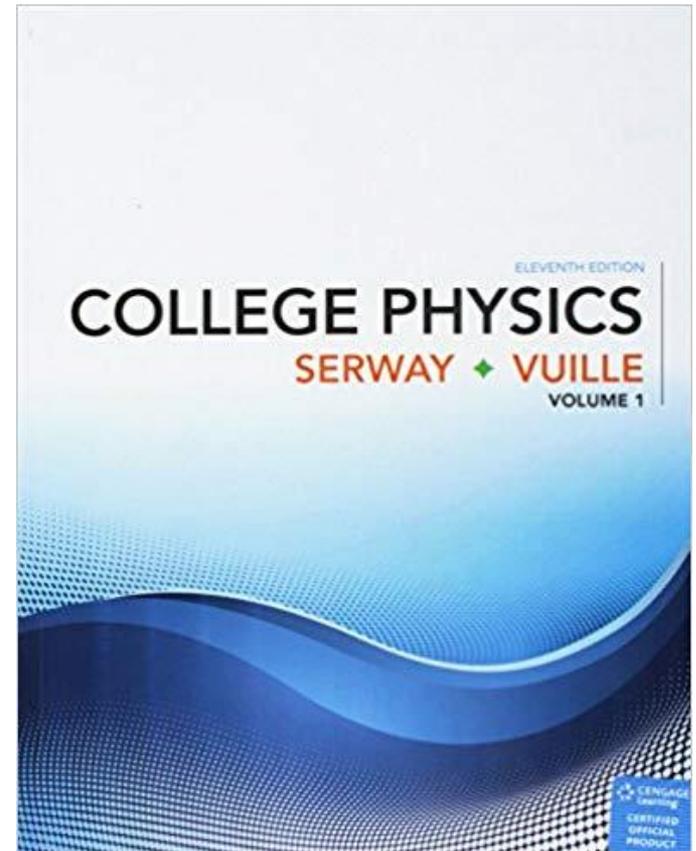
# *Bedtime Reading!*

- **Textbook:**  
*College Physics*  
Serway, Vuille

**11<sup>th</sup> edition**

**Chapters 15-30**

**Many chapters towards the end are either short or will be trimmed to certain topics.**



## ***Grade determined by:***

- **Attendance:** 0%

Attending the online meetings, when held, is highly desirable because of the fast nature of this course. Slacking would put you at a big disadvantage. Each day corresponds to about 1 chapter. Chapters are related to each other so missing any information would make it harder to understand newer concepts.

- **Tests:** Face to face tests. Two (22.5% each) or Three (15% each) tests for a total of 45% of the total grade.
- **Final exam:** 20% **Tuesday, December 8 from 10:00 to 11:50 AM (cumulative)**
- **Quizzes:** 15% - All quiz points will be added at the end of the semester and normalized to 15% of the total grade.
- **Labs:** 20% (a minimum of 60% of the total lab grade is required to pass the lab). Failing the lab will also fail you the course regardless of your performance on the lecture portion.

- **Note 1:** There will absolutely be **no** make-up quizzes. Final exam may be taken within 48 hours, if missed, only in case of a well-documented and convincing emergency.
- **Note 2:** **Cheating and plagiarism are serious offenses.**

SafeAssign will catch plagiarized reports whether partially or fully (internet, student submissions any semester are all included in the search).

Offenders will be referred to the University's Judicial Office.

## ***GRADING SCALE:***

**Your final letter grade for the semester will be determined based on the following scale:**

**A 93 – 100%**

**A- 90 – 92.9%**

**B+ 87 – 89.9%**

**B 83 – 86.9%**

**B- 80 – 82.9%**

**C+ 74 – 79.9%**

**C 70 – 73.9%**

**D 60 – 69.9%**

**F 0 – 59.9%**

# ***COURSE CONTENT***

**This course consists of fifteen units. Each unit has lectures and demonstrations, a reading quiz, a lab, and exercises covering the material in that unit. At the end of the course there is a final exam covering all the units.**

- **The fifteen units are:**
- **Electric Charge**
- **Electric Energy**
- **Circuits**
- **Magnetism**
- **Induction**
- **Alternating Current**
- **Electromagnetic Waves**
- **Light Waves**
- **Optics**
- **Interference**
- **Relativity**
- **Photon**
- **Atoms**
- **Nuclei**
- **Subatomic Particles**

# ***COURSE OBJECTIVES***

**General objectives are to:**

**Develop an understanding of the basic concepts and principles in Physics.**

**Develop critical thinking and a scientific approach to problem solving.**

**Develop and use mathematical formulations of physical principles.**

**Prepare the student for the MCAT and similar exams**

# ***Specific Objectives - I***

## ***Electricity (electric charge, electric energy, circuits)***

- Describe the actions of like and unlike charges near each other.
- Use Coulomb's law to find the force on a charge.
- Define electric field, field lines, and equipotential lines.
- Describe the relationship between electric potential and electric field.
- Find the stored charge and energy on one or more capacitors in a circuit.
- Describe the differences between an open circuit, closed circuit, and equivalent circuit.
- Identify batteries, resistors and capacitors in a circuit diagram.
- Use Ohm's law and Kirchhoff's rules to find unknown voltages or currents in a circuit.
- Define the relationships between current, voltage, and electrical power.
- Describe the behavior of a circuit with resistors and capacitors.

## ***Specific Objectives - II***

### ***Magnetism (magnetism, induction, alternating current, electromagnetic waves)***

- Describe the magnetic field around a magnetic dipole and a wire with current.
- Find the force on a charged particle moving in a magnetic field and electric field.
- Use Ampere's law to find the magnitude of a magnetic field.
- Describe the principles behind motors, generators, and transformers.
- Use Faraday's law and Lenz's law to find the induced emf and current in a wire.
- Identify inductors and ac power sources in a circuit diagram.
- Define reactance, impedance and resonance in an AC circuit.
- Identify the regions of the electromagnetic spectrum.
- Find the energy stored in an electromagnetic field.
- Describe polarization and its effect on intensity.

# ***Specific Objectives - III***

## ***Light (light waves, optics, interference relativity)***

- Define the relationship between light waves and rays.
- Identify the speed of light and its relation to the index of refraction.
- Use Snell's law and the laws of reflection to find the angle of a light ray due to refraction and reflection.
- Find the size and location of an image formed by a mirror or lens.
- Describe the principles behind compound optical instruments.
- Define refractive power in diopters and magnification.
- Find points of constructive and destructive interference.
- Describe the difference between interference and diffraction.
- Use the Lorentz factor to find the changes in measured time and distance.
- Apply special relativity to find energy and momentum.

# ***Specific Objectives - IV***

## ***Quantum Physics (photons, atoms, nuclei, subatomic particles)***

- Describe the photoelectric effect and the photon.
- Define the electron volt and Planck's constant.
- Use the Bohr model of the atom to find the energy of emitted and absorbed photons.
- Describe matter waves and the uncertainty principle and their application.
- Find the quantum numbers for electron shells in an atom.
- Define the relationship between mass number, atomic number, protons and neutrons in the nucleus.
- Identify common particles involved in radioactivity and nuclear reactions.
- Use half-life to find the activity due to radioactive decay.
- Describe nuclear fission and fusion.
- Identify the fundamental particles of the Standard Model.

# More Important Notices

- This is a tentative Syllabus which is subject to change whenever needed or required. **The grading scale and scheme will not change unless there's a typo.** You will be informed in class if any modifications are warranted.
- Syllabus and grading scheme is designed for students completing the full semester. Withdrawal grades may be calculated differently. Please consult with me before withdrawing.
- If dropping the course, please make sure you do so before the official deadline; otherwise, a WF or WP may be recorded on your transcripts (depending on your standing).

# Accessibility

*Northern Illinois University is committed to providing an accessible educational environment in collaboration with the Disability Resource Center (DRC). Any student requiring an academic accommodation due to a disability should let his or her faculty member know as soon as possible. Students who need academic accommodations based on the impact of a disability will be encouraged to contact the DRC if they have not done so already. The DRC is located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 (V) or [drc@niu.edu](mailto:drc@niu.edu).*

<https://www.niu.edu/disability/forms/syllabus-statement.shtml>

***I look forward to talking with you to learn how I may be helpful in enhancing your academic success in this course.***

# Academic Integrity

**Academic Integrity:** As detailed in the current NIU undergraduate catalog: *Good academic work must be based on honesty. The attempt of any student to present as his or her own work that which he or she has not produced is regarded by the faculty and administration as a serious offense. Students are considered to have cheated if they copy the work of another during an examination or turn in a paper or an assignment written, in whole or in part, by someone else. Students are responsible for plagiarism, intentional or not, if they copy material from books, magazines, or other sources without identifying and acknowledging those sources or if they paraphrase ideas from such sources without acknowledging them. Students responsible for, or assisting others in, either cheating or plagiarism on an assignment, quiz, or examination may receive a grade of F for the course involved and may be suspended or dismissed from the university.*

*A faculty member has original jurisdiction over any instances of academic misconduct that occur in a course which the faculty member is teaching. The student shall be given the opportunity to resolve the matter in meetings with the faculty member and the department chair. If the facts of the incident are not disputed by the student, the faculty member may elect to resolve the matter at that level by levying a sanction no greater than an F for that course. The faculty member shall notify the student in writing whenever such action is taken, and the **Office of Community Standards and Student Conduct** shall receive a copy of the Academic Misconduct Incident Report indicating final disposition of the case, which will be placed in the student's judicial file. In all matters where the charge of academic misconduct is disputed by the student or if the faculty member feels a sanction greater than an F in the course is appropriate (such as repeated offenses or flagrant violations), the faculty member shall refer the matter to the Office of Community Standards and Student Conduct making use of the Academic Misconduct Incident Report. Additional sanctions greater than an F in a course can be levied only through the University Judicial System. With regards to finding the student either responsible or not responsible for his or her action, the ruling of the Judicial Hearing Board shall be binding. In cases where there is either a finding of responsibility or an admission of responsibility by the student, any recommendations by the hearing board regarding the course grade are non-binding on the instructor, who remains solely responsible for assigning a course grade, consistent with the policies set forth in the course syllabus.*