

Syllabus for PHYS F212X FE1+FE2+FE4 – General Physics II
College of Natural Science and Mathematics
University of Alaska Fairbanks
Fall 2014 (9/4/2014 to 12/18/2014)

Course Information: **PHYS F212X FE1+FE2+FE4 (CRN 77549+77550+77552)**
Title: General Physics II – 4 credits (3+1)
Lectures: Monday, Wednesday, and Friday from 17:50 to 18:50
in room 201 Reichardt Building
Lab: FE1: Tuesday from 14:15 to 17:15 in room 257 Reichardt Building
FE2: Wednesday from 14:15 to 17:15 in room 257 Reichardt Building
FE4: Tuesday from 18:00 to 21:00 in room 257 Reichardt Building
Final exam: Wednesday, December 17, 17:45 to 19:45
Prerequisites: Concurrent enrollment in MATH F202X; PHYS F211X or ES F208 or
concurrent enrollment in ES F210; placement in ENGL F111X or
higher; or permission of instructor.

Instructor: **Dr. Chris Fallen, Research Assistant Professor,**
Space Physics and Aeronomy Group, Geophysical Institute,
Arctic Region Supercomputing Center
Office: Room 706A Elvey Building
Office Hours: MTWRF from 16:00 – 17:00
Or by appointment.
Please note: Office hours are when I commit time to be *accessible to students*. If you are unable to attend office hours in person, *please call or email to schedule an appointment*.
Phone: 907-347-6255 (cell phone)
907-450-8687 (office phone)
Email: ctfallen@alaska.edu

Required Texts (1): *Physics for Scientists and Engineers, 3rd ed., Addison-Wesley*
Knight, R. D.
ISBN: 9780321740908

Outside Resources:
Blackboard: <http://classes.uaf.edu> (Handouts, assignments, schedules, etc.)
Calculators, tutorials, examples
HyperPhysics: <http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html>
Microsoft Mathematics: <http://www.microsoft.com/en-us/download/details.aspx?id=15702>
Physics portal: <http://www.physics.org/>
Alternate texts: *Fundamentals of Physics* by Halliday, Resnick, and Walker
Physics, by Tipler

Course Description: Heat, temperature, laws of thermodynamics, Coulomb's Law, electrical potential, capacitance, Kirchoff's Laws, Biot-Savart Law, Faraday's Law, and electromagnetic waves. Physics 212X is for engineering, mathematics and physical science majors.

Course Objectives: Develop logical approaches to solve quantitative physics problems
Develop physical intuition and how to apply it
Develop abilities to work as a team in a laboratory environment
Develop hypothesis building abilities
Develop abilities to collect and analyze data from physics experiments
Discover and explain relationships between science and society

Instructional Methods: In-class lectures, quizzes, homework assignments, laboratory experiments and reports, and student written/oral presentations are closely integrated. Class activities emphasize a hands-on approach to developing problem solving skills and physical intuition. The written and oral project/presentation will explore the relationship between science and society.

Grading weights: (will use +/- grades)

Quizzes or other in-class exercises	15%
Weekly homework assignments	10%
Project	10%
Lab participation and reports	15%*
Midterm exam 1	15%
Midterm exam 2	15%
Final Exam	20%

Course Policies:

- *Attendance & active participation are required for all class lectures and laboratories.*
 - ***All labs and reports must be completed to earn a passing grade in lab.**
 - ***A passing grade in lab is required to earn a passing grade in the course.**
- A short quiz or in-class exercise will be assigned approximately once per week.
- Homework assignments will typically be assigned weekly and are due at the specified time.
- Late assignments will generally not be accepted for credit without prior approval from the instructor
- You are free and encouraged to ask questions of others and learn from your friends, but not to copy solutions. All work submitted by each student must be his/her own work except for designated group projects.
- The UAF student code of conduct applies to this course and plagiarism will not be tolerated. See review the UAF student code of conduct and plagiarism guide at the following links:
 - http://www.uaf.edu/catalog/current/academics/regs3.html#Student_Conduct
 - <http://library.uaf.edu/lis101-plagiarism>
- Two midterm exams and one final exam will be given during the term.
- UA email and Blackboard accounts are required to be active the first day of class.

Disabilities Services: The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodations to students with disabilities.

Note on the core natural science designator: PHYS F212X satisfies the Natural Science component of the UAF Core Curriculum. As such, this course will conform to the guidelines set by UAF Faculty Senate, excerpted below from <https://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/guidelines-for-core-desig/>

The goal of the Natural Science component of the Core Curriculum is to prepare students for lifelong learning in the natural sciences (biology, chemistry, earth science, physics). In order to achieve this goal, three objectives will be met:

1. Students will become familiar with the methods used for acquisition and expansion of scientific knowledge through laboratory/field exercises which deal with
 - a. data collection and analysis,
 - b. hypothesis building, and
 - c. experimentation.
2. Students will learn and use major concepts of natural science either by exploring in depth a single discipline or the conceptual relationship between at least two of the natural sciences. Although there are no well-defined criteria for identifying a "major concept" of natural science, the following are generally accepted examples: momentum and energy, electricity and magnetism, the atomic and nuclear nature of matter, equilibrium, the cellular basis of life, evolutionary theory, and plate tectonics.
3. Students will understand the relationships between science and society in terms of the historical context of modern science and the influence of science on contemporary issues. They will also study elements of public science policy and the methods by which it is developed.

Tentative Schedule

Week	Lab	Lab topic	Day	Date	Lecture	Lecture topic	Chapter	Notes
1	0	None	FRI	9/5/2014	1	Introduction, Temperature	16	
			MON	9/8/2014	2	Heat and the first law of thermodynamics	17	
2	1	Uncertainty	WED	9/10/2014	3	Heat and the first law of thermodynamics	17	
			FRI	9/12/2014	4	Ideal gasses	18	Deadline for adding classes
3	2	Ideal gas law	MON	9/15/2014	5	Ideal gasses	18	
			WED	9/17/2014	6	Entropy and the second law of thermodynamics	19	
			FRI	9/19/2014	7	Entropy and the second law of thermodynamics	19	Deadline for penalty-free withdraw
4	3	Latent Heat of Fusion	MON	9/22/2014	8	Entropy and the second law of thermodynamics	19	
			WED	9/24/2014	9	Electric charge and electrostatics	25	
			FRI	9/26/2014	10	Electric charge and electrostatics	25	
5	R&R	Recitation and Review	MON	9/29/2014	11	Electrostatic fields	26	
			WED	10/1/2014	12	Calculating electrostatic fields with Gauss's Law	27	
			FRI	10/3/2014	13	Calculating electrostatic fields with Gauss's Law	27	
6	4	Thermal Conductivity	MON	10/6/2014	14	Exam 1	16 - 19, 25-26	
			WED	10/8/2014	15	Electric potential	28	
			FRI	10/10/2014	16	Electric potential	28	Freshman progress reports due
7	5	Coulomb's Law	MON	10/13/2014	17	Electric potential	28	
			WED	10/15/2014	18	Capacitance	29	
			FRI	10/17/2014	19	Capacitance	29	
8	6	Mapping Equipotentials	MON	10/20/2014	20	Capacitance	29	
			WED	10/22/2014	21	Current and resistance	30	
			FRI	10/24/2014	22	Current and resistance	30	
9	7	Capacitance of Parallel Plates	MON	10/27/2014	23	DC circuits	31	
			WED	10/29/2014	24	DC circuits	31	
			FRI	10/31/2014	25	DC circuits	31	Deadline to withdraw with a 'W' grade
10	R&R	Recitation and Review	MON	11/3/2014	26	Magnetism	32	
			WED	11/5/2014	27	Magnetism	32	
			FRI	11/7/2014	28	Magnetism	32	
11	8	DC circuits	MON	11/10/2014	29	Exam 2	27 - 31	
			WED	11/12/2014	30	Magnetism	32	
			FRI	11/14/2014	31	Magnetic fields of moving charges	32	
12	9	Charge to mass ratio of electrons	MON	11/17/2014	32	Magnetic fields of moving charges	32	
			WED	11/19/2014	33	Magnetic fields of moving charges	32	
			FRI	11/21/2014	34	Induction and Inductance	33	
13	X	Make-up labs	MON	11/24/2014	35	Induction and Inductance	33	
			WED	11/26/2014	36	Induction and Inductance	33	
			FRI	11/28/2014	X	No Lecture - UAF holiday		
14	10	Current Balance	MON	12/1/2014	37	Electromagnetic fields and waves	34	
			WED	12/3/2014	38	Electromagnetic fields and waves	34	
			FRI	12/5/2014	39	AC circuits	35	
15	R&R	Recitation and Review	MON	12/8/2014	40	AC circuits	35	
			WED	12/10/2014	41	AC circuits	35	
			FRI	12/12/2014	42	Review or special topic		
16	Finals week		WED	12/17/2014	43	Final Exam 17:45 to 19:45 AKST		