

Syllabus for PHYS F212X FE1+FE2+FE4 – General Physics II
College of Natural Science and Mathematics
University of Alaska Fairbanks
Fall 2015 (9/4/2014 to 12/18/2014)

Course Information: **PHYS F212X FE1+FE2+FE4 (CRN 75481+75482+75484)**
Title: General Physics II – 4 credits (3+1)
Lectures: Monday, Wednesday, and Friday from 17:50 to 18:50
in room 201A 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: Friday, December 18, 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, Assistant Research Professor,**
Space Physics and Aeronomy Group, Geophysical Institute

Office: Room 706A Elvey Building
Office Hours: MTRF from 11:00 – 12:00
Or (preferably) by appointment.
Please note: Office hours are when I commit time to be *accessible to students*. Still, please call or email to schedule an appointment during or outside of office hours.
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, note that the final grade is a *weighted average*)

Quizzes or other in-class exercises	10%
Weekly homework assignments	15%
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
0	0	None	FRI	9/4/2015	1	Introduction, Temperature	16	
1	1	Uncertainty	MON	9/7/2015	X	No Lecture - UAF holiday	17	
			WED	9/9/2015	2	Heat and the first law of thermodynamics	17	
			FRI	9/11/2015	3	Heat and the first law of thermodynamics	17	Deadline for adding classes
2	2	Ideal gas law	MON	9/14/2015	4	Ideal gasses	18	
			WED	9/16/2015	5	Ideal gasses	18	
			FRI	9/18/2015	6	Ideal gasses	18	Deadline for penalty-free withdraw
3	3	Latent Heat of Fusion	MON	9/21/2015	7	Entropy and the second law of thermodynamics	19	
			WED	9/23/2015	8	Entropy and the second law of thermodynamics	19	
			FRI	9/25/2015	9	Entropy and the second law of thermodynamics	19	
4	4	Thermal Conductivity	MON	9/28/2015	10	Electric charge	25	
			WED	9/30/2015	11	Electric charge	25	
			FRI	10/2/2015	12	Electrostatic fields	26	
5	5	Coulomb's Law	MON	10/5/2015	13	Electrostatic fields	26	
			WED	10/7/2015	14	Gauss's law for calculating electrostatic fields	27	
			FRI	10/9/2015	15	Gauss's law for calculating electrostatic fields	27	Freshman progress reports due
6	R&R	Recitation and Review	MON	10/12/2015	16	Electric potential	28	
			WED	10/14/2015	17	Electric potential	28	
			FRI	10/16/2015	18	Exam 1	16 - 19, 25 - 27	
7	6	Mapping Equipotentials	MON	10/19/2015	19	Electric potential, fields, and capacitance	29	
			WED	10/21/2015	20	Electric potential, fields, and capacitance	29	
			FRI	10/23/2015	21	Electric potential, fields, and capacitance	29	
8	7	Capacitance of Parallel Plates	MON	10/26/2015	22	Current and resistance	30	
			WED	10/28/2015	23	Current and resistance	30	
			FRI	10/30/2015	24	Current and resistance	30	Deadline to withdraw with a 'W' grade
9	8	DC Circuits	MON	11/2/2015	25	DC circuits	31	
			WED	11/4/2015	26	DC circuits	31	
			FRI	11/6/2015	27	DC circuits	31	
10	9	Charge to mass ratio of electrons	MON	11/9/2015	28	Magnetism	32	
			WED	11/11/2015	29	Magnetism	32	
			FRI	11/13/2015	30	Magnetism	32	
11	R&R	Recitation and Review	MON	11/16/2015	31	Magnetic forces on moving charges	32	
			WED	11/18/2015	32	Magnetic forces on moving charges	32	
			FRI	11/20/2015	34	Exam 2	27 - 32	
12	X	No Labs	MON	11/23/2015	33	Induction and Inductance	33	
			WED	11/25/2015	34	Induction and Inductance	33	
			FRI	11/27/2015	X	No Lecture - UAF holiday		
13	10	Current Balance	MON	11/30/2015	35	Electromagnetic fields and waves	34	
			WED	12/2/2015	36	Electromagnetic fields and waves	34	
			FRI	12/4/2015	37	Electromagnetic fields and waves	34	
14	X	Make-up labs	MON	12/7/2015	38	AC circuits	35	
			WED	12/9/2015	39	AC circuits	35	
			FRI	12/11/2015	40	AC circuits	35	
15	15	Finals week	MON	12/14/2015	41	Review or catch up or special topic		
			WED	12/18/2015	42	Final Exam 17:45 to 19:45 AKST		
			FRI	12/18/2015	42	Final Exam 17:45 to 19:45 AKST		