

Syllabus for PHYS F211X FE1+FE2+FE3 – General Physics I
College of Natural Science and Mathematics
University of Alaska Fairbanks
Spring 2015 (1/15/2015 to 5/8/2015)

Course Information: **PHYS F211X FE1+FE2+FE3 (CRN 35927+35928+35929)**
Title: General Physics I – 4 credits (3+1)
Lectures: Monday, Wednesday, and Friday from 17:50 to 18:50
in room 202 Reichardt Building
Lab: FE1: Thursday from 18:00 to 21:00 in room 254 Reichardt Building
FE2: Tuesday from 14:15 to 17:15 in room 254 Reichardt Building
FE3: Thursday from 14:15 to 17:15 in room 254 Reichardt Building
Final exam: Thursday, May 7, 17:45 to 19:45
Prerequisites: Concurrent enrollment in MATH F201X; placement in ENGL F111X
or higher; or permission of instructor. Recommended: One year of
high school physics.

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 13:00 – 14:00 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.)

HyperPhysics: *Calculators, tutorials, examples*
<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/>
Supplemental texts: *Fundamentals of Physics* by Halliday, Resnick, and Walker
Physics, by Tipler

Course Description: Vectors, kinematics, Newton's Laws, momentum, work, energy, rotational motion, oscillations, waves, gravity and fluids. 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/ls101-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 F211X 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-designator/>

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	X	None	FRI	1/16/2015	1	Introduction, Concepts of motion	1	
			MON	1/19/2015	X	No Lecture - UAF holiday	X	
1	X	None	WED	1/21/2015	2	Concepts of Motion	1	
			FRI	1/23/2015	3	Concepts of Motion	1	Deadline for adding classes
			MON	1/26/2015	4	One-dimensional kinematics	2	
2	1	Uncertainty analysis	WED	1/28/2015	5	One-dimensional kinematics	2	
			FRI	1/30/2015	6	Vectors and coordinate systems	3	Deadline for penalty-free withdraw
			MON	2/2/2015	7	Vectors and coordinate systems	3	
3	2	Distance and velocity	WED	2/4/2015	8	Two-dimensional kinematics	4	
			FRI	2/6/2015	9	Two-dimensional kinematics	4	
			MON	2/9/2015	10	Two-dimensional kinematics	4	
4	3	Acceleration and force	WED	2/11/2015	11	Force and motion	5	
			FRI	2/13/2015	12	Force and motion	5	Freshman progress reports due
			MON	2/16/2015	13	One-dimensional dynamics	6	
5	X	Recitation and Review	WED	2/18/2015	14	Review and catch-up / 1D dynamics	6	
			FRI	2/20/2015	15	Exam 1	1 - 5	
			MON	2/23/2015	16	One-dimensional dynamics	6	
6	4	Simple machines	WED	2/25/2015	17	Motion of interacting objects	7	
			FRI	2/27/2015	18	Motion of interacting objects	7	
			MON	3/2/2015	19	Two-dimensional dynamics	8	
7	5	Conservation of mechanical energy	WED	3/4/2015	20	Two-dimensional dynamics	8	
			FRI	3/6/2015	21	Impulse and momentum	9	
			MON	3/9/2015	22	Impulse and momentum	9	
8	6	Conservation of momentum	WED	3/11/2015	23	Impulse and momentum	9	
			FRI	3/13/2015	24	Energy	10	Deadline to withdraw with a 'W' grade
			MON	3/16/2015	X	No Lecture - UAF holiday	X	
9	X	Spring Break	WED	3/18/2015	X	No Lecture - UAF holiday	X	
			FRI	3/20/2015	X	No Lecture - UAF holiday	X	
			MON	3/23/2015	25	Energy	10	
10	7	Ballistic pendulum	WED	3/25/2015	26	Energy	10	
			FRI	3/27/2015	27	Work	11	
			MON	3/30/2015	28	Work	11	
11	X	Recitation and Review	WED	4/1/2015	29	Review and catch-up / Work	11	
			FRI	4/3/2015	30	Exam 2	6 - 10	
			MON	4/6/2015	31	Work	11	
12	8	Torque	WED	4/8/2015	32	Rotational motion	12	
			FRI	4/10/2015	33	Rotational motion	12	
			MON	4/13/2015	34	Gravity	13	
13	9	Harmonic motion and resonance	WED	4/15/2015	35	Gravity	13	
			FRI	4/17/2015	36	Oscillatory motion	14	
			MON	4/20/2015	37	Oscillatory motion	14	
14	10	The speed of sound in air	WED	4/22/2015	38	Fluids	15	
			FRI	4/24/2015	X	No Lecture - UAF holiday	X	
			MON	4/27/2015	39	Fluids	15	
15	X	Make-up labs	WED	4/29/2015	40	Waves	20	
			FRI	5/1/2015	41	Waves	20	
16		Finals week	THU	5/7/2015		Final Exam 17:45 to 19:45 AKDT		