Physics 413: "Mechanics, Electricity and Magnetism"

Instructor: Prof. Stephanie Majewski – smajewsk@uoregon.edu
Office Hours (402 Willamette): Thursdays 2:30-3:30pm, or by appointment

GTF Contact Information and Office Hours:
James Sartor, jsartor7@uoregon.edu, Fridays 3:30-4:30pm in 147 WIL
Rebecka Tumblin, rtumblin@uoregon.edu
Tutorial session A: Thursdays 11:00-11:50am in 147 WIL
Tutorial session B: Thursdays 2:00-2:50pm in 147 WIL
Abby Pauls, aapauls@uoregon.edu, Fridays 1-2pm in 147 WIL

Course (CRN 25564):
Lectures: MWF 11:00-11:50am in B040 Price Science Commons
Required Materials
Textbook: David J. Griffiths, Introduction to Electrodynamics, 4th ed. (2013)
iClicker: available at the Duck store, will be used every lecture
Prerequisite: Physics 412

Overview: This course is the second term of a three-term sequence of classical electromagnetism. You will use the tools of vector calculus to solve for the static and dynamic properties of electromagnetic fields. PHYS 413 includes time-independent current distributions (magnetostatics), magnetic properties of matter, and initial coverage of fully time-dependent problems (Maxwell's equations, continued in PHYS 422).

Course Learning Goals:
1. Content and mathematical skill mastery, including:
   a) The ability to translate a physical description in an electromagnetism problem to the mathematical equation(s) necessary to solve the problem.
   b) The ability to explain the physical meaning of the mathematical formulation of and solution to electromagnetism problems.
   c) The ability to achieve physical insight through the mathematics of a problem.
   d) The ability to visualize physical parameters (e.g., E/B fields, charge distributions, polarization).
2. Organization of knowledge and ability to make connections / links between different concepts.
3. The ability to justify and explain an approach to a problem or physical situation.
4. Development of specific problem-solving techniques such as use of approximations, series expansions, symmetries, integration, and superposition.
5. The ability to draw upon organized content knowledge and apply problem-solving techniques to that knowledge in order to carry out long analyses of physical problems, including connecting the pieces of the problem to reach the solution and persistence in working toward the solution even though the path may be unclear.

Reading: *is an essential part of PHYS 413!*
Reading the text before class is very important. The purpose of lecture is to clarify your understanding, to help you make sense of the material. I will assume you have done the required readings in advance! Griffiths is one of the best (and most readable) texts I know of - it will make a huge difference if you carefully read and follow the text.
Pre-flights will be given once/week on canvas, based on the reading assignment.

Classroom Etiquette:
Please turn off all cell phones and pagers when entering any classroom. Please do not throw vegetables at the instructor. Private chatter during lecture is very distracting, but it is perfectly OK to interrupt the lecture by raising your hand to ask a question. Questions in lecture are always good, and are strongly encouraged! **iClickers** will be used in class to enhance classroom interaction and award participation points.

Homework:
There will be a homework due every Monday (except exam weeks) at the *start* of class. Late homework cannot be accepted once solutions are posted. Your lowest homework score will be dropped. Homework is exceedingly important for developing an understanding of the course material, not to mention building skills in complex physical and mathematical problem solving. Homework problems will require considerable time and personal effort this term! Students who didn't attend the homework help sessions often performed poorly in the course. Most students reported spending a minimum of 10 hours per week on the homework (!!), but reported learning a tremendous amount in this course.

I strongly encourage collaboration, an essential skill in science and engineering (and highly valued by employers!). Social interactions are critical to scientists' success. Most good ideas grow out of discussions with colleagues, and essentially all physicists work as part of a group. Find partners and work on homework together. However, it is also important that you OWN the material. I strongly suggest you start homework by yourself (and that means really making an extended effort on every problem) Then work with a group, and finally, finish up on your own - write up your own work, in your own way. There will also be time for peer discussion during classes - as you work together, try to help your partners get over confusions, listen to them, ask each other questions, critique, teach each other. You will learn a lot this way!
Note: While collaboration is the rule in technical work, evaluations of individuals also play an important role. Exams will be done without help from others. For all assignments, the work you turn in must in the end be your own: in your own words, reflecting your own understanding.
[If, at any time, you feel isolated, contact me and I can discreetly try to help arrange study groups.]

Help/Tutorial Sessions:
Help sessions/office hours are to facilitate your learning. We encourage attendance - plan on working in small groups, our role will be as learning coaches. Tutorial sessions may involve special problems and activities designed to help you understand current

material, and set you up for the upcoming homework. These will be held on Thursdays, as listed above.

Course grade:

Homework (due Mondays):	35%
Clicker participation & Pre-flights:	10%
Exam 1 (in class):	15%
Exam 2 (in class):	15%
Final Exam:	25%

Exams:
There will be no makeup exams. *You may not miss any exam* except for reasons beyond your control, approved by Prof. Majewski (usually a confirmed medical issue with written documentation).

Final Grade:

A	90% to 100%
B	80% to 90%
C	70% to 80%
D	60% to 70%
F	lower than 60%

Course Website:
At https://canvas.uoregon.edu you may login and access course documents such as this syllabus. In addition, you may view announcements, course materials including preflights and homework assignments, and your grades at any time.

Student Conduct:
Mutual respect in class is paramount. Academic dishonesty, including cheating, fabrication, facilitating academic dishonesty, and plagiarism, devalues the reputation of our institution, its faculty, its students, and the degrees we offer**. Moreover, academic misconduct is particularly unfair for the students who do their work with integrity and honor. Violations of the student conduct code result in the incident being included on your student conduct record and can result in a failing grade on any course work related to the violation or a failing grade in the course.

Every effort will be made in this class to deter dishonesty through classroom procedures. **Suspected academic dishonesty will be reported.**
**For a list of other descriptions of cheating, see the Student Conduct Code.

Special Accommodations:
The AEC (Accessible Education Center) exists to help students achieve access to educational resources. If you have a disability but are not registered with AEC, you should contact them as soon as possible (http://aec.uoregon.edu). If you anticipate needing special accommodation in Phys 413 please contact me *as soon as possible* so we may discuss your situation.

Physics 413 - *Tentative* Course Schedule

Week 1	M	Jan	8	Lecture - Griffiths 5.1
	W	Jan	10	Lecture - Griffiths 5.1-5.2
	F	Jan	12	Lecture - Griffiths 5.2, cont.
Week 2	M	Jan	15	**No Lecture - MLK Holiday**
	W	Jan	17	Lecture - Griffiths 5.3 [HW #1 Due]
	F	Jan	19	Lecture - Griffiths 5.3, cont.
Week 3	M	Jan	22	Lecture - Griffiths 5.4 [HW #2 Due]
	W	Jan	24	Lecture - Griffiths 5.4, cont.
	F	Jan	26	Lecture - Griffiths 5.4, cont.
Week 4	M	Jan	29	Lecture - Griffiths 5.4, cont. [HW #3 Due]
	W	Jan	31	Lecture - Review for Exam 1
	F	Feb	2	**Exam 1 (in class)**
Week 5	M	Feb	5	Lecture - Griffiths 6.1
	W	Feb	7	Lecture - Griffiths 6.1-6.2
	F	Feb	9	Lecture - Griffiths 6.2, cont.
Week 6	M	Feb	12	Lecture - Griffiths 6.3 [HW #4 Due]
	W	Feb	14	Lecture - Griffiths 6.3-6.4
	F	Feb	16	Lecture - Griffiths 6.4, cont.
Week 7	M	Feb	19	Lecture - Griffiths 7.1 [HW #5 Due]
	W	Feb	21	Lecture - Griffiths 7.1-7.2
	F	Feb	23	Lecture - Review for Exam 2
Week 8	M	Feb	26	**Exam 2 (in class)**
	W	Feb	28	Lecture - Griffiths 7.2, cont.
	F	Mar	2	Lecture - Griffiths 7.2, cont.
Week 9	M	Mar	5	Lecture - Griffiths 7.3 [HW #6 Due]
	W	Mar	7	Lecture - Griffiths 7.3, cont.
	F	Mar	9	Lecture - Griffiths 8.1
Week 10	M	Mar	12	Lecture - Griffiths 8.2 [HW #7 Due]
	W	Mar	14	Lecture - Griffiths 8.3
	F	Mar	16	Lecture - Review for Final Exam
Week 11	**F**	**Mar**	**23**	**Final Exam at 10:15am**

The given schedule is tentative; changes will be discussed in class and posted online.

Important Dates: (**academic calendar**)

Jan 15th	Last day to drop without a “W”
Jan 17th	Last day to add a class
Feb 25th	Last day to withdraw (drop with a “W”) or change grading option to P/N