Physics 430 – Electricity and Magnetism

Spring 2016

COURSE MEETING TIME AND PLACE:

Meeting Time	Location
MoWeFr 1:00 – 1:50 pm	Schmucker Science North 191

INSTRUCTOR INFORMATION:

Dr. Shawn H. Pfeil
e-mail: spfeil@wcupa.edu (please include course in subject line)
phone: (610) 430-4084
office: Schmucker Science South 229

OFFICE HOURS:

My scheduled office hours as of the first day of class are listed below. I reserve the right to adjust this schedule to reflect unforeseen circumstances. Please note homework assignments are due Monday at the start of class.

Monday	Wednesday	Friday
11 am - 12 pm	11 am - 12 pm	11 am - 12 pm 2 pm – 4 pm

Office *hours are available by appointment for students with an ongoing conflict with my scheduled hours.*

REQUIRED COURSE MATERIALS:

Introduction to Electrodynamics 4th ed., David J. Griffiths (ISBN-10, 0-321-85656-2)

COURSE DESCRIPTION:

Physics 430 serves several functions in the undergraduate curriculum. The first is to cover electricity and magnetism at the level used on a day-to-day basis by working physicists. Topics include the electric field, Coulomb's Law, Gauss' Law, electric potential, conductors, capacitors, polarization, dielectrics, Lorentz Force Law, Biot-Savart Law, Ampere's Law, magnetization, and ferromagnetism. The second is to serve as an example of a classical field theory.

Field theories require a certain level of mathematical sophistication to appreciate and use. With this in mind, the third function of PHY430 in the curriculum is to review or develop the mathematical tools required. Topics will include a review of differential and integral calculus, curvilinear coordinates, the Dirac Delta function, vector fields, Laplace's Equation, the method of images, separation of variables, and multipole expansion.

This is a challenging course. Please make sure to set aside an appropriate amount of time (as outlined below). You will need to be time efficient. Please do not hesitate to ask me, other faculty members, or peers for help.

LEARNING OUTCOMES:

Physics 430 fulfills the goal of students understanding the concepts and principles of physics as outlined in the departments program assessment. In particular, PHY430 students are expected to obtain the following learning outcomes:

- Students will demonstrate the ability to apply Gauss's Law, Faraday's Law, and Ampere's law to a wide range of physical situations.
- Students will demonstrate an ability to explain energy conversion and conservation in the context of electrodynamics.
- Students will demonstrate an ability to interpret the behavior of matter in electric and magnetic fields.
- Students will be able to explain the rational for and apply special techniques in vector analysis.

- Students will demonstrate an ability synthesize Gauss's Law, Faraday's Law, and Ampere's law to derive Maxwell's equations.

Course objectives will be achieved via solving and understanding problems sets. Outcomes will be assessed via in class exams and discussions.

TIME COMMITMENT AND WORK FLOW:

The life of a college student is not easy. A full time student can expect to spend about 50 hrs per week on coursework, or about 12.5 hrs per week per course. Because PHY430 is a 400 level course I expect that you will have to spend slightly more time than this average.

Activity	Time Commitment
Reading Prior to Class	3 hrs/week
Class	3 hrs/week
Post Lecture Study	1.5 hrs/week
Homework After Lecture	6 hrs/week
Total Time Spent	13.5 hrs/week

COURSE ELEMENTS:

- **Pre-Class Reading:** You must read the assigned reading prior to class. Due to the pace of the course, we must focus our time in lecture on more challenging concepts. You are responsible for coming prepared.
- **Lecture:** Lots of questions are encouraged. This will be as informal as possible.
- **Problem Sets:** A problem set will be posted on D2L for each class meeting. (Problem sets for the previous week are due as a packet on Mondays.)

GRADING:

Component	**Percentage**
Regular Exams	60% (three exams @ 20%)
Final Exam	25%
Problem Sets	15%

- **Regular Exams**: Three exams spaced through-out the semester. No exam scores will be dropped.
- **Final Exam**: The final exam is cumulative and will occur in class on **Friday, May 4th from 1-3 pm**.
- **Problem Sets**: Problem sets will be collected every Monday at the start of class. Working with your peers is strongly encouraged; however any work turned in must be in your own words and represent **your** understanding of the material. Under no circumstances is it acceptable to represent someone else's work as your own.

We will be using the official WCU scale for grades, see p.48 in the undergraduate catalog. However, I reserve the right to adjust the weights of individual components, or the scale to account for unforeseen circumstances.

COURSE POLICIES

Below is a listing of established course policies. Please check this list first if you have a question. If your concern is not addressed by the list below, please see me in person.

EXAM POLICY

No make-up exams will be given. If you feel you must miss an exam for a University Sanctioned Event or health related reason contact me **in advance.**

ELECTRONIC DEVICE POLICY:
The pace of the course is such that your undivided attention will be required for the entire lecture and lab period. Please set all electronics to silent or "vibrate mode" and put them away. Both you and your neighbors will be able to concentrate on the material at hand. ***If you are using a device to record lecture, please see the intellectual property statement below.***

D2L:
D2L will be used to post problem sets, grades, and announcements. Please make sure to check D2L periodically or enable it to push announcements via e-mail.

ATTENDANCE POLICY:

I do not grade on attendance but it is crucial to success in class.

DISABILITY STATEMENT:
If you have a disability that requires accommodations under the Americans with Disabilities Act (ADA), please present your letter of accommodations and meet with me as soon as possible so that I can support your success in an informed manner. Accommodations cannot be granted retroactively. If you would like to know more about West Chester University's Services for Students with Disabilities(OSSD), please contact the OSSD which is located at 223 Lawrence Center. The OSSD hours of Operation are Monday – Friday 8:30 a.m.–4:30 p.m. Their phone number is 610-436-2564, their fax number is 610-436-2600, their email address is ossd@wcupa.edu, and their website is at www.wcupa.edu/ussss/ossd.

ELECTRONIC COMMUNICATIONS STATEMENT:
It is expected that faculty, staff, and students activate and maintain regular access to University provided e-mail accounts. Official university communications, including those from your instructor, will be sent through your university e-mail account. You are responsible for accessing that mail to be sure to obtain official University communications. Failure to access will not exempt individuals from the responsibilities associated with this course.

UNIVERSITY SANCTIONED EVENTS:
If you will be participating in a University sanctioned event during class or an exam **you must notify me in advance.** Please see the discussion of University Sanctioned Events in the general catalog.

INTELLECTUAL PROPERTY STATEMENT:
I, the instructor, utilize copyrighted materials under the "Freedom and Innovation Revitalizing the United States Entrepreneurship Act of 2007" (Fair Use Act). Apart from such copyrighted materials, all other intellectual property associated with this course is owned and copyrighted by the instructor, including, but not limited to, lectures, course discussions, course notes, slides, assessment instruments such as exams, and supplementary materials posted or provided to students authored by the instructor. No recording, copying, storage in a retrieval system, or dissemination in any form by any means of the intellectual property of the instructor, in whole or in part, is permitted without prior written permission of the instructor. When such permission is granted, it must specify the utilization of the intellectual property and all such permissions and waivers shall terminate on the last day of finals of the semester in which this course is held.

ACADEMIC INTEGRITY & CONDUCT
I have a zero tolerance policy for breaches of academic integrity. Breaches of academic integrity will be investigated and sanctions imposed to the full extent available under University policy. For questions regarding the university Academic Dishonesty, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to their major department's handbook, the Undergraduate Course Catalogue, the Rams Eye View, or the University Web Site. Please understand that improper conduct in any of these areas will not be tolerated and may result in immediate ejection from the class.

ALL OTHER ACADEMIC POLICIES
For any university wide academic policy not explicitly covered in this document, such as No Grade policies. Please consult your major advising handbook, the Undergraduate Catalog, the Ram's Eye View, or the University Website.

PUBLIC SAFETY
The Emergency Communications Committee recommends that the number of WCU's Department of public safety be available on every course syllabi. WCU Department of Public Safety: (610) 436-3311.

COURSE SCHEDULE: Please note schedule is subject to change..

Date	Day	#	Topic	Reading
01/20	W	1	Vector Analysis	1.1
01/22	F	2	Vector Analysis	1.2
01/25	M	3	Vector Analysis	1.3
01/27	W	4	Vector Analysis	1.4
01/29	F	5	Vector Analysis	1.5,1.6
02/01	M	6	Electrostatics	2.1
02/03	W	7	Electrostatics	2.2
02/05	F	8	Electrostatics	2.2
02/08	M	9	Electrostatics	2.3
02/10	W	10	Electrostatics	2.4
02/12	F	11	Electrostatics	2.5
02/15	M	12	Special Techniques	3.1
02/17	W	13	Special Techniques	3.2
02/19	F	14	Special Techniques	3.3
02/22	M		**Exam 1: Chapter 1 & 2**	
02/24	W	15	Special Techniques	3.3
02/26	F	16	Special Techniques	3.4
02/29	M	17	Special Techniques	3.4
03/02	W	18	Electric Fields in Matter	4.1
03/04	F	19	Electric Fields in Matter	4.2
03/07-03/11	MWF		**SPRING BREAK 03/07-03/11**	
03/14	M	20	Electric Fields in Matter	4.3
03/16	W	21	Electric Fields in Matter	4.4
03/18	F	22	Magnetostatics	5.1
03/21	M	23	Magnetostatics	5.2
03/23	W	24	Magnetostatics	5.2
03/25	F	25	Magnetostatics	5.3
03/28	M		**Exam 2: Chapter 3 & 4**	
03/30	W	26	Magnetostatics	5.3
04/01	F	27	Magnetostatics	5.4
04/04	M	28	Magnetostatics	5.4
04/06	W	29	Magnetic Fields in Matter	6.1
04/08	F	30	Magnetic Fields in Matter	6.2
04/11	M	31	Magnetic Fields in Matter	6.3
04/13	W	32	Magnetic Fields in Matter	6.4
04/15	F	33	Electromotive Force	7.1
04/18	M	34	Electromagnetic Induction	7.2
04/20	W		**Exam 3: Chapter 5 & 6**	
04/22	F	35	Electromagnetic Induction	7.2
04/25	M	36	Maxwell's Equations	7.3
04/27	W	37	Maxwell's Equations	7.3
04/29	F		SnowDay	
05/01	M		SnowDay	