2019 SPRING – PHYS 4202/6202 Electricity and Magnetism II (as of Jan. 09/2019)

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

Course Description:	**Topics include Maxwell's equations, electromagnetic radiation, the theory of electromagnetic fields in matter, and Einstein's special theory of relativity*.** ***If time permits, which is unlikely**
Additional info:	This course is an upper-level physics course dealing with the basics of electrodynamics theory. This is a two-semester course and PHYS 4202 is the second part that deals primarily with magnetic fields in matter and time-varying electric and magnetic fields. I assume you have at least two years of Calculus and PHYS 3700 and PHYS 3900 as part of your background.
Athena Title:	ELEC & MAGNET II
Prerequisite:	PHYS 4201/6201
Grading System:	A-F (Traditional)
Instructor:	Dr. Andrei Galiautdinov
Office:	220
Emailing Policy:	Before emailing, make sure you read and understood this syllabus in its entirety. I will not respond to your inquiry if the question you are asking had already been answered here. ag@physast.uga.edu
Sections:	**27333/27337** 11:15a – 12:05p MWF
Office hours:	12:05p – 01:05p MW
E-journals access:	*http://www.libs.uga.edu/ejournals/*
Academic Honesty:	*As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty," and the Student Honor Code. All academic work must meet the standards described in "A Culture of Honesty" found at: www.uga.edu/honesty. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.*
In-class rules:	➢ No laptops, pagers, cellphones, iPads, iPods, or any other electronic/communication devices are permitted in the classroom. ➢ If you are late for class, you must enter in the back of the room.
Attendance:	**Mandatory**
Text:	D.J. Griffiths, *Introduction to Electrodynamics*, 4th Edition (Pearson, 2013)
Instructional style:	Q&A concept discussion, Q&A problem-solving techniques, etc.
Homework rules:	You may work with others in the class on the homework, but, if you choose to do so, you must write on the homework who you worked with. There is no penalty for working with others, but I will assign the same exact grade to all the people who worked on the problems together. 1. By 3:00 p.m. on the day prior to the corresponding meetings (typically, on a Sunday), submit by email your pre-class hand-written notes and five (5) questions you'd like to be answered in class. 2. At 11:15 a.m. at start of class, submit your problem-solving HMWK. No late submission allowed.
Homework grading method:	One HMWK problem chosen at random.
Exam rules:	Closed books, closed notes. Non-graphing, nonprogrammable scientific calculator. Must work individually.
Grading policy:	**-1% for each ABSENCE** **10% Pre-class notes** **5% Questions (5 per submission)** **25% HMWK** (must be submitted on time, no make-ups) **20% EXAM 1** (no make-ups) **20% EXAM 2** (no make-ups) **20% FINAL EXAM** (mandatory, no make-ups)

	NOTE: Our departmental policy prohibits rescheduling of missed exams (regardless of the reason, be it a court appearance, immigration, medical, family, sporting, or any other type of emergency). The final exam will replace your worst midterm if it is better (say, if you got a zero for non-attendance). That replacement will not be visible on the eLC. Your overall grade will become available on Athena after the corresponding deadline. Use Excel to calculate your overall grade with the help of the formula below. Email me only if you strongly believe there was a mistake in my calculation. Do not ask for a bump-up, a curve, or any extra credit. Make sure to include your class and section number.
Cut-offs:	F: [0, 60) D: [60, 68) C-: [68, 70) C: [70, 75) C+: [75, 78) B-: [78, 80) B: [80, 85) B+: [85, 88) A-: [88, 90) A: [90, 100] *NOTE: No rounding; 89.99 = A-, etc.*
Grades:	Your grades will be posted on the eLC-New, http://elcnew.uga.edu

2019 SPRING Schedule (preliminary, including the number of the homework assignments; likely subject to change/adjustment):

Week	Day	Date	Reading	Topic
	W	Jan. 09		Intro to this course (syllabus, course structure, etc.) **Ch. 0: Review of E&M I** Maxwell's Equations (in a vacuum, static/stationary)
	R	Jan. 10		
	F	Jan. 11		Electric field in matter (conductors vs. dielectrics) Magnetic field in matter (magnetics: a look ahead) Maxwell's Equations (in matter, static/stationary) Boundary conditions for the ***E***- and ***D***-fields Maxwell's Equations (in a vacuum, time-dependent: a look ahead) Charge conservation and the continuity equation Maxwell's Equations (in matter, time-dependent: a look ahead)
1	M	Jan. 14	5.4.2	**Ch. 5: Magnetostatics (cont.)** Boundary conditions (for the *B*-field)
	T	Jan. 15		**D r o p/A d d e n d s**
	W	Jan. 16	5.4.3	Multipole expansion of the vector potential **3:00pm (Wednesday, this time only) – Ch. 6 Notes& Questions Due**
	R	Jan. 17		
	F	Jan. 18	6.1 6.2	**Ch. 6: Magnetic field in matter** Magnetization The field of a magnetized object
	M	Jan. 21		M L K D a y
	T	Jan. 22		
2	W	Jan. 23	6.3	**11:15am – HMWK 01 Due** The auxiliary field ***H*** (Ampere's Law in magnetized materials, A deceptive parallel, Boundary conditions)
	R	Jan. 24		
	F	Jan. 25	6.4	Linear and nonlinear media (Magnetic susceptibility and permeability, Ferromagnetism) **3:00pm (Sunday) – Secs. 7.1, 7.2 Notes& Questions Due**

3	M	Jan. 28	7.1.1 7.1.2 7.1.3	**Ch. 7: Electrodynamics** Ohm's Law Electromotive force Motional emf
	T	Jan. 29		
	W	Jan. 30	7.2.1 7.2.2	**11:15am – HMWK 02 Due** Faraday's Law of Induction The induced electric field
	R	Jan. 31		
	F	Feb. 01	7.2.3 7.2.4	Inductance Energy in magnetic field **3:00pm (Sunday) – Secs. 7.3 Notes& Questions Due**
4	M	Feb. 04	7.3.1 7.3.2	Electrodynamics before Maxwell Maxwell's correction (How Maxwell fixed Ampere's Law)
	T	Feb. 05		
	W	Feb. 06	7.3.3	**11:15am – HMWK 03 Due** Maxwell's equations (in a vacuum)
	R	Feb. 07		
	F	Feb. 08	7.3.5 7.3.6	Maxwell's equations in matter Boundary conditions
5	**M**	**Feb. 11**		**EXAM 1**
	T	Feb. 12		
	W	Feb. 13	8.1.1	**Ch. 8: Energy conservation in electrodynamics** The continuity equation
	R	Feb. 14		
	F	Feb. 15	8.1.2	Poynting's Theorem (in a vacuum)
6	M	Feb. 18	8.1.2	Poynting's Theorem (in a vacuum; cont.) Examples
	T	Feb. 19		
	W	Feb. 20	8.1.2	Poynting's Theorem (in matter)
	R	Feb. 21		
	F	Feb. 22		**3:00pm (Sunday) – Sec. 9.1 Notes& Questions Due**
7	M	Feb. 25	9.1.1 9.1.2	**Ch. 9: Electromagnetic waves** Waves in 1D: The Wave Equation Waves in 1D: Sinusoidal waves
	T	Feb. 26		
	W	Feb. 27	9.1.3	**11:15am – HMWK 04 Due** Waves in 1D: Boundary conditions (reflection and transmission)
	R	Feb. 28		
	F	Mar. 01	9.1.4	Waves in 3D: Polarization **3:00pm (Sunday) – Sec. 9.2 Notes& Questions Due**
8	M	Mar. 04	9.2.1	EMW: The Wave Equation for ***E*** and ***B***
	T	Mar. 05		
	W	Mar. 06	9.2.2	**11:15am – HMWK 05 Due** EMW: Monochromatic plane wave
	R	Mar. 07		
	F	Mar. 08	9.2.3	EMW: Energy and momentum
9	M	Mar. 11		
	T	Mar. 12		
	W	Mar. 13		S p r i n g B r e a k

	R	Mar. 14		
	F	Mar. 15		**3:00pm (Sunday) – Sec. 9.3 Notes& Questions Due**
10	M	Mar. 18	9.3.1	EMW in Matter: Propagation in linear media
	T	Mar. 19		
	W	Mar. 20	9.3.2	**11:15am – HMWK 06 Due** EMW in Matter: Reflection and transmission at normal incidence
	R	Mar. 21		**W i t h d r a w a l d e a d l i n e**
	F	Mar. 22	9.3.3	EMW in Matter: Reflection and transmission at oblique incidence **3:00pm (Sunday) – Sec. 9.4 Notes& Questions Due**
11	M	Mar. 25	9.4.1	EMW in Matter: Electromagnetic waves in conductors
	T	Mar. 26		
	W	Mar. 27	9.4.2	EMW in Matter: Reflection at a conducting surface
	R	Mar. 28		
	F	Mar. 29	9.4.3	EMW in Matter: The frequency dependence of permittivity
12	M	Apr. 01	9.4.3	EMW in Matter: The frequency dependence of permittivity (cont.)
	T	Apr. 02		
	W	Apr. 03		**11:15am – HMWK 07 Due**
	R	Apr. 04		
	F	**Apr. 05**		**EXAM 2**
13	M	Apr. 08	10.1.1	**Ch. 10: Potentials and Fields** Scalar and vector potentials
	T	Apr. 09		
	W	Apr. 10	10.1.2 10.1.3	Gauge transformations Coulomb gauge and Lorenz gauge
	R	Apr. 11		
	F	Apr. 12	10.1.4	Lorentz force law in potential form **3:00pm (Sunday) – Secs. 10.2, 10.3 Notes& Questions Due**
14	M	Apr. 15	10.2.1	Retarded potentials
	T	Apr. 16		
	W	Apr. 17	10.3.1	Lienard-Wiechert potentials
	R	Apr. 18		
	F	Apr. 19	10.3.1	Lienard-Wiechert potentials (cont.)
15	M	Apr. 22	10.3.2	The fields of a moving point charge
	T	Apr. 23		
	W	Apr. 24	10.3.2	**11:15am – HMWK 08 Due** The fields of a moving point charge (cont.)
	R	Apr. 25		
	F	Apr. 26	10.3.2	The fields of a moving point charge (cont.)
16	M	Apr. 29		TBD
	T	**Apr. 30**		**C l a s s e s E n d**
	W	May 01		**R e a d i n g D a y**
	R	May 02		
	F	May 03		
17	**M**	**May 06**		**FINAL EXAM: 12:00pm – 03:00pm**
	T	May 07		
	W	May 08		
	R	May 09		
	F	May 10		Commencement
18	**M**	**May 13**		**Grades due (5 PM)**
	T	May 14		
	W	May 15		
	R	May 16		

	F	May 17		
19	M	May 20		
	T	May 21		

Spring Semester 2019
Based on 50 minutes classes (MWF), 75 minutes classes (TTH), 15 weeks of classes + Exams

Orientation/Advisement	January 7	Monday
Registration	January 8	Tuesday
Classes Begin	January 9	Wednesday
Drop/Add	January 9-15	Wednesday - Tuesday
Holiday: Martin Luther King Jr. Day	January 21	Monday
Midterm	March 1	Friday
Last Day of Classes Prior to Spring Break	March 8	Friday
Spring Break - No Classes	March 11-15	Monday – Friday
Classes Resume	March 18	Monday
Withdrawal Deadline	March 21	Thursday
Classes End	April 30	Tuesday
Reading Day	May 1	Wednesday
Final Exams	May 2-8	Thursday - Wednesday
Commencement	May 10	Friday
Grades Due	May 13	Monday, 12:00 PM

Spring 2019 – Regular Final Exam Schedule

Monday/Wednesday/Friday Classes		**Tuesday/Thursday Classes**	
Meeting Time	**Exam**	**Meeting Time**	**Exam**
8:00 am	Mon., May 6 8:00 - 11:00 am	8:00 am	Thur., May 2 8:00 - 11:00 am
9:05 am	Wed., May 8 8:00 - 11:00 am	9:30 am	Tues., May 7 8:00 - 11:00 am
10:10 am	Fri., May 3 8:00 - 11:00 am	11:00 am	Thur., May 2 12:00 - 3:00 pm
11:15 am	**Mon., May 6 12:00 - 3:00 pm**	12:30 pm	Tues., May 7 12:00 - 3:00 pm
12:20 pm	Wed., May 8 12:00 - 3:00 pm	2:00 pm	Thur., May 2 3:30 - 6:30 pm
1:25 pm	Fri., May 3 12:00 - 3:00 pm	3:30 pm	Tues., May 7 3:30 - 6:30 pm

Monday/Wednesday/Friday Classes		Tuesday/Thursday Classes	
Meeting Time	**Exam**	**Meeting Time**	**Exam**
2:30 pm	Mon., May 6 3:30 - 6:30 pm	5:00 pm	Mon., May 6 7:00 - 10:00 pm
3:35 pm	Wed., May 8 3:30 – 6:30 pm	6:30 pm	Wed., May 8 7:00 - 10:00 pm
4:40 pm	Fri., May 3 3:30 - 6:30 pm	8:00 pm	Mon., May 6 7:00 - 10:00 pm
5:45 pm	Fri., May 3 7:00 - 10:00 pm	9:30 pm	Wed., May 8 7:00 - 10:00 pm
6:50 pm	Tues., May 7 7:00 - 10:00 pm		
7:55 pm	Tues., May 7 7:00 - 10:00 pm		
9:00 pm	Thur., May 2 7:00 - 10:00 pm		