DEPARTMENT: PHYSICS & ASTRONOMY
TRENT UNIVERSITY

PHYS 3200Y ELECTRICITY & MAGNETISM
2017-2018 FW
PETERBOROUGH CAMPUS

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Course Description:
Electrostatics, magnetostatics, electric and magnetic properties of matter, Maxwell's equations, electromagnetic wave propagation. A short library skills component will be included. This course will cover chapters 1-7 and 9 of Griffiths *Introduction to Electrodynamics*.

Course Pre-requisites: 60% or higher in PHYS 1002H (or 1000Y), PHYS-MATH 2150H, MATH 2110H, and 2120H. Excludes PHYS-COSC 3210Y

Required Texts: David J. Griffiths, *Introduction to Electrodynamics*, 4th ed.

Recommended Resources:
Student Version of MATLAB recommended: http://www.mathworks.com/academia/student_version/
Don't forget your 1st year resource: R.D. Knight, *Physics for Scientists and Engineers*

Course Format:

Check the online Academic Timetable at http://www.trentu.ca/timetable/ to confirm times and locations.

Type (e.g., Lecture, Seminar, Tutorial, Lab, etc.)	**Day**	**Time**	**Location**
Lecture	Tues	14:00 – 15:50	SC 317
Lecture	Thurs	13:00 – 13:50	SC 317
Laboratory	Fri	13:00 – 15:50	SC 305

Each week, pre-class reading will be assigned from the textbook, and there will be quizzes at the beginning of some classes based on these readings. The main points of the readings will then be summarized, and we will work in small groups on short, ungraded assignments designed to develop a strong understanding of the material. Take-home assignments requiring more in-depth quantitative analysis will be submitted for marking. The seminars (~bi-weekly) will review assignments after they are marked and handed back. The schedule of topics is listed below. Although specific dates are not listed, I will follow the order of topics as given and will regularly communicate in class and on the learningSystem/Blackboard about the pacing of the classes. For this reason, it is important for you to attend class and log on to the learningSystem/Blackboard regularly.

Learning Outcomes/Objectives/Goals/Expectations: By the end of the course a successful student should:

1. understand fundamental theories of electricity and magnetism
2. be able to calculate electromagnetic forces and fields, and their effect on simple materials
3. be able to use library resources for research
4. know computational methods for calculating electromagnetic fields and forces

Course Evaluation:

Type of Assignment	**Weighting**	**Due Date**
In-class quizzes	5%	~weekly
Problem sets (8-10 throughout the year)	20% total	~Bi-weekly
Tests (2)	15% each	Week 9 FA (Nov 14) & week 5 WI (Feb 6)
Final exam	25%	April exam period
Laboratory	17%	Throughout the year
Library skills	3%	Week 11 FA

This marking scheme and its timing is designed with the cumulative nature of this course in mind, as we progress through Griffiths (Ch 1-7; 9) from September through to the following April. The **in-class quizzes** include short questions based on the readings. Typical **problem sets** comprise a half-dozen problems based on the lecture material. These are to be solved and handed in for grading. Problem sets will include one problem to be solved numerically using Matlab. **Tests** will be held in-class and are of 1 hour 50 minute duration. These mostly cover material from the preceding 8 weeks. Test questions are similar to those on problem sets. The **final exam** will cover material from the entire year. The **library skills** component is administered by Bata library, and consists of a short assignment and a presentation. **Laboratories** consist of a schedule of experiments that will be determined once classes have started.

Week-by-week schedule:

We will cover chapters 1-7, and parts of ch. 9 of Griffiths' textbook. Although specific dates are not listed, I will follow the order of topics in the textbook and will regularly communicate in class or on Blackboard about the pacing of the lectures. This is just one of many reasons why you should attend class each week. A tentative schedule of topics is given below:

Weeks 1-4 FA: Chapter 2 - Electrostatics (electric fields, electric potential, work and energy, conductors)
Weeks 5-9 FA: Chapter 3 - Special techniques (Laplace's equation, image charges, separation of variables, multipoles)
Weeks 10-12 FA: Chapter 4 - Electric fields in matter (polarization, electric displacement, dielectrics)
Weeks 1-3 WI: Chapter 5 - Magnetostatics (Lorentz law, Biot-Savart law, vector properties of the magnetic field, magnetic vector potential)
Weeks 4-7 WI: Chapter 6 - Magnetic fields in matter (magnetization, linear and nonlinear media)
Weeks 8-10 WI: Chapter 7 - Electrodynamics (EMF, induction, Maxwell's equations)
Weeks 11-12 WI : Chapter 9 - Electromagnetic waves.

Department and/or Course Policies:

Except by prior arrangement, late assignments will be assessed a 10% penalty for each working day they are late, and will not be accepted more than one week late. All quizzes are to be completed during class with late submissions not normally possible. For quizzes and labs in exceptional circumstances (such as a medical issue) alternative arrangements can be made with the instructor or the lab demonstrator provided that a note from a doctor or equivalent is provided.
Note that a minimum 40% average must be obtained on the tests and final exam in order to pass this course. If this minimum is not met, then a maximum grade of 45% (i.e. an F) will be assigned for the course.

University Policies

Academic Integrity:
Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from failure on an assignment to expulsion from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent University's Academic Integrity Policy. You have a responsibility to educate yourself – unfamiliarity with the policy is not an excuse. You are strongly encouraged to visit Trent's Academic Integrity website to learn more: www.trentu.ca/academicintegrity

Access to Instruction:

It is Trent University's intent to create an inclusive learning environment. If a student has a disability and documentation from a regulated health care practitioner and feels that he/she may need accommodations to succeed in a course, the student should contact the Student Accessibility Services Office (SAS) at the respective campus as soon as possible.