UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE AND ENGINEERING
The Edward S. Rogers Sr. Department of Electrical and Computer Engineering

ECE221H1S: ELECTRIC AND MAGNETIC FIELDS

COURSE OBJECTIVES: Electric and magnetic fields are not only involved in many physical phenomena (strength of materials, bio- electricity, lightning etc.), but they are also underpinning current and emerging technologies such as wire- less/wireline communications, radio-frequency identification (RFID) systems, magnetic levitation, magnetic resonance imaging (MRI), wireless power transfer (and the related concept of wireless batteries), near-field communications (NFC) and micro-electromechanical systems (MEMS). This course is aimed at providing stu- dents with the ability to understand the fundamentals of electricity and magnetism and their relation to some of their most exciting current applications.

INSTRUCTORS

Lecture Section	**Name**	**Office**	**E-mail**
L01	Dr. Tome Kosteski	PT371	kostesk@ecf.utoronto.ca
L02	Prof. Li Qian	GB443	l.qian@utoronto.ca
L03	Prof. Sean V. Hum[1]	BA5122	sean.hum@utoronto.ca

[1]Course coordinator

MARK COMPOSITION

Midterm Exam (Monday, Feb. 27, 6-8pm)[1]	20%
Vector calculus quiz[2]	3%
Tutorial quizzes (6)[3]	12%
Extended 1 hour tutorial quiz (week of Mar. 27)	12%
Laboratories	13%
Final exam[1]	40%

[1]The midterm and the final exam are **closed book**, with only **non-programmable calculators** (Type 2) allowed. A set of aid sheets will be provided with your tests and the final exam. These will be made available on the course website.

[2]A vector calculus quiz will be held in the last 30 minutes of the tutorials of the week of January 23. To prepare for the quiz, the first week of tutorials will include vector calculus review. Closed book.

[3]All tutorials, except the tutorials of the weeks of Jan. 16 (first tutorial), Jan. 23 (vector calculus quiz), Feb. 27 (midterm week), Mar. 6 (midterm week), Mar. 27 (extended 1-hr tutorial quiz), and Apr. 10, (last week of classes) will be concluded with a brief 15 minute quiz, consisting of two questions closely related to the material of the problem set discussed during the tutorial. Each quiz counts for 2% for a total of six quizzes. Closed book.

Required Reference Materials

1. Fawwaz T. Ulaby, Umberto Ravaioli, Fundamentals of Applied Electromagnetics, 7th Ed., Boston, MA: Prentice Hall, 2014, (ISBN 0133356817)
2. Randall D. Knight, Physics for Scientists and Engineers Workbook Volume 4 (chapters 25-36), 3 ed., Reading, MA: Addison-Wesley, 2013, (ISBN 0321753119)

The U of T bookstore has a custom package containing these two items listed above.

Course Website

The course Blackboard website is accessible through the main UofT portal:

`https://portal.utoronto.ca`

Under your "My Courses" tab you should all have the course, Winter 2017 ECE221H1S: Electric and Magnetic Fields listed. Please note that we have merged the sites for all lecture sections (look for: Winter-2017-ECE221H1-S-LEC0101.LEC0102.LEC0103: ECE221H1S: Electric and Magnetic Fields). Much of the communication and handouts will be found at this website. Your learning in this course will also be supported through the online discussion forum known as *Piazza*. This Piazza site for this course can be accessed at:

`http://piazza.com/utoronto.ca/winter2017/ece221/home`

The instructors will not be checking Piazza but it is a forum for you to communicate with your peers about matters related to ECE221.

Problem Sets and Tutorials

Each week, a set of suggested problems will be posted on the course website. The problems will deal with material covered in the lectures that week. The tutorials of the following week, as well as the tutorial quiz, will be based on those problems.

Vector Calculus

Due to the importance of vector calculus to this course, the tutorials of the week of January 16 will include a review of vector calculus. You can also find notes on vector calculus on the course website on Blackboard. A 30 minute quiz on vector calculus will be held at the end of the tutorials of the week of January 23.

Computer Labs

This course has a computer lab component that consists of six 2-hour sessions starting the first week of classes, beginning January 9th. The lab sessions will provide you with the opportunity to acquire a basic understanding of MATLAB and how it can be used to solve electric and magnetic

field problems. This is in recognition of the fact that MATLAB is very commonly used as a programming tool by engineers worldwide.

The first two computer labs will help you to learn the basic use of MATLAB.

Students will work in groups of 2, and you may choose your own partner. Students will be marked on their preparation and the actual work carried out during the lab sessions.

Each student must hand in at the **beginning of the lab** a preparation report (except for the first lab). You may collaborate with your partner for this work, but each student must prepare their own preparation report. Any signs of copying between partners, and/or other students will automatically result in a mark of zero for the entire lab and possible further consequences. This type of academic offence is taken very seriously.

You must attend the PRA section you are registered in. Attendance will be taken during the labs and exceptions handled according to the policy described below.

TERM WORK PETITIONS

If you are unavoidably absent and miss term work (e.g. test, quiz, assignment, lab), discuss the matter with your instructor immediately. If necessary, submit a term work petition.

Effective Summer 2015, all term work petitions must be submitted through the online petition system, which is accessible through the Engineering Portal:

`http://www.apsc.utoronto.ca/portal/`

Term work petitions must be submitted within seven days of the term work in question and include valid documentation.

The weight of all missed coursework will be transferred to the final exam.

For further information about petitions, see:

`http://uoft.me/petitions`

ACADEMIC OFFENCES

Academic offences will be directly referred to and dealt with by the Dean's office. The relevant procedures for dealing with academic offences can be found in the Academic Calendar.

Representative examples of what is considered an academic offense are: any collaboration during an exam, use of unauthorized aids during an exam, continuing to write an exam after the end of the exam has been announced.