University of Victoria Engineering

Faculty of Engineering

COURSE OUTLINE

ELEC 216 – Electricity and Magnetism

Term – Summer 2017 (201705)

Instructor

Dr. Jens Bornemann
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Office Hours

Days: Mondays & Thursdays
Time: 14:00 – 15:00
Location: EOW 309

Course Objectives

Study the fundamentals of electromagnetics with emphasis on engineering applications.

Learning Outcomes

Upon completion of this course students should be able to:

a. Describe the basic properties of electric and magnetic forces.
b. Calculate the gradient of a scalar function and the divergence and curl of a vector function in any of the three primary coordinate systems.
c. Apply Coulomb's Law, Biot-Savart Law, Gauss' Law, Faraday's Law, Lenz's Law, Lorentz Force, Ampère's Law, and Maxwell's Equations to solve electromagnetic problems.
d. Calculate the resistance, capacitance, and inductance of electromagnetic structures.
e. Apply the phasor-domain technique to analyze steady-state electromagnetic problems.
f. Evaluate the magnetic force and torque on a current-carrying structure due to a magnetic field.

Syllabus

Electric charge, Coulomb's Law, electrostatic forces, electric field, Gauss's Law, electric potential, stored energy. Electric current, conduction in a vacuum and in material media, displacement current, magnetic field of a current, force on a current carrying wire, magnetic induction, electromotive force, energy stored in a magnetic field. Capacitance, resistance, inductance, and their characterization. Time-varying fields. Transmission lines.

Lectures:

A-Section(s): A01 / CRN 30296
A-Section(s): A02 / CRN 30297
Days: Mondays & Thursdays
Time: 8:30 – 9:50
Location: ECS 123

Labs: ELL 129 Doug McKenzie (dmckenzi@uvic.ca)

B01	Mon	12:00 – 14:50
B02	Mon	15:00 – 17:50
B03	Wed	13:30 – 16:20
B04	Thu	12:00 – 14:50
B05	Fri	14:30 – 17:20
B06	Thu	15:00 – 17:50
B07	Wed	17:30 – 20:20

Lab orientations begin week of 01 May Jan 2017

Tutorials:

T-Section(s): T01 Tue 16:00-16:50 ECS 125

Required Text

Title:	Fundamentals of Applied Electromagnetics, 6th or 7th ed.
Author:	Ulaby, Michielssen, Ravaioli
Publisher:	Pearson / Prentice Hall
Year:	2010 or 2015

Optional Text

Title:	Engineering Electromagnetics 7th ed.
Author:	W.H. Hayt, J.A. Buck
Publisher:	McGraw-Hill
Year:	2006

References: Course Website: TBA

Assessment:

Assignments:	10 %	Due Dates: TBA
Labs	20 %	
Mid-term	20 %	Date: 22 June 2017
Final Exam	50 %	

Lab Requirements

- Labs begin on Monday, 01 May 2017.
- See GENERAL LABORATORY REGULATIONS FOR STUDENTS in the lab manual for details about report requirements.
- Purchase the lab manual in the UVic Bookstore.

Note:

1. Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.
2. For students passing the mid-term test, the aggregate grade of the midterm and the final must be a passing grade to pass the course.
3. Students failing the mid-term test must pass the final to pass the course.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

There will be no supplemental examination for this course.

Note to students: Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

Accommodation of Religious Observance: http://web.uvic.ca/calendar2017-05/general/policies.html

Policy on Inclusivity and Diversity: http://web.uvic.ca/calendar2017-05/general/policies.html

Standards of Professional Behaviour: You are advised to read the Faculty of Engineering document Standards for Professional Behaviour, which contains important information regarding conduct in courses, labs, and in the general use of facilities.
https://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the entry in the current Undergraduate Calendar for the UVic policy on academic integrity.
http://web.uvic.ca/calendar2017-05/undergrad/info/regulations/academic-integrity.html

Equality: This course aims to provide equal opportunities and access for all students to enjoy the benefits and privileges of the class and its curriculum and to meet the syllabus requirements. Reasonable and appropriate accommodation will be made available to students with documented disabilities (physical, mental, learning) in order to give them the opportunity to successfully meet the essential requirements of the course. The accommodation will not alter academic standards or learning outcomes, although the student may be allowed to demonstrate knowledge and skills in a different way. It is not necessary for you to reveal your disability and/or confidential medical information to the course instructor. If you believe that you may require accommodation, the course instructor can provide you with information about confidential resources on campus that can assist you in arranging for appropriate accommodation. Alternatively, you may want to contact the Resource Centre for Students with a Disability located in the Campus Services Building.
The University of Victoria is committed to promoting, providing, and protecting a positive, and supportive and safe learning and working environment for all its members.

Course Lecture Notes: Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.