University of Victoria Engineering

Faculty of Engineering

COURSE OUTLINE

ECE 216 – Electricity and Magnetism

Term – Summer 2018 (201805)

Instructor

Dr. Jens Bornemann
Phone: 721-8666
E-mail: jbornema(at)ece(dot)uvic(dot)ca

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:

1. Evaluate the gradient of a scalar function and the divergence and curl of a vector function in any of the three primary coordinate systems.
2. 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.
3. Evaluate the magnetic force and torque on a current-carrying structure due to a magnetic field.
4. Calculate the resistance, capacitance, and inductance of electromagnetic structures.
5. Use Maxwell's Equations to assess the propagation characteristics of plane waves.
6. Solve transmission-line problems.

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 30236
A-Section(s): A02 / CRN 30237
Days: Mondays & Thursdays
Time: 8:30 – 9:50
Location: HSD A240

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

B01	Mon	12:00 – 14:50
B02	Mon	15:00 – 17:50
B03	Wed	12:30 – 15:20
B04	Thu	12:00 – 14:50
B05	Fri	14:30 – 17:20
B06	Thu	16:00 – 18:50

Lab orientations begin week of 07 May 2018 (c.f. schedule below).

Tutorials:

T-Section(s): T01 Tue 15 :30 – 16:20 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: 25 June 2018
Final Exam	50 %	

Lab Requirements

- Labs begin on Monday, 07 May 2018.
- 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. The aggregate grade of the midterm and the final exam must be a passing grade 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.

https://web.uvic.ca/calendar2018-05/undergrad/info/regulations/grading.html

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 Assistant to set up an appointment.

Accommodation of Religious Observance:
https://web.uvic.ca/calendar2018-05/undergrad/info/regulations/religious-observanc.html

Policy on Inclusivity and Diversity:
https://web.uvic.ca/calendar2018-05/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.
https://web.uvic.ca/calendar2018-05/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.

Elec. 216
May - August 2018

Introduction week for ALL sections – May 7 - 11
No Labs during week of July 2 – July 6
All Labs take place in Elliott Rm. 129

Week # / Experiment # / Sequence A B	**Monday** B01 B02	**Tuesday**	**Wednesday** B03	**Thursday** B04	**Friday** B05
Wk 1 **Exp 15 | 15**	May 14	May 15	May 16	May 17	May 18
Wk 2 **Exp 15 | 15**	May 28	May 22	May 23	May 24	May 25
Wk 3 **Exp 11 | 11**	June 4	May 29	May 30	May 31	June 1
Wk 4 **Exp 11 | 11**	June 11	June 5	June 6	June 7	June 8
Wk 5 **Exp 19 | 19**	June 18	June 12	June 13	June 14	June 15
Wk 6 **Exp 19 | 19**	June 25	June 19	June 20	June 21	June 22
Wk 7 **Exp 16 | 25**	July 9	June 26	June 27	June 28	June 29
Wk 8 **Exp 16 | 25**	July 16	July 10	July 11	July 12	July 13
Wk 9 **Exp 25 | 16**	July 23	July 17	July 18	July 19	July 20
Wk 10 **Exp 25 | 16**	July 30	July 24	July 25	July 26	July 27