University of Victoria Engineering

Faculty of Engineering

COURSE OUTLINE

ELEC 216 – Electricity and Magnetism

Term – SUMMER 2015 (201505)

Instructor

Dr. Jens Bornemann
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Office Hours

Days: Tuesdays, Wednesdays
Time: 1:30-2:30 pm
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. Time varying fields. Capacitance, resistance, inductance, and their characterization.

Lectures:

A-Section(s): A01 / CRN 30282
A-Section(s): A02 / CRN 30283
Days: Tuesdays, Wednesdays, Fridays
Time: 12:30 – 13:20
Location: ELL 060

Labs: **Location: ELL 129**

B-Section(s):	B01	Thu	14:30-17:20
B-Section(s):	B02	Wed	16:30-19:20
B-Section(s):	B03	Mon	17:30-20:20

Tutorials:

T-Section(s): T01	Tue	14:30-15:20	ECS 108

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: TBA
Final Exam	50 %	

Note: Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.

Lab Requirements

- Labs begin on Monday, 04 May 2015.
- See GENERAL LABORATORY REGULATIONS FOR STUDENTS in the lab manual for details about report requirements.

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.

Assignment of E grade and supplemental examination for this course will be at the discretion of the Course Instructor. The rules for supplemental examinations can be found in the current Undergraduate Calendar.

http://web.uvic.ca/calendar/FACS/UnIn/UARe/Grad.html

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/calendar/GI/GUPo.html

Policy on Inclusivity and Diversity
http://web.uvic.ca/calendar/GI/GUPo.html

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour in current Undergraduate Calendar, which contains important information regarding conduct in courses, labs, and in the general use of facilities.

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult entry in current Undergraduate Calendar for the UVic policy on academic integrity.

http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf

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 2015

Introduction week for ALL sections – May 4 - 8
No Labs during week of June 29 – July 3
All Labs take place in Elliott Rm. 129

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