Department of Electrical and Computer Engineering

COURSE OUTLINE

ELEC 340 – Applied Electromagnetics and Photonics

Term – Spring 2015 (201501)

Instructor

Poman So, Ph.D., P.Eng.
Phone: 250-472-4224
E-mail: Poman.So@UVic.CA

Office Hours

Days: Tue, Wed & Fri
Time: 13:30 – 14:30
Location: EOW 417

Lectures

A-Section(s): A01 / CRN 21079
A02 / CRN 21080
Days: Tue, Wed & Fri
Time: 12:30 – 13:20
Location: HSD A240

Labs Location: ELW A309

B-Section(s)

See the attached schedule for details

Required Text

Title: Fundamentals of Applied Electromagnetics, 7ed, ISBN: 0133356817
Author: Fawwaz T. Ulaby, Eric Michielssen, Umberto Ravaioli
Publisher: Pearson / Prentice Hall
Year: 2015

References

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

Assessment

Assignments:	10%
Labs*[1]	20%
Mid-term*[2]	10%
Final*[2&3]	60%

Date: **Fri 20 February 2015**

***Note**

1. Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.
2. Must attend all labs and at least 80% of the lectures in order to qualify to write the midterm and final examinations (http://web.uvic.ca/calendar2014/FACS/UnIn/UARe/Atte.html)
3. Failure to pass the final examination will result in a grade of F being awarded for the course.
4. Plagiarism detection software may be used to aid the instructor and/or TA's in the review and grading of some or all of the work you submit (http://library.uvic.ca/instruction/cite/plagiarism.html).

Assignment Requirements

- Assignments are due one week after the assignments are posted on CourseSpaces.
- Students must submit their assignments via CourseSpaces. Files uploaded to CourseSpaces must be in PDF, MS Word, or Open Office format. Files submitted in any other formats will not be graded.
- Files contain poorly reproduced images will not be graded.

Lab Requirements

- Tentatively, lab begins on Monday, 26 January 2015.
- Lab reports are due one week after the experiments are completed.
- Students must submit their lab report via CourseSpaces. Files uploaded to CourseSpaces must be in PDF, MS Word, or Open Office format. Files submitted in any other formats will not be graded.
- Files contain poorly scanned images will not be graded.

The final grade obtained from the above marking scheme will be based on the following percentage-to-grade point conversion:

Passing Grades	Grade Point Value	Percentage for Instructor Use Only	
A+ A A-	9 8 7	90 – 100 85 – 89 80 – 84	
B+ B B-	6 5 4	77 – 79 73 – 76 70 – 72	
C+ C	3 2	65 – 69 60 – 64	
D	1	50 – 59	
Failing Grades	**Grade Point Value**	**Percentage for Instructor Use Only**	**Description**
E	0	0 - 49	Fail, *Conditional supplemental exam. (For undergraduate courses only)
F	0	0 – 49	Fail, no supplemental.
N	0	0 – 49	Did not write examination, Lab or otherwise complete course requirements by the end of term or session; no supplemental exam.

**Assignment of E grade will be at the discretion of the Course Instructor.*

The rules for supplemental examinations are found on page 80 of the current 2014/15 Undergraduate Calendar.

Term in which E Grade Was Obtained	Application Deadline for Supplemental Exam	Supplemental Exam Date
First term of Winter Session (Sept – Dec)	February 28 in the following term	First week of following May
Second term of Winter Session (Jan – Apr)	June 30 in the following term	First week of following September
Summer Session (May – Aug)	October 31 in the following term	First week of following January

Deferred exams will normally be written at the start of the student's next academic term; i.e., approximately 4 months following the deferral of the exam.

Course Description

1. **Course Objectives:** Study electromagnetic field theory and its applications in engineering electromagnetics.
2. **Learning Outcomes:** Upon completion of this course students should be able to:
   a. Describe mathematically the electric and magnetic fields of TEM waves.
   b. Relate the propagation parameters of a wave to the constitutive parameters of the medium.
   c. Calculate the rate of power carried by an EM wave in both lossless and lossy media.
   d. Characterize wave propagation in a rectangular waveguide.
   e. Determine the behaviour of resonant modes inside a rectangular cavity.
   f. Calculate the electric and magnetic fields of waves radiated by a dipole antenna.
   g. Calculate the Doppler frequency shift observed by a radar.
   h. Describe the basic operation of satellite communication systems.
   i. Describe the basic operation of photonic structures.
   j. Design electromagnetic structures for polarization of electromagnetic waves.
   k. Design electromagnetic structures to optimize transmission behavior of plane-waves incident upon plane boundaries, for both normal and oblique incidence.
3. **Syllabus:** Field concept, Maxwell's equations, power, and energy. Plane wave propagation, polarization, and reflection and transmission at material interfaces. Introduction to waveguides, antennas, and photonic structures. Engineering electromagnetics design concepts and examples with emphasis on impedance transformers and shielding structures.

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 ECE Chair by email or the ECE Chair's Secretary eceasst@uvic.ca to set up an appointment.

Accommodation of Religious Observance
See http://web.uvic.ca/calendar2014/GI/GUPo.html

Policy on Inclusivity and Diversity
See http://web.uvic.ca/calendar2014/GI/GUPo.html

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour at http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf 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

http://web.uvic.ca/calendar2014/FACS/UnIn/UARe/PoAcI.html for the UVic policy on academic integrity.

Plagiarism detection software may be used to aid the instructor and/or TA's in the review and grading of some or all of the work you submit.
(http://library.uvic.ca/instruction/cite/plagiarism.html)

help | exit

Class Schedule Listing

Second Term: Jan - Apr 2015
Dec 17, 2014

Sections Found

APPLD: ELECTRMAGNTCS+PHOTONCS - 21079 - ELEC 340 - A01

Reserved for ECE students.
Associated Term: Second Term: Jan - Apr 2015
Registration Dates: Jun 16, 2014 to Jan 21, 2015
Levels: Graduate, Law, Undergraduate

Main Campus
Lecture Schedule Type
Face to Face Instructional Method
1.500 Credits
View Catalog Entry

Scheduled Meeting Times

Type	Time	Days	Where	Date Range	Schedule Type	Instructors
Every Week	12:30 pm - 1:20 pm	TWF	Human & Social Development A240	Jan 05, 2015 - Apr 02, 2015	Lecture	Poman Pok Man So (P)

APPLD: ELECTRMAGNTCS+PHOTONCS - 21080 - ELEC 340 - A02

Not open to ECE students.
Associated Term: Second Term: Jan - Apr 2015
Registration Dates: Jun 16, 2014 to Jan 21, 2015
Levels: Graduate, Law, Undergraduate

Main Campus
Lecture Schedule Type
Face to Face Instructional Method
1.500 Credits
View Catalog Entry

Scheduled Meeting Times

Type	Time	Days	Where	Date Range	Schedule Type	Instructors
Every Week	12:30 pm - 1:20 pm	TWF	Human & Social Development A240	Jan 05, 2015 - Apr 02, 2015	Lecture	Poman Pok Man So (P)

APPLD: ELECTRMAGNTCS+PHOTONCS - 21081 - ELEC 340 - B01

ELEC340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2015
Registration Dates: Jun 16, 2014 to Jan 21, 2015
Levels: Graduate, Law, Undergraduate

Main Campus
Lab Schedule Type

Face to Face Instructional Method
0.000 Credits
View Catalog Entry

Scheduled Meeting Times

Type	Time	Days	Where	Date Range	Schedule Type	Instructors
Every Week	12:00 pm - 2:50 pm	M	Engineering Lab Wing A309	Jan 26, 2015 - Jan 26, 2015	Lab	TBA
Every Week	12:00 pm - 2:50 pm	M	Engineering Lab Wing A309	Feb 16, 2015 - Feb 16, 2015	Lab	TBA
Every Week	12:00 pm - 2:50 pm	M	Engineering Lab Wing A309	Mar 02, 2015 - Mar 02, 2015	Lab	TBA
Every Week	12:00 pm - 2:50 pm	M	Engineering Lab Wing A309	Mar 16, 2015 - Mar 16, 2015	Lab	TBA

APPLD: ELECTRMAGNTCS+PHOTONCS - 21082 - ELEC 340 - B02

ELEC340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2015
Registration Dates: Jun 16, 2014 to Jan 21, 2015
Levels: Graduate, Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 Credits
View Catalog Entry

Scheduled Meeting Times

Type	Time	Days	Where	Date Range	Schedule Type	Instructors
Every Week	12:00 pm - 2:50 pm	M	Engineering Lab Wing A309	Feb 02, 2015 - Feb 02, 2015	Lab	TBA
Every Week	12:00 pm - 2:50 pm	M	Engineering Lab Wing A309	Feb 23, 2015 - Feb 23, 2015	Lab	TBA
Every Week	12:00 pm - 2:50 pm	M	Engineering Lab Wing A309	Mar 09, 2015 - Mar 09, 2015	Lab	TBA
Every Week	12:00 pm - 2:50 pm	M	Engineering Lab Wing A309	Mar 23, 2015 - Mar 23, 2015	Lab	TBA

APPLD: ELECTRMAGNTCS+PHOTONCS - 21083 - ELEC 340 - B03

ELEC340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2015
Registration Dates: Jun 16, 2014 to Jan 21, 2015
Levels: Graduate, Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 Credits
View Catalog Entry

Scheduled Meeting Times

Type	Time	Days	Where	Date Range	Schedule	Instructors

					Type	
Every Week	1:30 pm - 4:20 pm	T	Engineering Lab Wing A309	Jan 27, 2015 - Jan 27, 2015	Lab	TBA
Every Week	1:30 pm - 4:20 pm	T	Engineering Lab Wing A309	Feb 17, 2015 - Feb 17, 2015	Lab	TBA
Every Week	1:30 pm - 4:20 pm	T	Engineering Lab Wing A309	Mar 03, 2015 - Mar 03, 2015	Lab	TBA
Every Week	1:30 pm - 4:20 pm	T	Engineering Lab Wing A309	Mar 17, 2015 - Mar 17, 2015	Lab	TBA

APPLD: ELECTRMAGNTCS+PHOTONCS - 21084 - ELEC 340 - B04

ELEC340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2015
Registration Dates: Jun 16, 2014 to Jan 21, 2015
Levels: Graduate, Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 Credits
View Catalog Entry

Scheduled Meeting Times

Type	Time	Days	Where	Date Range	Schedule Type	Instructors
Every Week	1:30 pm - 4:20 pm	T	Engineering Lab Wing A309	Feb 03, 2015 - Feb 03, 2015	Lab	TBA
Every Week	1:30 pm - 4:20 pm	T	Engineering Lab Wing A309	Feb 24, 2015 - Feb 24, 2015	Lab	TBA
Every Week	1:30 pm - 4:20 pm	T	Engineering Lab Wing A309	Mar 10, 2015 - Mar 10, 2015	Lab	TBA
Every Week	1:30 pm - 4:20 pm	T	Engineering Lab Wing A309	Mar 24, 2015 - Mar 24, 2015	Lab	TBA

APPLD: ELECTRMAGNTCS+PHOTONCS - 21085 - ELEC 340 - B05

ELEC340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2015
Registration Dates: Jun 16, 2014 to Jan 21, 2015
Levels: Graduate, Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 Credits
View Catalog Entry

Scheduled Meeting Times

Type	Time	Days	Where	Date Range	Schedule Type	Instructors
Every Week	4:30 pm - 7:20 pm	W	Engineering Lab Wing A309	Jan 28, 2015 - Jan 28, 2015	Lab	TBA
Every Week	4:30 pm - 7:20 pm	W	Engineering Lab Wing A309	Feb 18, 2015 - Feb 18, 2015	Lab	TBA

Every Week	4:30 pm - 7:20 pm	W	Engineering Lab Wing A309	Mar 04, 2015 - Mar 04, 2015	Lab	TBA
Every Week	4:30 pm - 7:20 pm	W	Engineering Lab Wing A309	Mar 18, 2015 - Mar 18, 2015	Lab	TBA

APPLD: ELECTRMAGNTCS+PHOTONCS - 21088 - ELEC 340 - B08

ELEC340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2015
Registration Dates: Jun 16, 2014 to Jan 21, 2015
Levels: Graduate, Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 Credits
View Catalog Entry

Scheduled Meeting Times

Type	Time	Days	Where	Date Range	Schedule Type	Instructors
Every Week	2:00 pm - 4:50 pm	F	Engineering Lab Wing A309	Feb 06, 2015 - Feb 06, 2015	Lab	TBA
Every Week	2:00 pm - 4:50 pm	F	Engineering Lab Wing A309	Feb 27, 2015 - Feb 27, 2015	Lab	TBA
Every Week	2:00 pm - 4:50 pm	F	Engineering Lab Wing A309	Mar 13, 2015 - Mar 13, 2015	Lab	TBA
Every Week	2:00 pm - 4:50 pm	F	Engineering Lab Wing A309	Mar 27, 2015 - Mar 27, 2015	Lab	TBA

Release: 8.5.1