Faculty of Engineering

COURSE OUTLINE

ELEC 340 – Applied Electromagnetics and Photonics

Term – Spring 2017 (201701)

CourseSpaces – http://coursespaces.uvic.ca/course/view.php?id=21740

Instructor
Dr. Poman So
Phone: 250-472-4224
E-mail: Poman.So@UVic.CA

Office Hours
Days: Tuesday and Wednesday
Time: Appointment via email
Location: EOW 417

Course Objectives
Study electromagnetic and photonic theory as well as their applications in engineering.

Learning Outcomes
a. Describe mathematically the electric and magnetic fields of TEM waves.
b. Describe the propagation parameters of a wave to the constitutive parameters of the medium.
c. Describe wave propagation in a rectangular waveguide.
d. State the resonant modes inside a rectangular cavity.
e. State the basic operation of photonic structures.
f. State the electric and magnetic fields of waves radiated by a dipole antenna.
g. State the Doppler frequency shift observed by a radar.
h. Identify the basic operation of satellite communication systems.
i. Evaluate the rate of power carried by an EM wave in both lossless and lossy media.
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 incidences.

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.

A-Sections: A01 (02) / CRN 21155 (21156)
Days: TWF
Time: 12:30 – 13:20
Location: ELL 168

B-Sections: B01–B06, and B08–B09
See the class schedule listing at the end of this course outline for details
Location: ELW A309

Required Text
Author: Fawwaz T. Ulaby and Umberto Ravaioi
Publisher: Pearson / Prentice Hall
Year: 2015
Assessment
Assignments: 10%  
Due Dates: See CourseSpaces for details
Labs: 20%
Mid-term: 10%  
Date: Tuesday February 21, 2017.
Final Exam: 60%

Note:
1. The required textbook is your main source of reference for this course. Material in the book will not be reproduced in the course notes. Students are expected to attend all classes in this course and to take their own notes. See http://web.uvic.ca/calendar2017-01/undergrad/info/regulations/attendance.html for attendance requirements.
2. Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.
3. Failure to pass the final exam may result in a failing grade, min{45%  above  assessment }, for the course.
4. Plagiarism detection software may be used to aid the instructor and/or TAs in the review and grading of some or all of the work you submit (http://library.uvic.ca/instruction/cite/plagiarism.html)

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/calendar2017-01/general/policies.html

Policy on Inclusivity and Diversity: http://web.uvic.ca/calendar2017-01/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/calendar2017-01/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.
Class Schedule Listing

Second Term: Jan - Apr 2017
Dec 14, 2016

Sections Found

**Applied Electromagnetics and Photonics - 21155 - ELEC 340 - A01**

Reserved for Bachelor of Engineering students.
Associated Term: Second Term: Jan - Apr 2017
Registration Dates: Jun 13, 2016 to Jan 20, 2017
Levels: Graduate, Law, Undergraduate

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

### Scheduled Meeting Times

<table>
<thead>
<tr>
<th>Type</th>
<th>Time</th>
<th>Days</th>
<th>Where</th>
<th>Date Range</th>
<th>Schedule Type</th>
<th>Instructors</th>
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<tr>
<td>Every Week</td>
<td>12:30 pm - 1:20 pm</td>
<td>TWF Elliott Building 168</td>
<td>Jan 04, 2017 - Apr 04, 2017</td>
<td>Lecture</td>
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**Applied Electromagnetics and Photonics - 21156 - ELEC 340 - A02**

Not open to Bachelor of Engineering students.
Associated Term: Second Term: Jan - Apr 2017
Registration Dates: Jun 13, 2016 to Jan 20, 2017
Levels: Graduate, Law, Undergraduate

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

### Scheduled Meeting Times

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<th>Type</th>
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**Applied Electromagnetics and Photonics - 21157 - ELEC 340 - B01**

ELEC340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2017
Registration Dates: Jun 13, 2016 to Jan 20, 2017
Levels: Graduate, Law, Undergraduate

Main Campus
Lab Schedule Type
### Scheduled Meeting Times

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<tr>
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Applied Electromagnetics and Photonics - 21158 - ELEC 340 - B02

FI FC:340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2017
Registration Dates: Jun 13, 2016 to Jan 20, 2017
Levels: Graduate, Law, Undergraduate

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

### Scheduled Meeting Times

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<tr>
<th>Type</th>
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Applied Electromagnetics and Photonics - 21150 - ELEC 340 - B03

ELEC340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2017
Registration Dates: Jun 13, 2016 to Jan 20, 2017
Levels: Graduate, Law, Undergraduate

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

Scheduled Meeting Times
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**Applied Electromagnetics and Photonics - 21160 - ELEC 340 - B04**

ELEC 340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2017
Registration Dates: Jun 13, 2016 to Jan 20, 2017
Levels: Graduate, Law, Undergraduate

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

**Scheduled Meeting Times**

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<th>Type</th>
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**Applied Electromagnetics and Photonics - 21161 - ELEC 340 - B05**

ELEC 340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2017
Registration Dates: Jun 13, 2016 to Jan 20, 2017
Levels: Graduate, Law, Undergraduate

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

**Scheduled Meeting Times**

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<tr>
<th>Type</th>
<th>Time</th>
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<th>Date Range</th>
<th>Schedule Type</th>
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<td>Engineering Lab Wing A309</td>
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Week  4:20 pm  A309

Every 1:30 pm - F  Engineering Lab Wing  Mar 03, 2017 - Mar 03, 2017  Lab  TBA
Week  4:20 pm  A309

Every 1:30 pm - F  Engineering Lab Wing  Mar 17, 2017 - Mar 17, 2017  Lab  TBA
Week  4:20 pm  A309

**Applied Electromagnetics and Photonics - 21162 - ELEC 340 - B06**

ELEC340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2017
Registration Dates: Jun 13, 2016 to Jan 20, 2017
Levels: Graduate, Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 Credits

**View Catalog Entry**

### Scheduled Meeting Times

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<tr>
<th>Type</th>
<th>Time</th>
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<th>Schedule Type</th>
<th>Instructors</th>
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</table>
| Every  | 1:30 pm - F  Engineering Lab Wing  Feb 03, 2017 - Feb 03, 2017  Lab  TBA
| Week   | 4:20 pm  A309
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| Every  | 1:30 pm - F  Engineering Lab Wing  Feb 24, 2017 - Feb 24, 2017  Lab  TBA
| Week   | 4:20 pm  A309
|        |       |     |                |                  |               |             |
| Every  | 1:30 pm - F  Engineering Lab Wing  Mar 10, 2017 - Mar 10, 2017  Lab  TBA
| Week   | 4:20 pm  A309
|        |       |     |                |                  |               |             |
| Every  | 1:30 pm - F  Engineering Lab Wing  Mar 24, 2017 - Mar 24, 2017  Lab  TBA
| Week   | 4:20 pm  A309

**Applied Electromagnetics and Photonics - 21164 - ELEC 340 - B08**

FI FC:340 labs meet on alternate weeks.
Associated Term: Second Term: Jan - Apr 2017
Registration Dates: Jun 13, 2016 to Jan 20, 2017
Levels: Graduate, Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 Credits

**View Catalog Entry**

### Scheduled Meeting Times

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<th>Type</th>
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<th>Where</th>
<th>Date Range</th>
<th>Schedule Type</th>
<th>Instructors</th>
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| Every  | 4:30 pm - T  Engineering Lab Wing  Jan 31, 2017 - Jan 31, 2017  Lab  TBA
| Week   | 7:20 pm  A309
|        |       |     |                |                  |               |             |
| Every  | 4:30 pm - T  Engineering Lab Wing  Feb 21, 2017 - Feb 21, 2017  Lab  TBA
| Week   | 7:20 pm  A309
|        |       |     |                |                  |               |             |
| Every  | 4:30 pm - T  Engineering Lab Wing  Mar 07, 2017 - Mar 07, 2017  Lab  TBA
| Week   | 7:20 pm  A309
|        |       |     |                |                  |               |             |
Every Week 4:30 pm - T  Engineering Lab Wing  Mar 21, 2017 - Mar 21, 2017  Lab  TBA

Applied Electromagnetics and Photonics - 24043 - ELEC 340 - B09
Associated Term: Second Term, Jan - Apr 2017
Registration Dates: Jun 13, 2016 to Jan 20, 2017
Levels: Graduate, Law, Undergraduate

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

### Scheduled Meeting Times

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<th>Type</th>
<th>Time</th>
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