ELEC 216 – Electricity and Magnetism
Term – Fall 2014 (201409)

Instructor
Dr. Jens Bornemann, P.Eng.
Phone: 250-721-8666
E-mail: jbornema(at)ece(dot)uvic(dot)ca

Office Hours
Days: Monday & Wednesday
Time: 13:00 – 14:00
Location: EOW 309

Lectures
A-Section(s): A02 / CRN 11161
Days: Mon & Wed
Time: 14:30 – 15:50
Location: ELL 129

B-Section(s)

Labs
Location: ELL 129

See the attached schedule for details

Tutorials
T-Section(s):
T01: 11176 Tue 13:30 – 14:20 FRA 159
T02: 11177 Thur 16:30 – 17:20 ECS 125

Required Text
Author: Fawwaz T. Ulaby, Eric Michielssen, Umberto Ravaioili
Publisher: Pearson / Prentice Hall
Year: 2010

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: 20% Date: Mon 20 October 2014
Final*2&3: 50%

*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. Students earning less than 45% (less than 22.5 out of 50) in the final exam will fail 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).
Due Dates for Assignments
- T.B.A.

Lab Requirements
- Lab begins on Monday, 08 September 2014.
- See GENERAL LABORATORY REGULATIONS FOR STUDENTS in the lab manual for details about report requirements.

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

<table>
<thead>
<tr>
<th>Grades</th>
<th>Grade Point Value</th>
<th>Percentage for Instructor Use Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>9</td>
<td>90 – 100</td>
</tr>
<tr>
<td>A</td>
<td>8</td>
<td>85 – 89</td>
</tr>
<tr>
<td>A–</td>
<td>7</td>
<td>80 – 84</td>
</tr>
<tr>
<td>B+</td>
<td>6</td>
<td>77 – 79</td>
</tr>
<tr>
<td>B</td>
<td>5</td>
<td>73 – 76</td>
</tr>
<tr>
<td>B–</td>
<td>4</td>
<td>70 – 72</td>
</tr>
<tr>
<td>C+</td>
<td>3</td>
<td>65 – 69</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>60 – 64</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>50 – 59</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>0 – 49</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>0 – 49</td>
</tr>
<tr>
<td>N</td>
<td>0</td>
<td>0 – 49</td>
</tr>
</tbody>
</table>

*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.

<table>
<thead>
<tr>
<th>Term in which E Grade was obtained:</th>
<th>Application Deadline for Supplemental Exam</th>
<th>Supplemental Exam Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>First term of Winter Session (Sept – Dec)</td>
<td>February 28 in the following term</td>
<td>First week of following May</td>
</tr>
<tr>
<td>Second term of Winter Session (Jan – Apr)</td>
<td>June 30 in the following term</td>
<td>First week of following September</td>
</tr>
<tr>
<td>Summer Session (May – Aug)</td>
<td>October 31 in the following term</td>
<td>First week of following January</td>
</tr>
</tbody>
</table>

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 the fundamentals of electromagnetics with emphasis on engineering applications.
2. **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.
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.

3. **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.

**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](http://web.uvic.ca/calendar2014/GI/GUPo.html)

**Policy on Inclusivity and Diversity**

See [http://web.uvic.ca/calendar2014/GI/GUPo.html](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/current/undergrad/index.php#section0-25](http://www.uvic.ca/engineering/current/undergrad/index.php#section0-25) 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](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](http://library.uvic.ca/instruction/cite/plagiarism.html))
### Class Schedule Listing

**First Term: Sep - Dec 2014**
**Aug 31, 2014**

#### Sections Found

**ELECTRICITY AND MAGNETISM - 11160 - ELEC 216 - A01**

- **Associated Term:** First Term: Sep - Dec 2014
- **Registration Dates:** Jun 16, 2014 to Sep 19, 2014
- **Levels:** 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>
</tr>
</thead>
<tbody>
<tr>
<td>Every</td>
<td>2:30 pm -</td>
<td>MW</td>
<td>David Strong</td>
<td>Sep 03, 2014 -</td>
<td>Lecture</td>
<td>Poman P. So</td>
</tr>
<tr>
<td>Week</td>
<td>3:50 pm</td>
<td></td>
<td>Building C103</td>
<td>Dec 03, 2014</td>
<td></td>
<td>(P)</td>
</tr>
</tbody>
</table>

**ELECTRICITY AND MAGNETISM - 11161 - ELEC 216 - A02**

- **Associated Term:** First Term: Sep - Dec 2014
- **Registration Dates:** Jun 16, 2014 to Sep 19, 2014
- **Levels:** 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>
</tr>
</thead>
<tbody>
<tr>
<td>Every</td>
<td>2:30 pm -</td>
<td>MW</td>
<td>Engineering Comp</td>
<td>Sep 03, 2014 -</td>
<td>Lecture</td>
<td>Jens</td>
</tr>
<tr>
<td>Week</td>
<td>3:50 pm</td>
<td></td>
<td>Science Bldg 125</td>
<td>Dec 03, 2014</td>
<td></td>
<td>Bornemann (P)</td>
</tr>
</tbody>
</table>

**ELECTRICITY AND MAGNETISM - 11162 - ELEC 216 - B01**

- **Associated Term:** First Term: Sep - Dec 2014
- **Registration Dates:** Jun 16, 2014 to Sep 19, 2014
- **Levels:** Law, Undergraduate

**Main Campus**
- **Lab Schedule Type**
- **Face to Face Instructional Method**
- **0.000 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>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Time</td>
<td>Days</td>
<td>Where</td>
<td>Date Range</td>
<td>Schedule</td>
<td>Instructors</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
<td>------</td>
<td>-----------</td>
<td>------------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>Every Week</td>
<td>4:00 pm - 6:50 pm</td>
<td>M</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>

**ELECTRICITY AND MAGNETISM - 11163 - ELEC 216 - B02**

Associated Term: First Term: Sep - Dec 2014
Registration Dates: Jun 16, 2014 to Sep 19, 2014
Levels: Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 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</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every Week</td>
<td>2:30 pm - 5:20 pm</td>
<td>T</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>

**ELECTRICITY AND MAGNETISM - 11164 - ELEC 216 - B03**

Associated Term: First Term: Sep - Dec 2014
Registration Dates: Jun 16, 2014 to Sep 19, 2014
Levels: Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 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</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every Week</td>
<td>11:30 am - 2:20 pm</td>
<td>W</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>

**ELECTRICITY AND MAGNETISM - 11165 - ELEC 216 - B04**

Associated Term: First Term: Sep - Dec 2014
Registration Dates: Jun 16, 2014 to Sep 19, 2014
Levels: Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 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</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every Week</td>
<td>4:00 pm - 6:50 pm</td>
<td>W</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>

**ELECTRICITY AND MAGNETISM - 11166 - ELEC 216 - B05**

Associated Term: First Term: Sep - Dec 2014
**ELECTRICITY AND MAGNETISM - 11167 - ELEC 216 - B06**

Associated Term: First Term: Sep - Dec 2014
Registration Dates: Jun 16, 2014 to Sep 19, 2014
Levels: Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 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>
</tr>
</thead>
<tbody>
<tr>
<td>Every  Week</td>
<td>11:30 am - 2:20 pm</td>
<td>Th</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>

**ELECTRICITY AND MAGNETISM - 11168 - ELEC 216 - B07**

Associated Term: First Term: Sep - Dec 2014
Registration Dates: Jun 16, 2014 to Sep 19, 2014
Levels: Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 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>
</tr>
</thead>
<tbody>
<tr>
<td>Every  Week</td>
<td>2:30 pm - 5:20 pm</td>
<td>F</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>

**ELECTRICITY AND MAGNETISM - 11169 - ELEC 216 - B08**

Associated Term: First Term: Sep - Dec 2014
Registration Dates: Jun 16, 2014 to Sep 19, 2014
Levels: Law, Undergraduate

Main Campus
Lab Schedule Type
Face to Face Instructional Method
0.000 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>
</tr>
</thead>
<tbody>
<tr>
<td>Every  Week</td>
<td>5:30 pm - 8:20 pm</td>
<td>T</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>
### ELECTRICITY AND MAGNETISM - 11170 - ELEC 216 - B09

Associated Term: First Term: Sep - Dec 2014  
Registration Dates: Jun 16, 2014 to Sep 19, 2014  
Levels: Law, Undergraduate

Main Campus  
Lab Schedule Type  
Face to Face Instructional Method  
0.000 Credits  
[View Catalog Entry](https://www.uvic.ca/BAN2P/bwckctlg.p_disp_listcrse?term_in=201409&subj_in=EL...)

<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>
</tr>
</thead>
<tbody>
<tr>
<td>Every Week</td>
<td>7:00 pm - 9:50 pm</td>
<td>W</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>

### ELECTRICITY AND MAGNETISM - 11171 - ELEC 216 - B10

Associated Term: First Term: Sep - Dec 2014  
Registration Dates: Jun 16, 2014 to Sep 19, 2014  
Levels: Law, Undergraduate

Main Campus  
Lab Schedule Type  
Face to Face Instructional Method  
0.000 Credits  
[View Catalog Entry](https://www.uvic.ca/BAN2P/bwckctlg.p_disp_listcrse?term_in=201409&subj_in=EL...)

<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>
</tr>
</thead>
<tbody>
<tr>
<td>Every Week</td>
<td>6:30 pm - 9:20 pm</td>
<td>T</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>

### ELECTRICITY AND MAGNETISM - 11172 - ELEC 216 - B11

Associated Term: First Term: Sep - Dec 2014  
Registration Dates: Jun 16, 2014 to Sep 19, 2014  
Levels: Law, Undergraduate

Main Campus  
Lab Schedule Type  
Face to Face Instructional Method  
0.000 Credits  
[View Catalog Entry](https://www.uvic.ca/BAN2P/bwckctlg.p Disp_listcrse?term_in=201409&subj_in=EL...)

<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>
</tr>
</thead>
<tbody>
<tr>
<td>Every Week</td>
<td>3:30 pm - 6:20 pm</td>
<td>T</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>
### ELECTRICITY AND MAGNETISM - 11173 - ELEC 216 - B12

Associated Term: First Term: Sep - Dec 2014  
Registration Dates: Jun 16, 2014 to Sep 19, 2014  
Levels: Law, Undergraduate

**Main Campus**  
Lab Schedule Type  
Face to Face Instructional Method  
0.000 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>
</tr>
</thead>
<tbody>
<tr>
<td>Every Week</td>
<td>5:30 pm - 8:20</td>
<td>F</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>

### ELECTRICITY AND MAGNETISM - 11174 - ELEC 216 - B13

Associated Term: First Term: Sep - Dec 2014  
Registration Dates: Jun 16, 2014 to Sep 19, 2014  
Levels: Law, Undergraduate

**Main Campus**  
Lab Schedule Type  
Face to Face Instructional Method  
0.000 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>
</tr>
</thead>
<tbody>
<tr>
<td>Every Week</td>
<td>11:30 am - 2:20</td>
<td>M</td>
<td>Elliott Building 129</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Lab</td>
<td>TBA</td>
</tr>
</tbody>
</table>

### ELECTRICITY AND MAGNETISM - 11176 - ELEC 216 - T01

Associated Term: First Term: Sep - Dec 2014  
Registration Dates: Jun 16, 2014 to Sep 19, 2014  
Levels: Law, Undergraduate

**Main Campus**  
Tutorial Schedule Type  
Face to Face Instructional Method  
0.000 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>
</tr>
</thead>
<tbody>
<tr>
<td>Every Week</td>
<td>1:30 pm - 2:20</td>
<td>T</td>
<td>Fraser Building 159</td>
<td>Sep 03, 2014 - Dec 03, 2014</td>
<td>Tutorial</td>
<td>Mostafa Esmaeili (P)</td>
</tr>
</tbody>
</table>

### ELECTRICITY AND MAGNETISM - 11177 - ELEC 216 - T02

Associated Term: First Term: Sep - Dec 2014  
Registration Dates: Jun 16, 2014 to Sep 19, 2014  
Levels: Law, Undergraduate

**Main Campus**
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>
</tr>
</thead>
<tbody>
<tr>
<td>Every</td>
<td>4:30 pm-5:20 pm</td>
<td>Th</td>
<td>Engineering Comp Science Bldg 125</td>
<td>Sep 03, 2014-Dec 03, 2014</td>
<td>Tutorial</td>
<td>Trevor R. Beugeling (P)</td>
</tr>
</tbody>
</table>