ELEC 529A – Selected Topics in Microwaves, Millimeter Waves and Optical Engineering: Advanced Bio Nano Photonics

Term - SPRING 2015 (201501)

http://www.ece.uvic.ca/~taolu/elec529a

Instructor      Office Hours
Dr. Tao Lu      Days: Monday
Phone: 250-721-8617     Time: 14:30-17:30
E-mail: taolu@uvic.ca     Location: EOW 321

Lectures
A-Section(s): A01 / CRN 21124
Days: Monday/Thursday
Time: 13:00-14:20
Location: ECS 128

Required Text
No textbook is required, teaching material includes a series of papers/book chapters.

References:
Title: Nonlinear Fiber Optics (4th Edition)
Author: Govind P. Agrawal
Publisher: Academic Press
Year: 2007

Title: Optical Electronics in Modern Communications (5th Edition)
Author: Amnon Yariv
Publisher: Oxford University Press, Inc.
Year: 1997

Title: Electromagnetic Noise and Quantum Optical Measurements (3rd edition)
Author: Hermann A. Haus
Publisher: Springer
Year: 2000

Title: Principles of Nano-Optics
Author: Lukas Novotny and Bert Hecht
Publisher: Cambridge University Press
Year: 2007
Assessment:
Assignments: 25%
Final Report: 50% Due: Thursday, Apr. 2, 2015
Presentation: 25%

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

Due Dates for Assignments:
Two weeks after each assignment is handed out.
The final grade obtained from the above marking scheme will be based on the following percentage-to-grade point conversion:

<table>
<thead>
<tr>
<th>Passing 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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Failing Grades</th>
<th>Grade Point Value</th>
<th>Percentage for Instructor Use Only</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>0</td>
<td>0 – 49</td>
<td>Fail, *Conditional supplemental exam. (For undergraduate courses only)</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>0 – 49</td>
<td>Fail, no supplemental.</td>
</tr>
<tr>
<td>N</td>
<td>0</td>
<td>0 – 49</td>
<td>Did not write examination, Lab or otherwise complete course requirements by the end of term or session; no supplemental exam.</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>
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</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 Outline

1. Course Objectives
This course is intended for graduate students whose research area includes nano technologies, photonics and their applications to biological sensing and imaging.

2. Learning Outcomes
The students will learn necessary knowledge in the area of biophotonics with focus on biosensing and imaging. Through this course, they will also be familiar with the frontier researches in the relating fields.

3. Syllabus
Overview of electromagnetic waves, optical waveguide theory and modeling techniques, nonlinear optics and lasers. Principles of evanescent wave coupling, plasmonics, passive/active microresonators, microresonator noises, suppressing and measurement techniques, and their applications to biosensing.

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.