ECE 695: Fiber Optic Communications

Spring 2020: Location and times TBA; approximately March 30 – May 2 (last five weeks of the second eight-week portion of the semester).

Instructor: Peter Bermel <pbermel@purdue.edu>

Office Hours: In EE 332, immediately after our class meets (or email for another time)

In addition to office hours, students are encouraged to make use of the following online resources:
- ECE 695 – Fiber Optic Communications -- Primary Course Page (this page)
- ECE 695 Blackboard website (for non-public information, such as grades and homework)

The primary course textbook is Fiber-optic communication systems (4th Edition) by Govind P. Agrawal.

Course Description:
This course will aim to introduce students to the fundamentals of fiber optic communications, which constitute the backbone of the internet. The course will start with a refresher on the operation of key components needed for an effective fiber optic communication system, and then show how these components interact at a system level. Finally, the course will conclude with outlook for future research in extending the capabilities of these networks to higher bandwidths and quantum-secured communications.

Lecture Format:
Students are expected to watch the assigned material on edX prior to class. Class periods will be devoted to providing an opportunity for relevant discussions and solving problems in class.

Class Schedule:
TBA.

Grading:
Your course grade will be based on a total of 300 points from quizzes. Up to 50 extra points can also be earned from attendance and extra credit assignments. Your course grade will be calculated by dividing your total by 400, and assigning letter grades on a 10-point scale.

Each quiz will be worth 100 points, and your lowest grade will be dropped. However, if you miss an quiz without a valid reason, it will be averaged into your final grade as a zero. If your quiz averages are lower than the target average, they will be curved at the discretion of the instructor.

Quiz Schedule:
Quiz 1 Wednesday, April 8, 2020
Quiz 2 Wednesday, April 15, 2020
Quiz 3 Wednesday, April 22, 2020
Quiz 4 Wednesday, April 29, 2020

Quizzes are closed book, but a formula sheet will be provided. You should bring a calculator to each quiz. Following ECE policy, your calculator must be a Texas Instruments TI-30X IIS scientific calculator.
Make-up Quiz Policy:

There will be NO written make-up quizzes. If you have a good excuse for missing a quiz, you will either be given an oral quiz, or your missed quiz will be dropped without penalty.

Academic Dishonesty:

Any case of academic dishonesty will result in a grade of F in this course.

Campus Closing/Disruption of Classes:

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. In such an event, information will be posted on the course webpage or emailed to you by the instructor.

Class Attendance:

Your class attendance is important. If you must miss class, you are responsible for any material, information, handouts, announcements, etc. you missed. If you are not in class and have someone else sign the attendance sheet for you, you will both receive an F for the class. Attending class is the only way to earn extra credit for attendance.
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<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Agrawal</th>
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<tbody>
<tr>
<td>1</td>
<td>Optical fibers: wave propagation, dispersion, and loss</td>
<td>Chapters 1 &amp; 2</td>
</tr>
<tr>
<td>2</td>
<td>Optical transmitters and receivers: materials, sources, modulation, speed limitations</td>
<td>Chapters 3 &amp; 4</td>
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<tr>
<td>3</td>
<td>Fundamental concepts in optical communication networks: power, noise, and speed</td>
<td>Sections 5.1, 5.2, 6.1, 6.4</td>
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<td>4</td>
<td>Current optical communication network architectures: TDM, DWDM, QPSK, QAM</td>
<td>Chapter 8, Section 10.2</td>
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<td>5</td>
<td>Future optical networks: fiber-to-the-home, data centers, quantum key distribution</td>
<td>Chapter 9</td>
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**Please come to class on-time!**
**Class announcements may supersede prior written information**