Integrated Optics
SYLLABUS

University Course Number: ELEG 853

Course Title: Integrated Optics

Instructor:Dr. Robert G. Hunsperger, Electrical Engineering, University of Delaware, Evans Hall, Newark, DE 19716

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Texts: Integrated Optics: Theory and Technology. Sixth Edition, R.G. Hunsperger, Springer Verlag, 2009 ISBN 978-0-387-89774-5 (Required)
Photonic Devices & Systems, R.G. Hunsperger, Ed., Marcel Dekker, 1994, ISBN 0-8247-9243-2 (Supplemental-not required)

Prerequisites: Basic undergraduate courses in semiconductor devices and electromagnetic waves.

Course Objectives:

1) **To explain how the various optoelectronic devices of an integrated optic system operate and how they are assembled into a system.**
2) **To explain how these devices are fabricated.**
3) **To illustrate the current state-of-the-art by reference to journal articles and to examples of actual devices and systems in use today.**

Course Description:

This course is an introduction to the theory and technology of integrated optics for graduate students in electrical engineering, and for practicing engineers and scientists who wish to improve their understanding of the principles and applications of this relatively new, and rapidly growing field. The basic goals, principles and techniques of integrated optics are discussed. The emphasis is on physical explanations of how devices and systems work rather than on elaborate mathematical models.

Integrated Optics or Photonics is the name given to a new generation of opto-electronic systems in which the familiar wires and cables are replaced by light-waveguiding optical fibers, and conventional integrated circuits are replaced by optical integrated circuits (OIC's) or photonic integrated circuits (PhCs). In an OIC (PhC), the signal is carried by means of a beam of light rather than by an electrical current, and the various circuit elements are interconnected on the substrate wafer by optical waveguides. Some advantages of an integrated optic system are reduced weight, increased bandwidth (or multiplexing capability), resistance to electromagnetic interference, and low loss signal transmission.

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Course Requirements

Homework:	**Problems assigned on a weekly basis.**
Exams:	**Midterm and a Final exam.**
Class Activities:	**Students are responsible for all material covered in the lectures and reading assignments.**

Submit all homework and exams to the course instructor by the due dates shown on the Assignment Schedule. (FAX to 302-831-1468 is preferred for online students.) This will ensure rapid grading and recording of your work. Please include the University course number on all work. (Delays of up to one week are OK. Approval for longer delays should be requested from the instructor.)

The homework will account for 15% of your grade and the exams will count equally into the other 85%. Each exam will cover roughly half of the course material. The Midterm exam will be 1.5 hours long, while the Final will be 2 hours long.

The exams will be 'closed-book" but a formula and data sheet will be provided, so it will not be necessary to memorize equations or constants. It will only be necessary for you to be able to select the right equations and data from a list of all those covered by the course. Graded midterm exams will be returned. Final exams are not usually returned unless you specifically request it.

A complete set of all homework assignments will be sent to you at the beginning of the term, and/or will be posted on the course website (www.ece.udel.edu/~hunsperg/853). Homework will be graded on a "logical approach" basis rather than on whether you obtain the right answer. Thus you should be able to obtain 100% on the homework by making a reasonable effort to solve all problems and submitting them. Graded homework submitted by FAX will not be returned to you, but solutions will be posted on the website and you will be notified on Sakai that we have received your homework. If you do not have web and/or FAX access, mail in your homework and it will be returned with a copy of the solutions. Note that solutions may be posted before the problems are due to be handed in, since I do not grade on the basis of correct answers and often students at different locations are taking the course on different schedules. Please try your best on the problems and then submit them before you look at the solutions. Be sure that you understand the homework solutions before taking the exams.