EEE 448 Fiber Optics (3) [F]

Catalog Data:
Principles of fiber optic communications.
Lecture (no lab)

Prerequisite:
EEE 341

Textbook:
Fiber Optic Communications, Joseph C. Palais, Prentice-Hall, 2005, 5th edition.

Coordinator:
J.C. Palais, Professor

Prerequisites by topic:
1. Electromagnetic theory through Maxwell's equations, the wave equation, and plane wave propagation (as in EEE 341).
2. Spectral analysis (as in EEE 203).
3. Electric circuits (as in EEE 202).

Course Objective:
To give students the ability to understand, specify, and design fiber-optic communications components and systems.

Course Outcome(s):
1. Students will learn the fundamentals of fiber optic communications.
2. Students will learn the applications of fiber optic communications
3. Students will be able to converse with technologists in the field of fiber optic communications.

Course Topics:
1. Fiber optic communications systems (1 week)
2. Optics review (2 weeks)
3. Lightwave fundamentals (2 weeks)
4. Integrated optic waveguides (2 week)
5. Optic fiber waveguides (4 weeks)
6. Optical sources and amplifiers (2 weeks)
7. Light detectors (2 weeks)

Computer Usage:
A number of simulation programs are available to students on the Internet. Many of the simulations are used to demonstrate principles during the lectures. Students are allowed, but not required, to complete homework problems on the computer.

Course Project:
None

Laboratory Experiments: None

Course Contribution to Engineering Science and Design:
Students learn to analyze dielectric waveguides by applying appropriate boundary conditions to solutions of the electromagnetic wave equation. Students learn the capabilities of various types of fiber optic structures in terms of information capacity and transmission efficiency.

Course Relationship to Program Objectives:
This course reinforces EE Program Educational Objectives A and D. Students do numerous problems in homework and exams requiring them to critically evaluate technical problems and their possible solutions. The students are required to apply basic mathematical and scientific principles to the understanding of fiber optic components, systems, and design.

EE Program Educational Objectives

The EE Program educational objectives follow directly from the undergraduate educational goals stated above, and provide more specific and quantifiable components, as follows:

A. **Problem solving:** EE graduates will have the ability to think in a critical and evaluative manner and to consider a broad perspective, in order to solve technical and non technical problems.
B. **Leadership and communication:** EE graduates provide effective leadership, act in an ethical manner and whose skills include the ability to communicate well and to work successfully within diverse groups.
C. **Market Acceptance:** EE graduates will be sought after by constituent industries and respected graduate programs.
D. **Technical competence:** EE graduates are technically competent and have a thorough grounding in the fundamentals of math and science in electrical engineering and experience in engineering design.

People preparing this description and date of preparation:
Joseph Palais (June 10, 2010)