

The University of Texas at Tyler
Department of Electrical Engineering

Course: EENG 5316– Optical Fiber Communication Systems(Elective)

Syllabus

Catalog Description:

An introduction to the analysis and design of fiber optic communication systems. Course begins with electromagnetic wave propagation treatment in optical fibers leading to single and multimode descriptions. The class will cover standard methods for measuring fiber parameters, and overall communication system performance including sources and receivers.

Prerequisites: Prerequisites, graduate standing and EENG 3303, EENG4312.

Credits: (3 hours lecture, 0 hours laboratory per week)

Text(s): Optical Fiber Communications, Gerd Keiser

Additional Material: Access to MATLAB software

Course Coordinator: Ron J Pieper

Topics Covered: (paragraph of topics separated by semicolons)

Review Electromagnetic theory, Ray theory, single mode analysis, graded index fiber mode analysis, signal degradation in optical fibers, Optical sources, Photodetectors, Power launching and Coupling, Digital transmission systems, Analog transmission systems, Link analysis (power and bandwidth)

Evaluation Methods: (only items in dark print apply):

- 1. Examinations / Quizzes**
2. Homework
3. Report
- 4. Computer Programming**
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Objectives¹: By the end of this course students will be able to:

1. Predict acceptance angle from fiber parameters
2. Use fiber mode analysis to distinguish single and multimode fibers
3. Predict modal and group-velocity (GVD) dispersions
4. Evaluate power losses due to source to fiber coupling and fiber to fiber splices
5. From semiconductor parameters characterize light emitting diodes and laser diodes
6. From semiconductor parameters and device specifications characterize performance for PIN and APD photo-detectors
7. Be able to determine if a fiber communication system is power limited or bandwidth limited using link budget methods.
8. Apply programming tools to analyze fiber and optical source performance

¹Numbers in brackets refer to method(s) used to evaluate the course objective.

Relationship to Program Outcomes (only items in dark print apply)²: This course supports the following Electrical Engineering Program Outcomes, which state that our students will: : (only items in dark print apply):

- 1. Possess a breadth and depth of knowledge in electrical and computer engineering. [1,2,3,4,5,6,7,8]**
2. Possess and demonstrate oral and written communication skills.[1,4,6,7,8,9,10]
- 3. Demonstrate the capability to perform independent learning and investigation. [8]**

²Numbers in brackets refer to course objective(s) that address the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:	1	hours
Engineering Sciences and Design:	2	hours
General Education Component:		hours

Prepared By: Ron J Pieper

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