



SYLLABUS
KENNESAW STATE UNIVERSITY
ELECTRICAL & COMPUTER ENGINEERING
EE 4490: SPECIAL TOPICS: FIBER OPTIC COMMUNICATIONS - FALL 2026

Course Information

Class meeting time: W/F 12:40pm-1:35pm Lectures - F 9:10am-11:55am Laboratory
Lecture Modality and Location: *Face to Face; Civil & Environmental Engr- Room 121*
Lab Modality and Location: *Face to Face; ETC Q-246*
Syllabus is posted in D2L

Instructor Information

Omar Rawdah, Instructor
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Office Phone:
Office Hours: TBA
Office Location: Room Q-253
Preferred method of communication: Email

Course Description

3 Credit Hours- 2 Class Hours 1 Laboratory Hours

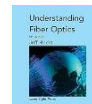
Prerequisites: EE 3605 Electromagnetics or ECET 3410 High Frequency Systems.

Course Materials

Required Text: Understanding Fiber Optics, by Jeff Hecht, 5th edition, SPIE Press Book, 2015.

ISBN: 1511445653

ISBN13: 9781511445658



Recommended Text: Optical WDM Networks, Biswanath Mukherjee, 2nd edition, Springer, 2006.

ISBN: 978-1-4899-7883-7

Some students learning material to be provided from personal notes.

Course Outline

This course is a study of fiber optics fundamentals including optical fiber properties, cable types and assemblies, optical sources and detectors, transmitters and receivers, fiber optic components, and basics of a fiber-optic communications system.

WDM Transmission aspects of optical networks, designing optical systems, power and loss budgets, and optical measurement techniques, are also covered in this course. The laboratory familiarizes students with main components, measuring and troubleshooting tools and techniques for optical communications applications.

You will learn about:

- Fiber optics fundamentals, types, and how they are assembled into cables.
- Optical fibers, their properties (propagation, dispersion, attenuation, non-linearity).
- Laser and LED sources, optical transmitters, detectors, receivers, and amplifiers.
- Fiber optic components: connectors, splicers, couplers, and passive components.
- WDM optics, optical switches, modulators and active components.
- Optical measurement techniques, and test equipment.
- Fiber Optic networks and systems, designing optical systems, and link budgets.
- Applications: Metro and access networks, LANs, Passive Optical Networks, and Undersea Fiber Cables & Networks. 

Labs Outline:

- Fiber and Connector Preparation
- Insertion Loss Testing
- Splicing
- OTDR Trace analysis
- Loss Budget Measurements

Learning Outcomes

After successful completion of this course, the students will be able to:

1. Comprehend the fundamentals of optical fibers used for communications.
2. Learn the functionality of the components of a fiber-optic communication system.
3. Describe the properties of optical fiber and performance of a communication link.
4. Recognize and describe Laser and LED sources, optical transmitters, detectors, receivers, optical amplifiers, and repeaters.
5. Identify and describe fiber optic passive and active components, including: connectors, splicers, couplers, splitters, WDM optics.
6. Use optical fiber test equipment and understand optical measurement techniques.
7. Perform simple measurements of fiber, compare multi-mode and single-mode fiber, and splice optical fibers.
8. Measure properties of components used in WDM optical systems
9. Design an optical communication link and analyze its main parameters.
10. Differentiate between fixed optical communications networks (passive and active) and describe the role of fiber in wireless communication networks.
11. Successfully design a modern fiber optic network.