

COURSE SYLLABUS
SOUTHEAST MISSOURI STATE UNIVERSITY

Department of Industrial Engineering Technology

Course No.: ET254

Title of Course: Fiber Optics & Network Communications

Revision: Fall 2004

Instructor:

Email:

Office:

Office Phone:

Web URL:

I. Catalog Description and Credit Hours of Course:

Principles of fiber optics, system components, applications of fiber optics in data and network communication systems. 3 Credit Hours (2 hours lecture and 2 hours lab).

II. Prerequisites: ET245

III. Purposes or Objectives of the Course:

Upon the successful completion of the course, the student will be able to:

1. Be familiar with the operating principles of fiber optics and its characteristics.
2. Describe the principles of data and network communications for analog and digital systems.
3. Describe modulation, multiplexing and demultiplexing in fiber optic systems.
4. Describe the systems and hardware of fiber optic communication systems.
5. Perform noise and error analysis on fiber optic communication systems.

IV. Expectations of Students:

1. Read and study all assignments.
2. Class attendance and participation are required, both lecture and lab.
3. Complete and turn in assignments at the scheduled time
4. In a professional environment, work areas are kept clean. In keeping with a professional attitude towards fellow students, always clean your area before leaving
5. All laboratory work must be completed during the regularly scheduled lab time.

V. Course Content or Outline:

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|---|---------|
| 1. Principles of Fiber Optics & Characteristics | 2 Weeks |
| A. Light Propagation | |
| i. Total Internal Reflection | |
| ii. Mode Propagation. | |
| iii. Acceptance Angle & Numerical Aperture | |
| B. Line Width | |
| C. Propagation Velocities | |
| D. Fiber Losses | |
| i. Material Losses | |
| ii. Scattering | |
| iii. Waveguide & Microbend Losses | |
| E. Dispersion | |
| i. Intermodal Dispersion | |

- ii. Intramodal Dispersion
 - F. Transmission Wavelength
 - G. Step Index: Multimode & Singlemode Fibers
 - H. Graded Index Fibers

- 2. Principles of Fiber Optics Communications 2 Weeks
 - A. Analog & Digital Transmission
 - B. Digital Coding
 - C. Electrical & Optical Bandwidth
 - D. Dispersion Effects
 - E. Bandwidth and Data Rate
 - F. Dynamic Range
 - G. Noise and Bit Error Rate.

- 3. Modulation & Multiplexing 2 Week
 - A. Pulse Amplitude Modulation
 - B. Pulse Code Modulation
 - C. Time Division Multiplexing
 - D. Wavelength Division Multiplexing
 - E. Frequency Division Multiplexing.

- 4. Fiber Optic Components 1 Week
 - A. Splicing
 - B. Connectors
 - C. Connector Losses
 - D. Fiber Optic Couplers
 - E. Fiber Optic Switches
 - F. LED and Laser Diode Drivers
 - G. Photodetectors – Photodiodes.

- 6. Fabrication, Cabling, and Installation. 1 Week

- 7. Data Communications 2 Weeks
 - A. Network Classification
 - B. Network Architectures & Standards
 - C. Introduction to Protocols
 - D. Data Communication Fundamentals
 - E. Data Link Control Protocols

- 8. Communication Networks 2 Weeks
 - A. Local Area Networks (LANs)
 - B. LAN Systems
 - C. Wide Area Networks (WANs)
 - D. Internetworking

- 9. Fiber Optic Network Concepts & Design 3 Weeks
 - A. Regional & Metro Telecommunications
 - B. Local Telephone & Access Networks
 - C. Computers & Local Area Networks

10. Final Exam

VII. Textbook and Other Required Materials or Equipment:

Understanding Fiber Optics, 4/E Jeff Hecht, Prentice Hall, 2003

VIII. Student Evaluation:

Grading will consist of the following criteria and percentages.

Class Participation*	10%
Assignments/Drawings	40%
Quizzes/Tests.....	30%
Final/Final Project	20%

Participation in class discussions, performing lab activities, homework, and exams on the assigned time slots

Grading Scale:

A =	100 - 90%
B =	89 - 80%
C =	79 - 70%
D =	69 - 60%
F =	59 - 0%

NOTHING IS ACCEPTED LATE without appropriate reason such as illness, death in family etc. If unable to attend class, work may only be made up if prior arrangements have been made. Students must e-mail BEFORE class time with reason for missing. Assignments due at the beginning of the period (BOP) are not accepted later in the period. Assignments due at the end of the period (EOP) are not accepted after that time. Nothing is to be turned in to the department secretary. Tests or quizzes may or may not be announced ahead of time. Assignments turned in may be graded in whole, or in part as announced.

IX. Lab Fee:

None

X. Disabilities Statement:

If student has special needs addressed by the Americans with Disabilities Act (ADA) and needs course materials in an alternative format, please notify Instructor immediately. Reasonable efforts will be made to accommodate special needs.

Instructor reserves the right to change the content and/or sequencing of the materials presented and will notify students of any changes