ECE 417 – OPTICAL FIBER COMMUNICATION

Type (check one): Required: _____ Elective: X

2005-2006 Catalog Data: ECE 417. Optical Fiber Communication. (Formerly EE 417) A study of the transmission properties of optical fibers; light sources and detectors; power launching and coupling; noise sources; modulation formats, system analysis and design. Prerequisites: ECE 331, 335, 406 and PHYS 252. *One semester; three credits*. Offered in the Spring.

Prerequisites: ECE 331, 335, 405, and PHYS 252

Co-Requisites: None

Textbook: Gerd Keiser, (2000). *Optical Fiber Communications*, Third Edition, McGraw-Hill, New York, ISBN 0-07-232101-6.

Other Required Materials: None

Other References: None

Instructor: Fred H. Terry, Ph.D., Professor of Electrical and Computer Engineering

Course Objectives:

1. Basic competence in solving problems involving fiber optic components.
2. Introduction to fiber optic system organization and operation.
3. Use of fundamental concepts from electromagnetic fields and electronic communications.
4. Use of engineering software such as PSICE and MathCAD© to supplement more traditional methods of problem solving.
5. Design of fiber optic systems including realistic constraints such as security, reliability, and economic considerations.

Prerequisites by Topics:

1. Engineering problem solving
2. Basic electronic circuits
3. Introduction to continuous and discrete communication systems
4. Electromagnetic field theory through Maxwell's Equations and plane wave propagation

Topics:

1. Overview
2. Optical Fibers: Structures, Waveguide Properties, and Fabrication
3. Signal Degradation
4. Optical Sources
5. Power Coupling
6. Photodetectors
7. Digital Transmission Systems
8. Optical Networks

Class Schedule: Two 75-minute sessions per week

Prepared by: Dr. Fred H. Terry **Date:** August 2005

Professional Component:
ChE 417 – OPTICAL FIBER COMMUNICATION

Category (check one)	____ Math/Basic Science __X__ Engineering ____ General Education ____ Other
Design (check one)	____ Significant __X__ Some ____ None
Realistic Constraints (check all that apply)	__X__ Economic ____ Environmental ____ Sustainability __X__ Manufacturability ____ Ethical ____ Health & Safety __X__ Social ____ Political

Relationship to Program Outcomes:

Check all that apply:

__X__ (a) an ability to apply knowledge of mathematics, science, and engineering
____ (b) an ability to design and conduct experiments, as well as to analyze and interpret data
__X__ (c) an ability to design a system, component, or process to meet desired needs
____ (d) an ability to function on multi-disciplinary teams
__X__ (e) an ability to identify, formulate, and solve engineering problems
__X__ (f) an understanding of professional and ethical responsibility
__X__ (g) an ability to communicate effectively
____ (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
____ (i) a recognition of the need for and an ability to engage in life-long learning
____ (j) a knowledge of contemporary issues
__X__ (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice