



Course Syllabus

Course: K251/2 Fiber Optic Systems and Devices
Credits: 4
Prerequisites: EET* K105/106, MAT* K186, and PHO* K101
Instructors: Lecture - Dan Courtney – dcourtney@trcc.commnet.edu – 860-885-2338
Lab – jdonnelly@lasertechonline.org – 860-885-2353
Office Hours: As Posted – Office C134
Text: Understanding Fiber Optics, Fifth Edition, Jeff Hecht, Pearson Education, ISBN 0131174290

Course Descriptions:

This course will introduce parameters describing optical fibers, fiber optic system components, waveguide transmission as well as non-telecommunications uses of fiber. Fiber coupling, splicing, and testing will also be covered. Concepts from optics and electronics will be used extensively to explain the operation of fiber systems and devices.

This laboratory course accompanies PHO* K251 and provides practical experience applying and testing fiber optic connectors and splices, fusion splicing, and using instrumentation such as optical loss test sets and the optical time domain reflectometer (OTDR). Students will measure fiber optic parameters and work active and passive devices commonly found in fiber optic systems.

Grading: Notebooks, Lab Reports, Oral Presentation, Class Participation, Attendance, Promptness, Homework, Tests, Professional Attitude

Course Topics:

Background and Applications
Fiber Types and Characteristics
Cables, Connectors and Splicing
Sources and Detectors
Transmitters and Receivers
Fiber Optic Components
Test Equipment
Fiber Optic Sensors and Other Applications
Integrated Optics

Lab Topics:

PI Plastic Fiber- connector application
Plastic Fiber- connector testing
Numerical aperture
Measurement of attenuation
MM connector on glass fiber- application (room temp epoxy)
MM Connector on glass fiber- polish and test
Connector losses
Single mode connector- application (heat epoxy), polish and test
Splicing (fusion and mechanical) and OTDR (2 weeks)
Fiber distance sensor
WDM
Fiber Laser



ABET Program Outcome Requirements

- a) an appropriate mastery of the knowledge, techniques, skills, and modern tools of their Disciplines
- b) an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology
- c) an ability to conduct, analyze and interpret experiments, and apply experimental results to improve processes
- d) an ability to apply creativity in the design of systems, components, or processes appropriate to program educational objectives
- e) an ability to function effectively on teams
- f) an ability to identify, analyze and solve technical problems
- g) an ability to communicate effectively
- h) a recognition of the need for, and an ability to engage in lifelong learning
- i) an ability to understand professional, ethical and social responsibilities
- j) a respect for diversity and a knowledge of contemporary professional, societal and global issues
- k) a commitment to quality, timeliness, and continuous improvement

LFOT Program Outcomes

Upon successful completion of all program requirements, graduates will be able to:

1. use general electronic and optical test instrumentation as well as specialized instrumentation such as optical spectrum analyzers and laser beam analyzers.
2. specify, mount, and align optical components and install, align, and operate support and positioning equipment.
3. demonstrate proper optical fiber handling techniques, including connectorization, splicing and the use of optical sources, meters and OTDR.
4. survey a laser work area, citing unsafe conditions present.
5. work cooperatively with team members to gather and analyze data using applicable software and report results in both oral and written format.
6. read and interpret vendor catalogs and instruction manuals.

K251 Course Outcomes

1. Mastery of Fiber Optic concepts as defined in the course syllabus
2. Develop the necessary skills to safely handle fiber optic components
3. Develop basic skills for testing fiber optic components and systems
4. Demonstrate an ability to analyze and solve problems relating to basic fiber optic systems
5. Demonstrate senior level oral and written communication skills
6. Demonstrate an appreciation for lifelong learning
7. Demonstrate proper professional and ethical behavior
8. Demonstrate a commitment to quality, timeliness and continuous improvement



TRCC EET Program Outcomes

1. Students will practice the skills needed to work effectively in teams and as an individual.
2. Students will demonstrate the ability to use appropriate mathematical and computational skills needed for engineering technology applications.
3. Students will combine oral, graphical, and written communication skills to present and exchange information effectively and to direct technical activities.
4. Students will know of a professional code of ethics.
5. Students will describe concepts relating to quality, timeliness, and continuous improvement.
6. Students will describe how the concepts of electric circuits, electrical measurements, digital electronic devices, programmable logic circuits, electromechanical and automated systems, affect the design, maintenance, and operation of electrical systems.
7. Students will illustrate an ability to think critically and identify, evaluate and solve complex technical and non-technical problems; demonstrate creativity in designing problem solutions; and conduct and interpret experimental data and outcomes.
8. Students will recognize actions and acts of professionalism that allows them to become informed and participating citizens cognizant of ethics, civic duty, and social responsibility.
9. Students will recognize the need to be lifelong learners.

A	11312	PHO*	K251	T1	textbook info	3.00	Fiber Optic System and Devices	TRAD	MW	10:46 am-11:59 am	12	9	3	Daniel P Courtney	01/20-05/18	KTRCC B209
A	11313	PHO*	K252	T1A	textbook info	1.00	LAB, Fiber Optic System Device	TRAD	M	01:00 pm-02:40 pm	12	7	5	Judith F. Donnelly	01/20-05/18	KTRCC B213

Instructor Bio - Dan Courtney

AS 1976 (STCC)	1976	Electronic Technology
MSEE (UMass)	1983	Electrical and Computer Engineering, Microwave Engineering
Galileo Electro-Optics	1976	Engineering Technician, Fiber Optic Characterization, Fiber Optic Fabrication
STCC	1977-83	Assistant Prof – Electronics, Laser/Electro-Optics Technology
Western New England College	1983-84	Adjunct Faculty - Computer Algorithms, Advanced Programming Languages
United Technologies	1983-95	
UT Diesel Systems	1983-84	Systems Engineer - Diesel Engine Electronic Controls
UT Hamilton Sundstrand	1984-95	Principal Engineer - Fiber Optics Gyro, Aircraft Environmental Control Systems
JDS Uniphase (JDSU)	1995-present	Specialist – Business Processes
TRCC	2009-present	Program Coordinator – Electrical Engineering Technology