UCF CREOL, THE COLLEGE OF OPTICS AND PHOTONICS

Course Syllabus

OSE-4470L Fiber Optic Communication Laboratory, 1 CREDIT HOUR

Instructor: Mohammad Umar Piracha, Ph.D.
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Phone:
Office:
Office Hours:

Term: Fall 2015
Class Meeting Days: Wednesdays
Class Meeting Time: 12pm – 2:50pm
Class Location CREOL: A210
Website: webcourses@ucf

Additional Notes: Often, I get questions via e-mail that can be quickly answered, therefore email is the preferred mode of contact. However, for more elaborate discussions, I can arrange to meet at CREOL via appointment, preferably before or after the laboratory session.

Course Catalog Description:
Pre/Co-requisites: OSE 4470 Fiber-Optic Communications

Detailed Course Description and Learning Outcomes:

Detailed Description:
This lab course is associated with the theory course on the same topic (OSE 4470) on Introduction to the Principles of Optical Fiber Communication Systems.

1. This laboratory course will enable students to relate what they have learnt in classroom to practical, hands-on experiments that will be performed in a fiber optic communication laboratory.
2. Take away the "fear factor" by providing experience of operating various equipment.
3. Establish good practices in experimentation including accurate data collection, and critical thinking, analysis of data, and sources of error.
4. Learn to write lab reports.

Learning Outcomes and Measures:
Upon completing this course, students will become familiar with various fiber optic components and systems and know how to:

- Couple light in and out of fibers and connect them
- Measure loss and dispersion in fibers
- Measure the performance of analog and digital fiber links
- Relate an integrated view of engineering by explaining the fundamental analogies between electrical and optical communication systems

Topics: (A detailed schedule with dates follows at the end of this document.)

The experiments are set up to cover three main topics:

1. The optical fiber as a transmission channel.
2. Optoelectronic devices used in transmitters, receivers, and multiplexers.
3. Overall communication system performance. The challenges of coupling light into and between fibers and the associated losses are experimentally quantified. The dispersion of various types of optical fibers is measured. The issues of digital and analog systems and their performances are introduced and quantified. Introductions to wavelength-division multiplexing (WDM) components and systems are also provided.

Relationship of Course to ABET Criteria

ABET Criteria	Level of Emphasis During Course (Low, Medium, High)
(a) An ability to apply knowledge of mathematics, science, and engineering.	High
(b) An ability to design and conduct experiments, as well as to analyze and interpret data.	High
(c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	Low
(d) An ability to function on multidisciplinary teams.	Low
(e) An ability to identify, formulate, and solve engineering problems.	High
(f) An understanding of professional and ethical responsibility.	Low
(g) An ability to communicate effectively.	Medium
(h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	Low
(i) A recognition of the need for, and an ability to engage in life-long learning.	Medium
(j) A knowledge of contemporary issues.	Low
(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	High

Textbook:
Laboratory notes and instructions will be sufficient for most students. However students may find the following textbook useful: *Optical Fiber Communications*, 4th Edition G. Keiser, McGraw-Hill

Recommended Reference:
- Optical Fiber Communication Systems, W. Jones, HRW.
- Fundamentals of Photonics, B. Saleh and M. Teich, Wiley.

Course Grading and Requirements for Success:

Attendance & Participation: 10%
Laboratory Questionnaires: 42% (6% for each lab)
1 Full Laboratory Report: 20%
Quizzes: 28% (4% per experiment)
Bonus Credit: 1%, based on student evaluations from their project partners and peers.

Make up class policy: If an emergency arises and a student cannot submit assigned work on or before the scheduled due date or cannot show up for class, the student **must** give notification to the instructor **no less than 24 hours before** the scheduled date and **no more than 48 hours after.**

Grading Scale (%)	Rubric Description
100 ≥ A > 90	Excellent, has a strong understanding of all concepts and is able to apply the concepts in all and novel situations. Has full mastery of the content of the course.
> B ≥	Good, has a strong understanding of most or all of the concepts and is able to apply them to stated and defined situations.
> C ≥	Average, has a basic understanding of the major concepts of the course and is able to apply to basic situations.
> D ≥	Below average, has a basic understanding of only the simple concepts and is able to apply to only a limited number of the most basic situations.
> F ≥ 0	Demonstrates no understanding of the course content.

Grade Objections:
All objections to grades should be made **in writing within one week** of the work in question.
Objections made after this period has elapsed will **not** be considered – NO EXCEPTIONS.

Class Website:
Materials used for classes will be available on UCF Webcourses for download before each class. If students want a hard copy of the slides, they may print them on their own. These are only printed for you for the first class. You are required to read or view materials prior to class. If you do not, you will not be able to do well in this class. See below.

Teaching vs. Learning:
Most people learn things for themselves. As a teacher, my job is to help students to learn the material. In order to help students learn in depth, I plan to use a significant amount of class time for detailed discussion of concepts, and problem-solving. Credit will be given for these activities. These types of activities require that students actually carry out reading assignments prior to class. I will conduct quizzes to ensure that students come to class prepared.

On a more practical note, I aim to encourage, inspire and mentor students as they prepare to graduate and enter life outside college. During this course, I will not only help students achieve the technical learning outcomes of the class, but also help them figure out their careers and goals within or beyond the area of optics. Students are encouraged to participate in discussions and ask questions.

Professionalism and Ethics:
Per university policy and plain classroom etiquette, mobile phones, etc. must be silenced during all classroom lectures, unless you are specifically asked to make use of such devices for certain activities. **Academic dishonesty in any form will not be tolerated**. If you are uncertain as to what constitutes academic dishonesty, please consult The Golden Rule in the UCF Student Handbook (www.goldenrule.sdes.ucf.edu) for further details. As in all University courses, The Golden Rule Rules of Conduct will be applied. Violations of these rules will result in a record of the infraction being placed in your file and the student receiving a zero on the work in question AT A MINIMUM. At the instructor's discretion, you may also receive a failing grade for the course. Confirmation of such incidents can also result in expulsion from the University.

Students with Special Testing/Learning Needs:
Students with special needs and require special accommodations must be registered with UCF Student Disability Services prior to receiving those accommodations. Students must have documented disabilities requiring the special accommodations and must meet with the instructor to discuss the special needs as early as possible in the

first week of classes. UCF Student Disability Services can be contacted at www.sds.sdes.ucf.edu or at (407)823-2371.

Dates:

First Day of Class	Aug 26th 2015
Last Day to Drop Classes:	Aug 27th 2015
Last Day to Add Classes:	Aug 28th 2015
Final Exam:	--

OSE-4470 Fiber Optic Communication Laboratory, Instructor: Dr. Mohammad Umar Piracha **Daily Schedule (subject to change)**			
Week	Date	Concepts Presented:	Textbook chapter
1	Aug 26th 2015	Numerical Aperture of a Fiber - i	
2	Sep 2nd 2015	Numerical Aperture of a Fiber - ii	
3	Sep 9th 2015	Mode Profile of the Fundamental Mode - i	
4	Sep 16th 2015	Mode Profile of the Fundamental Mode - ii	
5	Sep 23rd 2015	High-Order Modes in Fiber - i	
6	Sept 30th 2015	High-Order Modes in Fiber - ii	
7	Oct 7th 2015	Coupling and Propagation Loss - i	
8	Oct 14th 2015	Coupling and Propagation Loss - ii	
9	Oct 21st 2015	Analog Communication Link - i	
10	Oct 28th 2015	Analog Communication Link - ii	
11	Nov 4th 2015	Digital Communication Link - i	
12	*Nov 11th 2015*	**Veterans Day Holiday**	
13	Nov 18th 2015	Digital Communication Link - ii	
14	Nov 25th 2015	Wavelength Division Multiplexing - i	
15	Dec 2nd 2015	Wavelength Division Multiplexing - ii	

		FINAL EXAM	