

OSE 4470L Fiber-Optic Communications Laboratory

Instructor: Guifang Li, CREOL 278,
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Time: Wednesday 12:00pm – 2:50pm

TA: Christian Carboni and Shengli Fan

Office Hours: Fridays 9:00-12:00 CREOL 278 or by
appointment (no appointments on Wednesday)

Goals:

1. Relate what you have learnt in classroom to what you can see in the lab of a variety topics related to fiber-optic communications.
2. Take away the “fear factor” by providing experience of operating various equipment.
3. Establish good practices in experimentation including keeping a lab notebook and keeping the experiment station clean.
4. Learn to write lab reports.

Course Description

- **This lab course is associated with the theory course on the same topic (OSE 4470). The experiments are cover three topics:**
 - 1. The optical fiber as a transmission channel, for example**
 - **Coupling light into and between fibers**
 - **Measuring losses of fibers**
 - **Observing modes/dispersion of various types of optical fibers**
 - 2. Optoelectronic devices used in transmitters, receivers, and multiplexers (how to use them)**
 - 3. Fiber-optic communication systems performance**
 - **Setting up a digital or analog fiber-optic communication system and observe their**
 - **Components for wavelength-division multiplexing (WDM) and WDM systems.**

Learning Outcomes

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**

Preliminary Schedule

Week	Date	Laboratory Topic
1	Aug 24	Numerical Aperture of a Fiber - i
2	Aug 31	Numerical Aperture of a Fiber - ii
3	Sep 7	Mode Profile of the Fundamental Mode - i
4	Sep 14	Mode Profile of the Fundamental Mode - ii
5	Sep 21	High-Order Modes in Fiber - i
6	Sep 28	High-Order Modes in Fiber - ii
7	Oct 5	Coupling and Propagation Loss - i
8	Oct 12	Coupling and Propagation Loss - ii
9	Oct 19	Analog Communication Link - i
10	Oct 26	Analog Communication Link - ii
11	Nov 2	Digital Communication Link - i
12	Nov 9	Digital Communication Link - ii
13	Nov 16	Wavelength Division Multiplexing - i
14	Nov 23	Thanksgiving
15	Nov 30	Wavelength Division Multiplexing - ii

Instructional Materials

- **Lab Notes**
- **Lab Procedure**

Textbook

- **Optical Fiber Communications, 4th Edition G. Keiser, McGraw-Hill**

References:

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

Grading Policy

- **Attendance (on time) & Participation: 10%**
- **6 Short Lab Reports/Questionnaires: 42% (7% for each lab)**
- **1 Full Laboratory Report: 14%**
- **6 Quizzes: 24% (4% per experiment)**
- **Lab Skill Test 10%**

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.
89 > B ≥ 80%	Good, has a strong understanding of most or all of the concepts and is able to apply them to stated and defined situations.
79 > C ≥ 70%	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.

House-Keeping Items

- Lab notebooks will be examined periodically and collected at the end of the semester.
- Lab reports must be submitted through Webcourses at <http://webcourses.ucf.edu/> **by 12:00 am of the next Wednesday** after the experiment is completed.
- Lab reports sent via email or hard copy will **NOT** be accepted.
- Absences and Makeup Lab Sessions:
 - Because of the fluid nature of the lab with the experimental setup changing every week, there will be **NO MAKEUPS ALLOWED** except in cases of genuine emergency.
 - With prior arrangements, students may be allowed access to the lab before or after the class on Wednesday.

Laboratory Notebook

- **A bound pre-numbered laboratory notebook must be used to properly document all experimental procedures, observations, data, and measurements during the laboratory session. All entries must be in ink. The notebook must be dated and signed by the lab instructor.**
- **Goal is to be able to**
 - **Reproduce the experimental setup (hardware)**
 - **Repeat the experiment by recording the details of the laboratory settings**
- **Notebook Organizations**
 - **Date, Partner(s)**
 - **Equipment List include model #**
 - **Schematic Drawing and Raw Data for each lab procedure**

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. 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.

Enjoy the Lab!