

Course Syllabus

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SYLLABUS

OSE 4470. Fiber Optic Communications

College of Optics and Photonics

Number of Credit Hours: 3

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Instructor Information



 Dr. Rodrigo Amezcua Correa

 407-823-6853

 r.amezcua@creol.ucf.edu

Office Location: CREOL A118

Office Hours: Tuesday and Thursdays 12:00 pm to 1:00 pm. I will be happy to discuss the material with you anytime by appointment.

Teaching Assistant



Course Information



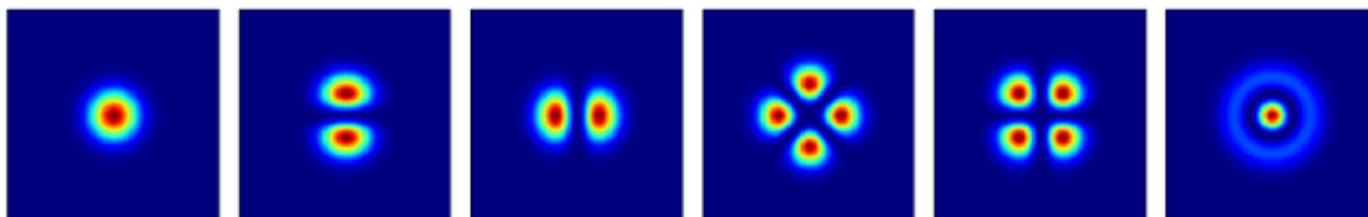
- **Term:** Fall 2021
- **Course Number & Section:** OSE 4470
- **Course Name:** Fiber Optic Communications
- **Class Location:** CREOL 102
- **Credit Hours:** 3
- **Class Meeting Days:** Tuesdays and Thursdays
- **Class Meeting Time:** 10:30 AM - 11:45 AM

Enrollment Requirements

Course Prerequisites: OSE 3052, Foundations of Photonics

Other Enrollment Requirements: Students are expected to attend classes at designated days and times as specified in the class meeting pattern. Instruction may be supplemented by additional online activity, guest lectures and/or exams.

Course Description



Introduction to the principles and design of optical fiber communication systems including the optical fiber medium and optoelectronic devices used in transmitters and receivers.

The course covers three topics: 1) The optical fiber as a transmission channel. 2) Optoelectronic devices used in transmitters, receivers, and multiplexers. 3) Design of the overall communication system and assessment of its performance. In part 1, step-index and graded-index multimode and

single-mode optical fibers are described and their attenuation and dispersion characteristics are determined. The transfer function of the fiber system is determined. Part 2 introduces the basic principles of interaction of light with semiconductor materials, including absorption and electroluminescence. Light emitting diodes, laser diodes, and photodiodes are introduced as the basic components of optical transmitters and receivers. Semiconductor and fiber optical amplifiers are also introduced. Part 3 deals with the design of the digital fiber communication system, including derivation

of the bit error rates for attenuation- and dispersion-limited systems and determination of the maximum data rates possible for a given length. Introductions to wavelength-division multiplexing (WDM) and optical fiber networks are also provided.

Course Materials and Resources

Required Materials/Resources



- Internet access, browser and e-mail



Course Textbook

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

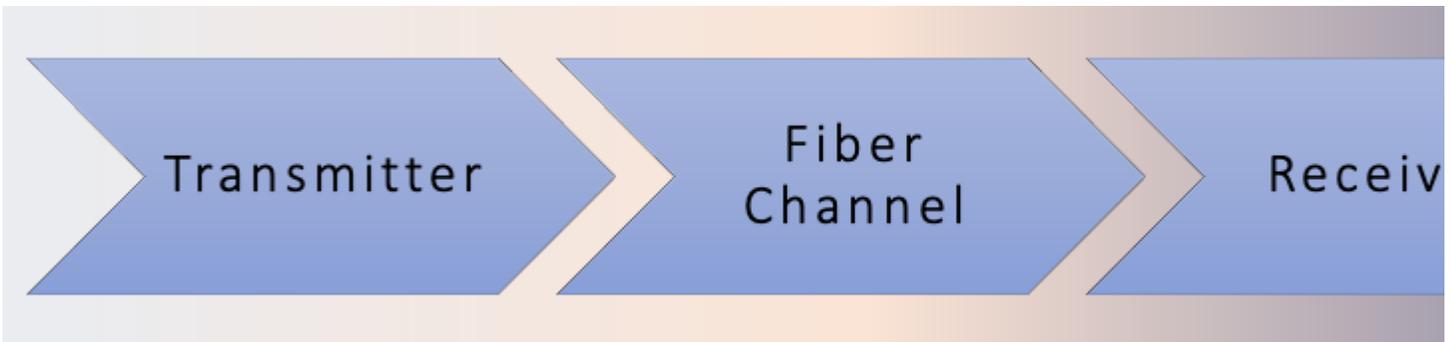
Chapters 1- 8 and 10 of Keiser's textbook are covered. Also, the following Sections from Chapters 1 through 8 are not covered and will not be part of exams:

Excluded Book Sections: 1.7, 1.8, 2.8, 2.10, 3.4, 4.4, 4.5, 4.6, 4.7, 5.4, 5.6.3, 6.4, 6.6, 7.5, 8.2.4, 8.2.5, 8.2.7, 8.3, 8.4, and 8.5.

Optional Reference Books

- Introduction to Optical Fiber Communication Systems, W. Jones, Jr., Oxford University Press.
- Fiber-Optic Communication Systems, G. Agrawal, Wiley
- Fundamentals of Photonics, 2nd edition B. Saleh and M. Teich, Wiley, 2007

Student Learning Outcomes



Upon completing this course, the students will be able to:

- Describe the fundamental physics of light guidance in optical fibers, including the concepts of guided modes and group velocity
- Compute the attenuation and pulse broadening encountered when optical pulses at a given wavelength travel in long fibers
- Describe the operational principles of light emitting diodes and laser diodes and their distinction

- Describe the operational principles of light emitting diodes and laser diodes and their distinction
- Describe the operational principles and the limitations of photodiodes and avalanche photodiodes
- Explain the basics of optical modulation and multiplexing
- Design a fiber link of given length operating at a given wavelength, and at a prescribed bit error rate by use of optical repeaters
- Acquire an integrated view of engineering by seeing the fundamental analogies between electrical and optical communication systems

Course Activities

- **Participate!**
 - Ask questions during class
- **Assignments**
- **Two mid-term exams**
 - In class, dates to be determined
- **Comprehensive final exam**
 - According to UCF final exam calendar
- **In-class quizzes**
- **Invited lectures**
- The student is expected to review the textbook, notes, and other materials before class. Materials used for class will be available on UCF Webcourses

Activity Submissions

- Please submit your homework on Webcourses as pdf files. Solutions will be posted on the web after the submission deadline.

Attendance/Participation

- Regular class attendance is mandatory
- Please be on time to class
- Come to class prepared

Make-up Exams and Assignments

Per university policy, you are allowed to submit make-up work (or an equivalent, alternate assignment) for authorized university-sponsored activities, religious observances, or legal obligations (such as jury duty). If this participation conflicts with your course assignments, I will offer a reasonable opportunity for you to complete missed assignments and/or exams. The make-up assignment and grading scale will be equivalent to the missed assignment and its grading scale. In the case of an authorized university activity, it is your responsibility to show me a signed copy of the Program Verification Form for which you will be absent, prior to the class in which the absence occurs. In any of these cases, please contact me ahead of time to notify me of upcoming needs.

Assessment and Grading Procedures

The table shows the weight distribution for each assignment.

Assignment	Percentage of Grade
Homeworks	5%
Guest lectures report	15%

and discussion	15%
Midterm exam 1	20%
Midterm exam 2	20%
Quizzes	15%
Final exam	25%
Total	100%

The table shows the range for each letter grade and uses a plus/minus system.

Letter Grade	Points
A	93 – 100 points
A-	90 – 92 points
B+	87 – 89 points
B	83 – 86 points
B-	80 – 82 points
C+	77 – 79 points
C	73 – 76 points
C-	70 – 72 points
D+	67 – 69 points
D	63 – 66 points
D-	60 – 62 points
F	59 and below

Consult the latest Undergraduate or Graduate **catalog** for regulations and procedures regarding

grading such as incomplete grades, grade changes, and grade forgiveness.



Course Schedule

University Services and Resources

Academic Services and Resources

A list of available academic support and learning services is available at [**UCF Student Services**](#) . Click on "Academic Support and Learning Services" on the right-hand side to filter.

Non-Academic Services and Resources

A list of non-academic support and services is also available at [**UCF Student Services**](#) . Click on "Support" on the right-hand side to filter.

If you are a UCF Online student, please consult the [**UCF Online Student Guidelines**](#) for more information about your access to non-academic services.

Policy Statements

