EE412 Lightwave Communication (3-0)

2021 Spring, Thursday: 9:45-12:30

Course Coordinator: Dr. Kıvılcım Yüksel Aldoğan
Assistant: Şamil Şirin

Text Books:

Optical Fiber Communications Principles and Practice J. M. Senior Prentice Hall	*** Fiber Optics and Optoelectronics *** R.P Khare Oxford Higher education

Additional Reading:

Optoelectronics and Photonics
S.O Kasap
Pearson

Fundamentals of Photonics
B.E.A. Saleh, M.C. Teich
Wiley-Inter science

Papers:

Fiber-optic transmission and networking: the previous 20 and the next 20 years
Vol. 26, No. 18 | 3 Sep 2018 | OPTICS EXPRESS 24190
https://doi.org/10.1364/OE.26.024190

Vulnerabilities and security issues in optical networks
DOI: 10.1109/ICTON.2014.6876451

Digital Signal Processing for Optical Communications and Networks
http://dx.doi.org/10.5772/intechopen.68323

Grading

Final Exam (written and oral)…….. 40 %
Quiz Score……. 60 %

Weekly quizzes will be applied throughout the semester (11:45-12:30). There are 10 quizzes. 8 best quizzes out of 10 will be used for grading. There will be a Final Examination at the end of the semester.

Students are expected to attend at least 70% of the lectures and problem sessions

Contents

a. Fiber Loss-induced limitations
b. Dispertion-induced limitations
c. WDMs and couplers
d. Fiber network planning
e. Roadmaps of optical communications

8) Passive Optical Components
   a. Couplers
   b. Circulators
   c. Isolators
   d. Filters
9) Optical Multiplexing Techniques (EE511)
   a. Wavelength-division multiplexing (WDM)
   b. Polarization-division multiplexing (PDM)
   c. Time-division multiplexing (TDM)
   d. Orthogonal frequency-division multiplexing (OFDM)

Course plan:

Week	Tentative Content	Quiz	Section in Book
Week-1	Introduction	-	Cp.1
Week-2	Optical Fiber Transmission (Ray Prop. And Dispersion)	-	Cp.2
Week-3	Optical Fiber Transmission (Attenuation)	-	Cp.5
Week-4	Optical Fiber Transmission (Polarisation)	Q1 (ray optics)	Supplementary Notes
Week-5	Optical Fiber Transmission	Q2 (dispersion)	Supplementary Notes
Week-6	Passive optical components	Q3 (attenuation)	Cp.6
Week-7	Optoelectronic sources (Fabry-Perot Filter)	-	Cp.7
Week-8	Optoelectronic sources	Q4 (polarization)	Cp.7
Week-9	Optoelectronic sources	Q5 (passive components)	Cp.7
Week-10	Optical Receivers	Q6 (sources)	Cp.8
Week-11	Noise in Optical Receivers	Q7 (sources)	Supplementary Notes
Week-12	Transmission System Design	Q8 (detectors)	Cp.12
Week-13	Transmission System Design	Q9 (detectors)	Cp.12
Week-14	Performance Analysis	Q10 (system design, take-home)	Cp.11
Week-15	Roadmaps of optical communications	-	Journal paper
Week-16	FINAL (written and oral exams)		

Note: The instructor reserves the right to make changes to this syllabus as necessary.

ACADEMIC ETHICS

According to Personal Data Protection Law, sharing any kinds of lecture materials (lecture videos, handouts, homework/quiz/exam questions, etc.) with third parties, use them on the web, or publish them through any social network without written approval of our institution is strictly forbidden even after your graduation (https://uzem.iyte.edu.tr/en/duyuru/distance-learning-and-the-personal-data-protection-law).

All written submissions (homework assignments, exams, etc.) must reflect purely independent and individual efforts. All reference material (books, scientific papers, web sites, etc.) in these submissions should be properly cited. Academic dishonesty, including any form of cheating will not be tolerated and may result in failure of the course and/or formal disciplinary proceedings that may lead to suspension. Cheating includes but is not limited to such acts as offering or receiving unpermitted assistance in the exams, using any type of unauthorized written material during the exams, handing in any part or all of someone else's work as your own, copying from an internet source. Plagiarism is a specific form of cheating. It means using someone else's work without giving credit and it is a form of literary theft.