An Introduction to Fiber Optic Systems - ESE 522

Introduction

The last two decades has seen a tremendous proliferation of fiber optics, initial growth being fueled by the communication industry and the second wave being sustained by the information processing age. Fiber optics has truly made the world a smaller place and our thirst for rapid on-line information is a driving force for the next generation of fiber optic systems that will bring the entire world to the office at home. This course introduces the student to all the necessary concepts for understanding the various related technologies, such as, semiconductor lasers, avalanche photodiodes, modulation techniques and wavelength division multiplexing.

Project Description: Transport of mixed data over a multimode fiber optic link

Design and fabricate a digital fiber optic link for transporting ethernet traffic over a gradient index optical fiber. The target data rate is 125 $Mb.s^{-1}$ over a distance of 1 km with a BER of 10^{-12}.

Week 1	Introduction to digital systems
Week 2	Propagation characteristics of optical fibers
Week 3	Signal degradation – attenuation
Week 4	Signal degradation – dispersion
Week 5	Optical sources - LEDs
Week 6	Optical sources - LDs
Week 7	Optical detectors – photodiodes and APD
Week 8	Noise processes – digital receivers design
Week 9	Single wavelength systems
Week 10	Power and rise time budget analysis
Week 11	Optical amplifiers
Week 12	WDM techniques
Week 13	Project presentations
Exams	Two tests and Final

TEXTBOOK:
Fiber Optic Communication, Govind Agrawal, Wiley Interscience 4th ed. (2010) ISBN 9780470505113