

ELEN 526 – Modern Wireless and Optical Networking

Overview:

An overview of current issues in wireless and optical networking is presented (at all layers of the OSI telecommunications model). Wireless transport on 4G systems and software defined radio. Optical topics range from FTTx architectures, reconfigurable optical networks, optical packet and burst switching, DWDM vs OTDM, and bypassing SONET; to long-haul systems and impairments. Optical wireless convergence issues and OFDM in wireless and optical systems.

Topics will include:

Wireless standards, impairments and technologies

Multipath and flat fading compensation via adaptive equalizers, space diversity and OFDMA. CDMA, cellular networks, Bluetooth, WiFi, GSM, 4G, LTE, WiMax, software defined radio.

Optical standards, impairments and technologies

Shot noise mitigation, dispersion compensation, reduction and exploitation of nonlinearities. Raman fiber amplifiers and EDFAs, microstructured fiber, all-optical regenerators, FBGs.

Networking and architectures

Optical grids, optical packet and burst switching, reconfigurable optical networks , ROADM, FTTx architectures, coherent systems, bypassing SONET, DWDM vs OTDM architectures, software defined reach-based modulation networks, soliton systems, optical cross-connects, OFDM in optical and wireless systems, optical wireless convergence, impact on VoIP and IPTV.

Course grading:

There will be two exams (each at 30% of the course grade) and a term paper (also at 30%). Although the homework only comprises 10% of the course grade, these are imperative since they provide the problem solving practice necessary for learning, and hence doing well on the exams. Since the telecommunications industry is one of rapid change, it is vital that our students learn how to read and skim technical and trade journals; and learn how to summarize and convey this information in a simple way. The term paper serves to initiate this lifelong learning process. Therein the student is free to focus on the regulatory, industrial and/or technical aspects of any topic (related to the above) that they wish to study at greater depth.

Midterm Exam	30%
Final Exam	30%
Homework	10%
Term Paper	30%