

OPTI 500C- Photonic Communications Engineering I C

Course Description:

Photonic Communications Engineering consists of two parts. Each course is further broken down into three sections: A, B and C. PCE I A covers optical fiber light guiding, wave propagation characteristics, materials properties, and fabrication. PCE I B covers optical transmitters, receivers and amplifiers. PCE I C covers communications systems, fiber optics networks, and Internet infrastructure. Sections A, B and C are each 1 credit and can be taken in any combination. When all three sections are taken together the course is designed as a survey, from the device to the systems level, of Photonic Communications Engineering. Reference material for the course is in a digital platform to allow dense hyperlinking between topics so that students from various disciplines can customize the reading material to their individual background knowledge.

Grading Policy:

Section C Exam (covering Module 10-13) will determine the Course Grade.

Each Module will have 3 exam questions of which students select 2 questions to answer (or complete all questions and 2 highest scores are chosen by the instructor). All questions are weighted equally towards the Course Grade.

The grade will be determined according to the percentage earned such that 90-100% = A, 80-89% = B, 70-79% = C, 60-69% = D, below 60% = E.

See [Office of the Registrar website](#) for courses within a semester with different start and end dates.

Outline

Module 10: Amplifiers by Stojan at UCSD

- EDFA configurations and properties
- Spectral properties, gain saturation, amplification factor
- Large signal amplification, output saturation power
- Noise in an amplifier, SNR, noise figure
- EDFA used as a pre-AMP to a RX, noise components
- Amplifier design
- Raman amplifiers

Module 11: Fiber Optic Networks and the Internet

- Network Topology

- Time division multiplexing and SONET
- Wavelength-division multiplexing systems and components
- Metropolitan and local area networks

Module 12: System Architecture and Design

- Telecommunications Network Framework
- Modulation formats
- System limitations

Module 13: Error Correction Codes

- Channel BER and User BER
- Linear Block Codes
- Channel and user SNR
- Reed-Solomon Codes, Concatenated Codes and Product Codes

Review

Exam