Advanced optical communications B

Finalità
Analysis and design of modern multi-channel fiber-optic based communication systems in the nonlinear regime.

Programma
Introduction, motivation and state of the art.
The nonlinear Schroedinger equation.
Propagation in the linear regime: group velocity dispersion (GVD).
Propagation in the nonlinear regime. Self phase modulation (SPM). Cross phase modulation (XPM). Four Wave Mixing (FWM). Optical wave breaking.
Optical Solitons. Raman effect. Parametric gain and modulation instability. Optical parametric amplifiers.
Small-signal descriptions of the field propagation. Advanced design rules for WDM system performance optimization. Advanced optical modulation formats robust to fiber nonlinearities.
Polarization mode dispersion (PMD) and its formalism.

Modalità d'esame
oral

Testi consigliati
G. P. Agrawal, "Nonlinear Fiber Optics", 3rd. ed, Academic Press, 2001