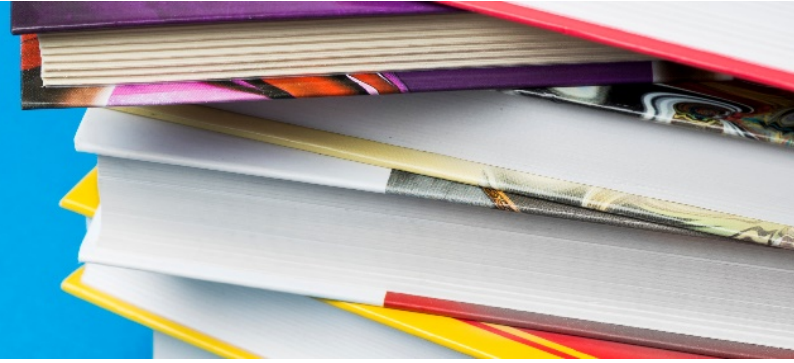




Full Syllabus



Course Title

Optics of Ultrashort Pulses

Lecturer

Alon Bahabad

Semester

B

Course requirements

1. Undergrad course in lasers
2. Undergrad course in quantum mechanics

Final grade components

Exam

Course schedule

Class no. / Date	Subject and Requirements (assignments, reading materials, tasks, etc.)
1	Generation of ultrashort pulses – lasers, mode-locking, Kerr lensing
2	Characterization of ultrashort pulses: intensity, phase, local frequency, group velocity dispersion, chirp
3	Propagation of ultrashort pulses: chromatic dispersion, angular dispersion, pulse duration
4	Amplification of ultrashort pulses: chirped-pulse-amplification, multipass amplifiers, regenerative amplifier
5	Nonlinear optics: Maxwell equations in a medium, low-order harmonic generation, self-phase modulation, supercontinuum generation
6	Measurement of ultrashort pulses: auto-correlation, Frequency Resolved Optical Gating
7	Extreme nonlinear optics – High-order harmonic generation, attosecond pulses, control of basic electronic processes
8	Schrodinger equation under a dipole perturbation, selection rules for electronic energy level transitions
9	Two level system in an electromagnetic field, Rabi Oscillations, Dressed states
10	Decay processes in a two level system
11	Optical Bloch equations
12	Maxwell-Bloch equations, rate equations approximation, adiabatic processes
13	Resonant propagation of ultrashort pulses

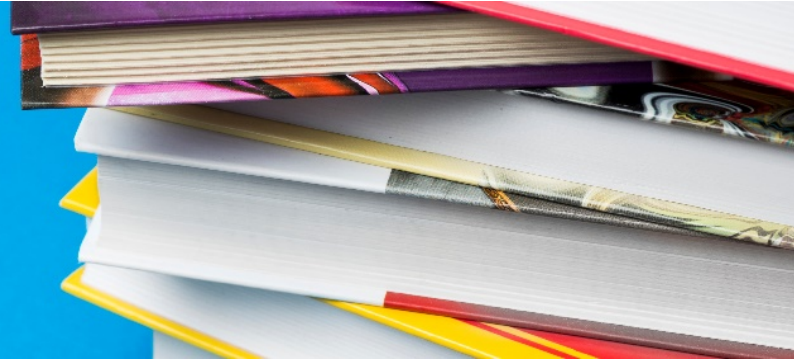
Required course reading

1. Jean Claude Diels and Wolfgang Rudolph, *Ultrashort Laser Pulse Phenomena, Academic*



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Press 2nd edition 2006.

2. Peter Milloni and Joseph Eberly, *Laser Physics*, Wiley, 2010

Optional course reading

1. Andrew Marc Weiner, *Ultrafast Optics*, Wiley 2009.
2. Gilbert Grynberg, Alain Aspect and Claude Fabre, *Introduction to Quantum Optics*, Cambridge university press, 2010.

Comments