

OPTI 671

Advanced Optical Networks

- Course Type: Graduate Course
- Semester Offered: Spring

Course Number:
OPTI 671

Units:
3

Distance Course:
Yes

Course Description:
Principles and procedures of optical networking with focus on high speed optical signal transmission between network nodes, lightpath routing and distribution, multilayer network design, and advanced photonic techniques and devices for optical signal transmission and switching.

Days and Times:
Tuesday and Thursday
12:30-1:45 p.m.

Room Number:
Meinel 305

Instructor(s):
[Milorad Cvijetic](#)

Contact:
milorad@optics.arizona.edu | 626-1778

Office Hours:
Tuesday and Thursday 11:00 a.m.- 3:00 p.m.

Textbooks:
Required

- Cvijetic, M., Djordjevic. I. B.: Advanced Optical Communication Systems and Networks, Artech House 2012

Grading Policy:

- Homework/projects: 20%
- Midterm Exam: 30%
- Final Exam: 50%

Homework/project assignments will be given biweekly. Solutions will be discussed on Thursdays.

Final exam will be given at the end of the semester.

Course Syllabus:

Outline

Introduction with Brief History Note
Optical Networking Principles

- Role of the Optical Networking
- Optical Network Structure
- WDM as a foundation of Optical Networking
- Principles of Multilayer Networks

Enabling Technologies for Optical Networks

- Light Transmission in Optical Fibers
- Signal Impairments Along the Lightpath
- Optical Transmitters and Modulators
- Optical Receivers
- Optical Amplifiers
- Optical Switching Elements

Optical Networks Design

- Core Optical Networks
- Metro Optical networks
- Access Optical Networks
- Wavelength Routing and Assignment
- Traffic Grooming and Protection
- Multilayer Network Structure

Advanced Techniques and Devices for Optical Networking

- Techniques for Space and Spectral Signal Processing – MIMO and OFDM
- Elastic Modulation Coding as a Networking Tool
- Optical Devices for design ROADMs and PXC design
- Wavelength Agile Devices
- Wavelength Convertors

Optical Network Management and Routing Principles

- Functions of Network Control and Management
- Impairment Aware Routing
- Optical Circuit Switching
- Optical Packet Switching
- Optical Burst Switching
- Energy Awareness in Optical Networking
- Network Modeling Tools
- Network Design Guidelines

Academic Integrity

According to the [Arizona Code of Academic Integrity](#), “Integrity is expected of every student in all academic work. The guiding principle of academic integrity is that a student’s submitted work must be the student’s own.” Unless otherwise noted by the instructor, work for all assignments in this course must be conducted independently by each student. Co-authored work of any kind is unacceptable. Misappropriation of exams before or after they are given will be considered academics misconduct.

Misconduct of any kind will be prosecuted and may result in any or all of the following:

- Reduction of grade
- Failing grade
- Referral to the Dean of Students for consideration of additional penalty, i.e., notation on a student’s transcript re: academic integrity violation, etc.

Students with Learning Disabilities

If a student is registered with the [Disability Resource Center](#), he/she must submit appropriate documentation to the instructor if he/she is requesting reasonable accommodations.

The information contained in this syllabus may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.