<table>
<thead>
<tr>
<th>Course Title</th>
<th>Optical Networks</th>
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<tbody>
<tr>
<td>Course Code</td>
<td>ECE 459</td>
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<tr>
<td>Course Type</td>
<td>Elective</td>
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<tr>
<td>Level</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>Year / Semester</td>
<td>4th Year/ 1st Semester</td>
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<tr>
<td>Teacher’s Name</td>
<td>Georgios Ellinas</td>
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<tr>
<td>ECTS</td>
<td>6</td>
</tr>
<tr>
<td>Lectures / week</td>
<td>2 x 1.5 hours (lectures) + 1 hour (tutorial) per week</td>
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<tr>
<td>Laboratories / week</td>
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**Course Purpose and Objectives**

This course provides a fundamental understanding of optical networking based on Wavelength Division Multiplexing (WDM). Introduces all the networking aspects associated with a multiwavelength optical network and presents the current and future trends in these networks. The specific objectives of this course is for the students to:

- Learn basic graph theory and algorithm concepts
- Learn routing and wavelength assignment techniques for mesh optical networks.
- Learn fault protection and restoration techniques for mesh optical networks.
- Learn about different switch fabric, node, and network architectures used in fiber-optic networks.
- Learn about optical access networks
- Learn about the optical control plane

**Learning Outcomes**

After the completion of this course the students should be able to:

- Use basic graph theory and algorithmic techniques to solve optical networking problems including using routing and channel assignment problems, as well as fault protection/restoration problems.
- Design switch fabric, node, and network architectures
- Design and evaluate the performance of optical access networks
- Apply optical control and management techniques to design an optical control plane.

**Prerequisites**

Required

**Course Content**

This course provides a fundamental understanding of optical networking based on Wavelength Division Multiplexing (WDM). Introduces all the networking aspects associated with a multiwavelength optical network and presents the current and future trends in these networks. The course covers wavelength routing, wavelength assignment, control and management, failure detection and restoration, as well as a variety of other networking aspects of optical networks. Different architectures, media-access and scheduling methods will also be covered in this course. Discussion of first generation optical networks, current laboratory testbeds and future
deployments will be presented. The course is self-contained and is recommended for undergraduate students with interest in telecommunications networks and fiber-optic communication systems. The course includes an individual software project on an original optical networking topic.

| Teaching Methodology   | Lectures  
|                       | Literature Review  
|                       | Project  


| Assessment | Class participation  
|           | Literature Review  
|           | Final Exam  
|           | Simulation Project/Project Report and Presentation  

| Language | Greek  