

 Lebanese American University	COE	799
School of Engineering	Optical Networks (Elective)	3 credits
Department of Electrical and Computer Engineering	Th 4:00 pm – 6:50 pm	ENG 506
Course syllabus	Dr. Wissam F. Fawaz	Fall 2011

1. Course Description and Course Prerequisite

This course covers the fundamentals of optical networking. In particular it touches on the following topics: connection oriented packet switched networks (ATM and MPLS), SONET/SDH, wavelength division multiplexing (WDM) and its enabling technologies, WDM access and metro optical network architectures, wavelength routed optical WDM wide area networks, optical burst switched networks, and optical packet switched networks.

2. Course Objectives

The objectives of this course are to give the students:

- An understanding of the main principles of WDM optical networking.
- The foundation for more advanced courses in related areas.
- The basic skills to simulate and to mathematically analyze optical networks.
- The basic background information that will allow them to practice and conduct research in this field.

3. Contribution of course to meeting the professional component

Professional Component	Credits
Mathematics and Basic Sciences	0
Engineering Topic	3
General Education	0

4. Relationship of course to program outcomes

PO (c) *an ability to design a system, component, or process to meet desired needs with realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.*

- Uses numerical and/or experimental simulation to verify a design or solution.
- Analyzes results and draws conclusions.

PO (k) *an ability to use the techniques, skills and modern engineering tools necessary for engineering practice*

- Uses computer programs necessary for engineering practice

5. Course Outline

In this course, we will examine various connection-oriented network architectures that are useful for the understanding of optical networks. Topics to be covered include:

- SONET/SDH (Weeks 1 – 3)
- ATM (Weeks 4 – 6)
- MPLS/GMPLS (Weeks 7 & 8)
- Optical Wavelength-Routed Networks (Weeks 9 & 10)
- Access Networks (Week 11)
- Optical Burst Switching (Weeks 12 & 13)
- Optical Packet Switching (Weeks 14 & 15)

6. Required tools / software / skills

Basic knowledge of computer networks, and good programming skills (Matlab, C, C++, or Java)

7. Textbook[s]

Connection-Oriented Networks: SONET/SDH, ATM, MPLS, Optical Networks by H.G. Perros, Wiley, 2005.

8. Additional References

Biswanath Mukherjee, *Optical WDM Networks*, Springer, 2006.

J. Zheng and Hussein T. Mouftah, *Optical WDM Networks*, Wiley Interscience, 2004.

Peter Tomsu and Christian Schmutzer, *Next Generation Optical Networks*, Prentice Hall, 2002.

9. Schedule of Exams & Grading Percentage

The class time will be divided into lectures by the instructor, student presentations, and group discussions. The course grade will be based on course topic presentation, a mid-term exam, a final exam, and homeworks/projects. For topic presentations, a group of 1-2 students will select one optical topic to survey, summarize in a report, and present in class.

Topic Presentation:	15%
HWs/Projects:	25%
Mid-term:	25%
Final:	35%

10. Course Policies

Cheating is considered to be a very serious breach of the cheating policy of the faculty and will not be tolerated. Students are expected to submit their own solutions to all homework assignments and programming projects. Solutions must be handed in at the beginning of the class in which they are due. Late assignments will not be accepted.

11. General Comments

Instructor: Dr. Wissam FAWAZ email: wissam.fawaz@lau.edu.lb
Office: 103, Bassil Bldg, ext: 2414
Office Hours: Monday, Wednesday, and Friday, from 10:00 a.m. – 1:00 p.m.
Course webpage: http://www.wissamfawaz.com/optical_networks.htm

12. General Rules & Regulations

- A student can miss no more than the equivalent of 5 weeks of instruction. Students who exceed the allowed number of absences must withdraw from the course; otherwise, the course grade will be recorded as "F".
- Plagiarism: students caught cheating on an exam receive a grade of Zero on the exam in the first cheating attempt and a warning. Students caught cheating for the second time in the same course receive an F grade in the course and a second warning. A grade of zero on an exam resulting from cheating must be counted in the student's course grade. The zero cannot be dropped in computing the final grade in case the instructor has a policy of allowing students to drop their worst exam grade.
- Any student who receives 3 warnings will be suspended.