OPTICAL COMPUTER-COMMUNICATION NETWORKS— SPRING 2001

332: 559 Advanced Topics in Communication Engineering

Instructor: Prof. Zoran Gajic, email: gajic@ece.rutgers.edu

Textbook: R. Ramaswami and K. Sivarajan, *Optical Networks: A Practical Perspective*, Morgan and Kaufmann, 1998.

Recommended Reading: T. Stern and K. Bala, *Multiwavelength Optical Networks: A Layered Approach*, Addison Wesley (Prentice Hall), 1999.

Office Hours: M 7:40–9:00 in ELE 222; W 11:30–12:50 in WINLAB 109.

Class webpage: http://www.ece.rutgers.edu/˜gajic/559.html

TOPICS

Lecture 1: Introduction. Multiplexing Techniques. History (Sections 1.1–1.3, 1.5).

Lecture 2: Second Generation Optical Networks (Section 1.4).

Lecture 3: Light Propagation in a Multimode Optical Fiber (Section 2.1.1).

Lecture 4: Light Propagation in a Singlemode Optical Fiber (Section 2.1.2).
Fiber Loss and Optical Fiber Bandwidth (Section 2.2).

Lecture 5: Chromatic Dispersion (Section 2.3).

Lecture 6: Nonlinear Effects. Solitons (Sections 2.4 and 2.5).

Lecture 7: Couplers, Isolators, Circulators, Multiplexers and Filters (Sections 3.1, 3.2, 3.3).

Lecture 8: Fabry-Perot, Thin-Film, Mach-Zahnder, and Arrayed Waveguide Filters (Sections 3.3.4–3.3.7).

Lecture 9: Optical Amplifiers—Erbium Doped Fiber Amplifier (Section 3.4 up to 3.4.4).

Lecture 10: Transmitters (Lasers) and Detectors (Section 3.5 and 3.6).

Lecture 11: Switches and Converters (Sections 3.7 and 3.8).

Lecture 12: Exam I

Lecture 13: Modulation and Demodulation (Sections 4.1 and 4.2)

Lecture 14: Optical Signal Transmission (Chapter 5)

Lecture 15: Optical Signal Transmission (Chapter 5)

Lecture 16: Optical Signal Transmission (Chapter 5)

PART II NETWORKS

Lecture 17: Broadcast and Select Networks (Chapter 7)

Lecture : Wavelength Routing Networks (Chapter 8)

Lecture : Photonic Packet Switching OTDM (Chapter 14)

Lecture 28: Exam II

Grading:

Exam 1 40% (theory and some problems)

Exam 2 40% (theory and some problem)

Project/Term Paper 20%