

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**

**COURSE OUTLINE**

**COURSE TITLE:** FIBER OPTIC COMMUNICATIONS

**CODE NO:** ELN-318 - 3

**PROGRAM:** ELECTRONIC ENGINEERING TECHNOLOGY (4023)

**AUTHOR:** PETER SZILAGYI

**DATE:** JANUARY 5, 1996      **PREVIOUS OUTLINE DATED:** Sept. 2, 1993

**APPROVED:**

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Date

Total credit hours: 48

Prerequisite: ELN-245

### **I. PHILOSOPHY/GOALS:**

Optical fiber systems are by far the most stable and interference-free transmission-medium available. They became a near automatic choice for transmission of data, digitized voice and picture. Industrial applications are also emerging. This course is taught at the technology level and treats the applications of optical fibers and the functioning of various system components. A knowledge of AC and DC circuits, communication systems and digital electronics is assumed.

### **II. STUDENT PERFORMANCE OBJECTIVES:**

Upon successful completion of this course the student will

1. be able to recall a short history of fiber optic technology.
2. understand the basic principles of light using Snell's law and its relationship to F/O cable.
3. understand the operation of the components of a fiber optic system, such as Optical Sources, Photodetectors, Connectors, Splices and Couplers.
4. be familiar with system architecture and different types of networks.
5. be knowledgeable in the installation, handling and testing of fiber optic systems.

### **III. TOPICS TO BE COVERED:**

#### **Block 1: OPTICAL FIBERS**

- History of fiber optic cable technology.
- The basic principles of light.
- Types and parameters of optical fiber.
- Optical Fiber manufacturing process.

**Block 2: COMPONENTS and MODULATION**

- Connectors, Splices and Couplers.
- Optical sources for fiber optic transmission.
- Photodetectors and their parameters.
- Modulation schemes.

**Block 3: TRANSMITTERS, RECEIVERS AND NETWORKS**

- Practical Optical Transmitters and Receivers.
- Fiber Optic Networks.
- Complete F/O Systems.
- Installation and Testing.

**IV. LEARNING ACTIVITIES/REQUIRED RESOURCES:****BLOCK 1: OPTICAL FIBERS**

15 hours

**Learning activities:**

Listen to lectures on the history of fiber optic cable technology, the basic principles of light, and Snell's law. The various types of fiber, fiber parameters and specifications and the fiber manufacturing process are also presented. Homework will be assigned at the end of each lecture. Related laboratory experiments are conducted. 5 minute quizzes can be expected.

**Resources:**

Textbook: S.L. Wymer Meardon, The Elements of Fiber Optics, pp. 1-75. Laboratory equipment and handouts will be provided.

**Block 2:      COMPONENTS and MODULATION****15 hours.****Learning activities:**

Lectures on connectors, splices and couplers are followed by presentations on the topics of light sources, photodetectors and transmission schemes. Homework will be assigned. Laboratory experiments will support relevant theory.

**Resources:**

Textbook: S.L. Wymer Meardon, The Elements of Fiber Optics, pp. 1-75. Laboratory equipment and handouts will be provided.

**Block 3:      TRANSMITTERS, RECEIVERS AND NETWORKS****15 hours****Learning activities:**

Listen to lectures on the different configurations for transmitters and receivers, networking schemes and topologies, power budgets and installation practices. Beware of short, five minute quizzes. Homework will be assigned, and related work will be done in the laboratory.

**Resources:**

Textbook: S.L. Wymer Meardon, The Elements of Fiber Optics, pp. 1-75. Laboratory equipment and handouts will be provided.

**V. EVALUATION METHODS**

Tests and Quizzes:	70%
Laboratory experiments:	<u>30%</u>
Total:	100%

The grading system used will be as follows:

A+	= 90% - 100%
A	= 80% - 89%
B	= 70% - 79%
C	= 55% - 69%
R	= Repeat

The student must attain a 55% in both theory and laboratory portions to successfully complete the course.

Upgrading:

- If a student misses a test, he or she must have a valid reason to qualify for a rewrite.
- The method of upgrading is at the teachers discretion. It may consist of the rewriting of block tests, the writing of a comprehensive exam, repeating laboratory experiments or repeating the course.
- In the case of final marks less than 55% and greater than 50%, provided an 80% or better attendance record, consideration will be given to a supplemental examination. The grades that can be obtained on the supplemental exam are either a "C" or an "R" grade.
- All rewrites, make-up tests and supplemental examinations are scheduled at the end of the semester.

Attendance:

- Attendance for laboratory classes is compulsory. Laboratory activities missed for reasons whatsoever must be completed promptly, in the students own time.
- Attendance for all theory classes is highly recommended and recorded, but not mandatory.

