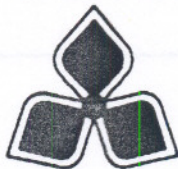


**SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE MARIE, ON**



COURSE OUTLINE

Course Title: FIBER OPTICS COMMUNICATIONS

Code No.: ELN318

Semester: 6

Program: ELECTRICAL/ELCTRONICS ENG. TECHNOLOGY

Author: DOUG FAGGETTER

Date: JAN. 1998

Previous Outline Date: JAN. 1997

Approved:

A. DeRosario
Dean

Jan. 6/98
Date

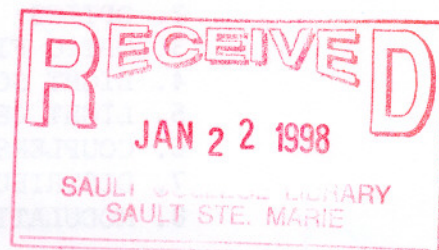
Total Credits: 3

Prerequisite(s): ELN213, MTH551

Length of Course: 16

Total Credit Hours: 48

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For additional information, please contact Kitty DeRosario, Dean, School of Trades
& Technology, (705) 759-2554, Ext. 642.



FIBER OPTIC COMMUNICATIONS
COURSE NAME

ELN 318
CODE NO.

I. PHILOSOPHY/GOALS:

A THIRD YEAR COURSE AT THE TECHNOLOGY LEVEL IN THE NEWLY DEVELOPED HIGH TECHNOLOGY FIELD OF ELECTRONIC COMMUNICATIONS.

THE CONCEPTS OF ANALOG AND DIGITAL MODULATION OF LIGHT-WAVES, THE APPLICATION AND FUNCTIONING OF LASER DIODES, LIGHT EMITTING DIODES AND VARIOUS PHOTO DETECTORS ARE STUDIED. THE ANALYSIS OF THE PROPAGATION MODES OF LIGHT IN OPTICAL FIBERS, SPLICING AND CONNECTING FIBERS, TRANSMITTING AND RECEIVER CIRCUITS ARE ALSO INCLUDED. LABORATORY PROJECTS AND EXPERIMENTS SUPPORT THE THEORY.

II. STUDENT PERFORMANCE OBJECTIVES:

UPON SUCCESSFUL COMPLETION OF THIS COURSE THE STUDENT WILL:

1. UNDERSTAND THE PHYSICS OF LIGHT AS IT APPLIES TO OPTICAL FIBERS;
2. BE FAMILIAR WITH THE CONSTRUCTION OF OPTICAL FIBERS AND OPTICAL FIBER CABLES;
3. UNDERSTAND THE OPERATION OF OPTICAL FIBER LIGHT SOURCES AND DETECTORS AND ASSOCIATED CIRCUITS;
4. BE FAMILIAR WITH OPTICAL FIBER COUPLERS AND CONNECTORS;
5. BE FAMILIAR WITH FIBER OPTIC DISTRIBUTION SYSTEMS.

III. TOPICS TO BE COVERED:

1. FIBER OPTIC COMMUNICATION SYSTEMS;
2. OPTICS;
3. OPTIC FIBER WAVEGUIDES;
4. LIGHT SOURCES;
5. LIGHT DETECTORS;
6. COUPLERS AND CONNECTORS;
7. DISTRIBUTION SYSTEMS;
8. MODULATION.

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IV. LEARNING ACTIVITIES	REQUIRED RESOURCES
1. FIBER OPTIC COMMUNICATIONS SYS. - DEFINE FIBER OPTICS - BLOCK DIAGRAM OF A FIBER OPTIC SYSTEM - ADVANTAGES AND DISADVANTAGES - APPLICATIONS	TEXT: FIBER OPTIC COMMUNICATIONS, 2nd. ed., J. C. PALAIS. CH.1
2. OPTICS - QUANTUM MECHANICS - THE ELECTROMAGNETIC SPECTRUM - RAY THEORY AND APPLICATIONS, FOUR RULES OF RAY THEORY - LENSES - NUMERICAL APERTURE - SOLID ANGLE - PHYSICAL OPTICS - RADIOMETRIC AND PHOTOMETRIC UNITS - DISPERSION, PULSE DISTORTION, AND INFORMATION RATE - POLARIZATION - REFLECTION AT A PLANE BOUNDARY	CH.2,3
3. OPTIC FIBER WAVEGUIDES - STEP-INDEX FIBER - GRADED-INDEX FIBER - MODES AND MODAL DISTORTION - ATTENUATION - CONSTRUCTION OF OPTIC FIBERS	CH.5
4. LIGHT SOURCES - LIGHT-EMITTING DIODES (LED) - HOMOJUNCTION LEDs - HETEROJUNCTION LEDs - LED OPERATING CHARACTERISTICS - LASER PRINCIPLES - LASER DIODES (LD) - LD OPERATING PRINCIPLES	CH.6

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LEARNING ACTIVITIES	REQUIRED RESOURCES
5. LIGHT DETECTORS - PRINCIPLES OF PHOTODETECTION - PHOTOMULTIPLIERS - SEMICONDUCTOR PHOTODIODES - PIN PHOTODIODES - AVALANCHE PHOTODIODES	CH.7
6. COUPLERS AND CONNECTORS - CONNECTOR PRINCIPLES - FIBER END PREPARATION - SPLICES - CONNECTOR TYPES - SOURCE COUPLING	CH.8
7. DISTRIBUTION SYSTEMS - DISTRIBUTION NETWORKS - DIRECTIONAL COUPLERS - STAR COUPLERS - SWITCHES - WAVELENGTH-DIVISION MULTIPLEXING	CH.9
8. MODULATION - LED MODULATION AND CIRCUITS - LD MODULATION AND CIRCUITS - ANALOG MODULATION FORMATS - DIGITAL MODULATION FORMATS - OPTIC HETERODYNE RECEIVERS	CH.10
9. LAB ACTIVITIES - BIASING LEDs - FIBER OPTIC LEDs - PHOTODETECTORS - FIBER OPTIC SYSTEMS - INTERFACING RS-232C, TTL AND CMOS SIGNALS TO FIBER OPTIC LEDs AND DETECTORS. - LINK TWO PERSONAL COMPUTERS WITH OPTICAL FIBERS - OTHER LABS AS INTERESTS AND TIME PERMIT	

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V. EVALUATION METHODS

TESTS	70%
LAB EXERCISES	30%
TOTAL	100%

THE GRADING SYSTEM USED WILL BE AS FOLLOWS:

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

NOTE: THE STUDENT MUST ATTAIN A 55% IN BOTH THEORY AND LAB PORTIONS TO SUCCESSFULLY COMPLETE THE COURSE.

VI. REQUIRED STUDENT RESOURCES:

TEXT BOOKS: FIBER OPTIC COMMUNICATIONS, SECOND EDITION.
J. C. PALAIS. PRENTICE HALL, 1984.

VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY BOOK SECTION:

BAKER, D. G. FIBER OPTIC DESIGN AND APPLICATIONS. RESTON PUBLISHING COMPANY, INC., 1985. TA 1800.B35

LACY, E. A. FIBER OPTICS. PRENTICE HALL, INC., 1982.
TK 5103.5.L3

MOTOROLA. OPTOELECTRONICS DEVICE DATA, REV. 2. MOTOROLA, INC., 1988. TA 1750.M68

YEH, C. HANDBOOK OF FIBER OPTICS: THEORY AND APPLICATION. ACADEMIC PRESS, INC., 1990. TA 1800.Y44

