



BROWARD COLLEGE COURSE OUTLINE

LAST REVIEW: 2009-2010
(i.e. 2003-2004)

NEXT REVIEW: 2014-2015
(i.e. 2008-2009)

STATUS: A
(A, I, D)

COURSE TITLE: Fiber Optic Communications

COMMON COURSE NUMBER: EST 2224C

CREDIT HOURS: 3

CONTACT HOUR BREAKDOWN
(per 16 week term)

CLOCK HOURS:
(Voc. Course ONLY)

Lecture: **48** Lab: **16**

Clinic: Other:

PREREQUISITE(S): EET 2142C

COREQUISITE(S): None

PRE/COREQUISITE(S):

COURSE DESCRIPTION:

The study of fiber optic communication systems and devices; Topics include electronic and optical devices, splices and fiber optic cables as well as telecommunications applications of fiber optic systems. Extensive lab experience.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s):

Area

General Education Requirements – Associate in Science Degree (AS), meets Area(s):

Area

UNIT TITLES

1. **Fundamentals**
2. **Elements of Fiber Optic Cabling**
3. **Light Sources**
4. **Transmitters**
5. **Receivers**
6. **Repeaters, Regenerators, and Optical Amplifiers**
7. **Connectors and Splices**
8. **Couplers and Switches**
9. **Fiber Optic Tools and Measurements**
10. **System Concepts and Design**
11. **Telecommunication Applications**
12. **Video Transmission**
13. **Computer Networks**
14. **Fiber-Optic Sensors**

EVALUATION:

Students will be assessed through a variety of means. Evaluation may include, but is not limited to, the following: exams, quizzes, presentations, portfolios, discussions, class participation, attendance, projects, networking diagnosis, co-ops, practical, internships, externships, and research reports.

Common Course Number: EST 2224C

UNITS

Unit 1: Fundamentals of Fiber Optics

General Outcome:

- 1.0 The student shall: be able to describe the concepts of fiber optics, its applications, and the types.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1 Discuss the uses of fiber optics at home, in the community, and in business.**
- 1.2 Describe the Clad Fiber.**
- 1.3 Explain the basic concepts of optics.**
- 1.4 Relate light collection to fiber optics.**
- 1.5 Analyze transmission and attenuation in fiber optics.**
- 1.6 Describe system considerations.**
- 1.7 Discuss the basic concepts of computer data communications.**

Common Course Number: EST 2224C

Unit 2: Elements of Fiber Optic Cabling

General Outcome:

- 2.0 The student shall: be able to list and describe the components of a fiber optic system.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1 Describe the reasons for cabling.**
- 2.2 Identify the types of cable.**
- 2.3 List the elements of cable structure.**
- 2.4 Discuss causes of cable failure.**

Common Course Number: EST 2224C

Unit 3: Light Sources

General Outcome:

- 3.0 The student shall: be able to describe the operating wavelength, the output power and light coupling, modulation, and cost/performance trade-offs.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 3.1 Determine the operating wavelength.**
- 1.2 Discuss the output power and light coupling.**
- 1.3 Explain modulation.**
- 3.4 Discuss the cost/performance trade-offs.**

Common Course Number: EST 2224C

Unit 4: Transmitters

General Outcome:

- 4.0 The student shall: be able to discuss the factors affecting transmitter performance.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 4.1 Describe transmitter performance.**
- 4.2 Discuss transmitter design.**
- 4.3 List the types of transmitters.**
- 4.4 Identify sample transmitters.**

Common Course Number: EST 2224C

Unit 5: Receivers

General Outcome:

5.0 The student shall: be able to discuss the factors affecting receiver performance.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 5.1 Discuss the performance considerations.**
- 5.2 Describe detector types.**
- 5.3 Identify electronic functions.**
- 5.4 Discuss packaging considerations.**

Common Course Number: EST 2224C

Unit 6: Repeaters, Regenerators, and Optical Amplifiers

General Outcome:

- 6.0 The student shall: be able to discuss repeaters, regenerators, and optical amplifiers.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 6.1 Discuss types of amplification.**
- 6.2 Describe Electro-Optic repeaters and regenerators.**
- 6.3 Explain optical amplifiers.**

Common Course Number: EST 2224C

Unit 7: Connectors and Splices

General Outcome:

- 7.0 The student shall: be able to perform connections and splices and explain the issues affecting installation, attenuation and reflection.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 7.1 Discuss connector attenuation.**
- 7.2 Identify causes of internal reflections.**
- 7.3 Explain mechanical considerations.**
- 7.4 Establish connector installation.**
- 7.5 Discuss the types of splicing.**
- 7.6 Identify splicing issues.**
- 7.7 Describe splice housings.**

Common Course Number: EST 2224C

Unit 8: Couplers and Switches

General Outcome:

- 8.0 The student shall: be able to discuss the different couplers and switches and their applications.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 8.1 Discuss coupler applications.**
- 8.2 Identify coupler issues.**
- 8.3 Establish practical couplers.**
- 8.4 Explain planar waveguide technology.**
- 8.5 Describe waveguide switches and modulators.**
- 8.6 Describe other optical switches.**

Common Course Number: EST 2224C

Unit 9: Fiber Optic Tools and Measurements

General Outcome:

9.0 The student shall: be able to discuss the tools and equipment used in fiber optics.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 9.1 Discuss optical components.**
- 9.2 Describe index-matching materials.**
- 9.3 Identify mode strippers and filters.**
- 9.4 Discuss microscopes.**
- 9.5 Describe fiber tools.**
- 9.6 Describe mounting and positioning equipment.**
- 9.7 Discuss the basics of optical measurement.**
- 9.8 Identify quantities to be measured in fiber optics.**
- 9.9 Discuss measurement instruments.**

Common Course Number: EST 2224C

Unit 10: System Concepts and Design

General Outcome:

10.0 The student shall: be able to discuss types of transmission systems and design.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 10.1 Identify types of transmission systems.**
- 10.2 Describe transmissions.**
- 10.3 Discuss controlling pulse dispersion.**
- 10.4 Explain multiplexing.**
- 10.5 Discuss fiber transmission standards.**
- 10.6 Describe power budgeting.**
- 10.7 Determine bandwidth budget.**
- 10.8 Discuss cost/performance trade-offs**

Common Course Number: EST 2224C

Unit 11: Telecommunications Applications

General Outcome:

11.0 The student shall: be able to discuss the concepts of basic telecommunications and networks.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 11.1 Describe telecommunications.**
- 11.2 Discuss network installation.**
- 11.3 Identify submarine cables.**
- 11.4 Discuss future technology.**
- 11.5 Identify trunk systems.**
- 11.6 Describe the use of fiber in the subscriber loop.**
- 11.7 Identify emerging services and spreading fibers.**
- 11.8 Discuss designs for network future.**

Common Course Number: EST 2224C

Unit 12: Video Transmission

General Outcome:

12.0 The student shall: be able to discuss the basics of video transmission and the emerging cable technology.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

12.1 Describe video basics.

12.2 Discuss the present cable network.

12.3 Identify emerging cable technology.

Common Course Number: EST 2224C

Unit 13: Computer Networks

General Outcome:

13.0 The student shall: be able to discuss the different types of computer networks and their use.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

13.1 Describe local and wide area networks and point-to-point transmission.

13.2 Discuss fiber optic usage in connection with computer networks.

13.3 Identify fiber optic data networks.

Common Course Number: EST 2224C

Unit 14: Fiber-Optic Sensors

General Outcome:

14.0 The student shall: be able to discuss the concepts of optic sensors.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 14.1 Describe fiber-optic probes.**
- 14.2 Discuss fiber sensing mechanism.**
- 14.3 Explain interferometric sensing.**
- 14.4 Discuss fiber-optic gyroscopes.**
- 14.5 Identify smart skins and structures.**
- 14.6 Discuss system development and implications.**