

Course Profile

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I. Course Code:	EEE 461		
II. Course Title:	Optical Fiber Communication		
III. Credit:	3	IV. Pre-Requisite:	EEE 315
V. Contact Hours:	Lecture- 3 hours/week		

VI. Course Objectives:

The objectives of this course are

- a. To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures.
- b. To understand the different kind of losses, signal distortion, SM fibers.
- c. To learn the various optical sources, materials and fiber splicing
- d. To learn the fiber optical receivers and noise performance in photo detector.
- e. Explain the different types of optical amplifier

VII. Course Outcome (COs):

Sl. No.	COs (Upon successful completion of this course, students should be able to)	Co rr es po nd in g P O s	Bloom's taxonomy domain/level*			Delivery Methods & activities	Assessment tools
			C	A	P		
CO 461-1	Illustrates the basic knowledge of Ray optics theory and Explain the Transmission Characteristics of fiber	PO1	2	1,2	-	Lectures, Tutorials	CT, Exam

CO 461-2	Compare Step Index, Graded index fibers and compute mode volume.	PO1	4	1,2	3	Lectures, Tutorials	CT, Exam, Assignments
CO 461-3	Classify the various types of fiber loss, linear and non linear effects and compute the losses	PO1	4	1,2	3	Lectures, Tutorials	CT, Exam, Assignments
CO 461-4	Outline the construction and characteristics of optical sources and detectors and Compare the different types of optical amplifier in basis of their principles and applications, Receiver analysis.	PO1	4	-	-	Lectures, Tutorials	CT, Exam, Assignments

* C: Cognitive, P: Psychomotor; A: Affective

VIII. Course Plan with Detail Description:

Session	Contents	COs
Week 1	<ul style="list-style-type: none"> ❖ Introduction to the course. ❖ Historical development, general system, advantages, disadvantages, and applications of optical fiber communication, ❖ Ray transmission theory 	1
Week 2	<ul style="list-style-type: none"> ❖ Types of optical fiber and their application ❖ Comparison between different types of optical fiber ❖ Refractive index profile of different fibers 	2
Week 3	<ul style="list-style-type: none"> ❖ Introduction to different types of fiber loss ❖ Attenuation, absorption, scattering losses, bending loss 	3
Week 4	<ul style="list-style-type: none"> ❖ Modal dispersion, chromatic dispersion and polarization mode dispersion 	3
Week 5	<ul style="list-style-type: none"> ❖ Math on coupling loss 	3
Week 6	<ul style="list-style-type: none"> ❖ Self phase modulation, cross phase modulation, four wave mixing ❖ Scattering effect, stimulated Brillouin scattering, stimulated Raman scattering 	3
Week 7	<ul style="list-style-type: none"> ❖ Principle of LED ❖ Math on optical source 	4
Week 8	<ul style="list-style-type: none"> ❖ Principle of laser ❖ Math on laser 	4
Week 9	<ul style="list-style-type: none"> ❖ Principle of optical detector ❖ Math on optical detector 	4

Week 10	❖ Basics of optical amplifier	4
Week 11	❖ Comparison of booster, inline amplifier, pre amplifier ❖ Principle of SOA, RA and EDFA ❖ Comparison and application different types of optical amplifier	4
Week 12	❖ Receiver analysis: Direct detection and coherent detection, noise and limitations. ❖ Multi-channel optical system: Frequency division multiplexing, wavelength division multiplexing and co-channel interference.	4

IX. Evaluation Policy:

Marks Distribution:	Attendance	10%
	Quiz	20%
	Assignment	10%
	Presentation	10%
	Final Exam	50%
	Total	100%
Grading System:	As per DIU rule	

X. Resources:

Textbook(s):

[1] Optical Fiber Communications principle and practice, John M. Senior

Reference(s):

[1] Fiber Optic Communication System, G.V Agrawal

XI. Course Link in Moodle/Google Class Room:

<https://classroom.google.com/c/MTcxOTQyNjgiMTVa>

XII. Course Instructor(s):

- Name: Fahmida Hossain Tithi

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Signature of the Instructors