MUTAH UNIVERSITY
Faculty of Engineering
Department of Electrical Engineering

Course Syllabus

Course Code	Course Name	Credits	Contact Hours
0401527	Optical Communications	3	12:30 -14:00 Monday, Wednesday

INSTRUCTOR/COORDINATOR	
Name	Dr. Aser M. Matarneh
Email/Office	Aser.matarneh@mutah.edu.jo
Office Hours	12:00 -14:00 Sunday, Tuesday
Classroom/Time	12:30 -14:00 Monday, Wednesday

TEXTBOOK	
Title	Fiber Optics Communications. *Pearson, 2008, 3rd ed.*
Author/Year/Edition	Senior, J. M.
Other Supplemental Materials	
Title	Optoelectronics and Photonics: Principles and Practices, Prentice Hall.
Author/Year/Edition	S. O. Kasap

SPECIFIC COURSE INFORMATION

A. Brief Description of the Content of the Course (Catalog Description)

The primary objective of the course is to provide both an analytical and a physical understanding of Optical communication elements, with particular emphasis on optical fiber based on the physics involved. Signal degradations defined by attenuation and dispersion will be lectured. Both Optical transmitters and Photodetectors will be explained and discussed. Their characteristics, principle of operations and some practical applications will be discussed. Moreover, Link budget analysis in terms of power budget and rise time budget will be explained and taught. Finally, Optical networks will be explored with particular emphasis on wave division multiplexing technique and future evolving technology.

B. Pre-requisites (P) or Co-requisites (C)

Fields and Waves (0401353) **(P)**

C. Course Type (Required or Elective)
Required
SPECIFIC GOALS
A. Course Learning Objectives (CLOs)
CLO1: Understand the light propagation and the physics of optical fiber [1]. **CLO2:** Describe the construction and working of light sources and photodetectors [1]. **CLO3:** Construct and design point to point optical fiber link [2]. **CLO4:** Analyze and differentiate between WDM and other conventional multiplexing techniques [4].
B. Student Learning Outcomes (SOs) Addressed by the Course

1	2	3	4	5	6	7
√	√		√			

BRIEF LIST OF TOPICS TO BE COVERED		
List of Topics	**No. of Weeks**	**Contact Hours**
Wave nature of light • Light waves in a homogeneous medium • Refractive index and phase velocity • Group velocity and group index • Snell's law and total internal reflection (TIR)	2	6
Dielectric waveguides and optical fiber • Basic optical Laws • Structure of the Optical Fiber • Evanescent Wave • Types of Optical Fiber: Single-mode, multimode…etc. • Fabrication	3	9
Polarization and modulation of light	1	3
Semiconductors science and light emitting diodes	1	3
Stimulated emission devices: Lasers	1	3
Photodetectors: PIN photodetector • Function and layers • Structure	1	3
Photodetectors: APD photodetectors • Function and layers • Structure	1	3
Link Budget: • Point-to point -power link budget • Point-to point -rise time link budget	2	6
Wave Division Multiplexing (WDM)	2	6

• Basic Types • Structure • Components • Comparison with conventional multiplexing techniques		
Total	*14*	*42*

EVALUATION		
Assessment Tool	**Due Date**	**Weight (%)**
Mid Exam	According to the university calendar	30
Course Work (Homeworks, Quizzes, Projects, …etc.)	One week after being assigned	20
Final Exam	According to the university calendar	50

ABET's Students Learning Outcomes (Criterion # 3)

	Relationship to program outcomes	
ABET 1-7		**… Engineering Student Outcomes**
1.	√	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2.	√	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic
3.		ability to communicate effectively with a range of audiences
4.	√	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5.		an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6.		an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7.		an ability to acquire and apply new knowledge as needed, using appropriate learning strategies