

Course Syllabus

BMT 336

1. Course number and name: **BMT 336/ Optical Biomedical Instrumentation**
2. Credits and contact hours: (2 + 1) credit hours, (2 +2) contact hours
3. Instructor's name: **Dr. Adham Aleid**
4. Text book, title, author, and year:
 - a. **Books or notes:** "Introduction to Optics", Frank L.
 - b. other supplemental materials:
 - Introduction to Optics (Advanced Texts in Physics), Germain Chartier
 - Lecture notes (available on my website and LMS system)
5. Specific course information
 - a. brief description of the content of the course:

This course covers the major optical devices used in biomedical field in terms of their principles of operation, their main component and the underlying relevant optical phenomena. Students also in this course are exposed to advanced optical techniques and their biomedical applications.
 - b. prerequisites or co-requisites:

Pre-requisites: BMT 224
Co-requisites: NA
 - c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program: **Required**
6. Specific goals for the course
 - a. specific outcomes of instruction:
 - Understand the basic principles of optical instrumentation and technology used in this field
 - Understand the basic physical principles and relevant optical phenomena, required to understand the operation of optical instrumentation in biomedical field.
 - Recognize and understand the major components of optical instrumentation systems.

- Develop an ability to use the, fiber optics, light sources and detectors in biomedical field.
 - Understand the operation of advanced optical techniques such as electronic microscopy and fluorescence.
- b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

	Course outcome	abet (a-k)
1	Ability to use the knowledge of physics and mathematics to understand the optical phenomena and the underlying physical principles relevant to biomedical optical instrumentation.	b
2	An ability to properly using equipment needed to conduct standard tests and measurements to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.	c
3	Expose students to a wide range of clinical applications of optical-based instruments, and potential uses of optical techniques in the biomedical field.	j

7. Brief list of topics to be covered

Topics
Electromagnetic waves & nature of light.
Reflection (mirrors)
Refraction
Lenses
Prism & Diffraction
Human eye & camera
Simple magnifier & light microscope
Optical detectors
Laser
fiber optic
Electron microscopy
Spectrophotometry
Electromagnetic waves & nature of light.

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
a.	Midterm 1	6	16%
b.	Short Exam	11	8%
c.	Special topic presentation	13	8%
d.	Lecture Quizzes	Continues	8%
e.	Lab report	Continues	10%
f.	Lab exam	14	10%
g.	Final exam	16	40%