



# Course Specification

— (Bachelor)

Course Title: Laser Physics in medicine

Course Code: MPHY6363

Program: B.Sc. Medical Physics.

Department: Physics.

College: Science

Institution: University of Bisha.

**Version: One**

**Last Revision Date:** *Pick Revision Date.*

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## 1. Course Identification

1. Credit hours: 2h

### 2. Course type

A. University  College  Department  Track  Others

B. Required  Elective

3. Level/year at which this course is offered: 6<sup>th</sup> Level / 3<sup>rd</sup> year

### 4. Course general Description

This course presents the basic principles of the laser. Properties of lasers used in medicine. Principles of laser-tissue interactions. Optical properties of biological tissues. Applications of Laser in Ophthalmology and the laser safety fundamentals.

### 5. Pre-requirements for this course (if any):

MPHY6362 (Light and Optics).

### 6. Co- requirements for this course (if any):

NA

### 7. Course Main Objective(s)

Recognize the basic of laser physics, and it's applications in the medicine.

## 1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	2	100%
2.	E-learning		
3.	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>		
4.	Distance learning		

## 2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30





2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
<b>Total</b>		<b>30</b>

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Recognize the basic concepts of the laser physics.	K1	Lecturing	Quizzes Homework
1.2	Describe the laser applications in medicine, and the laser safety fundamentals.	K2		Midterm exam Final exam
2.0	Skills			
2.1	Solve problems in the basic of laser physics.	S1	Solve problems. Self-learning	Quizzes Homework Midterm exam Final Exam.
2.2	Solve problems in the laser medical applications and laser safety fundamentals.	S1	Solve problems. Self-learning	Quizzes Homework Final Exam.
2.3	Communicate positively with others	S4	Presentation Work group	Reports presentation
3.0	Values, autonomy, and responsibility			
3.1	Apply academic and professional ethical values effectively and efficiently.	V1	Work group	Reports presentation
3.2	Exhibit self-learning skills independently.	V2	Self-learning	Reports presentation





## C. Course Content

No	List of Topics	Contact Hours
	<b><u>Elements of Laser Emission Process</u></b>	
1.	Introduction Components of a Laser Source Laser Amplification Beam Divergence Monochromaticity	3
2.	Optical Coherence Length and Time Interaction of Radiation with Atomic System Einstein Transition Coefficients	3
3.	Light Amplification Laser Efficiency of a Medium Laser Gain Q-Switched Laser	3
4.	Ruby Laser Helium-Neon Laser Lasers in Medicine	3
	<b><u>Laser-Tissue Interaction</u></b>	
5.	Introduction General Consideration of Laser-Tissue Interaction Overview of Laser Propagation in Tissue	3
6.	Thermal and Mechanical Damage of Tissue Examples of Tissue Properties	3
	<b><u>Laser Ophthalmology</u></b>	
7.	Introduction Characteristics of the Human Eye Visual Refractive Errors	3
8.	Laser Interaction with Eye Tissues Laser Applications in Ophthalmology - Diagnostic	3





9	<b><u>Laser Safety in Medicine</u></b>	3
	Introduction	
	Classification of Laser Hazards	
	Common Wavelengths	
	Non-beam Hazards	
10	Persons Under Risks	3
	Laser Safety Elements	
	Duties of a Laser Safety Officer	
	Laser Safety Committee	
	Laser Safety Training	
Authority for Laser Procedures		
Total		30

**Table:** The matrix of consistency between the content and the learning outcomes of the course.

	Course Learning Outcomes						
	1.1	1.2	2.1	2.2	2.3	3.1	3.2
Topic 1	√		√		√	√	√
Topic 2	√		√		√	√	√
Topic 3	√		√		√	√	√
Topic 4	√		√		√	√	√
Topic 5		√		√	√	√	√
Topic 6		√		√	√	√	√
Topic 7		√		√	√	√	√
Topic 8		√		√	√	√	√
Topic 9		√		√	√	√	√
Topic 10		√		√	√	√	√

#### D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework, quizzes, reports, and presentation.	1: 15	10 %
2.	First term exam	7: 8	20 %
3.	Second term exam	12:13	20 %



No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
4.	Final exam	End of Semester	50 %

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

## E. Learning Resources and Facilities

### 1. References and Learning Resources

Essential References	Medical Applications of Lasers. Edited by D. R. Vij and K. Mahesh. Copyright © 2002 by Springer Science Business
Supportive References	1- Lasers in Medicine, Edited by Ronald W. Waynant, CRC Press LLC, 2000 N.W. Corporate Blvd., Boca Raton, Florida 33431. 2- Lasers Basics, Advances and Applications, Edited by Hans Joachim Eichler • Jürgen Eichler Oliver Lux© Springer Nature Switzerland AG 2018
Electronic Materials	- Blackboard. - PowerPoint presentations. - Digital library of University of Bisha <a href="https://ub.deepknowledge.io/Bisha">https://ub.deepknowledge.io/Bisha</a>
Other Learning Materials	NA

### 2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	NA
Technology equipment (projector, smart board, software)	Smart board or Projector
Other equipment (depending on the nature of the specialty)	NA

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students.	Indirect (Questionnaire).



Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of students assessment	Students, Staff members, Program Leader.	Indirect (Questionnaire).
	Peer Reviewer.	Direct (Review exam)
Quality of learning resources	Students, Staff members, Program Leaders.	Indirect (Questionnaire).
The extent to which CLOs have been achieved	Students, Staff members, Program Leader.	Indirect (Questionnaire).
	Course coordinator.	Direct (Course Learning Outcomes Assessment).

**Assessor** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval Data

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

