

## Course Plan

<b>Semester :</b> 1	<b>Academic Year:</b> 2024-2025
<b>Level:</b> MD	<b>Major:</b>
<b>Course Title:</b> Medical Physics	<b>Department:</b> Medical Physics
<b>Course Code:</b> 1113443126	<b>University Professor or Faculty member:</b>
<b>Class NO:</b>	<b>Credit Hours:</b> 34 h
<b>Prerequisite:</b>	<b>Credit Units:</b> (.....Theo and ..... Prac )
<b>Availability of Professor:</b>	<b>Tel:</b> +98-3137929095
<b>Office Address:</b>	<b>E-mail:</b> shahbazi@med.mui.ac.ir
<b>Name of Student Representative and Cellphone Number:</b>	<b>Number of Students :</b>

**The General Purpose of the Lesson:**  
Concepts and applications of Physics in Medicine

### Learning Outcomes (Objectives):

#### Assessment Methods:

(The Assessment Methods that will be Used to Test Students Learning outcomes & the Skills & Competencies Stated in learning Outcomes)

Assessment	Score From 20
Mid Exam (Theory)	10
Final Exam	10
Practical Exam	0
Assignments:	0
Total Marks	20

### Main References (Text Books):

1. Martin Hollins. Medical Physics, 2<sup>nd</sup> ed., McMillan Education Ltd, London, UK.
2. Cameron JR, Skofronick G. Medical Physics. John Wiley & Sons, New York, USA.
3. Basic Physics of Nuclear Medicine, Kieran Maher, Wikibooks contributor, 2006.

**References for More Reading:**

1- CHRISTENSEN'S PHYSICS OF DIAGNOSTIC RADIOLOGY 4th Edition, by James E. Dowdey Robert E. Murry, Thomas S., lii Curry, WOLTER; 1990.

2- Nuclear Medicine Physics: The Basics, Eighth Edition, by Ramesh Chandra , Arman Rahmim, LWW; 8<sup>th</sup> edition, 2017.

**Student's Responsibilities:**

NO of Session	Main Topic	Teacher's Name	Place & Time	Date	Method of Presentation
1	Properties of Electromagnetic waves, Visible light, Infrared, and Ultra violet (Domain of frequencies, Biological effects and applications) and Spherical and Cylindrical lenses: their different types and properties	Prof. Shahbazi-Gahrouei			
2	Instruction and function of the Eye, Visual Function, Optical defects and their correction (Myopia, Hypermetropia, Presbyopia, and Astigmatism) and Strabismus	"			
3	- Instruments in clinical optics - LASER: Concept, Basic Physics, Properties and its application in Medicine	"			
4	High frequency currents, Microwave, Diathermy and their application for treatment of diseases	"			
5	Basic radiation physics, atomic and nuclear structure, and interaction of radiation with matter	"			
6	Radioactivity decays, the radioactivity decay law, units and	"			
7	Radiation dosimetry, units and instruments (Gas filled and Scintillation detectors)	"			

8	Nuclear medicine physics, Nuclear medicine imaging systems, and its application in cancer treatment	"			
9	The basic Physics of Ultrasound, its properties and produce and detect of ultrasonic waves	Prof. Tavakoli			
10	Different techniques of ultrasonic imaging and biological effects	"			
11	The basic physics of X-ray, properties, spectrum and structure of x-ray tubes	"			
12	X-ray image formation, imaging systems and the effect of different factors on a good quality image	"			
13	Different type of X-ray image modalities (Mammography, Fluoroscopy, and CT) and introduction to MR imaging	"			
14	The physics of radiation therapy and its different types	"			
15	Concept of Radiation biology, biological effects of radiation on human tissues and cells radiation sensitivity	"			
16	Radiation protection, its organizations and limits for occupational exposures	"			