



Course Specification

— (Bachelor)

Course Title: **Physics of Medical Imaging**

Course Code: **MPHY6458**

Program: **Medical Physics**

Department: **Physics**

College: **Science**

Institution: **University of Bisha**

Version: **1**

Last Revision Date: 5 September 2023

Table of Contents

A. General information about the course:	3
1. Course Identification.....	3
٢. Teaching mode (mark all that apply).....	خطأ! الإشارة المرجعية غير معرّفة.
٣. Contact Hours (based on the academic semester).....	خطأ! الإشارة المرجعية غير معرّفة.
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	خطأ! الإشارة المرجعية غير معرّفة.
C. Course Content	خطأ! الإشارة المرجعية غير معرّفة.
D. Students Assessment Activities	خطأ! الإشارة المرجعية غير معرّفة.
E. Learning Resources and Facilities	خطأ! الإشارة المرجعية غير معرّفة.
1. References and Learning Resources	خطأ! الإشارة المرجعية غير معرّفة.
2. Required Facilities and equipment	خطأ! الإشارة المرجعية غير معرّفة.
F. Assessment of Course Quality	خطأ! الإشارة المرجعية غير معرّفة.
G. Specification Approval Data	خطأ! الإشارة المرجعية غير معرّفة.





A. General information about the course:

1. Course Identification

1. Credit hours:	3
2. Course type	
A.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Track <input type="checkbox"/> Others <input type="checkbox"/>
B.	Required <input type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered:	7 th Level / 4 th year
4. Course general Description	
This course presents the basic knowledge of Imaging Modalities (ionizing and non-ionizing). X-ray Imaging. Dual and Multi-modality Imaging Quality Management of Diagnostic and Interventional Radiology, Ultrasound Imaging, Magnetic Resonance Imaging (MRI), Mathematical Methods, Tomography, Acquisition, formation, processing and display of medical images. Evaluation of Image Quality.	
5. Pre-requirements for this course (if any):	
NA	
6. Co- requirements for this course (if any):	
NA	
7. Course Main Objective(s)	
Recognize the fundamental of Medical Imaging.	

2. Teaching mode (mark all that apply)

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

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	





Total	40
-------	----

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	explain and understanding of and processing, radiation safety issues in the operation of medical imaging equipment's.	K1	Lecturing	Quizzes Homework Midterm exam Final exam
1.2	Describe the physics principles underlying the operation of medical imaging equipment.	K1		
2.0	Skills			
2.1	Explain apply mathematical methods of image construction.	S1	Solve problems. Self-learning	Quizzes Homework Midterm exam Final exam
2.2	Describe and understanding the aspects of clinical applications of imaging methods.	S2	Practices lab	Reports Practical exam
2.3	Communicate positively with others.	S4	Presentation Work group	Reports Presentation
3.0	Values, autonomy, and responsibility			
3.1	Exhibit self-learning skills independently.	V2	Self-learning	Reports Presentation
3.2	Ability to work in team effectively.	V3	Work group	Reports Presentation



C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Medical Imaging The Modalities. CT Scan. PET scan. Image Properties.	4
2.	X-ray Imaging Production. X-ray tubes, insert, housing, filtration, and collimation. X-ray generator function, components, and circuit designs. Timing the X-ray exposure in radiography. Factors affecting X-ray emission.	5
3.	Screen film radiography Projection radiography. Basic geometric principles. Screen film cassette, and characteristics.	5
4.	Mammography	5
5.	Image quality Contrast. Spatial resolution. Noise.	4
6.	Digital radiography Computed radiography. Flat panel detectors. Implementation. Digital image processing.	4
7.	Magnetic resonance imaging (MRI) Localization of the MR signal. K-space data acquisition and image reconstruction. Image characteristics. Artifacts. Instrumentation. Safety and bioeffects.	5
8.	Ultrasound Characteristics of sound. Interactions with matter. Beam properties.	5
9.	Image data acquisition. Image quality and artifacts. Doppler ultrasound.	4
10.	Gamma Camera and SPECT	4
Total		40





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: 10	5 %
2.	Achievement file (Practical experience reports).	1: 10	5 %
3.	First term exam	7: 8	10 %
4.	Second term exam	12:13	10 %
5.	Practical exam	15	20 %
6.	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	The essential physics of medical imaging, 2 nd Edition, by Jerrold T. – J. Anthony – Edwin M. – John M., LIPPINCOTT WILLIAMS & WILKINS, 2002.
Supportive References	Introduction to Biological Physics for the Health and Life Sciences, 2 nd Edition, by Kirsten Franklin et. All, Willey, 2019.
Electronic Materials	- Blackboard.





	- PowerPoint presentations. - Digital library of University of Bisha https://ub.deepknowledge.io/Bisha
Other Learning Materials	NA

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	Projector or smart board
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).
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	College of Science Council
REFERENCE NO.	١
DATE	5 September 2023

