

Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Ultrasound Techniques			
Course Code (according to the bylaw)	TRMI 206			
Department/s participating in delivery of the course	Technology of Radiology and Medical Imaging			
Number of credit hours of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	2	2	-	3
Course Type	Compulsory			
Academic level at which the course is taught	Level 2 – 1 st Semester			
Academic Program	Technology of Radiology and Medical Imaging			
Institute	High Technology Institute of Applied Health Science			
Academy	Nile Delta for science			
Name of Course Coordinator	DR. Mohamed Auf			

	Ph.D. of Radiobiology, Institute of Graduate Studies and Research, Alexandria University
Course Specification Approval Date	Department Council No. 2, date: (2024 - 09 - 21)
Course Specification Approval (Attach the decision/minutes of the department /committee/council)	

2. Course Overview (Brief summary of scientific content)

This course introduces the fundamental physical principles and operational aspects of ultrasound imaging, including the components and functions of an ultrasound machine. Students will learn to use correct terminology, recognize common display modes such as A-mode, B-mode, M-mode, and Doppler, and understand how ultrasound interacts with different tissues, including the identification of common artifacts. The course also covers interpretation of basic sonographic findings such as echogenicity and masses, while building foundational skills in obstetric ultrasound and promoting safe scanning practices.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes Pos (ARS)

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Text	Code	Text	Code
PO.4 .	Learn techniques for correctly positioning	CLO.1.	Describe the basic physical principles of ultrasound.

	patients and various types of X-rays generating machines & equipment to capture clear diagnostic images.		
		CLO.2.	Identify the components and functions of ultrasound machines.
PO.5	. Gain knowledge of the hazards of radioactive substances and radiation, radiation protection for the safety of patients and healthcare workers.	CLO.3.	Explain key ultrasound terminology and display modes.
PO.8	Discuss the fundamentals of instrumentation components, imaging protocols, techniques and quality assurance used in different imaging modalities	CLO.4.	Describe how ultrasound interacts with various tissues.
		CLO.5.	Recognize and explain common ultrasound artifacts and image characteristics (e.g., echogenicity).
PO.4	Troubleshoot technical errors and artifacts.	CLO.6.	Analyze ultrasound images and identify normal and abnormal findings.
		CLO.7.	Correlate monographic appearance with physical principles (e.g., tissue type, artifact origin).
PO.6	Operate and manage effectively the different medical imaging equipment and practice the professional fieldwork.	CLO.8.	Differentiate between display modes and determine appropriate use in clinical scenarios.
		CLO.9.	Solve simple technical or clinical problems in ultrasound image interpretation.
PO.5	Practice a range of skills used in image processing techniques and in diagnostic	CLO.10	Operate ultrasound equipment and adjust basic machine settings appropriately.

	imaging systems.	CLO.11 .	Apply correct scanning techniques for basic and obstetric ultrasound procedures.
PO.7 .	Gain insight into specialized imaging processes including (CT scans, interventional procedures, magnetic resonance imaging (MRI), ultrasound).	CLO.12 .	Recognize and reduce artifacts during scanning.
		CLO.13 .	Demonstrate safe and professional conduct during practical sessions.
PO.4 .	Adjust to new technologies and methods.	CLO.14 .	Demonstrate a commitment to learning and professional development in ultrasound.

4. Teaching and Learning Methods

1. Interactive Lectures. Interactive Lectures.
2. Discussion and brain storming.
3. Asynchronous learning.
4. Case study /problem solving.

5. Self-Directed Learning (SDL).

6. Research and presentations, Assignment and reports.

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/)	Training (Practical/ Clinical/)	Self- learning (Tasks/ Assignments / Projects/ ...)	Other (to be determined)
1	Introduction to ultrasound techniques	3	2	2	1	-
2	Basics of Ultrasound	3	2	2	-	-
3	Physical Principles of Ultrasound	3	2	2	-	-
4	Ultrasound Machine	3	2	2	1	-
5	Ultrasound Terminology	3	2	2	1	-
6	Mid-Term Exam	-	-	-	-	-
7	Ultrasound Interaction with Tissue I	3	2	2	1	-
8	Ultrasound Interaction with Tissue II	3	2	2	-	-
9	Display Modes	3	2	2	-	-
10	Echogenicity	3	2	2	1	-
11	Ultrasound Artifacts	3	2	2	-	-

12	Ultrasound Description of Masses	3	2	2	-	-
13	Obstetric Sonography	3	2	2	-	-
14	Revision	3	2	2	-	-
15	Practical Exam	-	-	-	-	-
16	Final Written Exam	-	-	-	-	-

Course Schedule

5. Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	-	-	-
2	Exam 2 (Semester work)	6	20	13.3%
3	Assignments	10	10	6.6%
4	Final Practical Exam	15	45	30%
5	Final Written Exam	16	75	50%
6	Final Oral Exam	-	-	-
7	Field training	-	-	-
8	Other (Mention)	-	-	-

The methods mentioned are examples, the organization may add and/or delete

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	The main (essential) reference for the course (must be written in full according to the scientific documentation method)	Introduction to Ultrasound – Peter Hoskins
	Other References	Solography Principles and Instruments – Hagen-Ansert
	Electronic Sources (Links must be added)	Radiopaedia.org , the peer-reviewed collaborative radiology resource Knowledge bank: https://www.ekb.eg/ar
	Learning Platforms (Links must be added)	BISLMS: Log in to the site
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and	Devices/Instruments	Computers, Boards and Projectors
	Supplies	-
	Electronic Programs	Ibn Al-Haytham Program
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	Computers, Boards and Projectors

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Learning Resources and Supportive Facilities *