

## المجالات المعرفية لتخصص (التصوير الطبي، تكنولوجيا الأشعة) / برنامج البكالوريوس

**Program Title:** Program: Bachelor of Medical Imaging, Radiologic Technology

**Total Credit Hours:** needed for completion of the program: 136 credit hours

**Award (S) Granted On Completion of the Program:** Bachelor of Medical Imaging, Radiologic Technology.

### Program Goals:

1. Provide students with the necessary clinical and didactic experience to become competent diagnostic radiographer with the required skills for producing high quality medical images.
2. Develop critical, analytical problem-based learning skills with the ability to explain the scientific basis of diagnostic radiography and will have theoretical and practical knowledge about different medical imaging modalities, such as computed tomography, magnetic resonance imaging, and nuclear medicine.
3. Prepare graduates who understand the ethics and regulations of the radiography career and know the principles of health organizations and society.
4. Prepare graduates with the ability to provide professional patient care and the ability to show personal and professional development.
5. Provide students with the skills required to protect patients, themselves and others from unnecessary radiation exposure.
6. Providing the students with both academic and practical content in sufficient details to ensure that, on graduation, they are competent to work as diagnostic technologists within a healthcare team.

### F. Program Learning Outcomes (PLOs):

After completing this program, students should be able to:

1. Demonstrate a broad and coherent knowledge of the fundamental scientific and functional principles of all modalities associated with medical imaging including X-ray, Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Ultrasound, Angiography, Mammography and other emerging / hybrid modalities.
2. Demonstrate an understanding of the concepts of the interactions of ionizing radiation with matter and describe the instruments used to detect ionizing radiation and their appropriate selection in addition to understanding the hazards of ionizing radiations.
3. Demonstrate a deep understanding of the radiographic cross-sectional anatomy and optimal imaging strategies for human structures and pathologies.

4. Describe and demonstrate ability to implement the following: digital image processing techniques and applications: enhancement; segmentation; quantification; registration; medically relevant illustrative, image compression, investigative and imitative visualization technique.
5. Apply knowledge of the anatomy, physiology, pathology of body systems to the role of medical imaging suitable for registration as a diagnostic radiographer role.
6. Identify and implement the requirements of applying radiation protection and health and safety regulations to the specific radiographic examinations.
7. Apply critical and reflective thinking to clinical scenarios, including understanding how decision making impacts on the quality of clinical practice, assessing information and demonstrating appropriate inquiry, including those relating to complex problems.
8. Demonstrate through clinical placement professional and ethical conduct, sound patient care, high levels of communication and autonomy.
9. Implement and evaluate a range of diagnostic imaging examinations, adapt technique and approach to suit a range of patient clinical complexities and presentations and have the capacity to investigate alternative and emerging imaging techniques for optimal health-care delivery.
10. Demonstrate autonomous work-practices while also being capable of working in a dynamic and fast-moving team environment.
11. Maintain a current knowledge of digital biomedical imaging techniques and technologies, whilst incorporating new knowledge into clinical practice using an evidence based approach.

#### Learning Outcomes (PLOs)

PLOs		
PLO#	PLO statement	Value-added
PLO1	Demonstrate a broad and coherent knowledge of the fundamental scientific and functional principles of all modalities associated with medical imaging including X-ray, Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Ultrasound, Angiography, Mammography and other emerging / hybrid modalities.	Graduated students are playing an important role in the healthcare industry. In addition, fundamental science develops scientific knowledge which is used as the scientific foundation for applied health sciences. This PLO provides the necessary analytical tools to conduct healthcare functions and concepts, which enable students to develop skills and competences in the research institutes and to be a leader in the healthcare sector in Jordan.

<b>PLO2</b>	Demonstrate an understanding of the concepts of the interactions of ionizing radiation with matter and describe the instruments used to detect ionizing radiation and their appropriate selection in addition to understanding the hazards of ionizing radiations.	Graduated students are playing an important role in reducing patients' dose and choosing the optimum exposure factors based on scientific based evidence practice in order to produce high quality radiographs while maintaining the patients' dose as low as possible. This PLO provides the necessary analytical information to describe and identify the effects of scattered radiation and tools used to detect them, therefore, establishing a work environment in line with international scientific standards in Jordan hospitals.
<b>PLO3</b>	Demonstrate a deep understanding of the radiographic cross-sectional anatomy and optimal imaging strategies for human structures and pathologies	This PLO is designed to provide students with knowledge and skills to gain a clear understanding of human radiographic normal and pathological anatomy images which makes them more successful and effective in assisting in diagnosis.
<b>PLO4</b>	Describe and demonstrate ability to implement the following: digital image processing techniques and applications: enhancement; segmentation; quantification; registration; medically relevant illustrative, image compression, investigative and imitative visualization technique.	Use of Information Technology to improve the quality of medical imaging and health care in Jordan. The graduate students should be equipped with a set of knowledge, technical skills and competences that enhance decisions of scheduling and organizing the plan of patient imaging. Medical diagnostic imaging professionals play a vital role in improving the health outcomes, quality of care, and the healthcare experience of patients since they form the base of the health care hierarchy. Digital medical imaging and Postprocessing is an important tool that can be used to improve image quality as well as keeping the patients' dose as low as possible alongside with reducing the departments' financial costs.
<b>PLO5</b>	Apply knowledge of the anatomy, physiology, pathology of body systems to the role of medical imaging suitable for registration as a diagnostic radiographer role.	This PLO will provide the graduates with the knowledge and skills to apply the principles and tools of necessary to effectively lead and manage within the complexities of the health care industry. The program offers a variety of courses designed to provide graduated students with the skills for a commitment to life-long learning skills; emphasizes inter-professional and team-based education and practice the transforming of the health care system, which will in turn require a fundamental knowledge and skills been developed to make sure that the patient is undergoing the medical imaging exam that suites his disease as well as his need. Target necessary improvements in quality, access, and value, and management of the problems raised in the healthcare organizations in jordan.
<b>PLO6</b>	Identify and implement the requirements of applying radiation protection and health	The purpose of this PLO is to provide the theoretical and applied background necessary for the radiological protection requirements of both ionizing and non-ionizing radiations used

	and safety regulations to the specific radiographic examinations.	in hospitals. There is increasing scrutiny of healthcare professional and public concerns related to the variability in the quality of healthcare provided and the safety of the medical imaging systems regarding radiation dose, groups, and teams, and with people from different cultural, social, professional, and organizational backgrounds.
<b>PLO7</b>	Apply critical and reflective thinking to clinical scenarios, including understanding how decision making impacts on the quality of clinical practice, assessing information and demonstrating appropriate inquiry, including those relating to complex problems	Develop skills in analytical thinking and problem solving related to clinical medical imaging practice to contribute in healthcare industry by implementing a systematic problem solving process, analytical modeling and recommendation. Therefore graduate students will understand and discuss clinical scenarios, including understanding how decision making impacts on the quality of clinical practice in hospitals in Jordan and around the globe.
<b>PLO8</b>	Demonstrate through clinical placement professional and ethical conduct, sound patient care, high levels of communication and autonomy.	Furnish students with the knowledge related to socio-cultural sciences in all its aspects. This PLO equips our students with the knowledge and skills related to describing the culture, which are the most influential factors that are known to determine one's health beliefs and behaviors. It is necessary for one to be aware of and respect the cultural beliefs and traditions, both domestically and internationally, to establish successful and open relationships, further engagement with the patient, and enhanced quality of health care in Jordan society.
<b>PLO9</b>	Implement and evaluate a range of diagnostic imaging examinations, adapt technique and approach to suit a range of patient clinical complexities and presentations and have the capacity to investigate alternative and emerging imaging techniques for optimal health-care delivery	The development of professional attitudes and demonstration of professional behaviors are key factors in the practice of medical imaging. Graduated students will demonstrate an understanding of the health status of patients, determinants of health and illness, factors contributing to health promotion and disease prevention and factors influencing the use of medical imaging approaches through an application of various disciplines in our medical imaging program.
<b>PL10</b>	Demonstrate autonomous work-practices while also being capable of working in a dynamic and fast-moving team environment.	Students shall hone their skills, which allow them to comprehensively apply the knowledge and skills gained during their studies, and work as part of a team following the rules and regulations of the training institution. Therefore, this program will prepare graduates to assume rewarding and high-demand leadership careers within the health care industry.
<b>PL11</b>	Maintain a current knowledge of digital biomedical imaging techniques and technologies,	This PLO is designed to provide students with knowledge, skills and competencies enabling them to better understand, evaluate and develop different types of applied research and

	whilst incorporating new knowledge into clinical practice using an evidence based approach	prepare them to elaborate their own research related to healthcare industry. Tomorrow's leaders should not only master the technical tools and the latest managerial techniques, they will be increasingly asked to develop their leadership skills.
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### Qualifications frame work: Basic Knowledge Area

<i>Knowledge</i>	Minimal Credit
<b>Foundation Requirements</b> Administration and quality assurance in applied medical sciences General biology General biology practical General chemistry General chemistry lab Scientific research methods Research project Gross anatomy and histology Human physiology Human physiology lab Ethics in applied medical careers Biostatistics	24
<b>General Requirement</b> General physics Calculus Biochemistry Biochemistry lab	9
<b>Elective Requirements</b>	9
<b>Basic Radiologic Sciences and Principles of Radiation</b> Introduction to radiologic technology Physics of radiology Digital image processing and analysis Principles of diagnostic imaging Quality management in medical imaging Introduction to radiation biology and radiation protection	12
<i>Skill</i>	
<b>Conventional X-Ray Procedure and Radiographic Anatomy</b>	12

Peripheral osseous system radiography Radiographic surface anatomy Central osseous system radiography Radiographic cross sectional anatomy Mammography Dental radiography	
<b>Advanced Medical Imaging Applications</b> Computed Tomography Computed Tomography Procedure Magnetic Resonance Imaging Magnetic Resonance Imaging Procedure Vascular Imaging Radiotherapy Nuclear Medicine Ultrasound Evidence-based Imaging Computer in Medical Imaging	24
<b>Health and Care</b> Patient care in radiology department Radiologic pathology First Aid Basic Medical Care	9
<b>Clinical Training</b>	15(at least 45 contact hr)
<b>Graduation Project</b>	As determined by department

## Radiologic Technology, Medical Imaging Laboratories:

Along with theoretical courses, lab work and clinical placement provides students with hands-on practical experience. This in-turn provides academic learning and real-life practice of the profession. Thus ensuring that graduates are ready to work in hospitals and health care centers. The following table shows the number of labs needed and their specifications:

Lab	Bio	Area	Equipment	Students #
Medical Diagnostic Imaging Lab 1	The lab is designed to introduce students to the necessary preclinical skills and prepare them for the clinical phase of their study. In addition, the lab offers students a controlled environment for practicing the necessary quality control tests of the x-ray machine, the dark room, and view boxes, and for understanding the	70 m <sup>2</sup>	General x-ray machine	25
			CR Unit	
			Densitometer Tools	
			Sensitometer	
			Thermometer	
			Digital KV Dose and Time Meter	



	<p>underpinning physical principles of x-ray imaging.</p> <p>In the lab, the students are also trained in patient care by practicing role play, learn how to prepare contrast media for fluoroscopic studies, and introduced to materials and equipment used in angiography and cardiac catheterization.</p>		<p>Precision Photometer</p> <p>Digital Timer and Stopwatch</p> <p>Full-body phantom</p> <p>view boxes</p> <p>White Board</p>	
<p>Medical Diagnostic Imaging Lab 2</p>	<p>The lab is designed to provide a virtual environment to simulate the processes of CT and MRI imaging. Simulations software will be used to provide such an experience. Medical image quality data show connected to a PC will also be mounted to project high quality DICOM images to enable post-processing and manipulations of image data. This is designed to introduce students to a wide spectrum of skills such as medical image processing and the understanding of anatomy orientation.</p>	70 m <sup>2</sup>	<p>20 computers supported with CT Simulator Software</p> <p>Vascular Radiography instruments including (guidewires, catheter &amp; contrast media)</p> <p>Viewing Boxes.</p> <p>White Board</p>	20
<p>Medical Diagnostic Imaging Lab 3</p>	<p>The lab is designed to provide a virtual environment to simulate the processes of CT and MRI imaging. Simulations software will be used to provide such an experience. Medical image quality data show connected to a PC will also be mounted to project high quality DICOM images to enable post-processing and manipulations of image data. This is designed to introduce students to a wide spectrum of skills such as medical image processing and the understanding of anatomy orientation.</p>	70 m <sup>2</sup>	<p>20 computers supported with MRI Simulator Software</p> <p>Viewing Boxes.</p> <p>White Board</p>	20

مقرر اللجنة



د. هيثم العويدات

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