

# Faculty of Allied Medical Sciences

## Department of Technology of Radiographic Imaging

### Study Plan for the Bachelor Degree in Technology of Radiographic Imaging

**2024 / 2025**

**Vision:**

Excellence in learning and teaching of Technology of Radiographic Imaging, Research, and Community Service

**Mission:**

Graduate specialists in Technology of Radiographic Imaging who possess international standards of scientific capabilities and clinical skills in order to meet the needs of national and regional market.

**Program Objectives:**

1. Prepare qualified graduates specialized in technology of radiographic imaging in order to meet the need of national and regional market.
2. Accomplish international accreditation standards in teaching/learning technology of radiographic imaging.
3. Continuous enhancement of faculty members performance and competencies in the specialty area of technology of radiographic imaging.
4. Promote students' self-reliant learning skills, communication, and scientific thinking.
5. Application of faculty members and students to scientific research skills, participation in scientific conferences and workshops.
6. Provision of continuing education programs, and training sessions in the specialty area of technology of radiographic imaging.
7. Provision of distinguished levels of academic activities and clinical training for the students in the program of technology of radiographic imaging.
8. Reinforce the use of medical ethics, justice, and equity principles.
9. Encourage community service through voluntary work.

**Intended Learning Outcomes (ILOs):**

1.	Knowledge of basic principles in anatomy, physiology, pathology, and general health related to understanding the movement of the body.
2.	Perform various Medical Imaging procedures competently.
3.	Ability to utilize between intellectual and practical skills which provide the basis for professional development and advanced practice.
4.	Evaluate diagnostic outcomes and institute corrective actions where necessary.
5.	Appraise the critical thinking skills while performing medical imaging procedures.
6.	Utilize professional and ethical behavior in performing medical imaging responsibilities.
7.	Apply safety and protection measures while working in the various fields of medical imaging.
8.	Manipulate equipment appropriately and undertake Quality Assurance to identify and rectify problems.

### Framework for Technology of Radiographic Imaging Bachelor Degree (136 Cr. Hrs.)

Classification	Credit Hours			Percentage
	Compulsory	Elective	Total	
University Requirements	12	12	24	17.6%
Faculty Requirements	19	-	19	13.9%
Program Requirements	93	9	84	68.3%
Support Courses	-	-	-	-
Free Electives	-	-	-	-
<b>Total</b>	<b>115</b>	<b>21</b>	<b>136</b>	<b>100%</b>

### Course Numbering:

Example: Fundamentals of Medical Imaging (12022126)

1	2	0	2	2	1	2	6
Faculty Code		Dept. Code		Course Level		Knowledge Field	Sequence

### Knowledge Areas

Number	Knowledge Field	Credit Hours
0	Basic Principles	3
1	Quality Control and Radiation Protection in Medical Imaging	13
2	Conventional Medical Imaging Applications	17
3	Radiology Diagnosis and Healthcare Management	10
4	Advanced Medical Imaging Applications	25
5	Patient care in radiology department	1
6	Clinical Training	15

#### 1. University Requirements: (24 Credit Hours)

##### 1.1 Compulsory University Requirements: (12Credit Hours)

Course No.	Course Title	Cr. Hr.	Prerequisite	Corequisite
01101101	* Military Sciences	3	-	-
01101112	* Civic Education	3	-	-
01101105	Volunteer work	3	-	-
01101111	Arabic Language	3	01100011	-
01101112	English Language	3	01100012	-
<b>Total</b>		<b>12</b>		

**1.2 Elective:** 12 Credit Hours from the following courses.

Course No.	Course Title	Cr. Hr.	Prerequisite	Corequisite
01101103	Traffic Education	3	--	
01101104	Innovation and Entrepreneurship	3	-	
01101121	Life Skills	3	-	
01101131	Islamic Education	3	-	
01101132	Jerusalem and the Hashemite Custodianship	3	-	
01101141	Sport and Health	3	-	
01101142	Environment and Society	3	-	
01101151	Computer Skills	3	01100051	
01101152	Internet and Communication	3	-	
01101161	Economic concepts and systems	3		
01101171	Psychology and society	3		
01101213	Communication skills in Arabic	3	01101111	
01101214	Communication skills in English	3	01101112	
01101243	Public safety and first aid	3		
01101281	Scientific research methods	3		
01101282	Introduction in astronomy	3		
03011101	The law in our life	3		
03021201	Human rights	3		

**2. Faculty Requirements:** (19 Credit Hours)

Course No.	Course Title	Cr. hr.	Prerequisite	Corequisite
12011110	General Medical Chemistry	3		
12011111	General Medical Chemistry (laboratory)	1		11011109 (C)
12021110	General Medical Biology	3		-
12021111	General Medical Biology (laboratory)	1		11011283 (C)
12021112	General Medical Physics	3		-
12011211	Anatomy & Histology	3		11011283 (C)
12011212	Anatomy & Histology (laboratory)	1		12021212 (C)
12032116	Pathology	3		11011283
12041218	Medical Ethics	1		
<b>Total</b>		<b>19</b>		

### 3. Department Requirements (93 Credit Hours)

#### 3.1. Compulsory Department Requirements: (84 Credit Hours)

Course No.	Course Title	Cr.Hr.	Prerequisite	Corequisite
11031101	Differentiation and Integration 1	3	--	--
12041210	Human Physiology	3	11011283	--
12041228	Nursing care	2	-	--
12041229	Nursing care practical	1		12041228
12021210	Biochemistry	3	11011109	--
12022129	Diagnostic Radiation Physics	2	11021206	--
12022219	Management and quality control	2	--	--
12022218	Biostatistics	2	--	--
12014110	Methods of scientific research	3	--	--
12022126	Fundamentals of Medical Imaging	2	--	--
12022127	Radiobiology and radiation protection	3	--	--
12022128	Principles of Radiological Diagnosis	2	--	12022129
12022229	Analysis and processing the digital radiography images	2	--	12022127
12022237	Mammography	1	--	12022126
12022238	Peripheral Skeletal System Radiography	2	12022128	--
12022239	Peripheral skeletal system radiography (lab)	1	--	12022238
12022248	Computers in Medical Imaging	2	--	--
12022249	Computers in Medical Imaging (Lab)	1	--	12022248
12023129	Adjusting quality of radiography images	2	12022219	--
12023137	Cross Sectional Anatomy	2	--	12022249
12023138	Central Skeletal System Radiography	2	--	12022239
12023139	Central Skeletal System Radiography (lab)	1	--	12023138
12023159	Patient care in radiology department	1	12041228	--
12023169	Clinical training (1)	3	--	12022229
12023243	Magnetic Resonance Imaging	2	12023139	--
12023244	Magnetic Resonance Imaging Simulation	1	12023243	--
12023245	Contrast Media Radiography	2	12022239	--
12023246	Contrast Media Radiography (lab)	1	--	12023245
12023247	Nuclear Medicine Imaging	3	12023139	--
12023248	Computerized Tomography (1)	2	--	12023137
12023249	Computerized Tomography (1) simulation	1	--	12023248
12023262	Clinical training (2)	3	--	12023138
12024139	Panorama dental imaging	1	12023159	--

12024146	Ultrasound Imaging	2	--	12023244
12024147	Computerized Tomography (2)	2	12023249	--
12024148	Computerized Tomography (2) Simulation	1	--	12024147
12024149	Angiography	2	--	12023247
12024169	Clinical training (3)	3	12023249	--
12024219	Project research in Radiographic Imaging	1	--	12024269
12024249	Radiotherapy	3	12024148	--
12024269	Medical Imaging Internship	6	--	12024169
<b>Total</b>		<b>84</b>		

### 3.2. Department Electives: (9 Credit Hours)

Course No.	Course Title	Cr. hr.	Prerequisite	Corequisite
12024144	Advanced topics of MRI	3	12023243	---
12024245	Artificial intelligence for radiography images	3	12023129	---
12024248	Advanced topics in CT	3	12024147	---
12024210	Clinical Services Management		---	---
12031262	Microbiology	3	11011283	---
12032111	General pharmacology	3	---	---
12034220	Medical Terminology	3	---	---
12014221	Medical sociology	3	---	---

## Study Plan Guide

First Year				
First Term				
Course No.	Course Title	Cr. hrs.	Prerequisite	Corequisite
11011109	General Medical Chemistry	3	-	-
11011110	General Medical Chemistry (laboratory)	1	-	11011109
11011283	General Medical Biology	3	-	-
11011284	General Medical Biology (laboratory)	1	-	11011283
11021206	General Medical Physics	3	-	-
	University Compulsory Course 1	3		
	University Elective Course 1	3		
<b>Total</b>		<b>17</b>		

Second Term				
Course No.	Course Title	Cr. hrs.	Prerequisite	Corequisite
12021212	Anatomy & Histology	3	-	11011283
12021213	Anatomy & Histology (laboratory)	1	-	12021212
12041218	Medical Ethics	1	-	-
12021210	Biochemistry	3	11011109	-
11031101	Differentiation and integration 1	3	-	-
	University Compulsory Course 2	3	-	-
	University Elective Course 2	3	-	-
<b>Total</b>		<b>17</b>		

Second Year				
First Term				
Course No.	Course Title	Cr. hrs.	Prerequisite	Corequisite
12041210	Human Physiology	3	11011283	-
12022129	Diagnostic Radiation Physics	2	11021206	-
12022128	Principles of Radiological Diagnosis	2	-	12011211
12032116	Pathology	3	-	12021110
12022127	Radiobiology and radiation protection	3	-	-
12022126	Fundamentals of Medical Imaging	2	-	-
	University Elective Course 3	3	-	-
<b>Total</b>		<b>18</b>		

Second Term				
Course No.	Course Title	Cr. hrs.	Prerequisite	Corequisite
12022219	Management and quality control	2	-	-
12022248	Computers in Medical Imaging	2	-	-
12022249	Computers in Medical Imaging (Lab)	1	-	12022248
12041228	Nursing care	2	-	-
12041229	Nursing care practical	1	-	12041228
12022218	Biostatistics	2	-	-
12022238	Peripheral Skeletal System Radiography	2	12022128	-
12022239	Peripheral skeletal system radiography (lab)	1	-	12022238
12022229	Analysis and processing the digital radiography images	2	-	12022127
	University Compulsory Course 3	3	-	-
<b>Total</b>		<b>18</b>		

Third Year				
First Term				
Course No.	Course Title	Cr. hrs.	Prerequisite	Corequisite
12023138	Central Skeletal System Radiography	2	-	12022239
12023139	Central Skeletal System Radiography (lab)	1	-	12023138
12023129	Adjusting quality of radiography images	2	12022219	-
12022237	Mammography	1	-	12022126
12023159	Patient care in radiology department	1	12041228	-
12023137	Cross Sectional Anatomy	2	-	12022249
12014110	Methods of scientific research	3	12014110	-
12023169	Clinical training (1)	3	-	12022229
	University Elective Course 4		-	-
<b>Total</b>		<b>18</b>		

Second Term				
Course No.	Course Title	Cr. hrs.	Prerequisite	Corequisite
12023248	Computerized Tomography (1)	2	-	12023137
12023249	Computerized Tomography (1) simulation	1	-	12023248
12023247	Nuclear Medicine Imaging	3	12023139	-
12023245	Contrast Media Radiography	2	12022239	-
12023246	Contrast Media Radiography (lab)	1	-	12023245
12023243	Magnetic Resonance Imaging	2	12023139	-
12023244	Magnetic Resonance Imaging simulation	1	12023243	-
12023262	Clinical training (2)	3	-	12023138
	University Compulsory Course 4	3	-	-
<b>Total</b>		<b>18</b>		

Fourth Year				
First Term				
Course No.	Course Title	Cr. hrs.	Prerequisite	Corequisite
12024149	Angiography	2	-	12023247
12024139	Panorama dental imaging	1	12023159	-
12024147	Computerized Tomography (2)	2	12023249	-
12024148	Computerized Tomography (2) Simulation	1	-	12024147
12024146	Ultrasound Imaging	2	-	12023244
12024169	Clinical training (3)	3	12023249	-
	Department Elective Course 1	3	-	-
	Department Elective Course 2	3	-	-
	<b>Total</b>	<b>17</b>		
Second Term				
Course No.	Course Title	Cr. hrs.	Prerequisite	Corequisite
12024249	Radiotherapy	3	12024148	
12024269	Medical Imaging Internship	6	-	12024169
12024219	Project research in Radiographic Imaging	1	-	12024269
	Department Elective Course 3	3		
	<b>Total</b>	<b>13</b>		

## Description of Faculty Compulsory Courses

Course Number	Course Name	Cr. Hr.	Prerequisite	Teaching Method
1101109	General Medical Chemistry	3	---	Hybrid
Basic principles of chemistry, measurement and significant figures, the study of atoms, elements, molecules and ions, chemical reactions and the study of mass relationships for chemical reactions, physical properties and calculations of concentrations by different methods and reactions in aqueous solutions, the study of gases and their physical properties, the study of acids and bases and the basic principles of equilibrium titrations in volumetric analysis and the use of chemistry in pharmaceutical calculations, including drug dilution and dose calculation.				
1101110	General Medical Chemistry (Lab)	1	1101109 (C)	Face-to-Face
General safety principles and basic laboratory techniques, determining the physical and chemical properties of matter, preparing and diluting solutions, titrating acids and bases, and the physical properties of gases.				
11011283	General medical Biology	3	---	Online
Cell structure, cell chemistry, cellular respiration, photosynthesis, cell communication, cell division, principles of molecular genetics, genetic code, replication and reproduction of genetic material, protein synthesis, genetics of bacteria and viruses, hormonal regulation in plants and animals, principles of biological classification and basics of ecosystems of living organisms.				
11011284	General Medical Biology (Lab)	1	11011283 (C)	Face-to-Face
Cell structures, chemical components of living cells and cellular activities (methods of reproduction, enzyme activities, physical properties, respiration and photosynthesis). The subject also includes the study of plant and animal tissues, diversity of living organisms, and genetics.				
11021206	General Medical Physics	3	---	Hybrid
Basic concepts and principles of mechanics (motion of objects, laws of motion, work and energy), elasticity, and fluid dynamics. Description of elasticity and general information about fluid dynamics, heat and temperature, frequency (sound, electromagnetic).				
12021212	Anatomy & Histology	3	11011283 (C)	Hybrid
Learn anatomical terms and study the anatomy of the various organs of the human body, the skin and its appendages, bones, muscles, nervous system, circulatory and cardiac system, respiratory system, urinary and reproductive system and endocrine glands. The subject links the anatomy of organs and functions. As well as the types of tissues with the naked eye and at the microscopic level starting from the cell and the structure of tissues of different types and how they work.				
12021213	Anatomy & Histology (Lab)	1	12021212 (C)	Face-to-Face
Anatomical terms and anatomical sections of the body. Anatomy of human body systems; skeletal system and joints, muscles, nervous system, cardiovascular system, digestive system, respiratory system and genitourinary system. Histology of epithelial and connective tissues, skin and its appendages, and lymphatic system.				
12032116	Pathology	3	11011283 (C)	Hybrid

Cell diseases, acute and chronic infections, tissue regeneration, blood disorders, tumors, infectious diseases, respiratory diseases, heart diseases, skin diseases, and chronic diseases (diabetes and hypertension). It also includes an overview of diseases and disorders affecting bones, muscles and joints, as well as injuries to the musculoskeletal system and various congenital and acquired diseases affecting bones.

<b>12041218</b>	<b>Medical Ethics</b>	<b>1</b>	<b>-</b>	<b>Online</b>
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Principles of Medical Rehabilitation Ethics: Patient rights: respect, privacy, integrity, and autonomy in decision-making; Patient safety: patient protection law, legal responsibility of allied health professionals for their actions in the professional context and understanding of responsibility and obligations in the event of taking medical-legal actions: informed consent, confidentiality of information; Legal issues: malpractice and negligence; Risk management, infection control; Quality of services and legal aspects: Enforcement of standards in the health professions to promote good care; Code of professional conduct: relationship with patients, with colleagues, and with other professionals.

## Description of Department Compulsory Courses

Course Number	Course Name	Cr. Hr.	Prerequisite	Teaching Method
12041210	Human Physiology	3	11011283	Hybrid
Basic information on the functions of the cardiovascular, respiratory and circulatory systems, as well as the nervous system and the basic principles of physiological control, stopping and special senses, nerves, muscles, blood, glands, reproductive and urinary systems, in addition to the role of these systems in the final function of the human body.				
12021210	Biochemistry	3	11011109	Hybrid
Introduction to biochemistry, properties of water and its storage, amino acids, protein structures, types of proteins such as globular proteins and fibrous proteins, enzymes, enzyme kinetics, nucleic acids, introduction to carbohydrates, carbohydrate metabolism, lipid structure, function and metabolism.				
11031101	Differentiation and Integration 1	3	---	Face-to-Face
Functions, displacements, trigonometric functions, limits, limits of trigonometric functions, sandwich theorem, continuity, differentiation, definition of derivative, chain rule, implicit differentiation, extreme values and critical points, concavity and inflection points, graphing functions, integrals, definite and indefinite integrals, integration by substitution				
12041228	Nursing Care	2	---	Face-to-Face
Theoretical foundations and principles of vital signs: body temperature, respiration, pulse and blood pressure; medication management, skin integrity and wound care; oxygenation and perfusion; circulation; fluid and electrolyte balance; acid-base balance; preoperative nursing care.				
12041229	Nursing Care (Lab)	1	12041228 (C)	Face-to-Face
Knowledge and practical application of basic nursing skills with integration of concepts acquired in the theoretical nursing fundamentals: Hand washing; Removal of personal protective equipment and sterile gloves; Asepsis; Establishment and maintenance of a sterile field; Dressing of the wound; Irrigation of the wound; Insertion and removal of nasogastric tube; Vital signs: Temperature, pulse, respiration; Blood pressure; Oxygen administration and suctioning; Oral, pharyngeal, nasal, tracheal and measuring oxygen saturation; Medication administration: Ocular, ear, oral, injection, vaginal, metered dose inhalers; Intravenous fluids: Administration and regulation of intravenous fluids; Body mechanics: Patient positioning: Fowler, semi-Fowler, supine, prone, lateral, Trendelenburg position, Sim; Moving and turning the patient/beneficiary in bed; Transferring and turning the patient/beneficiary; Assisting the patient/beneficiary to walk; Assisting the patient/beneficiary with the use of a walker.				
12014110	Methods of Scientific Research	3	---	Hybrid
Defining the importance of scientific research and its types, defining the methods, techniques and basic elements in scientific research, and the requirements and conditions that must be met to create disciplined scientific research, taking into account the ethics of scientific research and how to conduct research in an organized manner, selecting and designing the study, collecting information and analytical strategies, including case studies, experimental design, survey methods, and writing a review of research.				
12022219	Management and quality control	2	-	Online

Concepts of medical institution management with a focus on management concepts for radiology department staff, distributing tasks to radiology technicians in the department, and monitoring the performance and efficiency of materials, devices, and tools used in radiology.				
<b>12022129</b>	<b>Diagnostic Radiation Physics</b>	<b>2</b>	<b>11021206</b>	<b>Face-to-Face</b>
Learn about the types of radiation including X-rays, their origin, their uses in medical diagnosis, how to measure them, and their interactions with matter, in addition to knowing the main parts of the medical X-ray machine and the functions of each part.				
<b>12022218</b>	<b>Biostatistics</b>	<b>2</b>	<b>-</b>	<b>Face-to-Face</b>
Introduction to statistics, population and sample, frequency distributions, measures of central tendency, measures of dispersion, measures of skewness and kurtosis, correlation and regression, principles of probability, laws of addition and multiplication of probabilities, perfect probability, Bayes' law, random variables, discrete and continuous distributions, binomial distribution, Poisson distribution, normal distribution				
<b>12014110</b>	<b>Methods of scientific research</b>	<b>3</b>	<b>-</b>	<b>Hybrid</b>
Research design, hypothesis, identification of research problems and sampling procedures. It will also cover scientific paper writing skills.				
<b>12022126</b>	<b>Fundamentals of Medical Imaging</b>	<b>2</b>	<b>-</b>	<b>Face-to-Face</b>
Introduction to the different types of medical imaging devices and their differences in terms of the type of rays and their main applications. Knowing the types of reactions that occur to produce X-rays and produce an image of the organ to be imaged.				
<b>12022127</b>	<b>Radiobiology and radiation protection</b>	<b>3</b>	<b>-</b>	<b>Hybrid</b>
Sources of ionizing radiation and radioactivity, studying the concept of determining and reducing the dose of X-rays, methods of reducing the exposure of workers and patients to radiation in radiology centers, and the basic rules used in radiation protection in general. In addition to designing and planning diagnostic radiation device rooms and discussing the use of radiation scanning monitoring devices for workers in the radiation field. Practical training on the proper use of radiation. Radiation doses, radiation chemistry, and the effect of ionizing radiation on the human body at the genetic and physical levels, including the effect of radiation on the level of cell components, cells, tissues, organs, and the sensitivity response of cells and tissues to radiation, studying theories and models for cell survival after exposure to radiation, and discussing factors that modify the biological effects of radiation. The focus is also on general safety procedures when using radiation at the individual and societal levels.				
<b>12022128</b>	<b>Principles of Radiological Diagnosis</b>	<b>2</b>	<b>12011211 (C)</b>	<b>Face-to-Face</b>
Medical terminology for diseases that require radiological imaging and interpretation of radiological images for these medical conditions, in addition to identifying the different methods used to image these diseases to obtain appropriate, high-quality radiological images.				
<b>12022229</b>	<b>Analysis and processing digital radiography images</b>	<b>2</b>	<b>12022127 (C)</b>	<b>Face-to-Face</b>
The basic components of digital radiological systems and their use in medical imaging, in addition to studying the development of computer and digital imaging for radiology, including digital mammography, digital radiography, digital subtraction for vascular imaging, digital image quality control, image archiving, digital display, and digital image storage systems.				
<b>12022237</b>	<b>Mammography</b>	<b>1</b>	<b>12022126 (C)</b>	<b>Face-to-Face</b>
Learn about the equipment used in breast imaging, breast anatomy, and mammography methods, including digital mammography and tomosynthesis.				
<b>12022238</b>	<b>Peripheral Skeletal System Radiography</b>	<b>2</b>	<b>12022128</b>	<b>Face-to-Face</b>

Radiological imaging methods in terms of preparing patients for imaging of the upper and lower extremities, pelvis and shoulder girdle using theoretically appropriate radiological positions. As well as training students in the radiology laboratories within the department and the university to image the upper and lower extremities, pelvis and shoulder girdle practically.				
<b>1202239</b>	<b>Peripheral skeletal system radiography (lab)</b>	<b>1</b>	<b>1202238 (C)</b>	<b>Face-to-Face</b>
Training students in radiology laboratories within the department and university to image the upper and lower extremities, the pelvis, and the shoulder girdle practically.				
<b>1202248</b>	<b>Computers in Medical Imaging</b>	<b>2</b>	<b>-</b>	<b>On-line</b>
Reviewing the main parts of the computer and computer operating systems in medical imaging devices, then explaining the application of ready-made software in various fields in the medical imaging specialty, such as PACS and DICOM, with a focus on explaining their practical use. The course also explains the Internet, databases, and their applications on medical images.				
<b>1202249</b>	<b>Computers in Medical Imaging (Lab)</b>	<b>1</b>	<b>1202248 (C)</b>	<b>Face-to-Face</b>
Applying ready-made software in various fields of medical imaging, such as PAX and DICOM, with a focus on explaining their practical use. The student also applies the use of the Internet, databases, and their applications to medical images.				
<b>12023129</b>	<b>Adjusting quality of radiography images</b>	<b>2</b>	<b>12022219</b>	<b>Face-to-Face</b>
Basic concepts of quality assurance of radiological images, study of quality control factors, knowledge of components of X-ray imaging devices, practical examinations and conventional radiological imaging equipment which include X-ray devices, X-ray films, strengthening screens and film loading to maintain good quality of both devices and radiological images. In addition to studying quality control in devices: radiography, mammography, and computed tomography, and discussing factors that help reduce radiation dose for all types of medical imaging.				
<b>12023137</b>	<b>Cross Sectional Anatomy</b>	<b>2</b>	<b>12022249 (C)</b>	<b>Face-to-Face</b>
Learn about the anatomy of different organs and areas of the human body using MRI and CT scan images.				
<b>12023138</b>	<b>Central Skeletal System Radiography</b>	<b>2</b>	<b>12022239 (C)</b>	<b>Face-to-Face</b>
Radiological imaging methods in terms of preparing patients for imaging of the skull, head, neck, spine, chest and abdomen using the appropriate radiological positions theoretically, as well as training students in the radiology laboratories within the department and the university to image the skull, head, neck, spine, chest and abdomen practically.				
<b>12023139</b>	<b>Central Skeletal System Radiography (lab)</b>	<b>1</b>	<b>12023138 (C)</b>	<b>Face-to-Face</b>
Training students in radiology laboratories within the department and university to image the skull. Head, neck, spine, thorax and abdomen practically.				
<b>12023159</b>	<b>Patient care in radiology department</b>	<b>1</b>	<b>12041228</b>	<b>On-line</b>
Basic concepts related to patient care methods, knowledge of important vital signs, and knowledge of first aid for patients. Using the lowest doses of radiation in the shortest period of time to image the patient and using lead shields to protect the patient from unwanted exposure to radiation, as well as not exposing companions or pregnant women to radiation.				
<b>12023169</b>	<b>Clinical training (1)</b>	<b>3</b>	<b>12022229 (C)</b>	<b>Face-to-Face</b>
Clinical training in medical imaging using general X-rays, fluoroscopy and radiocontrast materials for diagnostic purposes.				

<b>12023243</b>	<b>Magnetic Resonance Imaging</b>	<b>2</b>	<b>12023139</b>	<b>Face-to-Face</b>
The physical principles of MRI, theories and methods of MRI, physical properties of tissues, image contrast and use of contrast materials in MRI, basic software for MRI. The course also includes a detailed explanation of the components of the MRI, image adjustment and methods of preventing the dangers of MRI. Modern and advanced imaging methods and medical applications of MRI such as cardiovascular imaging, functional imaging of the nervous system, and quantitative imaging. Then students are trained to use computer simulation of the MRI and adjust imaging parameters to obtain an MRI image of different areas of the human body.				
<b>12023244</b>	<b>Magnetic Resonance Imaging - Simulation</b>	<b>1</b>	<b>12023243</b>	<b>Face-to-Face</b>
Training students to use computer simulations of the MRI device and adjust imaging parameters to obtain images of the MRI device for various areas of the human body.				
<b>12023245</b>	<b>Contrast Media Radiography</b>	<b>2</b>	<b>12022239</b>	<b>Face-to-Face</b>
Identifying the nature of the dye used in color imaging and its types, as well as identifying color imaging of the pharynx, stomach, small intestine, colon, and color imaging of the gallbladder, bile ducts, kidneys, ureters, and bladder theoretically, as well as training students in color imaging for color imaging of the pharynx, stomach, small intestine, colon, and color imaging of the gallbladder, bile ducts, kidneys, ureters, and bladder in the university's radiology lab practically.				
<b>12023246</b>	<b>Contrast Media Radiography (lab)</b>	<b>1</b>	<b>12023245(C)</b>	<b>Face-to-Face</b>
Training students on color fluoroscopic imaging devices, equipment used in fluoroscopy, types of contrast media, effects of color imaging, and evaluation of radiographic examinations.				
<b>12023247</b>	<b>Nuclear Medicine Imaging</b>	<b>3</b>	<b>12023139</b>	<b>Hybrid</b>
Physics of nuclear medicine devices, principles of using radioisotopes (pharmaceutical radioactive materials), methods of forming radiological images and how to apply them in the medical field. This includes the different methods of using these pharmaceutical radioactive materials in diagnosing many diseases, especially cancerous ones, in addition to studying imaging of the digestive system, liver, gallbladder, skeletal system, thyroid glands, lung, heart, blood vessels, brain and central nervous system imaging, and studying methods of preventing the risks of using pharmaceutical radioactive materials and how to get rid of them, with practical application of these principles.				
<b>12023248</b>	<b>Computerized Tomography (1)</b>	<b>2</b>	<b>12023137 (C)</b>	<b>Face-to-Face</b>
The physical principles of the operation of the CT scanner, theories and methods of imaging, image composition and the device, image quality and radiation doses and methods of patient care, then training students to use computer simulation of the CT scanner and adjust imaging parameters to obtain a medical CT image of different areas of the human body.				
<b>12023249</b>	<b>Computerized Tomography (1) simulation</b>	<b>1</b>	<b>12023248 (C)</b>	<b>Face-to-Face</b>
Training students to use computer simulations of a CT scanner and adjust imaging parameters to obtain medical CT images of various areas of the human body				
<b>12024147</b>	<b>Computerized Tomography (2)</b>	<b>2</b>	<b>12023249</b>	<b>Face-to-Face</b>
Advanced methods of tomography and image synthesis in addition to advanced medical applications such as cardiovascular and nervous system imaging, then training students to use computer simulation of the tomography device for these advanced applications.				
<b>12023262</b>	<b>Clinical training (2)</b>	<b>3</b>	<b>12023138 (C)</b>	<b>Face-to-Face</b>
Clinical training in computed tomography using X-ray computed tomography of various areas of the human body, as well as training in nuclear medicine imaging.				
<b>12024139</b>	<b>Panorama dental imaging</b>	<b>1</b>	<b>12023159</b>	<b>On-line</b>
The course covers a two-dimensional dental X-ray examination, a complete image of the mouth, including the teeth, upper and lower jaws and surrounding tissues. The course also explains the structure and parts of the panoramic device used to image the jaw and teeth.				

12024146	<b>Ultrasound Imaging</b>	2	12023244 (C)	Face-to-Face
Definition of ultrasound, its physics, transducers, Doppler effect, etc., with emphasis on how images of organs appear using ultrasound, whether normal or diseased, including the abdomen, pelvis, uterus, and superficial organs, as well as the importance of ultrasound in physiology, with practical applications of that.				
12024147	<b>Computerized Tomography (2)</b>	2	12023249	Face-to-Face
This course aims to introduce students to the clinical use of CT. In addition, various protocols, factors, and modifications of CT will be covered in this course. An important goal of this course is to understand how to manage patients before, during, and after CT examination. Some important and common clinical cases will be presented.				
12024148	<b>Computerized Tomography (2) Simulation</b>	1	12024147 (C)	Face-to-Face
Training students to use computer simulations of a CT device and displaying some important and common pathological conditions on CT of various areas of the human body.				
12024149	<b>Angiography</b>	2	12023247 (C)	Face-to-Face
Introduction to the arteries and veins in the human body, then we explain how to image these arteries and veins using a dye on a CT scanner, as well as training students in hospitals on these advanced applications in medical imaging of arteries and blood vessels.				
12024169	<b>Clinical training (3)</b>	3	12023249	Face-to-Face
Clinical training in MRI of various areas of the human body, as well as training in ultrasound imaging.				
12024219	<b>Project research in Radiographic Imaging</b>	1	12024269 (C)	Face-to-Face
In this course, the student selects a case as a research project for graduation. The student begins by conducting a literature review on radiological imaging methods in such cases. Finally, a presentation will be made at the end of the semester to colleagues in the form of a seminar.				
12024249	<b>Radiotherapy</b>	3	12024148	Hybrid
Methods of using radiation in the treatment of malignant tumors, and defining the doses required for each disease case, with the practical application of these methods and observing general safety rules during treatment, in addition to using modern methods of radiation therapy, including three-dimensional radiation therapy, stereotactic radiation therapy, and the study of local radiation within blood vessels.				
12024269	<b>Medical Imaging Internship</b>	6	12024169 (C)	Face-to-Face
The student spends two days, at a rate of 16 hours per week, in one of the hospitals or centers specialized in medical imaging, so that the student can train to apply the techniques he has learned in medical imaging on patients in these centers and hospitals within the following topics:				
<ul style="list-style-type: none"> <li>• Diagnostic medical imaging with X-rays</li> <li>• Computed tomography</li> <li>• Magnetic resonance imaging</li> <li>• Nuclear medicine imaging</li> <li>• Ultrasound imaging</li> <li>• Color imaging</li> </ul>				

## Course Description of Department Elective Courses

Course Number	Course Name	Cr. Hr.	Prerequisite	Teaching Method
12024144	Advanced topics of MRI	3	12023243	Hybrid
The course covers advanced and specialized topics in closed magnetic resonance imaging, nuclear magnetic resonance and magnetic resonance therapy				
12024245	Artificial intelligence for radiography images	3	12023129	Hybrid
This course deals with the use of artificial intelligence in processing radiological images. The use of artificial intelligence techniques in examining medical data and its benefits. Also, learning about the methods used in artificial intelligence to analyze and read radiological images.				
12024248	Advanced topics in CT	3	12024147	Hybrid
Advanced and specialized topics in Cardiac CT or cardiac CT is a procedure used to image the heart, coronary arteries and heart valves				
12004210	Management of Health Services	3	---	Hybrid
Principles of management and leadership in general, management skills for rehabilitation therapists in hospitals and medical clinics. Communication with the medical team, problem-solving skills, delegation, time management, improving the quality of medical service, quality control. Writing and preparing CVs, preparing for job interviews and presentation skills.				
12032111	General Pharmacology	3	---	Hybrid
General principles of pharmacology, including the pharmacokinetics and pharmacodynamics of drugs in general, especially drugs related to anesthesia, intensive care unit, and describes the pharmacokinetics of drugs in special patient populations such as obese patients, pregnant women, premature infants, neonates and children. Finally, describes the various classes of drugs acting on all body systems with special attention to anesthetic agents and groups.				
12034220	Medical Terminology	3	---	Hybrid
Introducing students to basic medical concepts and terminology used in the healthcare field. Emphasis will be placed on vocabulary and expressions related to the specialty of radiographic technology. The course focuses on developing the ability to understand and interpret common terminology that helps them to communicate effectively with medical teams and analyze medical cases.				
12031262	Microbiology	3	11011283	Hybrid
Early history of microbiology. Brief note on prokaryotic (bacteria) and eukaryotic (fungi and protists) microbial cells, viruses and prions. Beneficial and harmful effects of microbes. Control of infection (antimicrobials): bactericidal and antibacterial agents, development of resistance. Laboratory evaluation of antimicrobial agents. Microbial contamination and spoilage of pharmaceutical products. Sterile and non-sterile pharmaceutical products, sterile areas and handling of sterile materials.				
12014221	Medical Sociology	3	---	Hybrid
The basic principles of medical rehabilitation and teamwork. It highlights the role of each member of the rehabilitation team and its relationship to the roles of other members. This course also focuses on the medical and research ethics that rehabilitation team members deal with in clinics and hospitals.				