



# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	21109151
<b>Course Title</b>	<b>Patient Care in Radiology Department</b>
<b>Credit Hours</b>	(3)
<b>Theoretical Hours</b>	(2)
<b>Practical Hours</b>	(3)



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008



**Brief Course Description:**

- ❖ It course general care of patients in radiology department, emphasizes radiographers role in patient care arrest, vital signs, accidents victims, besides procedures, septic techniques, contagious diseases control, blood borne pathogens, veni puncture medications, administration and contrast media reactions, including fundamentals of urinary catheterization.

**Course Objectives:**

Upon the completion of the course, the student will be able to:

1. Understand the ways of moving and lifting all types of patient properly.
2. Understand most types of sterilization techniques.
3. Cope with all emergency cases might occur in radiology department.
4. Able to cope effectively with geriatric and pediatric patients.



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1	Features of general patient care	<ul style="list-style-type: none"> <li>▪ General preliminaries of examination.</li> <li>▪ Moving chair and stretcher patient.</li> <li>▪ Hygiene in radiology department.</li> <li>▪ General contrast and reassurance for patients.</li> </ul>	
2	Sterilization and sterile techniques	<ul style="list-style-type: none"> <li>▪ Methods of sterilization.</li> <li>▪ General sterile supply.</li> <li>▪ Preparation of hands for aseptic procedures.</li> </ul>	
3	Infections patient	<ul style="list-style-type: none"> <li>▪ Infections patient</li> </ul>	
4	Elderly patient	<ul style="list-style-type: none"> <li>▪ Characteristics of elderly.</li> <li>▪ Problem associated with elderly patient.</li> </ul>	
5	Infants and children patient	<ul style="list-style-type: none"> <li>▪ Characteristics.</li> <li>▪ Waiting.</li> <li>▪ Dressing.</li> <li>▪ Cooperation.</li> <li>▪ Sedation</li> <li>▪ Equipment needed</li> </ul>	
6		<ul style="list-style-type: none"> <li>▪ First aid in the radiology department</li> <li>▪ Radiological emergencies</li> </ul>	

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### Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

### Teaching Methodology:

- ❖ Lectures
- ❖ Discussion & quizzes
- ❖ Audio – visual display
- ❖ Demonstrations
- ❖ Practical training

### Text Books & References:

1. Chesney, N. Care of patient in diagnostic radiography 6th edition Blachwell Scientific publication. London 1982.
2. Collins, Communication in health care, 1977, Mosby company.
3. Ehrlich, Givens, Patient care in Radiology, 1981, C.V. Mosby Company.
4. Purtilo, health professional/patient interaction, 1978 W.B. Saunders.



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# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	<b>21116231</b>
<b>Course Title</b>	<b>Radiology Administration</b>
<b>Credit Hours</b>	<b>(3)</b>
<b>Theoretical Hours</b>	<b>3</b>
<b>Practical Hours</b>	<b>0</b>



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

### Brief Course Description:

This course is a summary of the administrative process and its application on radiology department, its intended to introduce the student to the basis of radiography with emphasis on the usefulness of the early diagnosis in treatment of different diseases, and also introducing the student to the multi-disciplinary effect of radiology with inter relations to other branches of medicine. Also, expressing the role of the radiologist, radiographer and all personnel contributing to radiology.

### Course Objectives:

Upon the completion of the course, the student will be able to:

1. Know the basis of radiology.
2. Know the lay out of radiology department.
3. Know the role of radiologist and radiographer.
4. Know the impact of radiology to medicine.
5. Perform most radiology administrative processes such as making radiology budget evaluation employees, and writing memos.
6. Know the chain of command particularly in radiology department and at the hospital level.
7. Know the various controlling methods.
8. Know the leadership style.



## Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Introduction	<ul style="list-style-type: none"> <li>▪ Historical perspective.</li> <li>▪ Needs of administrative process.</li> <li>▪ Management process.</li> </ul>	
2.	Role of radiology in medical diagnosis	<ul style="list-style-type: none"> <li>▪</li> </ul>	
3.	Role of radiology in medical diagnosis	<ul style="list-style-type: none"> <li>▪</li> </ul>	
4.	Role of radiologist	<ul style="list-style-type: none"> <li>▪</li> </ul>	
5.	Role of radiographer	<ul style="list-style-type: none"> <li>▪</li> </ul>	
6.	Radiology administration	<ul style="list-style-type: none"> <li>▪</li> </ul>	
7.	Planning	<ul style="list-style-type: none"> <li>▪ Determination of the goals.</li> <li>▪ Forecasting</li> <li>▪ Budgeting</li> <li>▪ Implementation of policies.</li> </ul>	
8.	Organization	<ul style="list-style-type: none"> <li>▪ Definition</li> <li>▪ Radiology department as a work place.</li> <li>▪ Radiology work</li> </ul>	
9.	Staffing	<ul style="list-style-type: none"> <li>▪ Type of staffing radiology department.</li> <li>▪ Calculation of the staffing need.</li> </ul>	
10.	Controlling	<ul style="list-style-type: none"> <li>▪ Basic controlling process.</li> <li>▪ Evaluation.</li> <li>▪ Radiology department manual.</li> </ul>	
11.	Leadership	<ul style="list-style-type: none"> <li>▪ Style of leadership.</li> <li>▪ Role of the leader.</li> </ul>	

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### Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

### Teaching Methodology:

- ❖ lectures
- ❖ discussion & quizzes
- ❖ home works

### Text Books & References:

#### References:

1. Al-Sakran Mohammad, Impact of quality Assurance program in diagnostic radiology department graduation thesis, long island University, 1986.
2. Osborn, Royse A professional Approach to Radiology Administration Charls Thomas publisher. Illinios 1980.
3. Terry W, and McLaren Planning A diagnostic radiology department: Basic consideration W.B. Saunders Company, L T D. Philadelaphia. 1973
4. Janower, murray Administration of Radiology department for day to day operation charis Thomas, Illinois 1976.



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# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	<b>21109255</b>
<b>Course Title</b>	<b>Radiographic Pathology</b>
<b>Credit Hours</b>	<b>(3)</b>
<b>Theoretical Hours</b>	<b>(3)</b>
<b>Practical Hours</b>	<b>(0)</b>



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

### Brief Course Description:

- ❖ This course is an integrated anatomy course in radiography as it concentrates on the appearances of pathological effects of anatomical radiology. It is aimed to provide students with basic anatomical positions and their normal appearances, also to differentiate between structural and abnormal body tissue. It also enable student to differentiate between structural and functional aspects of diseases, links anatomical structures with its radiological appearances. And give the students an idea about the appearances of the anatomical parts of the body as they correspond to computerized tomography and MRI where body slices are acquired.

### Course Objectives:

Upon the completion of the course, the student will be able to:

1. Determine the palpable land marks of various body parts.
2. Know the listed radiographic manifestation of the listed diseases of various body systems.
3. Basic idea of normal body anatomy.
4. Appreciate the normal radiological appearances of different body organs and its relation to different diseases.
5. Know the structure and cross sectional as well a multiplanner appearance of the central nervous systems.
6. Know the structure and anatomy of the main anatomical parts of the chest, abdomen and pelvis as well as their radiological appearance and location.



**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1.	<b>Head And Neck</b>	<p>Introduction: cerebro spinal fluid.</p> <ul style="list-style-type: none"> <li>▪ Skull and facial bones.</li> <li>▪ Bones of the skull base.</li> <li>▪ Cranial fossae and their boundaries.</li> <li>▪ Foramina of the skull base.</li> <li>▪ Orbit: boundaries &amp; contents.</li> <li>▪ Paranasal sinuses.</li> <li>▪ The mandible &amp; teeth.</li> <li>▪ The ear: External, middle &amp; internal ear.</li> <li>▪ Parts of the pharynx: nasopharynx, oropharynx and laryngopharynx.</li> <li>▪ Cross section anatomy of the larynx.</li> <li>▪ Thyroid &amp; Parathyroid gland.</li> <li>▪ Salivary glands.</li> <li>▪ The major vessels in the neck: Common carotid artery, internal, carotid &amp; external carotid artery.</li> <li>▪ Dural Veins sinuses.</li> <li>▪ Veins of the neck.</li> <li>▪ Meningeal Layers</li> </ul>	
2.	<b>Thorax</b>	<ul style="list-style-type: none"> <li>▪ Thoracic cage: ribs, sternum.</li> <li>▪ Diaphragm: sternum, openings, blood supply.</li> <li>▪ Lungs &amp; Pleura and bronchial segments.</li> <li>▪ Mediastinal division.</li> <li>▪ Heart: Chambers &amp; blood supply and cross sectional anatomy.</li> </ul> <p>Cross sectional anatomy of level T3, T4, T5, T6, T8, T10</p>	
3.	<b>Abdomen</b>	<ul style="list-style-type: none"> <li>▪ Anterior abdominal wall T10, T11.</li> <li>▪ Cross sectional anatomy at T12, L1, L2</li> </ul> <p>Major intra abdominal organs: gross artery of the liver, pancreas, spleen, stomach &amp; duodenum, kidneys &amp; adrenal glands, small &amp;</p>	

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		large bowel.	
4.	<b>Pelvis</b>	<ul style="list-style-type: none"> <li>▪ Bony pelvis and pelvic floor.</li> <li>▪ Major organ of the pelvis in male &amp; female.</li> <li>▪ Cross section anatomy through different organs like bladder, male perineum, rectum, .</li> <li>▪ Peritoneal spaces with pelvis &amp; abdomen</li> </ul>	
5.	<b>Spine</b>	<ul style="list-style-type: none"> <li>▪ Vertebral column. <ul style="list-style-type: none"> <li>○ A typical vertebra.</li> <li>○ Cervical vertebra.</li> <li>○ Thoracic vertebra.</li> <li>○ Lumbar Vertebra.</li> <li>○ Sacrum.</li> <li>○ Coccyx.</li> </ul> </li> <li>▪ Cross sectional appearance of the vertebra &amp; inter vertebral disc.</li> <li>▪ Ligaments of the vertebral column.</li> <li>▪ Blood supply to vertebral column.</li> <li>▪ Meninges of the spine.</li> </ul>	
6.	<b>Upper extremities</b>	<ul style="list-style-type: none"> <li>▪ Anatomical review, Anatomical land mark, radiographic lines if present, normal length and size, radiographic anatomy and radiographic pathology.</li> </ul>	
7.	<b>Lower extremities</b>	<ul style="list-style-type: none"> <li>▪ Anatomical review, Anatomical land mark, radiographic lines if present, normal length and size, radiographic anatomy and radiographic pathology.</li> </ul>	





### Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

### Teaching Methodology:

- ❖ Lectures
- ❖ Discussion & quizzes
- ❖ Demonstrations
- ❖ Homeworks

### References:

1. An atlas of normal radiographic anatomy, Meschan.
2. Anatomy for Diagnostic Imaging S.P. Ryan, M.M.J Mc Nicholas 2002.
3. Radiographic Anatomy & Positioning: An Integrated approach. By Diane H. Gronefeld, Andrea Gauthier cornuelle, Publisher: McGraw-Hill Professional 1998.
4. Radiographic Anatomy, Frank Slaby, Eugene R. Jacobs 1990.



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# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	<b>21109161</b>
<b>Course Title</b>	<b>Radiographic Equipment</b>
<b>Credit Hours</b>	<b>(3)</b>
<b>Theoretical Hours</b>	<b>(2)</b>
<b>Practical Hours</b>	<b>3</b>



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### **Brief Course Description:**

- ❖ This course is designed to expose students to the various types of radiographic equipment available in radiology department, introduce students to the anatomy and physiology of these equipment and physiology of these equipment and finally to familiarize students with the impact of technology on the progress of diagnostic imaging.

### **Course Objectives:**

Upon the completion of the course, the student will be able to:

- 1- Acquire a good theoretical framework for understanding the principles of X-ray imaging equipment.
- 2- Recognize simple malfunction of these equipment.
- 3- Learn the basic foundations necessary for the practical aspects of radiography.
- 4- Acquire the awareness of the use of computer –aided image analysis.



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**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1.	x-ray tube	<ul style="list-style-type: none"> <li>▪ General design, construction and operation.</li> <li>▪ Care of x-ray tube.</li> </ul>	
2.	x-ray generator:	<ul style="list-style-type: none"> <li>▪ Voltage transformation.</li> <li>▪ High tension primary circuit and high tension cables</li> <li>▪ Rectification .</li> <li>▪ Exposure switching &amp; exposure timing</li> </ul>	
3.	Radiographic couches, stands & tube supports	<ul style="list-style-type: none"> <li>▪ X-ray tube support .</li> <li>▪ Radiographic couches.</li> <li>▪ Chest stand.</li> <li>▪ Vertical Buckys.</li> </ul>	
4.	Fluoroscopic Equipments	<ul style="list-style-type: none"> <li>▪ Types of fluoroscopic equipment</li> <li>▪ Mobile and specialized fluoroscopic units</li> <li>▪ T.V Camera &amp; monitor.</li> <li>▪ Image recording .</li> </ul>	
5.	Mobile radiographic equipments	<ul style="list-style-type: none"> <li>▪ Electrical energy source.</li> <li>▪ Conventional generators.</li> <li>▪ Capacitor discharge equipment.</li> <li>▪ Battery powered generators.</li> <li>▪ Physical features.</li> </ul>	
6.	Mammographic Equipment	<ul style="list-style-type: none"> <li>▪ Mammographic x-ray tube.</li> <li>▪ Compression.</li> <li>▪ Exposure timing</li> <li>▪ Breast support plate.</li> </ul>	
7.	Dental Radiographic	<ul style="list-style-type: none"> <li>▪ Intra oral equipment.</li> </ul>	

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	Equipment		
8.	Computer Based Imaging Modalities	<ul style="list-style-type: none"> <li>▪ Cephalostat (craniostat).</li> <li>▪ Orthopantomography.</li> </ul>	
9.	Computed Tomography	<ul style="list-style-type: none"> <li>▪ Difference between analogue and digital.</li> <li>▪ Benefits of diagnostic image digitization.</li> </ul>	
10.	Radionuclide imaging	<ul style="list-style-type: none"> <li>▪ Equipment for CT and x-ray generator.</li> <li>▪ The table, operating / display console.</li> <li>▪ The computer.</li> <li>▪ Use of CT equipment: the op judgement.</li> </ul>	
11.	Equipment for ultrasound	<ul style="list-style-type: none"> <li>▪ Gamma camera: camera gentry, couch, computer facilities.</li> <li>▪ Types of radioactivity.</li> <li>▪ Radiation dosimetry</li> </ul>	
12.	Magnetic resonance imaging (MRI)	<ul style="list-style-type: none"> <li>▪ Nature of Ultrasound.</li> <li>▪ Probes, transducers and ultrasound beam Shapes.</li> <li>▪ Safety in ultrasound.</li> <li>▪ Care of ultrasound equipment</li> </ul>	
		<ul style="list-style-type: none"> <li>▪ MR signal and image.</li> <li>▪ MR scanner: construction and design.</li> <li>▪ MR system: instillations, oxygen monitoring, observing the patient, changing room requirement.</li> <li>▪ Safety consideration</li> </ul>	





**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

**Teaching Methodology:**

- ❖ Discussion
- ❖ Lectures
- ❖ Demonstrations
- ❖ Homeworks

**References:**

1. Chiropractic Radiography & Quality Assurance hand book, by Russell L. Wilson, Publisher: Informa Health Care, 2007.
2. Chesney's equipment for student radiographers 5<sup>th</sup> edition 2006, Peter Carter, Audrey Paterson, Mike Thornton, Andrew Hyatt, John Pirrie.
3. The WHO Manual Of Diagnostic imaging: Radiographic Technique & projections By Staffan Sandstorm, Publisher: WHO 2003.



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# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	21109121
<b>Course Title</b>	<b>Radiographic Positioning 1</b>
<b>Credit Hours</b>	(3)
<b>Theoretical Hours</b>	(3)
<b>Practical Hours</b>	(0)



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### **Brief Course Description:**

- ❖ Introduces the basic positioning techniques used in radiography of the upper extremities, shoulder girdle, lower extremities and pelvic girdle. Practical sessions includes peer positioning, film critique, anatomical identifications, pathologies and an energized section using phantoms if available.

### **Course Objectives:**

Upon the completion of the course, the student will be able to:

- 1- Know the basic anatomy and positioning techniques if upper extremities.
- 2- Know the basic anatomy and positioning techniques of the shoulder girdle.
- 3- Know the basic anatomy and positioning techniques of the lower extremities.
- 4- Know the basic anatomy and positioning techniques of the pelvic girdle.
- 5- Define all deferent terms related to radiographic procedures such as view, projection, position, ... etc.
- 6- Discuss all basic and modified views of the upper lower extremities, shoulder girdle and pelvic girdle.
- 7- Outline the structures shown in each technique.



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## Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	<b>Introduction to radiographic procedures</b>	<ul style="list-style-type: none"> <li>▪ Positioning nomenclature.</li> <li>▪ Positioning principles.</li> <li>▪ Accessory equipment.</li> </ul>	
2.	<b>General considerations</b>	<ul style="list-style-type: none"> <li>▪ Evaluation of radiographic or requisition.</li> <li>▪ Establish plaint report.</li> <li>▪ Patient preparation.</li> <li>▪ Room preparation.</li> <li>▪ Patient monitoring.</li> </ul>	
3.	<b>radiography of the upper extremities</b>	<ul style="list-style-type: none"> <li>▪ Hand.</li> <li>▪ Wrist.</li> <li>▪ Forearm.</li> <li>▪ Elbow joint.</li> <li>▪ Humerus.</li> </ul>	
4.	<b>radiography of the shoulder girdle</b>	<ul style="list-style-type: none"> <li>▪ Shoulder joint.</li> <li>▪ Scapula.</li> <li>▪ Clavicle.</li> <li>▪ Sterno – clavicular joint.</li> <li>▪ Acromio – clavicular joint</li> </ul>	
5.	<b>Radiography of the lower extremities</b>	<ul style="list-style-type: none"> <li>▪ Foot.</li> <li>▪ Ankle.</li> <li>▪ Leg.</li> <li>▪ Knee joint</li> <li>▪ Femur</li> </ul>	
6.	<b>radiography of pelvic girdle</b>	<ul style="list-style-type: none"> <li>▪ Hip Joint</li> <li>▪ Sacro – iliac Joint</li> <li>▪ Pelvic bone ----- ( ilium, ischium and pubic bones).</li> </ul>	
7.	<b>Vertebral column</b>	<ul style="list-style-type: none"> <li>▪ Radiographic anatomy of the cervical spine &amp; neck.</li> <li>▪ Radiographic anatomy of the dorsal spine.</li> <li>▪ Radiographic anatomy of the lumbar spine.</li> </ul>	

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		<ul style="list-style-type: none"> <li>▪ Radiographic anatomy of the sacrum &amp; coccyx.</li> <li>▪ Radiographic positioning of the cervical spine &amp; neck.</li> <li>▪ Radiographic positioning of the dorsal spine.</li> <li>▪ Radiographic positioning of the lumbar spine.</li> <li>▪ Radiographic positioning of the sacrum &amp; coccyx.</li> </ul>	
8.	<b>Myelography</b>	<ul style="list-style-type: none"> <li>▪ Preparation <ul style="list-style-type: none"> <li>○ definition.</li> <li>○ Indications.</li> <li>○ Contra – Indications</li> </ul> </li> <li>▪ Cervical Myelography.</li> <li>▪ Dorsal Myelography.</li> <li>▪ Lumbar Myelography.</li> <li>▪ Contrast used in Myelography.</li> <li>▪ Complications.</li> <li>▪ After care &amp; education</li> </ul>	

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

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### Teaching Methodology:

- ❖ Lectures
- ❖ Discussion & quizzes
- ❖ Practical training
- ❖ Audio – visual display

### Text Books & References:

#### References:

1. Clark's positioning in Radiography, 11<sup>th</sup> Edition 2003.
2. Pocket Guide To Radiography, 5<sup>th</sup> edition, 2003
3. Philip W. Ballinger Eugene D. Frank.
4. Merrill's atlas of radiographic positioning and radiologic process 8<sup>th</sup> Edition 1998.
5. Kreel, Louis. Clark's postioning in Radiography, Vol. One, two and three. 10th Edition. A William Hwinemann Medical Books Publication, Chicago. 1997.
6. Ballinger, Philp. Merrill's Atlas of Radiographic Positions and Radiologic Prodedures. Vol. One, Two and Three. 7th Edition Mosby year book Inc, st. Louis. 1991/
7. Bontrager, Anthony; Textbook of Radiographic positioning and Related Anatomy. 1982. Multi-Media Publishing company.
8. Meschan, Fundamentals of Special Radiographic Procedures 1975 Mc Graw Hill, In





# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	<b>21109122</b>
<b>Course Title</b>	<b>Radiographic positioning 1/ practical</b>
<b>Credit Hours</b>	<b>(2)</b>
<b>Theoretical Hours</b>	<b>(0)</b>
<b>Practical Hours</b>	<b>(6)</b>



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**Brief Course Description:**

- ❖ This course provides the student with practical skills in radiology department which includes taking positioning techniques of the upper extremities, lower extremities and vertebral column. The course deals with the special radiographic position like myelography.

**Course Objectives:**

Upon the completion of the course, the student will be able to:

- 1- Taking radiographic positions of the upper extremities.
- 2- Taking radiographic positions of the lower extremities.
- 3- Taking radiographic positions of the vertebral column.
- 4- Taking radiographic positions of the Myelogram.
- 5- Know how to take care of the equipments.
- 6- Know how to take care of patients in radiology department.
- 7- Know how to evaluate each procedure.



**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1.	Introduction	<ul style="list-style-type: none"> <li>▪ Positioning principles.</li> <li>▪ Accessory equipments.</li> <li>▪ Patient preparation.</li> <li>▪ Radiographic room preparation and dark room.</li> <li>▪ Patient monitoring and observation.</li> </ul>	
2.	Upper Extremities	<ul style="list-style-type: none"> <li>▪ Radiographic anatomy of the shoulder &amp; humerus.</li> <li>▪ Radiographic anatomy of the elbow and forearm.</li> <li>▪ Radiographic anatomy of the wrist and hand.</li> <li>▪ Radiographic positioning of the shoulder.</li> <li>▪ Radiographic positioning of the humerus.</li> <li>▪ Radiographic positioning of the elbow.</li> <li>▪ Radiographic positioning of the forearm.</li> <li>▪ Radiographic positioning of the wrist.</li> <li>▪ Radiographic positioning of the hand and digits.</li> </ul>	
3.	Lower Extremities	<ul style="list-style-type: none"> <li>▪ Radiographic anatomy of the hip and femur.</li> <li>▪ Radiographic anatomy of the knee.</li> <li>▪ Radiographic anatomy of leg and ankle.</li> <li>▪ Radiographic anatomy of the foot.</li> <li>▪ Radiographic positioning of the hip joint.</li> <li>▪ Radiographic positioning of the</li> </ul>	

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

		<p>femur.</p> <ul style="list-style-type: none"> <li>▪ Radiographic positioning of the knee.</li> <li>▪ Radiographic positioning of the leg and ankle.</li> <li>▪ Radiographic positioning of the foot and digits.</li> </ul>	
4.	<b>Vertebral column</b>	<ul style="list-style-type: none"> <li>▪ Radiographic anatomy of the cervical spine &amp; neck.</li> <li>▪ Radiographic anatomy of the dorsal spine.</li> <li>▪ Radiographic anatomy of the lumbar spine.</li> <li>▪ Radiographic anatomy of the sacrum &amp; coccyx.</li> <li>▪ Radiographic positioning of the cervical spine &amp; neck.</li> <li>▪ Radiographic positioning of the dorsal spine.</li> <li>▪ Radiographic positioning of the lumbar spine.</li> <li>▪ Radiographic positioning of the sacrum &amp; coccyx..</li> </ul>	
5.	<b>Myelography</b>	<ul style="list-style-type: none"> <li>▪ Preparation <ul style="list-style-type: none"> <li>○ definition.</li> <li>○ Indications.</li> <li>○ Contra – Indications</li> </ul> </li> <li>▪ Cervical Myelography.</li> <li>▪ Dorsal Myelography.</li> <li>▪ Lumbar Myelography.</li> <li>▪ Contrast used in Myelography.</li> <li>▪ Complications.</li> <li>▪ After care &amp; education.</li> </ul>	

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

**Teaching Methodology:**

1. Discussion.
2. practical training.
3. Reports

**Text Books & References:**

**References:**

- 1- Clark's positioning in Radiography, 11<sup>th</sup> Edition 2003.
- 2- Pocket Guide To Radiography, 5<sup>th</sup> edition, 2003
  - a. Philip W. Ballinger
  - b. Eugene D. Frank.
- 3- Merrill's atlas of radiographic positioning and radiologic process 8<sup>th</sup> Edition 1998.





# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	<b>21109223</b>
<b>Course Title</b>	<b>Radiographic Positioning 2</b>
<b>Credit Hours</b>	<b>(3)</b>
<b>Theoretical Hours</b>	<b>(3)</b>
<b>Practical Hours</b>	<b>(0)</b>



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

### Brief Course Description:

- ❖ This course covers basic positioning of the abdomen, skull Para nasal sinuses, facial bones, temporal bone mastoids and mandible with sessions includes peer positioning, film critique, and anatomical identifications.

### Course Objectives:

Upon the completion of the course, the student will be able to:

1. Know the basic anatomy positioning of the skull.
2. Know the basic anatomy positioning of the Para nasal sinuses.
3. Taking radiographic positions of the abdomen.
4. Taking radiographic positions of the pelvis.
5. Taking radiographic positions of the female breasts.
6. Taking radiographic positions of the teeth.
7. Know how to take care of the equipments.
8. Taking radiographic positions of the patients in radiology department.
9. Taking radiographic positions of the evaluate each procedure



**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1.	Skull	<ul style="list-style-type: none"> <li>▪ Basic radiographic anatomy of the skull                             <ul style="list-style-type: none"> <li>• Calvarium:                                     <ul style="list-style-type: none"> <li>○ Bones of calvarium.</li> <li>○ Articulations (sutures).   <ul style="list-style-type: none"> <li>▪ Base of the skull:   <ul style="list-style-type: none"> <li>○ Anterior cranial fossa.</li> <li>○ Middle cranial fossa.</li> <li>○ Posterior cranial fossa.   <ul style="list-style-type: none"> <li>▪ Orbital cavity:   <ul style="list-style-type: none"> <li>○ Skeletal foundation.</li> <li>○ Extra ocular muscles.</li> <li>○ Outer ear.</li> <li>○ Middle ear.</li> <li>○ Inner ear Ear:   <ul style="list-style-type: none"> <li>▪ Temporal &amp; infratemporal regions:   <ul style="list-style-type: none"> <li>○ Parotid gland.</li> <li>○ Mandible and temporomandibular joint.</li> </ul> </li> </ul> </li> </ul> </li> </ul> </li> </ul> </li> </ul> </li> </ul> </li> <li>▪ Oral Cavity                                     <ul style="list-style-type: none"> <li>○ Palate.</li> <li>○ Tongue.</li> <li>○ Submandibular and sublingual salivary glands.</li> <li>○ Para nasal sinuses and post nasal space and nose.</li> <li>○ Mastoids.</li> <li>○ Skull Foramina.</li> <li>○ Sella Turcica.</li> </ul> </li> </ul> </li> <li>▪ Radiographic positioning of the skull.</li> <li>▪ Radiographic positioning of Sella turcica.</li> <li>▪ Radiographic positioning of Para nasal sinuses.</li> <li>▪ Radiographic positioning of nasal bone &amp;</li> </ul>	

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

		<p>facial bones.</p> <ul style="list-style-type: none"> <li>▪ Radiographic positioning of post nasal space.</li> <li>▪ Radiographic positioning of mandible &amp; T.M. joint mastoid air cells.</li> <li>▪ Radiographic Positioning of mastoid air cells</li> <li>▪ Radiographic positioning of orbit &amp; optic faramain.</li> <li>▪ Radiographic positioning of skull base &amp; foramen magnum.</li> <li>▪ Radiographic Positioning of Internal auditory canals.</li> <li>▪ Radiographic Positioning of Dental Radiography</li> </ul>	
2.	<b>para – nasal sinuses</b>	<ul style="list-style-type: none"> <li>▪ Frontal sinuses.</li> <li>▪ Maxillary sinuses.</li> <li>▪ Ethmoidal sinuses.</li> <li>▪ Sphenoidal sinuses.</li> </ul>	
3.	<b>Chest</b>	<ul style="list-style-type: none"> <li>▪ Radiographic anatomy of the respiratory system: <ul style="list-style-type: none"> <li>○ Larynx.</li> <li>○ Trachea.</li> <li>○ Bronchi.</li> <li>○ Lungs and lungs segments.</li> <li>○ Pleura</li> </ul> </li> <li>▪ Divisions of mediastinum and boundaries.</li> <li>▪ Heart: anatomical surfaces.</li> <li>▪ Major vessels of mediastinum <ul style="list-style-type: none"> <li>○ Aorta.</li> <li>○ SVC.</li> <li>○ IVC</li> </ul> </li> <li>▪ Radiographic position of the chest including lungs, heart and aorta.</li> <li>▪ Radiograph of pharynx, larynx and trachea.</li> <li>▪ Radiography of the diaphragm.</li> </ul>	



		<ul style="list-style-type: none"> <li>▪ Radiography of the thoracic inlet.</li> </ul>	
4.	<b>Abdomen</b>	<ul style="list-style-type: none"> <li>▪ Radiographic anatomy of the abdomen. <ul style="list-style-type: none"> <li>○ Anterior wall.</li> <li>○ Posterior wall</li> <li>○ Skeletal foundation.</li> <li>○ Divisions of abdominal cavity</li> </ul> </li> <li>▪ Major organs of the abdomen.</li> <li>▪ Abdominal radiography: <ul style="list-style-type: none"> <li>○ KUB.</li> <li>○ Plain Abdomen: erect &amp; supine.</li> <li>○ Decubitus plain abdomen.</li> <li>○ Others</li> </ul> </li> </ul>	
5.	<b>Pelvis</b>	<ul style="list-style-type: none"> <li>▪ Radiographic Anatomy of the pelvis <ul style="list-style-type: none"> <li>○ Skeletal framework (bony pelvis)</li> <li>○ Sacroiliac joint.</li> <li>○ Symphysis pubis.</li> </ul> </li> <li>▪ Major organs of the pelvis.</li> <li>▪ Pelvis radiography <ul style="list-style-type: none"> <li>○ Pelvimetry.</li> <li>○ S.I.joints.</li> <li>○ Symphysis pubis.</li> <li>○ Hips, etc...</li> </ul> </li> </ul>	
6.	<b>Mammography</b>	<ul style="list-style-type: none"> <li>▪ Radiographic anatomy of the breast.</li> <li>▪ Radiographic positions in mammography.</li> <li>▪ CT and MR breast imaging.</li> </ul>	
7.	<b>Dental Radiography</b>	<ul style="list-style-type: none"> <li>▪ Occlusal films.</li> <li>▪ Panoramic film (OPG).</li> </ul>	
8.	<b>General Principles and Positioning in new imaging modalities</b>	<ul style="list-style-type: none"> <li>▪ CT Scan.</li> <li>▪ MRI</li> <li>▪ Ultrasound.</li> <li>▪ PET &amp; SPECT</li> <li>▪ Gamma imaging (nuclear medicine).</li> </ul>	

### Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

### Teaching Methodology:

- ❖ Lectures
- ❖ Discussion & quizzes
- ❖ Audio – visual display

### Text Books & References:

1. Kreel, Louis. Clark's positioning in Radiography, Vol. One, two and three. 10th Edition. A William Hwinemann Medical Books Publication, Chicago. 1997.
2. Ballinger, Philp. Merrill's Atlas of Radiographic Positions and Radiologic Prodedures. Vol. One, Two and Three. 7th Edition Mosby year book Inc, st. Louis. 1991/
3. Bontrager, Anthony; Textbook of Radiographic positioning and Related Anatomy. 1982. Multi-Media Publishing company.
4. Meschan, Fundamentals of Special Radiograhic Procedures 1975 Mc Graw Hill, Inc.



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# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	21109224
<b>Course Title</b>	<b>Radiographic positioning 2/ practical</b>
<b>Credit Hours</b>	(2)
<b>Theoretical Hours</b>	(0)
<b>Practical Hours</b>	(6)



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**Brief Course Description:**

- ❖ This course provides the student with practical skills in radiology department which includes taking positioning techniques of the abdomen, pelvis and female breasts (Mammography), in addition to dental radiographic positions and new imaging modalities.

**Course Objectives:**

Upon the completion of the course, the student will be able to:

1. Taking radiographic positions of the abdomen.
2. Taking radiographic positions of the pelvis.
3. Taking radiographic positions of the female breasts.
4. Taking radiographic positions of the teeth.
5. Know how to take care of the equipments.
6. Taking radiographic positions of the patients in radiology department.
7. Taking radiographic positions of the evaluate each procedure



## Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Skull	<ul style="list-style-type: none"> <li>▪ Basic radiographic anatomy of the skull               <ul style="list-style-type: none"> <li>▪ Radiographic positioning of the skull.</li> <li>▪ Radiographic positioning of Sella turcica.</li> <li>▪ Radiographic positioning of Para nasal sinuses.</li> <li>▪ Radiographic positioning of nasal bone &amp; facial bones.</li> <li>▪ Radiographic positioning of post nasal space.</li> <li>▪ Radiographic positioning of mandible &amp; T.M. joint mastoid air cells.</li> <li>▪ Radiographic Positioning of mastoid air cells</li> <li>▪ Radiographic positioning of orbit &amp; optic faramain.</li> <li>▪ Radiographic positioning of skull base &amp; foramen magnum.</li> <li>▪ Radiographic Positioning of Internal auditory canals.</li> <li>▪ Radiographic Positioning of Dental Radiography</li> </ul> </li> </ul>	
	para – nasal sinuses	<ul style="list-style-type: none"> <li>▪ Frontal sinuses.</li> <li>▪ Maxillary sinuses.</li> <li>▪ Ethmoidal sinuses.</li> <li>▪ Sphenoidal sinuses.</li> </ul>	
	Chest	<ul style="list-style-type: none"> <li>▪ Radiographic position of the chest including lungs, heart and aorta.</li> <li>▪ Radiograph of pharynx, larynx and trachea.</li> <li>▪ Radiography of the diaphragm.</li> <li>▪ Radiography of the thoracic inlet.</li> </ul>	
	Abdomen	<ul style="list-style-type: none"> <li>▪ Abdominal radiography:</li> </ul>	

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		<ul style="list-style-type: none"> <li>○ KUB.</li> <li>○ Plain Abdomen: erect &amp; supine.</li> <li>○ Decubitus plain abdomen.</li> <li>○ Others.</li> </ul>	
2.	<b>Pelvis</b>	<ul style="list-style-type: none"> <li>▪ Major organs of the pelvis.</li> <li>▪ Pelvis radiography                             <ul style="list-style-type: none"> <li>○ Pelvimetry.</li> <li>○ S.I.joints.</li> <li>○ Symphysis pubis.</li> <li>○ Hips, etc...</li> </ul> </li> </ul>	
3.	<b>Mammography</b>	<ul style="list-style-type: none"> <li>▪ Radiographic anatomy of the breast.</li> <li>▪ Radiographic positions in mammography.</li> <li>▪ CT and MR breast imaging.</li> </ul>	
4.	<b>General Principles and Positioning in new imaging modalities</b>	<ul style="list-style-type: none"> <li>▪ CT Scan.</li> <li>▪ MRI</li> <li>▪ Ultrasound.</li> <li>▪ PET &amp; SPECT</li> <li>▪ Gamma imaging (nuclear medicine).</li> </ul>	
5.	<b>Dental Radiography</b>	<ul style="list-style-type: none"> <li>▪ Occlusal films.</li> <li>▪ Panoramic film (OPG).</li> </ul>	

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

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**Teaching Methodology:**

1. Discussion.
2. Practical Training.
3. Reports.

**Text Books & References:**

**References:**

1. Pocket Guide To Radiography 5<sup>th</sup> edition, 2003  
a. Philip W. Ballinger Eugene D. Frank.
2. Clark's positioning is radiography 11<sup>th</sup> edition 2002.
3. Merrill's atlas of radiographic positioning and radiologic process 8<sup>th</sup> e-stic 1998.





# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	21109231
<b>Course Title</b>	<b>Principles of exposure</b>
<b>Credit Hours</b>	<b>(3)</b>
<b>Theoretical Hours</b>	<b>(3)</b>
<b>Practical Hours</b>	<b>(0)</b>



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008



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### **Brief Course Description:**

- ❖ The course is designed to enable students to understand all parts that an imaging system has such as X-ray tub, x-ray film and expose the students to the processing chemicals and various types of X-ray film processing, also to enable students to understand image variables.

### **Course Objectives:**

Upon the completion of the course, the student will be able to:

1. Know the factors that affect the quantity & quality of x-ray film.
2. Know the construction and principle of grid, X-ray film and latent image formation.
3. Know the process of x-ray film & the contents of the processing chemicals solutions.
4. Know the effect of KVP , m As, distance, type of film on density, contrast and resolution.



5.

**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1.	X-ray emission	<ul style="list-style-type: none"> <li>X-ray tube, X-ray quantity, X-ray quality</li> </ul>	
2.	Radiographic film	<ul style="list-style-type: none"> <li>Film construction, formation of latent image, type of films, handling and storage of film.</li> </ul>	
3.	Intensifying screen	<ul style="list-style-type: none"> <li>Screen construction, luminance, care of screen, types of Screen.</li> </ul>	
4.	Processing of the latent image.	<ul style="list-style-type: none"> <li>Processing chemistry, automatic processing, effect of Temperature, time concentration on processing and dark room configuration.</li> </ul>	
5	Film sensitometry	<ul style="list-style-type: none"> <li>Photographic density, photographic contrast, characteristic curve, film speed film latitude.</li> </ul>	
6	Radiographic quality	<ul style="list-style-type: none"> <li>Film factors, geometric factors, subject factors, other factors.</li> </ul>	
7	Beam limiting devices	<ul style="list-style-type: none"> <li>Production of scattered radiation, control of scattered Radiation.</li> </ul>	
8	The grid	<ul style="list-style-type: none"> <li>Grid function, grid construction, measuring of grid Performance, types of grid, grid selection.</li> </ul>	
9	Conversion techniques	<ul style="list-style-type: none"> <li>Technique chart, determination of proper KVp , determination of proper mass</li> </ul>	

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

**Teaching Methodology:**

- ❖ Lectures
- ❖ Discussion & quizzes
- ❖ Demonstrations
- ❖ Homework

**Text Books & References:**

**References:**

1. Christensens, introduction to the physics of diagnostic radiology  
i. Curry III True, Doowdey J, Murry, R.
2. Physics for Medical imaging RF Farr, PJ Allisy – Roberts. Hurcant publisher limited 2001.
3. Principles of Radiographic Imaging By Richard R. Carlton, Publisher: Thomson Delmar Learning Medical 2000.
4. Review Of Radiological Physics, Walter Huda, Richard PJ. Slone 1995.
5. Christen's physics of diagnostic radiology, Thomas S Curry, James E. Eondey, Robert C.Murry. 4<sup>th</sup> Edition 1994.



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# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	21109263
<b>Course Title</b>	<b>Radiation Protection and Quality Assurance</b>
<b>Credit Hours</b>	<b>(3)</b>
<b>Theoretical Hours</b>	<b>(2)</b>
<b>Practical Hours</b>	<b>(3)</b>



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

### Brief Course Description:

This course is introductory to the basis of radiobiology & radiation protection emphasizing on diagnostic & nuclear medicine. It is designed to provide students with basic knowledge required to minimize excessive radiation exposure to patients, public and operators, expose students to various radiation effects and enabling the students to understand the radiation units and the main difference between them. It also provides the student with the basic knowledge about the concept of quality assurance & control, and their benefits.

### Course Objectives:

Upon the completion of the course, the student will be able to:

1. Know the mechanism of radiation effect on various cells as a function of dose and area exposed.
2. Comprehend with the basic radiation protection philosophy and how to calculate the maximum permissible dose allowed to occupational and non-occupational persons.
3. Know how to describe the radiation method of operation of all types of detection & measuring instruments.
4. Understand the general protection methods for internal & external sources of radiation.
5. Know the concept of QA&QC, and team of quality control addition to the importance and benefit of quality assurance.
6. Know and perform the various procedures of quality control tests used for various X-Ray Systems.



**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
6.	Principles of radiobiology	<ul style="list-style-type: none"> <li>Review of human biology, human radiosensitivity, low of bergonie &amp; tribondeau, the physical factors affecting radiosensitivity, biological factors affecting radiosensitivity radiolysis of water, target theory, lethal dose affecting radiosensitivity, radiolysis of water, target theory, lethal dose</li> </ul>	
7.	Review of interaction of X-ray with matter	<ul style="list-style-type: none"> <li>Interaction of X-ray with matter, radiation quantities.</li> </ul>	
8.	Biological effects of radiation	<ul style="list-style-type: none"> <li>basic mechanism &amp; short term effect cell radiation, repair, dose – response curve, whole body response.</li> <li>Long term genetic effect of radiation types of possible long</li> <li>term somatic effects</li> <li>Long term genetic effect of radiation, basic DNA-RNA, radiation effects on DNA, RNA.</li> </ul>	
9.	Maximum Permissible Dose (MPD)	.Basic radiation protection philosophym radiation workers, non-Occupationally wxposed	
10.	Lonizing radition detection instruments	<ul style="list-style-type: none"> <li>Personal detection devices, field survey instruments (gas filled detectors, scintillation detectors and semiconductor detectors).</li> <li>Methods of Minimizing diagnostic X-ray exposure to patients and operators radiographic units,</li> </ul>	

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008



		fluoroscopic units, nuclear medicine, radiation therapy.	
11.	<b>Quality Assurance</b>	<ul style="list-style-type: none"> <li>▪ Definition of quality assurance</li> <li>▪ Benefits of QA &amp; QC.</li> <li>▪ Team Of QC (committee of QA).</li> <li>▪ Factors affecting image quality: <ul style="list-style-type: none"> <li>○ Image contrast.</li> <li>○ Blur or lack of sharpness.</li> <li>○ Distortion &amp; artifacts.</li> <li>○ Image noise.</li> </ul> </li> <li>▪ Standards of acceptable image.</li> <li>▪ <b>Quality Assurance Equipments</b> <ul style="list-style-type: none"> <li>▪ Sensitometer.</li> <li>▪ Densitometer.</li> <li>▪ Multifunctionometer.</li> </ul> </li> </ul>	
12.	<b>Quality Assurance for X-Ray Systems:</b>	<ul style="list-style-type: none"> <li>▪ Visual check.</li> <li>▪ Tube potential or tube output measurement (KV).</li> <li>▪ Screen film contact or combination, and performance.</li> <li>▪ Collimation and beam alignment.</li> <li>▪ Grid alignment test.</li> <li>▪ Half value layer.</li> <li>▪ Phototimers (automatic exposure control)</li> </ul>	
13.	<b>Radiography machines</b>	<ul style="list-style-type: none"> <li>▪ Types of portable machines.</li> <li>▪ Objectives of QC.</li> <li>▪ Equipments used in QC.</li> <li>▪ Procedure of QC test.</li> <li>▪ Problems of portable machines</li> <li>▪ Reasons of rejected images.</li> <li>▪ Importance of retake film analysis.</li> <li>▪ Procedure of QC test.</li> <li>▪ Accepted rates.</li> </ul>	

**valuation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

**Teaching Methodology:**

**Lectures**

- ❖ Discussion & quizzes
- ❖ Demonstrations
- ❖ Home works

**Text Books & References:**

**References:**

1. Radiation protection for radiologic technology, Frankel, Robert
2. Radiologic sciences for technologists, bashing.
3. Chiropractic Radiography & Quality Assurance hand book, by Russell L. Wilson, Publisher: Informa Health Care, 2007.
4. Quality Assurance in Diagnostic Radiology, the University Of Sydney, 2007.
5. Total Quality in Radiology: A Guide to Implementation, Henry George Adams, Sudhir Arora, 1994.



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008





# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	21109371
<b>Course Title</b>	<b>Contrast Media Procedures</b>
<b>Credit Hours</b>	(3)
<b>Theoretical Hours</b>	(3)
<b>Practical Hours</b>	(0)



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

### Brief Course Description:

- ❖ This course is designed to group the radiographic procedure that need contrast media and special preparation & techniques also exposing students to various types of contrast media needed in radiology department and understand the adverse reaction of all types of contrast media with special preparation for each radiographic procedure, also enabling student to understand the required care after procedure.

### Course Objectives:

Upon the completion of the course, the student will be able to:

1. Know all types & kinds of contrast media available in radiology department & the required dosage for each radiographic examination.
2. React effectively & efficiently in case of adverse reaction of contrast media.
3. Perfectly assist the radiologist during special procedure examinations.
4. Perform all the basic radiographic projections associated with these special examinations.
5. Care of patient & equipment examination with contrast media



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1.	<b>Introduction</b>	<ul style="list-style-type: none"> <li>Definition of special procedures, contra indications of special procedures due to radiation or due to contrast media or due to technique and complications of contract media examinations.</li> </ul>	
2.	<b>Contrast media</b>	<ul style="list-style-type: none"> <li>Intravascular contract media, No vascular contrast media, Pharmacological agent.</li> </ul>	
3.	<b>Gastro intestinal tract</b>	<ul style="list-style-type: none"> <li>Barium swallow, Barium meal, barium follow through, small Bowel enema, barium enema.</li> </ul>	
4.	<b>Billiary tract</b>	<ul style="list-style-type: none"> <li>oral cholecystograh, intravenous cholecystography, post operative T-tube choledochography, endoscopic retrogradem choledopancreatography (ERCP).</li> </ul>	
5.	<b>Urinary tract</b>	<ul style="list-style-type: none"> <li>Excretion urography, Micturating cystourethography, Ascending urethrography, retrograde pyelourthrography, Percutaneous renal puncture.</li> </ul>	
6.	<b>Reproductive system</b>	<ul style="list-style-type: none"> <li>Pelvimetry, Hysterosalpingography</li> </ul>	
7.	<b>Respiratory</b>	<ul style="list-style-type: none"> <li>Bronchography</li> </ul>	
8.	<b>Darcystography</b>		
9.	<b>Silography</b>	<ul style="list-style-type: none"> <li>Parotid silography, submandiplular sialography, sublingual Sialography.</li> </ul>	
10.	<b>Arteriography</b>	<ul style="list-style-type: none"> <li>Introduction to catheter technique, Head &amp; neck Arteriography, Ascending</li> </ul>	

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		aortography, Translumbar Aortography of lower limb, celiac axis arteriography, Renal arteriography.	
11.	Venography	<ul style="list-style-type: none"> <li>▪ Peripheral venography, central venography, selective Retrograde venography.</li> </ul>	
12.	Arthrography	<ul style="list-style-type: none"> <li>▪ Knee arthrography, Hip arthrography.</li> </ul>	
13.	Biopsy guided investigation		

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

**Teaching Methodology:**

- ❖ Lectures
- ❖ Demonstrations
- ❖ Discussion & quizzes

**Text Books & References:****References:**

1. Kreel, Louis Clark's positioning in radiography, volume 3. 10th Edition, A William Hwinemann medical books publications, Chicago.
2. Ballinger, Philip. Merrill's Atlas of radiographic positions and radiologic procedures. Volume 3. 7th edition Mosby year book Inc, St. Louis, 1991.

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008



# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	21109372
<b>Course Title</b>	<b>Contrast Media Procedures/ Practical</b>
<b>Credit Hours</b>	(2)
<b>Theoretical Hours</b>	(0)
<b>Practical Hours</b>	(6)



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

**Brief Course Description:**

- ❖ The course is concentrating on radiographic Procedures that need contrast media and special preparation & techniques. It provides the Students with skills of contrast media used in radiology department, and the adverse reaction of all types of contrast media with special preparation for each radiographic procedure, indication and contraindications of each procedure and taking care of the patient after the end of the procedure.

**Course Objectives:**

Upon the completion of the course, the student will be able to:

1. Apply of contrast media available in radiology department & the required dosage for each radiographic examination.
2. Deal with effectively & deficiently with adverse reaction of contrast media.
3. Assist perfectly the radiologist during special procedure examinations.
4. Perform all the basic radiographic projections associated with these special examinations.
5. Take care of patient after the examination with contrast media.



**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1.	<b>Contrast Media</b>	<ul style="list-style-type: none"> <li>▪ Intravascular contrast media.</li> <li>▪ Non vascular contrast media.</li> <li>▪ Pharmacological agents.</li> </ul>	
2.	<b>Gastro intestinal tract</b>	<ul style="list-style-type: none"> <li>▪ Barium swallow.</li> <li>▪ Barium meal.</li> <li>▪ Barium follow through.</li> <li>▪ Small bowel enema.</li> <li>▪ Barium enema.</li> </ul>	
3.	<b>Biliary tract</b>	<ul style="list-style-type: none"> <li>▪ Oral cholecystography.</li> <li>▪ Intravenous cholecystography.</li> <li>▪ Post operative T- tube choledochography.</li> <li>▪ Endoscopic retrograde Choledopancreatography (ERCP).</li> <li>▪ PTC Percutaneous transhepatic cholangiography</li> </ul>	
4.	<b>Urinary Tract</b>	<ul style="list-style-type: none"> <li>▪ Excretion urography.</li> <li>▪ Micturating cystourethrography.</li> <li>▪ Ascending Urethrography.</li> <li>▪ Retrograde Pyeloureterography.</li> <li>▪ Percutaneous renal puncture.</li> </ul>	
5.	<b>Reproductive System</b>	<ul style="list-style-type: none"> <li>▪ Hysterosalpingography.</li> </ul>	
6.	<b>Respiratory Tract</b>	<ul style="list-style-type: none"> <li>▪ Bronchography.</li> </ul>	
7.	<b>Lacrimal System</b>	<ul style="list-style-type: none"> <li>▪ Dacryocystography..</li> </ul>	
8.	<b>Sialography</b>	<ul style="list-style-type: none"> <li>▪ Parotid Sialography.</li> <li>▪ Submandibular Sialography..</li> </ul>	
9.	<b>Arteriography</b>	<ul style="list-style-type: none"> <li>▪ Head &amp; Neck Arteriography.</li> <li>▪ Ascending aortography.</li> <li>▪ Translumbar Aortography.</li> </ul>	

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		<ul style="list-style-type: none"> <li>▪ Arteriography Of Lower Limb.</li> <li>▪ Coeliac axis arteriography.</li> <li>▪ Renal Arteriography.</li> </ul>	
10.	Venography	<ul style="list-style-type: none"> <li>▪ Peripheral Venography.</li> <li>▪ Central Venography.</li> <li>▪ Selective retrograde venography</li> </ul>	
11.	Arthrography	<ul style="list-style-type: none"> <li>▪ Knee arthrography.</li> <li>▪ Hip Arthrography.</li> </ul>	
12.	Misculereas procedures	<ul style="list-style-type: none"> <li>▪ Sinogram</li> <li>▪ Fistulogram.</li> <li>▪ Nasogram</li> </ul>	

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

**Teaching Methodology:**

1. Demonstrations & Homeworks.
2. Discussion & Quizzes.
3. clinical practice

**Text Books & References:**

1. Contrast Media: Safety Issues & ESUR guidelines, H.S. thomsen, 2005.
2. Contrast Media, Robert Older & William bush, 2002.
3. Text Book Of Contrast Media, Peter Dawson, David O, Cosgrove and Ronald G Grainger, 1999.
4. Trends In Contrast Media, Henrik s. thomsen, Rebert N. Muller, Robert F.Mattery & R. Agati, 1999.
5. Kreel, Louis 1997 Clark's Positioning in Radiography, Volume 3.10<sup>th</sup> edition. William Hwinemann medical books publication, Chikage, 1997.
6. A guide to radiological procedures, Stephen Chapman et all 3<sup>rd</sup> edition 1997.

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008





# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	21109281
<b>Course Title</b>	<b>Physics of Advanced Imaging Modalities</b>
<b>Credit Hours</b>	(3)
<b>Theoretical Hours</b>	(2)
<b>Practical Hours</b>	(3)



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

### Brief Course Description:

- ❖ This course is designed to provide the students with the physical Principles of CT, MRI, and NMR, also it allows students to know major configuration of these units to obtain high quality images and to understand the safety measures of these systems.

### Course Objectives:

Upon the completion of the course, the student will be able to:

1. Know the basic physical principles of these systems.
2. Draw the major configuration of these systems and the relationship between them.
3. Know the safety measures of these systems.
4. Know the basic physical principles of these systems.
5. Know hazards and safety measures of these system.
6. Know how to obtain images by these units.



## Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	<b>Computed Tomography (CT)</b>	<ul style="list-style-type: none"> <li>▪ Characteristic of sound : longitudinal waves, velocity of sound intensity.</li> <li>▪ Transducer and its components.</li> <li>▪ Characteristic of piezoelectric crystals.</li> <li>▪ Interaction between ultrasound and matter: reflexion, refraction, absorption.</li> <li>▪ Attenuation and penetration of ultrasound.</li> <li>▪ Ultrasound display : a-mode, tm mode, b mode.</li> <li>▪ Grey scale imaging.</li> <li>▪ Types of scan conversion memory.</li> <li>▪ Real time imaging :methods, copects.</li> <li>▪ Controls in ultrasonic imaging.</li> <li>▪ Artifacts.</li> <li>▪ Doppler methods: continuous wave doppler, pulsed doppler real time color flow imaging.</li> <li>▪ Safety considerations.</li> </ul>	
2.	<b>Magnetic Resonance Imaging ( MRI)</b>	<ul style="list-style-type: none"> <li>▪ Radioactivity: stable nuclei, isotopes, radionuclides their production and their production.</li> <li>▪ Decay (radioactive transformation) <ul style="list-style-type: none"> <li>○ Nuclides with neutron excess.</li> <li>○ Isomeric transition.</li> </ul> </li> <li>▪ Nuclides with a neutron deficit.</li> <li>▪ Position emitters.</li> <li>▪ Radioactive decay.</li> <li>▪ Activity.</li> <li>▪ Radiopharmaceuticals : properties</li> <li>▪ Preparation of radiopharmaceuticals.</li> <li>▪ Quality control tests.</li> </ul>	

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		<ul style="list-style-type: none"> <li>▪ Dose to the patient: does to the organs, effective dose to the body.</li> <li>▪ Precaution taken in handling of radionuclides, separation, personal protection, patient protection, dealing with radioactive spill, disposal of radioactive waste.</li> <li>▪ Gamma imaging: components of gamma camera: mutable collimator, crystal, photomultiplier, pulse arithmetic, plus height spectrum</li> </ul>	
3.	<b>Digital Video Imaging (DVI) (digital Radiography)</b>	<ul style="list-style-type: none"> <li>▪ Fluoroscopy and image intensifier.</li> <li>▪ Dual and triple mode intensifiers.</li> <li>▪ Beam splitter.</li> <li>▪ Vignetting.</li> <li>▪ The television system.</li> <li>▪ Cameras.</li> <li>▪ Digital imaging and its equipments.</li> <li>▪ Image processing, storage and recording: windowing, background subtraction, noise reduction.</li> <li>▪ Digital image processor: function, analog to digital conversion, digitization accuracy</li> <li>▪ Digital subtraction angiography (dsa): <ul style="list-style-type: none"> <li>○ Techniques: mask subtraction.</li> <li>○ Dual energy subtraction.</li> <li>○ Time interval differencing (tid).</li> <li>○ Temporal filtering.</li> <li>○ Hybrid subtraction.</li> </ul> </li> <li>▪ digital imaging processing : general types of image processing.</li> </ul>	

### Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

### Teaching Methodology

1. Lectures.
2. Demonstration.
3. Discussion and quizzes.

### Text Books & References:

#### References:

1. Physics for Medical imaging RF Farr, AJ Allisy – Lours. Hurcant publisher limited 2001.
2. Imaging System for medical diagnostics Erich Krestel 1996.
3. Christen's physics of diagnostic radiology, Thomas S curry, Jams E. Dowdey, Robert C.Murry. 4<sup>th</sup> the 1994.
4. Review of radiologic physics, Walter Huda Richard M.Slone 1994.
5. Nuclear magnetic resonance imaging, basic principles young, Sturat.
6. Computed Tomography Technology. Seeram, Enclod.





# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	21109261
<b>Course Title</b>	<b>Radiation Physics</b>
<b>Credit Hours</b>	(3)
<b>Theoretical Hours</b>	(3)
<b>Practical Hours</b>	(0)



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008



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### **Brief Course Description:**

- ❖ This course is designed to provide students with basi physics of radiology implementing both theoretical and practical applications of physics in X-ray machines. Also to understand and implement the safety measures of radiation and electricity.

### **Course Objectives:**

Upon the completion of the course, the student will be able to:

1. Know all measuring systems.
2. Differentiating between all types of electric circuits.
3. Properly understand the implementation of physics theories that are related to x-ray machine circuit such as magnestism, capacitance, transformers and others



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❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

## Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Review of general physics	<ul style="list-style-type: none"> <li>Introduction, measurement and units, force, work and energy, temperature and heat .</li> </ul>	
2.	Review of atomic structure	<ul style="list-style-type: none"> <li>The structure of the atom, the periodic table, isotopes, ionization and excitation.</li> </ul>	
3.	Electricity	<ul style="list-style-type: none"> <li>Electric charges, electric induction, electroscopes, electric charge and electrical potential, capacitance &amp; capacitors.</li> </ul>	
4.	Electric current	<ul style="list-style-type: none"> <li>Electric currents, resistance and ohms law, circuit law.</li> </ul>	
5.	Electric energy and power	<ul style="list-style-type: none"> <li>Energy and power, the heating effect of current, sources of electric energy electromotive force (EMF) and potential difference (Pd).</li> </ul>	
6.	Magnetism and electricit	<ul style="list-style-type: none"> <li>Magnetism, the magnetic effect of an electric current, further applications of the magnetic effect</li> </ul>	
7.	Electromagnetic induction	<ul style="list-style-type: none"> <li>electromagnetic induction, mutual induction and self induction</li> </ul>	
8.	Alternating currents and transformers		

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### Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

### Teaching Methodology:

- ❖ Lectures
- ❖ Discussion & quizzes
- ❖ Demonstrations
- ❖ Homeworks
- ❖ Alternating currents, transformer theory, transformers practical aspects, reactance, resonance, impedance and power factor.

### Text Books & References:

#### References:

1. First year physics for radiographers.
2. Physics of radiology Cunningham J. Edition 1988.



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008



# Paramedical Program

<b>Specialization</b>	<b>Radiologic Technology</b>
<b>Course Number</b>	21109201
<b>Course Title</b>	<b>Field Training</b>
<b>Credit Hours</b>	(3)
<b>Theoretical Hours</b>	(0)
<b>Practical Hours</b>	140 training hours



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008



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**Brief Course Description:**

- ❖ Provides students with practical skills in radiology department which includes applications of equipment manipulation and operation, radiological imaging procedures of upper extremities, shoulder girdle, lower extremities and pelvic girdle. It also provides students with knowledge about radiation protection, record keeping and patient care.

**Course Objectives:**

Upon the completion of the course, the student will be able to:

1. positioning techniques of upper extremities.
2. positioning techniques of shoulder girdle.
3. positioning techniques of lower extremities.
4. positioning techniques of pelvic girdle.
5. Know about radiation protection, record keeping.
6. Know how to take care of patient in radiology department.
7. Evaluate each procedure.



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❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1.	<b>Introduction to radiographic procedures</b>	<ul style="list-style-type: none"> <li>▪ Positioning nomenclature.</li> <li>▪ Positioning principles.</li> <li>▪ Accessory equipment.</li> </ul>	
2.	<b>General consideration</b>	<ul style="list-style-type: none"> <li>▪ Evaluation of radiographic or requisition</li> <li>▪ Establish patient report.</li> <li>▪ Patient preparation.</li> <li>▪ X-ray room preparation.</li> <li>▪ Patient monitoring</li> </ul>	
3.	<b>Radiography of the upper extremities</b>	<ul style="list-style-type: none"> <li>▪ Hand.</li> <li>▪ Wrist.</li> <li>▪ Forearm.</li> <li>▪ Elbow joint.</li> <li>▪ Humerus</li> </ul>	
4	<b>Radiography of the shoulder girdle</b>	<ul style="list-style-type: none"> <li>▪ Shoulder joint.</li> <li>▪ Scapula.</li> <li>▪ Clavicle.</li> <li>▪ Sterno – clavicular joint.</li> <li>▪ Acromio – clavicular joint</li> </ul>	
5.	<b>Radiography of the extremities lower</b>	<ul style="list-style-type: none"> <li>▪ Foot.</li> <li>▪ Ankle.</li> <li>▪ Leg.</li> <li>▪ Knee joint</li> <li>▪ Femur</li> </ul>	
6.	<b>and Anatomy radiography of pelvic girdle</b>	<ul style="list-style-type: none"> <li>▪ Hip Joint</li> <li>▪ Sacro – iliac Joint</li> <li>▪ Pelvic bone ----- ( ileum, ischium and pubic bones).</li> </ul>	

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	--/--/----
Discussions and lecture Presentations			

**Teaching Methodology:**

- ❖ Discussion
- ❖ Practical training
- ❖ Reports

**References:**

1. Radiation protection for radiologic technology, Frankel, Robert
2. Radiologic sciences for technologists, bashing.



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008