



Para-Paramedical Program

Specialization	Radiologic Technology
Course Number	21113101
Course Title	First Aids
Credit Hours	(3)
Theoretical Hours	(2)
Practical Hours	(3)





Brief Course Description:

- ❖ course is designed to introduce the student into emergency medical care providing him with the knowledge and skills that make him able to do patient assessment and choose first Aid priorities and the more suitable instruments which allow him to manage Airway Obstruction, shock and bleeding, soft-Tissue injuries (wounds), soft tissue Injuries (Burns) trauma and fractures, medical emergency (Allergies Reaction) and medical emergency (Poisoning) and, environmental emergency, and altered mental status, It also introduces him to the skills needed for doing CPR

Course Objectives:

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

- 1- The general rules, ethics and basis of First Aid:
- 2- How to examine and assess the causality safely and effectively.
- 3- How to deal with common first Aid Emergency.
- 4- How to assess many varying emergency situations to determine what patient care is needed and to provide the necessary care.
- 5- How / CPR is done safely.





Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Introduction	<ul style="list-style-type: none"> ▪ Introduction to emergency medical care. ▪ Definition of first aid. ▪ Equipment and supplies. ▪ Medical, legal and ethical. 	
2.	Patient assessment	<ul style="list-style-type: none"> ▪ Primary survey. ▪ Secondary survey for patient (trauma). ▪ Baseline vital signs. 	
3.	The air way	<ul style="list-style-type: none"> ▪ Oxygen sources. ▪ Equipment for oxygen delivery. ▪ Masks. ▪ Airway accessories. ▪ Suction 	
4.	Shock and bleeding	<ul style="list-style-type: none"> ▪ Definition. ▪ Assessing shock. ▪ Causes, classification. ▪ Emergency care for shock. ▪ Types of bleeding. ▪ Emergency care for bleeding. ▪ Bleeding from (ears, nose, and mouth) and emergency care. 	
5.	Soft – Tissue Injuries (wounds)	<ul style="list-style-type: none"> ▪ Definition. ▪ Closed injuries. ▪ Open injuries. ▪ Emergency care for soft-tissue injuries(dressing and bandages). 	
6.	Soft tissue injuries (burns)	<ul style="list-style-type: none"> ▪ Definition. Classification, and Causes ▪ Severity of Burns. Emergency medical Care for. 	

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7.	Trauma And Fractures	<ul style="list-style-type: none"> ▪ Fractures and Dislocation, Causes and Diagnosis. ▪ Emergency Care for patients with Fractures. ▪ Splinting, Principles of splinting, Equipments. ▪ Spinal cord injury Assessment Signs and Symptoms, Emergency Medical Care of the Spine – Injured Patient. 	
8.	Medical Emergency (poisoning)	<ul style="list-style-type: none"> ▪ Assessment of allergies Reactions. ▪ Cause, signs and symptoms. ▪ Emergency medial care for patients with Allergies Reaction. 	
9.	Medical Emergency (poisoning)	<ul style="list-style-type: none"> ▪ History of poisoning. ▪ Types and signs and symptoms. ▪ Use of activated charcoal. 	
10.	Environmental Emergency	<ul style="list-style-type: none"> ▪ Heat stroke, Heat Exhaustion, Heat cramps (Definition, Diagnosis, and Management). ▪ Hypothermia (Signs and Symptoms, Emergency care) ▪ Drowning. 	
11.	Altered Mental Status	<ul style="list-style-type: none"> ▪ Diabetic Emergency. ▪ Seizures. ▪ Emergency care of patients with Altered Mental status. 	
12.	Airway Obstruction	<ul style="list-style-type: none"> ▪ Choking – Heimlich Manoeuvre (Adults, Children) ▪ Choking. 	
13.	CPR	<ul style="list-style-type: none"> ▪ CPR (Adults, Children) ▪ CPR (Infants) 	
14	First Aid priorities	<ul style="list-style-type: none"> ▪ Case classification & triage 	

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

Text Books & References:**Reference**

1. First Aid. Taking Action MCGRAWII, NSC, 2007.
2. First Aid. CPR And AED, JONES AND BARTLETT, Thygerson, 2005.
3. First Aid. CPR, And AED Essentials. 41, AMERICAN COLLEGE OF. EMERG. Phy, 2005.
4. Airway Management Paramedic, Jones And Bartlett, Margolis, 2004
5. First Aid Manual, DK PUB, 2002.

المراجع العربية:

1. د. قطاش، رشيدى حمدان وقطاش، أحمد حمدان وحسن، نوال، الاسعافات الاولية - الطبعة الأولى، مؤسسة الوراق للتوزيع والنشر، 2004م
2. د. الصفدي، عصام، الإسعافات الأولية، الأردن - الطبعة الأولى، دار اليازوري العلمية للنشر، 2001م.
3. د. فريجات، حكمت عبد الكريم والحمود، محمد طه ود. أبو الرب، صلاح، أسس الإسعاف الأولي والفوري، 1991.

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



Para-Paramedical Program

Specialization	Radiologic Technology
Course Number	21104121
Course Title	Microbiology
Credit Hours	(3)
Theoretical Hours	(2)
Practical Hours	(3)





Brief Course Description:

- ❖ The course introduces the students into the whatness of microbiology with an emphases put on the general classifications of microbiology, bacteriology and the control of microbial growth. It also deals, with host parasite relationship, virology mycology principles of disease and epidemiology. Moreover, it deals with the mechanism of pathogenicity (Pathogenic Bacteria, Antimicrobial drugs, nosocomial infections), and the management of the collection, transportation, preservation and disposal of samples Finally, it shows how the results are reported and recorded

Course Objectives:

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

Principles of disease and epidemiology.

1. Principles of disease and epidemiology.
2. Mechanism of Pathogenicity
3. How to do the collection, Preservation and Transportation of Samples.
4. Know Antimicrobial drugs
5. To differentiate Pathogenic Bacteria
6. Preparation and Staining
7. The types of infections
8. Types of Viral Infections





Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1	Microbiology	<ul style="list-style-type: none"> ▪ Microbiology <ul style="list-style-type: none"> ○ Definition. ○ History. ○ Micro – organisms and human body. ▪ General Classifications of Microbiology. <ul style="list-style-type: none"> ○ Bacteriology. ○ Virology. ○ Mycology. ○ Parasitology. 	
2	Bacteriology	<ul style="list-style-type: none"> ▪ Bacteriology: <ul style="list-style-type: none"> ○ Size and Sharpe. ○ Structure ○ Bacterial species ○ Bacterial toxins. ○ Reproduction / curve. ○ Bacterial growth <ul style="list-style-type: none"> • Bacterial culture media: <ul style="list-style-type: none"> ○ Definition ○ Type. ▪ Control of Bacterial growth <ul style="list-style-type: none"> ○ Temperature. ○ Kind of bacteria. ○ Environment ○ physical state of bacteria. ○ Physical methods of bacterial control. ○ Chemical methods of bacterial control. ▪ Host parasite relationship: <ul style="list-style-type: none"> ○ Symbiotic relationships. 	



		<ul style="list-style-type: none"> ○ Normal microbial flora of human body. ○ Bacterial Pathogenicity and virulence. 	
3	Virology	<ul style="list-style-type: none"> ▪ Size and shapes. ▪ Structure. ▪ Multiplication and cultivation. ▪ Virus – host cell interaction. ▪ Interferon. ▪ Oncoviruses. ▪ Bacteriophages. 	
4	Mycology	<ul style="list-style-type: none"> ▪ Structure of Fungus. ▪ Habitat. ▪ Reproduction. ▪ Fungal infections (mycosis). <ul style="list-style-type: none"> ○ superficial. ○ Cutaneous ○ Deep 	
5	Parasitology	<ul style="list-style-type: none"> ▪ Introduction. ▪ Classification. <ul style="list-style-type: none"> ○ Protista / shape, structure, life cycle, mode of transmission & source of infection. ○ Helminthes/shape, structure, life cycle mode of transmission, source of infection. ▪ Medical Parasites: <ul style="list-style-type: none"> • Protozoa: Shapes, structure, life cycle, Diagnosis, control. • Human Protozoan <ul style="list-style-type: none"> ○ Entamaeba. ○ Giardia ○ Leishmania. ○ Toxoplasma. ○ Leishmania. ○ Trichomana. 	



		<ul style="list-style-type: none"> ○ Plasmodium. <ul style="list-style-type: none"> ● Helminthes: Shapes, structures, life cycle, Diagnosis, control. ◇ Nematodes. <ul style="list-style-type: none"> ○ Ascaris. ○ Enterabous. ○ Trichuris. ○ Trichuris. ◇ Cestodes: <ul style="list-style-type: none"> ○ Teanias. ○ Echinococcy. ○ Hymenolepis ◇ Trematodes: <ul style="list-style-type: none"> ○ Schistosoma. 	
6	Infection	<ul style="list-style-type: none"> ▪ Source of infection. ▪ Mode of transmission. ▪ prevention and control. 	
7	Immunity	<ul style="list-style-type: none"> ▪ Non specific defenses of the host. <ul style="list-style-type: none"> ○ Skin and mucous membrane. ○ Phagocytosis. ○ Inflammation ○ fever. ○ antimicrobial substances “Interferon, complement and properdine. ▪ Specific defenses of the host. <ul style="list-style-type: none"> ○ kinds of immunity ○ antigens and antibodies. ○ mechanism of antibody formation. ○ celluler immunity. ▪ hyper sensivity ▪ Vaccines <ul style="list-style-type: none"> ○ Definition ○ Types ○ EPI. 	



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. Group discussion.
3. Videos.
4. Live patterns & samples.
5. Practical applications.
6. Field Visits (Industries).

Text Books & References:

1. Microbiology Richard Harvey, Pamela, Champe Bruce D. Fisher 2007 PP438
2. Burton's Microbiology Paul Engel Kirk, Gwendolyn Buroon 2007 390PP.
3. Microbiology, General Tortora, Berdell Funke Christin Case 1000PP. 18JD 2007.
4. Medical Microbiology and Immunology Warren Levinson. 660PP. 2006
5. Microbiology Prescott Harley Kline Sixth edition 2005 Published by MC Graw. Hill Martin J. Lang.
6. Microbiology PRESCOTT HARLEY KLINE Sixth edition 2005
7. Published by MC Graw. Hill Martin J. Lang.
8. Medical Microbiology .Geo. F Brooks Janet s. Butel Stephen A. Morse, 20th edition 2004
9. Microbiology for the Health Sciences Gwendolyn R.W Burton Paul G.Englkirk. 2004 Lippincott Williams & Wilkins.
10. Medical Microbiology Cedric Mims, Hazel M Dockrem Richard V Goering. Ivan Ritt, Derek. Wakein, Mark Zuckerman 660PP 15JD.
11. Medical Microbiology. David Greenwood Richard. Slack, John Peutherer – 2002 708 PP.

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12. MEDICAL. MICROBIOLOGY ODY. 16f, Churchill Living, Greenwood, 2002 Microbiology and Infection Ingles 1998 PP 256.
13. Medical Microbiology, Tom Elliott Mark Hastings, Ulrich esselberger, 350 P.P 1997.
14. Microbiology for the health sciences, by Burton & Engel Kirk, 6th edd. Lippincott Williams & Wilkins.
15. Microbiology – An Introduction: Torkora, hunke, case, Benjamin cummings 8th. edd (ISBN/0 – 8053-7613-5).
16. Jawetz, Melnick, and Adelbergis, Medical Microbiology. Geo. F. Brooks, Janet. Butel. Stephen 21st edd, lang medical books.
17. Internet microbiology teaching resources





Program	Para-Medical
Specialization	Sterilization
Course Number	21115231
Course Title	Biostatistics
Credit Hours	(3)
Theoretical Hours	(3)
Practical Hours	(0)



وصف المادة الدراسية:

❖ يتناول هذا المساق العملية الإحصائية من حيث جمع البيانات وعرضها مع التركيز على مقاييس النزعة المركزية للبيانات المبوبة وغير المبوبة ومقاييس التشتت ومحنى التوزيع الطبيعي، والإحصاء التحليلي من حيث الفرضيات قبولها ورفضها والدلائل الإحصائية ومستوياتها و الارتباط وأشكالها وتربيع كاي واستعملاته ودلالته والتركيز على الإحصاءات الحيوية من حيث النسب والمعدلات والتعداد السكاني ومقاييس الخصوبة والمراضه والوفيات ومعدلاتها ومفهوم توقع الحياة.

أهداف المادة الدراسية:

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1. مبادئ علم الإحصاء الأساسية وتطبيقاته في الأمور الصحية .
2. أهمية الإحصاء واستخداماته في المجالات الصحية والطبية.
3. مصادر المعلومات وجمعه أو تصنيفها وعرضها بالأسلوب المناسب.
4. حساب مقاييس النزعة المركزية ومقاييس التشتت واستعمالاتها.
5. حساب المقاييس السكانية والخصوبة المرضة والوفاة.
6. بعض الاستنتاجات الإحصائية ذات الدلالة الإحصائية في مجالات الإحصاء التحليلي.



الوصف العام:

رقم الوحدة	اسم الوحدة	محتويات الوحدة	الزمن
1	المقدمة	<ul style="list-style-type: none"> ▪ تعريف الإحصاء، مراحل العملية الإحصائية، أقسام الإحصاء ▪ استعمال الإحصاء في المجالات الصحية والطبية ▪ مصادر المعلومات، البيانات تعريفها وتصنيفاتها، المجتمع الإحصائي، العينة؛ أسباب اختيارها وطرق اختيار العينة ▪ المسح الشامل، الإستبانة؛ استعمالاتها ومكوناتها 	
2	العملية الإحصائية	<ul style="list-style-type: none"> ▪ العملية الإحصائية: جمع البيانات وعرضها؛ جدوليا وبيانيا ورقميا ▪ الجداول البسيطة، الأعمدة والمستطيلات، الخط المتكسر، الخط المنحني، الدائرة، الصور، الخريطة الوبائية ▪ التوزيعات التكرارية: بناء جدول التوزيع التكراري؛ التكرارات، التكرارات النسبية والمئوية، التكرار المتجمع، النسبي والمئوي، أقل من وأكثر من ▪ عرض التوزيعات التكرارية بيانيا؛ المدرج التكراري، المضلع التكراري، المنحنى التكرارين، المضلعات التكرارية التجميعية ▪ أشكال التوزيعات التكرارية 	
3	مقاييس النزعة المركزية للبيانات غير المبوبة والمبوبة	<ul style="list-style-type: none"> ▪ مقاييس النزعة المركزية للبيانات غير المبوبة والمبوبة؛ ▪ الوسط الحسابي، الوسط المرجح، الوسط الهندسي، الوسيط، المنوال، استخراجها حسابها وبيانيا ▪ خصائص مقاييس النزعة المركزية وصفاتها 	
4	مقاييس التشتت للبيانات غير المبوبة والمبوبة	<ul style="list-style-type: none"> ▪ المدى ▪ الانحراف المتوسط 	

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	<ul style="list-style-type: none"> ■ الانحراف المتوسط المطلق ■ التباين ■ الانحراف المعياري ■ معامل الاختلاف (التباين) 		
	<ul style="list-style-type: none"> ■ خصائصه واستعمالاته وأهميته في الإحصاء والأبحاث 	منحنى التوزيع الطبيعي	5
	<ul style="list-style-type: none"> ■ الفرضيات: فرضية العدم (الصفريية) والفرضية البديلة ■ قبول الفرضية ورفضها ■ الدلالة الإحصائية ومستوياتها ■ الارتباط، أشكاله، معامل الارتباط ■ ترتيب كأي، استعمالاته ودلالاته 	مقدمة في الإحصاء التحليلي	6
	<ul style="list-style-type: none"> ■ النسب والمعدلات وتصنيفاتها: الخام والنوعية والمعيرة (المعدلة) ■ التعداد السكاني العام، الهرم السكاني، محتوياته وأشكاله. تقدير عدد السكان ■ مقاييس الخصوبة ■ مقاييس المراضة: معدلات حدوث المرض وانتشاره ■ مقاييس الوفيات: الوفيات الخام، وفيات الطفولة، وفيات الأمومة ■ معدلات الوفاة النوعية حسب الجنس والسن وسبب الوفاة ■ مفهوم توقع الحياة 	الإحصاء الحيوي	7

طرق التقييم المستخدمة :

التاريخ	نسبة الامتحان من العلامة الكلية	الامتحانات
/ / : التاريخ :	20%	الامتحان الأول
/ / : التاريخ :	20%	الامتحان الثاني
/ / : التاريخ :	10%	أعمال الفصل
/ / : التاريخ :	50%	الامتحانات النهائية

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الكتب و المراجع :

1. د. الشلبي، رياض ود. كنعان، غسان ود. الرواش، محمد، وأستاذ سعيان، أحمد، تطبيقات في الحاسوب والإحصاء جامعة اليرموك 2005.
2. د. حميدان، عدنان وأغا، عمار، الإحصاء الحيوي، دمشق، جامعة دمشق 2004م.
3. خياط، سهيل، مبادئ في الإحصاء الحيوي، دمشق، جامعة البعث 2004م.
4. رشيد، محمد، الإحصاء الوصفي والتطبيقي الحيوي - عمان، درا صفاء م 2003.
5. د. جيلاني، جيلاطو، الإحصاء الوصفي تطبيقات عملية، عمان، دار المناهج 2003م.
6. الدكتور الزعبي، محمد حسن، مدخل إلى طب المجتمع، مطبعة الأمن العام، عمان (2000).

References:

- 1-Medical Statistics, Aviva, Petrie, Caroline Sabin. 2007. PP158
- 2-Biostatistics, John Wiley, Dunial, 2005
- 3-Biostatistics An Introduction Glover and Mitchell 2002





Paramedical Program

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





Brief Course Description:

- ❖ This course covers the general patients care in radiology departments. Moreover, it deals with vital signs, cardiac arrest, accident victims, aseptic techniques, contrast media reactions. It also provides students with some knowledge about methods of sterilization and isolation.

Course Objectives:

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

- 1- Understand the ways of dealing with all types of patients properly.
- 2- Understand the types of sterilization techniques.
- 3- Cope with all emergency cases occur in radiology department.
- 4- Cope with geriatric and pediatric patients.





Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	The patient in Radiographic Imaging	<ul style="list-style-type: none"> ▪ Objectives. ▪ Basic Human Needs <ul style="list-style-type: none"> ▪ Patient Assessment: <ul style="list-style-type: none"> ○ Data Collection. ○ Data Analysis <ul style="list-style-type: none"> ▪ Communication with patient: ○ Therapeutic Communications. ○ Non therapeutic Communications 	
2.	Infection Control	<ul style="list-style-type: none"> ▪ Objectives. ▪ Elements Needed to Transmit Infection. ▪ Infection Control practices in Health care setting: <ul style="list-style-type: none"> ○ Dress in the workplace. ○ Hair. ○ Hand Washing. <ul style="list-style-type: none"> ▪ Additional infection control considerations; ○ Eye Protection. ○ Gloves. ○ Cleaning and proper waste Disposal. ○ Disinfection. <ul style="list-style-type: none"> ▪ Transmission – Based precautions: <ul style="list-style-type: none"> ▪ Airbore precautions ○ Droplet Precautions. ○ Contact Precaution <ul style="list-style-type: none"> ▪ Protective or Reverse Isolation. 	
3.	Basic Patient Care And Safety In Radiographic	<ul style="list-style-type: none"> ▪ Objectives. ▪ Care of patient Belongings. ▪ Methods of moving patients: <ul style="list-style-type: none"> ○ By Gurney. 	

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	Imaging:	<ul style="list-style-type: none"> ○ Sheet Transfer. ○ Sliding Board Transfer. ○ By Wheel chair. ○ Using Gait or Transfer Belt. ▪ Use of Immobilizers. ▪ Positioning the patient for Diagnostic Imaging Examinations. <ul style="list-style-type: none"> ▪ Assisting the patient to Dress and undress <ul style="list-style-type: none"> ○ Patient with intravenous Infusion. ▪ The disabled patient 	
4.	Surgical Asepsis And The Radiographer	<ul style="list-style-type: none"> ▪ Objectives. ▪ Methods of Sterilization. ▪ Disinfection. ▪ Packing and storing sterile supplies. ▪ Opening sterile packs. ▪ Taking Radiographic films in the operating room. 	
5.	Trauma And Mobile Radiographic Considerations	<ul style="list-style-type: none"> ▪ Objectives. ▪ Traumatic Injuries <ul style="list-style-type: none"> ○ The patient with a Head Injury. ○ The patient with a Facial Injury. ○ The patient with a Spinal Cord Injury. ○ Imaging consideration for the Trauma or Mobile Patient. ○ The patient with a Fracture. ○ The patient with Abdominal Traumas. ○ The confused patient. ○ The Intoxicated patient 	
6.	Pediatric And Geriatric Radiographic	<ul style="list-style-type: none"> ▪ Objectives. ▪ The high – risk newborn infant. ▪ The Adolescent or older child. ▪ Transporting infants and children. 	



	Considerations	<ul style="list-style-type: none"> ▪ Immobilizing the Anxious Child. ▪ The Geriatric patient: <ul style="list-style-type: none"> ○ Integumentary System. ○ Changes in the head and Neck. ○ Pulmonary System. ○ The Cardiovascular System. ○ The Gastrointestinal System. ○ The Hepatic System. ○ The Genitourinary System. ○ The Musculoskeletal System. ○ The patient who has had Arthroplastic Surgery. ○ The Neurologic System. ○ Culture and Aging. ○ Elder Abuse. 	
7.	Care Of Patients During special Procedures	<ul style="list-style-type: none"> ▪ Objectives. ▪ Interventional procedures. ▪ Computed tomography. ▪ Ultrasonography. ▪ Magnetic Resonance imaging. ▪ Positron emission tomography. ▪ Mammography. ▪ Urinary Catheterization. ▪ Barium studies of the gastrointestinal tract. 	

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:

1. Lectures.
2. Discussion & Quizzes.
3. Homeworks

Text Books & References:

References:

- 1- Basic Medical Techniques And Patient Care In Imaging Technology, By Andrea Guillent & Lillian S. Toress, Publisher: lippincott willians & Wilkins, 2007.
- 2- Basic Medical Techniques And Patient Care In Imaging Technology, Sixth Edition 2003, Lillian S. Toress.
- 3- Chesney, N; Care of patient in Diagnostic Radiography. 6th edition, London 1982.
- 4- Ehrlich, Givens; Patient Care in Radiology, 1981, C.V. Mosby Company.





Paramedical Program

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





Brief Course Description:

- ❖ This course concentrates on the appearance of pathological effects of anatomical radiology. It Provides students with basic anatomical positions and their normal appearances, also differentiates between structural and abnormal body tissues. It enable students to differentiate between structural and functional aspects of diseases, links anatomical structural and functional aspects of diseases, links anatomical structures with their radiological appearances.

Course Objectives:

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

1. Determine the palpable landmarks of various body parts.
2. Know the listed radiographic manifestation of the listed diseases of various body system.
3. Basic idea of normal body anatomy.
4. Appreciate the normal radiological appearances of different body organs and its relation to different diseases.





Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	General Principles Of Pathology	<ul style="list-style-type: none"> ▪ Pathology. <ul style="list-style-type: none"> ○ The disease process ▪ The Effects of injury. <ul style="list-style-type: none"> ○ Degeneration and necrosis. ○ Acute injury. ○ Chronic injury. ○ Inflammation. ○ Transudates. ○ Exudates. ○ Inflammatory lesions. ○ Repair. 	
2.	Respiratory System	<ul style="list-style-type: none"> ▪ Imaging of the chest ▪ Congenital disorders: <ul style="list-style-type: none"> ○ Cystic fibrosis. ○ Hyaline membrane disease ▪ Acute disorders: <ul style="list-style-type: none"> ○ Pulmonary edema. ○ Pneumonia. ○ Pneumothorax. ○ Pulmonary embolism. ○ Lung abscess. ○ Pleural effusion. ▪ Chronic disorders: <ul style="list-style-type: none"> ○ Bronchial asthma. ○ Tuberculosis. ○ Bronchiectasis 	
3.	Alimentary Tract	<ul style="list-style-type: none"> ▪ Imaging of the alimentary tract ▪ the esophagus: <ul style="list-style-type: none"> ○ The normal esophagus. ○ Diverticula ▪ The stomach and duodenum: <ul style="list-style-type: none"> ○ Normal stomach and duodenum. 	

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		<ul style="list-style-type: none"> ○ Congenital disorders. ○ Inflammatory disorders ▪ The small intestine: <ul style="list-style-type: none"> ○ Congenital abnormalities. ○ Intestinal obstruction ▪ The large intestine <ul style="list-style-type: none"> ○ Normal large intestine. ○ Congenital disorders. ○ Mechanical disorders. ○ Inflammatory disorders. 	
4.	The Hepatobiliary System	<ul style="list-style-type: none"> ▪ Inflammatory disorders of the liver. ▪ Inflammatory disorders of the gall bladder. ▪ Inflammatory disorders of the pancreas 	
5.	Genitourinary System	<ul style="list-style-type: none"> ▪ Imaging of the urinary system. ▪ Obstructive disorders of the kidneys. ▪ Inflammatory disorders of the kidneys. ▪ Chronic renal failure. ▪ Congenital disorders of the lower urinary tract. ▪ Inflammatory disorders of the lower urinary tract. 	





6.	Osseous System And Joints	<ul style="list-style-type: none"> ▪ Imaging the Osseous system and joints. ▪ Congenital Disorders: <ul style="list-style-type: none"> ○ Congenital Hip Dysplasia. ○ Achondroplasia. ○ Osteopetrosis ▪ Metabolic and Hormonal Disorders: <ul style="list-style-type: none"> ○ Hyperparathyroidism. ○ Acromegaly. ○ Osteoporosis. ▪ Inflammatory Disorders: <ul style="list-style-type: none"> ○ Osteomyelitis. ○ Rheumatoid Arthritis. ○ Ankylosing spondylitis. ○ Osteoarthritis. ▪ Trauma and Fractures <ul style="list-style-type: none"> ○ Classification of Fractures. ○ Types of Fractures. ○ Dislocation ▪ Cystic Bone Lesions. ▪ General Information of Bone Tumours 	
7.	Central Nerous System	<ul style="list-style-type: none"> ▪ Central nerous system <ul style="list-style-type: none"> • Imaging of c.n.s. • Brain: <ul style="list-style-type: none"> ○ Bra Congenital disorders. ○ Haemorrhage and infarction. ○ Arteriovenous malformation. ○ Contusion. ○ Fractures. 	
8.	Neoplasia	<ul style="list-style-type: none"> ▪ Causes of cancer. ▪ Characteristics of cancer. ▪ Types of cancer. ▪ Staging of cancer. ▪ Spread of malignant tumours. ▪ Sites of metastasis. 	



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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:

1. Lectures.
2. Group discussion.
3. Videos.
4. Live patterns & samples.
5. Practical applications.
6. Field Visits (Industries).

Text Books & References:**References:**

1. Biology Of Diseases by Chris Smith, Ed Wood, N. Ahmed, Maureen Dawson, 2006.
2. Essentials of Pathophysiology, Author: Carol Mattson Porth, Rn Publication Date: March 2006, Publisher: Lippincott Williams & Wilkins.
3. Pathophysiology (3rd edition), Authors: LEE-ELLEN C. COPSTEAD-KIRHORN, Ph.D., Jacquelyn L. Banasik, Publication Date: February 2005, Publisher: W B Saunders.
4. Pathophysiology: Concepts of Altered Health States, Authors: Carol Mattson Porth, Rn , Carol Porth, Publication Date: July 2004, Publisher: Lippincott Williams & Wilkins.
5. Radiographic pathology for technologists by Nina kowalczyk, james D. MacE, Bryan Pfeiffer, Kevin D. Evans, Beth McCarthy, 2004
6. Understanding Pathophysiology (3rd edition), Authors: Sue E. Huether, Kathryn L. McCance, Sue Huether, Publication Date: October 2003, Publisher: Mosby Inc.
7. Applied Pathology of Radiographers, Paul F. Laudicina 1989.



Paramedical Program

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





Brief Course Description:

- ❖ This course provides the students with the basic essential knowledge and information of the positioning techniques in radiography of the upper extremities, lower extremities and vertebral column, as well as their radiographic anatomy. In addition it deals with special radiographic procedures like myelography..

Course Objectives:

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

- 1- Know the basic radiographic anatomy positioning of the upper extremities.
- 2- Know the radiographic anatomy and positioning of the lower extremities.
- 3- Know the radiographic anatomy and positioning of the vertebral column and its special radiographic procedures





Detailed Course Description:

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

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



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- Discussion and quizzes.
- 3- Demonstration and practical training

Text Books & References:

References:

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





Paramedical Program

Specialization	Radiologic Technology
Course Number	21109222
Course Title	Radiographic Positioning (2)
Credit Hours	(3)
Theoretical Hours	(3)
Practical Hours	(0)





Brief Course Description:

- ❖ This course covers the basic radiographic anatomy of the skull and basic positioning techniques of the skull, paranasal sinuses, mastoids & mandible. It also deals with the radiographic anatomy of the chest and bony thorax in addition to their basic positioning techniques.

Course Objectives:

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

1. Know the basic radiographic anatomy and positioning of the skull and its structures.
2. Know the radiographic anatomy of the chest and lungs in addition to the basic positioning techniques.
3. Know the radiographic anatomy and positioning of the bony thorax (thoracic cage).





Detailed Course Description:

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



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



		<ul style="list-style-type: none"> ▪ Radiography of the diaphragm. ▪ Radiography of the thoracic inlet. 	
3.	Bony Thorax	<ul style="list-style-type: none"> ▪ Radiographic anatomy of the thoracic cage: <ul style="list-style-type: none"> ○ Ribs. ○ Scapula and dorsal spine. ○ Clavicles. ○ Sternum. ○ Sternoclavicular joint. ▪ Radiographic positions of sternum. ▪ Radiographic positions of scapula. <ul style="list-style-type: none"> ○ Radiographic positions of ribs: <ul style="list-style-type: none"> ○ Upper ribs. ○ Lower ribs. ▪ Radiographic position of sterna-clavicular joint. ▪ Radiographic position of acromion clavicular joint 	

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- Discussion and quizzes.
- 3- Demonstration and practical training

Text Books & References:

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References:

- 1- Pocket Guide To Radiography 5th edition, 2003
 - a. Philip W. Ballinger
 - b. Eugene D. Frank.
- 2- Clark's positioning is radiography 11th edition 2002.
- 3- Merrill's Atlas of Radiographic Positioning and Radiologic Procedures 8th Edition 1998





Paramedical Program

Specialization	Radiologic Technology
Course Number	21109323
Course Title	Radiographic Positioning (3)
Credit Hours	(3)
Theoretical Hours	(3)
Practical Hours	(0)





Brief Course Description:

- ❖ This course covers the basic positioning techniques of the abdomen and pelvis in addition to their basic radiographic anatomy. It also provides the students with the basic radiographic anatomy and positions of the female breast (Mammography), in addition to dental radiography and new imaging modalities (CT, MRI, etc).

Course Objectives:

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

1. Know the basic radiographic anatomy of the Abdomen and basic radiographic positions.
2. Know the basic radiographic anatomy of the pelvis and basic radiographic position.
3. Know the radiographic anatomy of the breast and standard position of mammography in addition to additional views.
4. Know the general principles of positioning in new imaging modalities as well as dental radiography.





Detailed Course Description:

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

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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:

1. Lectures.
2. Discussion & Quizzes.
3. Demonstration & Practical training.

Text Books & References:

References:

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





Paramedical Program

Specialization	Radiologic Technology
Course Number	21109231
Course Title	Principles of Exposure (1)
Credit Hours	(3)
Theoretical Hours	(3)
Practical Hours	(0)





Brief Course Description:

- ❖ The course Provides the Students with the essential knowledge about the structure and components of the imaging system like x-ray tube, x-ray film, and others and how to deal with them. It also provides the students with the basic information about the chemical structure of processing solutions and x-ray film processing, enabling the student to know the process of image formation

Course Objectives:

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

1. Know the design of x-ray tube and x-ray emission.
2. Know the factors affecting image quality.
3. Know the construction of grid, x-ray film and image formation.
4. Know the mechanism of chemical processing solutions, action.
5. Know the mechanism of beam restricting devices.





Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Introduction	<ul style="list-style-type: none"> ▪ X-ray production and x ray tube components. ▪ X-ray quality. ▪ X-ray quantity. ▪ Space charge and charge effect. ▪ Focusing cup. ▪ Tungsten and its characteristics. ▪ Focal spot. ▪ Heat dissipation. ▪ Factors limiting the life of rotating anode. ▪ Grid controlled x-ray tubes. ▪ Metal/ceramic x-ray tubes. ▪ Saturation voltage ▪ Heel effect. ▪ Tube rating chart 	
2.	Interaction Of Electron Beam With X-Ray Tube Target And Matter	<ul style="list-style-type: none"> ▪ Atomic structure and binding forces. ▪ Process of x – ray generation: <ul style="list-style-type: none"> ○ General radiation (bremsstrahlung). ○ Characteristic radiation. ▪ Molybdenum target. ▪ Interaction of x-ray with matter. 	
3.	Rachigraphic film	<ul style="list-style-type: none"> ▪ Structure of the film (layers). ▪ Latent image. ▪ Photographic effect direct absorption of x-ray. ▪ Sensitivity of the film to 	



		<p>direct x-ray exposure.</p> <ul style="list-style-type: none"> ▪ Film types. ▪ Screen type and non screen type film. ▪ Handling of the film. ▪ Film storage conditions. 	
4.	Intensifying Screen And Cassette	<ul style="list-style-type: none"> ▪ Construction. ▪ Intensifying action of screen. ▪ Intensification factor. ▪ Screen Types. ▪ Care of the screen. ▪ Structure of the cassette. 	
5.	Processing Of Latent Image	<ul style="list-style-type: none"> ▪ Stages of processing: Development, replenishment, Fixing, Washing, Drying. ▪ Contents of developing solutions, and their characteristics. ▪ Automatic Processing. ▪ Factors effecting development and fixation. ▪ Dark room design (Configuratio 	
6.	Photographic Characteristics of x-ray film	<ul style="list-style-type: none"> ▪ Photographic density. ▪ Photographic contrast, and factors affecting film contrast. ▪ Characteristic curve of the film. ▪ Film speed, and speed class system. ▪ Film latitude. 	
7.	Radiographic Image Quality	<ul style="list-style-type: none"> ▪ Radiographic contrast and radiation quality. ▪ Fog and scatter: definition and factors affecting them. ▪ Image quality and radiographic mottle. 	



		<ul style="list-style-type: none"> ▪ Speed versus noise. ▪ Sharpness. ▪ Artifacts 	
8.	Geometry Of The Radiographic Image	<ul style="list-style-type: none"> ▪ Magnification: Definition and factors affecting it. ▪ Distortion : Definition and factors affecting it. ▪ Penumbra : Definition and factors affecting it. ▪ Unsharpness: Causes & classification resolution. 	
9.	Beam Limiting devices (restrictors)	<ul style="list-style-type: none"> ▪ Classification: <ul style="list-style-type: none"> ○ Aperture diaphragm. ○ Cones & cylinder. ○ Collimeters ▪ Function of restrictors. ▪ Factors affecting scattered radiation. 	
10.	Grids	<ul style="list-style-type: none"> ▪ Definition and structure. ▪ Grid patterns. ▪ Evaluation of grid performance. ▪ Bucky factor. ▪ Lead contents. ▪ Grid cut off. ▪ moving grids. ▪ Grid selection. ▪ Air gap technique. 	

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



Teaching Methodology:

1. Lectures.
2. Demonstrations and Homeworks.
3. Discussion & Quizzes.

Text Books & References:

References:

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





Paramedical Program

Specialization	Radiologic Technology
Course Number	21109232
Course Title	Principles of Exposure (2)
Credit Hours	(3)
Theoretical Hours	(3)
Practical Hours	(0)





Brief Course Description:

- ❖ The aim of this course is to provide the students with the Knowledge and understanding means of the other parts of the imaging system including image intensifier, radiographic techniques like fluoroscopy, tomography, stereo -radiography, xeroradiography and magnification

Course Objectives:

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

1. Know principles of fluoroscopy, tomography, magnification and stereo radiography.
2. Know the structure and components of image intensifier and their function.
3. Know the concept of image quality and its relation with the density, contrast & resolution





Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Fluoroscopy	<ul style="list-style-type: none"> ▪ Fluoroscope and visual physiology. ▪ Image intensifier design. ▪ Magnification gain, flux gain, and brightness gain. ▪ Image Characteristics: contrast, lag, distortion. ▪ Multiple field image intensifier. ▪ Large Field of view image intensifier. 	
2.	Viewing and recording the fluoroscopic image	<ul style="list-style-type: none"> ▪ Closed circuit television and television camera. ▪ Video Signal. ▪ Television monitor & T.V. Scanning. ▪ Television image quality: resolution, contrast, lag. ▪ Automatic gain control. ▪ Automatic brightness control. ▪ Fluoroscopic image recorders : Spot film recorder, spot film camera, cine fluoroscopy, cine camera. ▪ T.V. image recorders : tape recorders, magnetic disc recorders, optical discs. 	
3.	Tomography	<ul style="list-style-type: none"> ▪ Definition and terminology. ▪ Basic methods of tomography. ▪ Types of tube motion. ▪ Blurring: <ul style="list-style-type: none"> ○ Definition. ○ Width of blane and factors affecting it. ○ Blurr margin ▪ Section thickness. 	

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

		<ul style="list-style-type: none"> ▪ Narrow versus wide angle tomography. ▪ Circular tomography: advantages & disadvantages. ▪ Complex tomographic motion. ▪ Phantom images. ▪ Determination of tomographic angle. ▪ Pan tomography. 	
4.	stereoscopy	<ul style="list-style-type: none"> ▪ Physiology of depth perception: monocular depth perception. ▪ Stereoscopic filming. ▪ Stereoscopic viewing and viewing systems. ▪ Advantage and disadvantages. 	
5.	xeroradiography	<ul style="list-style-type: none"> ▪ General principles. ▪ Photo conducting . ▪ Xeroradiographic plate. ▪ Exposure of charged plate. ▪ Xeroradiographic undercutting. ▪ powder development. ▪ Sensitometry of developed image. ▪ Quality of xeroradiographic image. ▪ Automatic xeroradiographic system. ▪ Patient exposure from film screen xeroradiographic mammography). 	
6.	Mammography & Breast imaging	<ul style="list-style-type: none"> ▪ Imaging requirements. ▪ Modern mammography. ▪ Screen – film techniques & x-ray tube about, compression, grids, screen combination. ▪ Film processing. ▪ Image features and dosimetry: magnification mammography, viewing mammography image quality breast dose, radiation 	

		<p>risk versus benefits.</p> <ul style="list-style-type: none"> ▪ Alternative breast imaging modalities ○ Xeromammography. ○ Xeroradiography versus screen – film ○ Ultrasound and Breast imaging. ○ MRI. 	
7.	Effect of KVP and MAs on the image	<ul style="list-style-type: none"> ▪ Effects Of Increased KVP. ▪ Effect Of mAS. 	

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. Discussion & Quizzes.
3. Demonstration & Homeworks

Text Books & References:

1. Physics for Medical imaging RF Farr, PJ Allisy – Roberts. Hurcant publisher limited 2001.
2. Principles of Radiographic Imaging By Richard R. Carlton, Publisher: Thomson Delmar Learning Medical 2000.
3. Review Of Radiological Physics, Walter Huda, Richard PJ. Stone 1995.
4. Christian's physics of diagnostic radiology, Thomas S Curry, James E. Eondey, Robert C.Murry. 4th Edition 1994.





Paramedical Program

Specialization	Radiologic Technology
Course Number	21109161
Course Title	Radiographic Equipment
Credit Hours	(3)
Theoretical Hours	(2)
Practical Hours	(1)





Brief Course Description:

- ❖ The aim of this course is to provide the student with the basic essential knowledge about the available equipments in the radiology department including the design and function of these equipments; in addition to their performance and maintenance where possible; and finally to be familiar 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:

Know a good theoretical information about the design of imaging equipments .

1. Know the function and performance of these equipments.
2. Be familiar with these equipments.
3. Acquire the awareness of the use of computer –aided image analysis.



Detailed Course Description:

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

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

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. Decision & demonstrating.
3. Homeworks

Text Books & References:

References:

1. Chiropractic Radiography & Quality Assurance hand book, by Russell L. Wilson, Publisher: Informa Health Care, 2007.
2. Chesney's equipment for student radiographers 5th 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.





Paramedical Program

Specialization	Radiologic Technology
Course Number	21109263
Course Title	Radiobiology and Radiation protection
Credit Hours	(3)
Theoretical Hours	(2)
Practical Hours	(3)



Brief Course Description:

- ❖ The course introduces the students into diagnostic radiology and nuclear medicine. It provides students with basic knowledge required to minimize excessive radiation exposure of patients, public and operators. Moreover, it deals with different types of radiosensitivity of various body organs, enabling students to know various radiation hazards and understanding the radiation units and the main differences between them.

Course Objectives:

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

1. Know and understand units & quantities of radiation and inter relationships between the various units of radiation.
2. Know the mechanism of radiation effect on various cells as a function of dose and area exposed.
3. Comprehend with the basic radiation protection philosophy and how to calculate the maximum permissible dose allowed to occupational and non – occupational persons.
4. Know how to describe the radiation method of operation of all types of detection & measuring instruments.
5. Understand the general protection methods for internal & external sources of radiation.



Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Review Of interaction Of x-ray with matter	<ul style="list-style-type: none"> ▪ Objectives . ▪ interaction with matter <ul style="list-style-type: none"> ○ Photoelectric effect. ○ Compton scattering. ○ Pair production. 	
2.	Radiation quantities and units	<ul style="list-style-type: none"> ▪ Radiation quantities. ▪ Radiation units 	
3.	Principles Of Radio biology	<ul style="list-style-type: none"> ▪ Review of human biology. ○ Cell components. ○ Low Of Bergone. ▪ Tissue radiosensitivity. ▪ Physical factors affecting radiosensitivity 	
4.	Biological factors affect radiosensitivity	<ul style="list-style-type: none"> ▪ Biological factors affect radiosensitivity 	
5.	Biological effects of ionizing radiation	<ul style="list-style-type: none"> ▪ Objective. ▪ Cell radiation exposure. <ul style="list-style-type: none"> ○ Direct hit theory . ○ Indirect hit theory. ○ Free radicals reactions. ○ Repair. ○ Cell sensitivity. ▪ Dose response curves. ▪ Whole body response. ▪ Lethal dose. ▪ Mechanism of Mammalian death. ▪ Gastrointestinal death. ▪ Central Nervous System Death. 	
6.	Long term somatic effects of ionizing	<ul style="list-style-type: none"> ▪ Types of long-term somatic effects. 	

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

	radiation		
7.	Biological effects of ionizing Radiation	<ul style="list-style-type: none"> ▪ Basic DNA-RNA expression in levanter ▪ Information Coding. ▪ DNA – RNA gene expression. ▪ DNA modification. ▪ Dose effects. 	
8.	Maximum Permissible dose (MPD)	<ul style="list-style-type: none"> ▪ Basic radiation protection philosophy. ▪ Categories of MPD. 	
9.	Ionizing radiation detection instruments	<ul style="list-style-type: none"> ▪ Types of instruments. ▪ Personal monitoring devices. ▪ Field survey instruments 	
10.	Basic Principles of radiation protection	<ul style="list-style-type: none"> ▪ Potential sources of radiation. <ul style="list-style-type: none"> ○ External. ○ Internal. ▪ basic ways for protection from radiation. ▪ Half value layer. ▪ Methods to minimize diagnostic x_ray exposure to patients and operators: <ul style="list-style-type: none"> ○ Methods. ○ Proper collimation. ○ Gonad shield. ○ Proper filtration. ○ Optimum kvp techniques. ○ High speed image receptor. ○ Proper dark room procedure ▪ Types of gonad shields. ▪ Use of gonad Shields. ▪ Methods to minimize operator exposure. 	

11.	Further reduction of operator exposure	<ul style="list-style-type: none"> ▪ Shield booth. ▪ Exposure Cord Length. ▪ Holding patts Pats. ▪ personal Monitoring. ▪ Special requirements for mobile machines. 	
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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:

1. Lectures.
2. Discussion & Quizzes.
3. Homeworks.
4. Demonstrations & Seminars.

Text Books & References:

References:

1. Radiologic sciences for technologists, Bushong, 2006.
2. Radiation protection for radiologic technology, Frankel, Robert 2004.





Paramedical Program

Specialization	Radiologic Technology
Course Number	21109257
Course Title	Radio pharmacology
Credit Hours	(3)
Theoretical Hours	(3)
Practical Hours	(0)





Brief Course Description:

- ❖ This course provides the students with the basic knowledge about the drugs used in radiology department either for diagnosis, aiding diagnosis. It also provides students with the aim of using of contrast media, chemical and physical properties of C.M. adverse reaction of C.M and its treatment. The course deals with effect of C.M on affect body organs.

Course Objectives:

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

1. Know the basic drugs used in radiology.
2. Know the indications and contra indications of these drugs.
3. Know the basic chemistry associated with these drugs.
4. Know what to do in case of an emergency.





Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Basic about C.M.	<ul style="list-style-type: none"> Basic about C.M. 	
2.	Chemistry Background	<ul style="list-style-type: none"> Osmolarity problem. Osmolarity problem. Their solution 	
3.	Practical aspects of drugs used in medicine	<ul style="list-style-type: none"> Kidney. Heart. Vessels. Thyroid. Brain. 	
4.	Side effects	<ul style="list-style-type: none"> Chemotoxicity Protein binding. Hydrophilicity & lipophilicity 	
5.	Cardiovascular effects of drugs	<ul style="list-style-type: none"> Effect of drugs in coronary angiography. Heart rhythm and ecg. Vascular system. Blood coagulation. 	
6.	Neurological effects of drugs	<ul style="list-style-type: none"> Neurological effects of drugs. 	
7.	Steps taken in an emergency	<ul style="list-style-type: none"> Treatment plan for drugs side effects and reactions. Patients at risk of an adverse reaction following radiopharmacological drug administration. Reducing the risk of an adverse drug reaction. 	



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. Discussion & Quizzes.
3. Homeworks

Text Books & References:

1. Contrast media in practice, P.Dawson, W. ClauB Qustions and answers 1994.
2. Contract media to see or not to see everything about C.M. Hans Hans H. Schild. 1994.





Paramedical Program

Specialization	Radiologic Technology
Course Number	21109165
Course Title	Quality Assurance & Quality control
Credit Hours	(3)
Theoretical Hours	(2)
Practical Hours	(3)





Brief Course Description:

- ❖ This course provides the student with the basic knowledge about the concept of quality assurance & control, and their benefits. It also provides the student with the necessary information about the procedures used in quality control tests for different X-Ray systems, as well as retake film analysis and protective devices

Course Objectives:

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

1. Know the concept of QA&QC, and team of quality control addition to the importance and benefit of quality assurance.
2. Know and perform the various procedures of quality control tests used for various X-Ray Systems.
3. Know the devices used in QC tests.
4. Know the importance of retake film analysis (repeat film analysis).



Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Introduction	<ul style="list-style-type: none"> ▪ Definition of quality assurance ▪ Benefits of QA & QC. ▪ Team Of QC (committee of QA). ▪ Factors affecting image quality: <ul style="list-style-type: none"> ○ Image contrast. ○ Blur or lack of sharpness. ○ Distortion & artifacts. ○ Image noise. ▪ Standards of acceptable image. 	
2.	Quality Assurance Equipments	<ul style="list-style-type: none"> ▪ Sensitometer. ▪ Densitometer. ▪ Multifunctionometer. 	
3.	Processors Quality Control (PQC)	<ul style="list-style-type: none"> ▪ Equipments used in PQC. ▪ Procedures used PQC. ▪ Precautions. ▪ Dark room fog: sources and causes of fog. ▪ Evaluation of dark room. ▪ Film storage. ▪ Screen cleaning. ▪ Replenishment rate test. 	
4.	Quality Assurance for X-Ray Systems:	<ul style="list-style-type: none"> ▪ Visual check. ▪ Tube potential or tube output measurement (KV). ▪ Screen film contact or combination, and performance. ▪ Collimation and beam alignment. ▪ Grid alignment test. ▪ Half value layer. ▪ Phototimers (automatic exposure cont 	
5.	Radiographic Density	<ul style="list-style-type: none"> ▪ Definition. ▪ Radiographic film structure . 	

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		<ul style="list-style-type: none"> ▪ Characteristic curve and film sensitivity parameters. ▪ Focal spots size and its measuring objects. ▪ Illuminators test (viewing box test). ▪ Cassette structure, contents, function and care. 	
6.	Fluoroscopic quality control	<ul style="list-style-type: none"> ▪ objectives ▪ T.V. monitor setup. ▪ Fluoroscopic film test and setup. ▪ Fluoroscopic exposure rate and level t 	
7.	Tomography	<ul style="list-style-type: none"> ▪ Definition. ▪ Special techniques of tomography. ▪ Tomographic cut location test. ▪ Extant and symmetry of tomographic movements tests. ▪ Bucky tray movement test. ▪ Problems of tomography. 	
8.	Mammography	<ul style="list-style-type: none"> ▪ Low dose mammography system. ▪ Breast phantom. ▪ Mammography: accreditation phantom (square wax box). ▪ Screen film test of monographic mamographic. 	
9.	Portable Radiography machines	<ul style="list-style-type: none"> ▪ Types of portable machines. ▪ Objectives of QC. ▪ Equipments used in QC. ▪ Procedure of QC test. ▪ Problems of portable machines. 	
10.	Rejected Or Repeated Films (retake Film Analysis)	<ul style="list-style-type: none"> ▪ Objectives. ▪ Reasons of rejected images. ▪ Importance of retake film analysis. ▪ Procedure of QC test. ▪ Problems. ▪ Accepted rates. 	



11.	Quality Control Of Protective Devices	<ul style="list-style-type: none"> ▪ Aprons. ▪ Gloves. ▪ Neck collar. ▪ Eye glasses. ▪ Gonad shields. ▪ Lead Barriers. 	
12.	Quality control In Modern Imaging Modalities	<ul style="list-style-type: none"> ▪ MRI. ▪ CT. ▪ U/S. ▪ Nuclear Medicine. 	

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. Chiropractic Radiography & Quality Assurance hand book, by Russell L. Wilson, Publisher: Informa Health Care, 2007.
2. Quality Assurance in Diagnostic Radiology, the University Of Sydney, 2007.
3. Total Quality in Radiology: A Guide to Implementation, Henry George Adams, Sudhir Arora, 1994.
4. Christensen' Physics of Diagnostic Radiology, Thomas S. Curry 111. Fourth Edition 1990.
5. Quality Control in Diagnostic Imaging, University Park Press, Baltimore 1983.
6. Quality Assurance in Diagnostic Radiology, WHO Geneva 1982.



Paramedical Program

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



Brief Course Description:

- ❖ The course is concentrating on radiographic Procedures that need contrast media and special preparation & techniques. It provides the Students with knowledge of various types 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. Know all type 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.	Introduction	<ul style="list-style-type: none"> ▪ Definition of Special Procedures ▪ Contra indications of special procedures due to radiation or due to contrast media or due to technique. ▪ Complication of contrast media examination. 	
2.	Contrast Media	<ul style="list-style-type: none"> ▪ Intravascular contrast media. ▪ Non vascular contrast media. ▪ Pharmacological agents. 	
3.	Gastro intestinal tract	<ul style="list-style-type: none"> ▪ Barium swallow. ▪ Barium meal. ▪ Barium follow through. ▪ Small bowel enema. ▪ Barium enema. 	
4.	Biliary tract	<ul style="list-style-type: none"> ▪ Oral cholecystography. ▪ Intravenous cholecystography. ▪ Post operative T- tube choledochography. ▪ Endoscopic retrograde Choledopancreatography (ERCP). ▪ PTC Percutaneous transhepatic cholangiography 	
5.	Urinary Tract	<ul style="list-style-type: none"> ▪ Excretion urography. ▪ Micturating cystrourethrography. ▪ Ascending Urethrography. ▪ Retrograde Pyeloureterography. 	

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

6.	Reproductive System	<ul style="list-style-type: none"> ▪ Percutaneous renal puncture. ▪ Hysterosalpingography. 	
7.	Respiratory Tract	<ul style="list-style-type: none"> ▪ Bronchography. 	
8.	Lacrimal System	<ul style="list-style-type: none"> ▪ Dacryocystography.. 	
9.	Sialography	<ul style="list-style-type: none"> ▪ Parotid Sialography. ▪ Submandibular Sialography.. 	
10.	Arteriography	<ul style="list-style-type: none"> ▪ Introduction to catheter technique. ▪ Head & Neck Arteriography. ▪ Ascending aortography. ▪ Translumaber Aortography. ▪ Arteriography Of Lower Limb. ▪ Coeliac axis arteriography. ▪ Renal Arteriography. 	
11.	Venography	<ul style="list-style-type: none"> ▪ Peripheral Venography. ▪ Central Venography. ▪ Selective retrograde venography 	
12.	Arthrography	<ul style="list-style-type: none"> ▪ Knee arthrography. ▪ Hip Arthrography. 	
13.	Misculereas procedures	<ul style="list-style-type: none"> ▪ Sinogram ▪ Fistulogram. ▪ Nasogram 	



**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. Demonstrations & Homeworks.
3. Discussion & Quizzes.

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 3.10th edition. William Hwinemann medical books publication, Chikage, 1997.
6. A guide to radiological procedures, Stephen Chapman et all 3rd edition 1997.
7. Ballinger, Philip. Merrill's Atlas of Radiographic positions and radiologic procedures. Volume 3.7th edition. Mosby Year book Inc, St, louis, 1991.





Paramedical Program

Specialization	Radiologic Technology
Course Number	21109381
Course Title	Physics Of Advanced Imaging Modalities”1”
Credit Hours	(3)
Theoretical Hours	(2)
Practical Hours	(3)





Brief Course Description:

- ❖ This course aims to provide the students with the basic physical principles of Ultrasound, nuclear medicine and digital video imaging (DVI) as well as the major configuration of these units and how to obtain a high quality images in addition 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 this system.
2. Know the major configuration of this system.
3. Know the safety measures of these systems.



Detailed Course Description:

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

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		<p>excess.</p> <ul style="list-style-type: none"> ○ Isomeric transition. ▪ Nuclides with a neutron deficit. ▪ Position emitters. ▪ Radioactive decay. ▪ Activity. ▪ Radiopharmaceuticals : properties ▪ Preparation of radiopharmaceuticals. ▪ Quality control tests. ▪ Dose to the patient: does to the organs, effective dose to the body. ▪ Precaution taken in handling of radionuclides, separation, personal protection, patient protection, dealing with radioactive spill, disposal of radioactive waste. ▪ Gamma imaging: components of gamma camera: mutable collimator, crystal, photomultiplier, pulse arithmetic, plus height spectrum 	
.3	Digital Video Imaging (DVI) (digital Radiography)	<ul style="list-style-type: none"> ▪ Fluoroscopy and image intensifier. ▪ Dual and triple mode intensifiers. ▪ Beam splitter. ▪ Vignetting. ▪ The television system. ▪ Cameras. ▪ Digital imaging and its equipments. 	

		<ul style="list-style-type: none"> ▪ Image processing, storage and recording: windowing, background subtraction, noise reduction. ▪ Digital image processor: function, analog to digital conversion, digitization accuracy ▪ Digital subtraction angiography (dsa): <ul style="list-style-type: none"> ○ Techniques: mask subtraction. ○ Dual energy subtraction. ○ Time interval differencing (tid). ○ Temporal filtering. ○ Hybrid subtraction. ▪ digital imaging processing : general types of image processing. 	
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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			

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Teaching Methodology:

1. Lectures.
2. Discussion, Ceminars & Quizzes.
3. Homeworks and demonstration



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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. 4th the 1994.
4. Review of radiologic physics, Walter Huda Richard M.Slone 1994.





Paramedical Program

Specialization	Radiologic Technology
Course Number	21109382
Course Title	Physics Of Advanced Imaging Modalities”2”
Credit Hours	(3)
Theoretical Hours	(2)
Practical Hours	(3)





Brief Course Description:

- ❖ This course provides the students with the knowledge about the basic physical Principles of computed tomography and magnetic resonance imaging enabling them to know how to obtain images by these units and to know 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. Know hazards and safety measures of these system.
3. Know how to obtain images by these units.



Detailed Course Description:

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Computed Tomography (CT)	<ul style="list-style-type: none"> ▪ Historical review EMI Scanners . ▪ Basic principles of CT. ▪ Scanning motions (computed tomography scanner) generations of CT, their characteristics and advantages. ▪ X-ray tubes in CT, and collimators. ▪ Detectors: types of detectors modes of operation of detectors. ▪ Image reconstruction: Mathematical methods of reconstruction, back projection interactive methods, Analytical methods ▪ Principles of CT imaging. <ul style="list-style-type: none"> ○ CT numbers, scanning the patients, acquiring data, reconstructing the image , windowing, image display. ▪ Image quality : noise, resolution , patient exposure, CT dose index (CTDI). ▪ Artifacts: motion artifacts, streak artifacts, beam hardening effect, ring artifacts, aliasing artifacts. ▪ Three dimensional reconstruction. ▪ Spiral (helical) scanning. ▪ Cine computed tomography scanning 	
2.	Magnetic Resonance Imaging (MRI)	<ul style="list-style-type: none"> ▪ Components of MRI system : magnet, console, host computers, pulse sequence controller, digital to analog convertor , RF coils , preamplifier , sample and hold component, analog 	

		<p>to digital converter, filter , array processor storage device.</p> <ul style="list-style-type: none"> ▪ Types of magnet : permanent magnets, electromagnets, resistive magnets, super conductive magnets. ▪ Requirements for MRI : strong magnet, external energy source suitable mateul within the human body . ▪ Precession and larmor equation. ▪ Radiofrequency and relaxation processes (proton relaxation) T1 , T2. ▪ MRI pulse sequence: spine echo, gradient echo, dual central spine echo, T2 contrast. Spoiled gradient echo, steady state gradient echo. Inversion recovery pulse sequence, fat suppressed inversion recovery, fast gradient echo, rapid spin echo. ▪ MRI imaging Para meters : <ul style="list-style-type: none"> ○ Repetition time, echo time, inversion time, RF flip angle, slice thickness, and order, gap, field of view (FOR) matrix. ▪ Artifacts in MRI , and artifact control techniques ▪ Multiplanner reconstruction and volume imaging: 2D , 3D. ▪ MR Angiography : blood flow characteristic, inflow enhancement phase contrast argiography ▪ MRI safety : contra indication, precautions emergency procedures ▪ Para magnetic contrast agents. 	
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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:

1. Lectures.
2. Discussion, Seminars & Quizzes.
3. Homeworks and demonstration.

Text Books & References:

1. Physics For Medical Imaging RF Farr And PJ Allisy Robert 2001.
2. MRI Registry review program Carolann Nielson, Daniel A. Kaiser 1995.
3. Christian's physics of diagnostic radiology Thomas S. Curry 1994.
4. MRI Made easy : H.H Schild 1990





Paramedical Program

Specialization	Radiologic Technology
Course Number	21109224
Course Title	Radiological Cross Sectional Anatomy
Credit Hours	(3)
Theoretical Hours	(3)
Practical Hours	(0)





Brief Course Description:

- ❖ This course provides the students with a complete idea and information about the radiological appearance of anatomical parts of the body as seen in cross sectional and multiplanner imaging via CT and MRI when examining the brain, thorax, abdomen, pelvis and spine

Course Objectives:

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

1. Know the structure and cross sectional as well a multiplanner appearance of the central nervous systems.
2. 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.	Head And Neck	<p>Introduction: cerebro spinal fluid.</p> <ul style="list-style-type: none"> ▪ Skull and facial bones. ▪ Bones of the skull base. ▪ Cranial fossae and their boundaries. ▪ Foramina of the skull base. ▪ Orbit: boundaries & contents. ▪ Paranasal sinuses. ▪ The mandible & teeth. ▪ The ear: External, middle & internal ear. ▪ Parts of the pharynx: nasopharynx, oropharynx and laryngopharynx. ▪ Cross section anatomy of the larynx. ▪ Thyroid & Parathyroid gland. ▪ Salivary glands. ▪ The major vessels in the neck: Common carotid artery, internal, carotid & external carotid artery. ▪ Dural Veins sinuses. ▪ Veins of the neck. ▪ Meningeal Layers. 	
2.	Spinal Column	<ul style="list-style-type: none"> ▪ Vertebral column. <ul style="list-style-type: none"> ○ A typical vertebra. ○ Cervical vertebra. ○ Thoracic vertebra. ○ Lumbar Vertebra. ○ Sacrum. ○ Coccyx. ▪ Cross sectional appearance of the vertebra & inter vertebral disc. ▪ Ligaments of the vertebral column. ▪ Blood supply to vertebral column. ▪ Meninges of the spine. 	



3.	Thorax	<ul style="list-style-type: none"> ▪ Thoracic cage: ribs, sternum. ▪ Diaphragm: sternum, openings, blood supply. ▪ Lungs & Pleura and bronchial segments. ▪ Mediastinal division. ▪ Heart: Chambers & blood supply and cross sectional anatomy. ▪ Cross sectional anatomy of level T3, T4, T5, T6, T8, T10. 	
4.	Abdomen	<ul style="list-style-type: none"> ▪ Anterior abdominal wall T10, T11. ▪ Cross sectional anatomy at T12, L1, L2 Major intra abdominal organs: gross artery of the liver, pancreas, spleen, stomach & duodenum, kidneys & adrenal glands, small & large bowel. 	
5.	Pelvis	<ul style="list-style-type: none"> ▪ Bony pelvis and pelvic floor. ▪ Major organ of the pelvis in male & female. ▪ Cross section anatomy through different organs like bladder, male perineum, rectum, . ▪ Peritoneal spaces with pelvis & abdomen 	

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 ❖



Teaching Methodology:

1. Lectures.
2. Simmers & Quizzes.
3. Demonstration & Homeworks.

Text Books & References:

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

