Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name:

Faculty/Institute: Al-Manara College for Medical Sciences

Scientific Department: Department of Radiology and sonar

Academic or Professional Program Name: Bachelor's degree in radiology technology

Final Certificate Name: Radiology and sonar technician

Academic System: courses

Description Preparation Date: 30/3/2024

File Completion Date: 30/3/2024

Signature:

Head of Department Name: Dr. Sabah Habeeb

Date: 7/4/2024

Signature:

Scientific Associate Name: mohamed fawzy

Date: 7/4/2024

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 7/4/2024

Signature:

Rasha Abed Hussein

Approval of the Dean

Academic Program Description Form

University Name:
Faculty/Institute: Al-Manara College for Medical Sciences
Scientific Department: Department of Radiology and sonar
Academic or Professional Program Name: Bachelor's degree in radiology technology
Final Certificate Name: Radiology and sonar technician
Academic System: courses
Description Preparation Date: 30/3/2024
File Completion Date: 30/3/2024

Signature:
Head of Department Name:
Date:7/4/2024

Signature:
Scientific Associate Name:
Date: 7/4/2024

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:

Date: 7/4/2024
Signature:

Approval of the Dean

1. Program Vision

The Department of Radiology is a solid, professional scientific institution that seeks leadership and excellence among its counterparts at the national, regional and global levels and in all fields.

2. Program Mission

Preparing medical technical staff in the field of radiology and ultrasound technology to provide general and specialized medical care capable of meeting the needs of society, with high knowledge and technical skills, and with the ability to conduct scientific research and address community health problems in general and radiological diagnostic problems in particular.

3. Program Objectives

1. Providing a high level of education at the bachelor's level.
2. Creating an optimal environment for work development that stimulates and facilitates mental development and scientific research.
3. Purposeful and constructive policies for dealing with students and graduates.
4. Developing programs and curricula to achieve academic standards and meet community needs and labor market requirements.
5. A plan for scientific research that supports the educational process, develops research capacity, and serves the community.
6. Participation between the college and the community to achieve the college's mission and enhance its activities.
7. Increase environmental awareness among the internal and external community
8. Developing service and advisory cooperation with civil society institutions, community and research centers, and civil society institutions.

4. Program Accreditation

In the process of being prepared for program accreditation

5. Other external influences

Is there a sponsor for the program?
Training courses
Developing students' professional skills

summer training

6. **Program Structure**				
Program Structure	**Number of Courses**	**Credit hours**	**Percentage**	**Reviews***
Institution Requirements	5	14	%16.7	
College Requirements	7	31	%23.3	
Department Requirements	18	128	%60	
Summer Training				
Other				

* This can include notes whether the course is basic or optional.

Program Description					
Year/Level	**Course Code**	**Course Name**	**Credit Hours**		
			Theoretical	**practical**	**Clinical**
Year (**1**) / Level (**1**)	RAD111	Anatomy of the skeleton	2	3	-
Year (**1**) / Level (**1**)	RAD112	General physics	2	3	-
Year (**1**) / Level (**1**)	RAD113	General physiology	2	3	-
Year (**1**) / Level (**1**)	RAD114	Biology	2	3	-
Year (**1**) / Level (**1**)	RAD115	General chemistry	2	3	-
Year (**1**) / Level (**1**)	RAD116	Computer principles1	1	2	-
Year (**1**) / Level (**1**)	RAD117	Human rights and	2	-	-

		democracy			
Year (**1**) / Level (**1**)	RAD118	English	3	-	-
Year (**1**) / Level (**2**)	RAD121	Anatomy of body systems	2	3	-
Year (**1**) / Level (**2**)	RAD123	Atom physics	2	3	-
Year (**1**) / Level (**2**)	RAD124	Systemic Physiology	2	3	-
Year (**1**) / Level (**2**)	RAD125	Radiobiology	2	4	-
Year (**1**) / Level (**2**)	RAD126	Principle of Nursing	2	4	-
Year (**1**) / Level (**2**)	RAD127	Computer principles 2	1	2	-
Year (**1**) / Level (**2**)	RAD128	Medical terms	2	-	-
Year (**1**) / Level (**2**)	RAD129	Arabic	2	-	-
Year (**2**) / Level (**1**)	RAD221	Special radiological procedures 1	2	5	
Year (**2**) / Level (**1**)	RAD212	Radiological anatomy of head and upper limbs	2	5	
Year (**2**) / Level (**1**)	RAD213	Radiographic techniques 1	2	5	
Year (**2**) / Level (**1**)	RAD214	Radiological medical equipment technologies1			
Year (**2**) / Level (**1**)	RAD215	Principles of radiation physics	2	3	-
Year (**2**) / Level (**1**)	RAD216	Fundamentals of radiation protection	2	3	-
Year (**2**) / Level (**2**)	RAD221	Special radiological procedures of biliary and reproductive			

		system			
Year (**2**) / Level (**2**)	RAD222	Radiological anatomy of lower limbs			
Year (**2**) / Level (**2**)	RAD223	Radiographic techniques for lower limbs	2	5	-
Year (**2**) / Level (**2**)	RAD224	Computed Tomography Equipment Techniques	2	5	-
Year (**2**) / Level (**2**)	RAD225	Physics of Computed Tomography	2	5	-
Year (**3**)	RAD311	Special radiological procedures 2	2	2	-
Year (**3**)	RAD312	Radiological anatomy Ⅱ	4	2	-
Year (**3**)	RAD313	Radiographic techniques 2	4	2	-
Year (**3**)	RAD314	Computer applications	4	2	-
Year (**3**)	RAD315	Radiation Protection	2	2	-
Year (**3**)	RAD316	Radiation Physics	2	2	-
Year (**3**)	RAD317	General pathology	2	1	-
Year (**4**)	RAD411	Principle of Medicine and Surgery	3	2	-
Year (**4**)	RAD412	English Language	4	2	-
Year (**4**)	RAD413	Biostatistics	4	2	-
Year (**4**)	RAD414	Computed tomography	4	2	-
Year (**4**)	RAD415	MRI	2	2	-
Year (**4**)	RAD416	Ultrasound imaging			

Year (**4**)	RAD417	Research project	-	-	

7. Expected learning outcomes of the program	
Knowledge	
Learning Outcomes 1	A1- Identifying the most important basic sciences that support radiology and sonar techniques, such as anatomy, physiology, microbiology, and other sciences. 2a- Identify the latest radiological diagnostic techniques. 3a- Identify the latest radiological devices. 4a- Identify ways to solve patient problems.
Skills	
Learning Outcomes 2	B1- Evaluating the patient's condition and diagnosing his needs through a therapeutic interview. B2- Develop an integrated plan to apply the appropriate radiological technology in light of the needs that have been diagnosed B3- Applying therapeutic communication skills with the patient B4- Applying patient care skills B5- The ability to conduct scientific research in the field of radiation and sonar
Ethics	
Learning Outcomes 3	C1- Consolidating human values in patient care C2- Establishing and focusing on religious values in dealing with and caring for the patient C3- Consolidating moral values in dealing with patients of different races and religions C4- Consolidating national values in providing health and medical care to patients

8. **Teaching and Learning Strategies**
- Giving lectures. - Providing the college with lectures on the college website. - Educational films. - Projectors and digital cameras. - Using educational models. - Training courses and workshops.

- Applied clinical education.
- Student groups

9. Evaluation methods

- Oral exams.
- Theoretical tests.
- Laboratory practical tests.
- Practical tests on patients.
- Reports and studies.

10.Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Prof.		✓			2	
Lecture	✓	✓			2	4
Assis.	✓	✓			2	4

Professional Development
Mentoring new faculty members
This is done through reviewed strategic plans, especially in order to control teaching and learning mechanisms and strategies for teaching methods according to blended education.
Professional development of faculty members
Plan and arrangements for the academic and professional development of faculty members, such as teaching and learning strategies by involving them in human resources development courses, which include five courses supervised by the Department of Studies, Planning and Follow-up, including - the administrative skills course, the self-skills course, the electronic governance skills course, the legal skills course, the financial skills course, as well as teaching methods courses. The modern approach approved by our honorable ministry adopts modern, interactive and integrated education as a curriculum for our dear university. As for evaluating learning outcomes, this is done through continuous interviews and the results of questionnaires that are distributed to students, as well as conducting field surveys of

the teachers' outputs and outcomes. As for professional development, etc., it is done. Evaluating it through performance evaluation forms and through the rate of promotions provided within its tenure periods and the extent of its success.

11.**Acceptance Criterion**
The following categories are eligible to apply to the Department of Radiology and Ultrasound Technology • Graduates of the biological scientific branch • Graduates of the Medical Technical Institute/Department of Radiology and Ultrasound Technologies

12.**The most important sources of information about the program**
The curriculum of the college with which it has a scientific twin.

13.Program Development Plan
A reference to internal audit operations... and periodic questionnaires to employers supervising the department's graduates... and periodic meetings with graduates of the department... and field permits for the department's academic education operations... The scientific committee in the department explored drawing up development policies for the department through the following points. 1- Establishing bridges of cooperation with corresponding departments in Iraqi universities and regional universities that have legal and legal departments... 2- Concluding memorandums of scientific understanding with the corresponding departments... 3- Continuous training for teaching and academic staff... 4- Establishing teaching methods courses according to the integrated education system

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Year (**1**) / Level (**1**)	RAD111	Anatomy of the skeleton	Basic	✓	✓			✓	✓						
	RAD112	General physics	Basic	✓	✓			✓	✓						
	RAD113	General physiology	Basic	✓	✓			✓	✓						
	RAD114	Biology	Basic	✓	✓			✓	✓						
	RAD115	General chemistry	Basic	✓	✓			✓	✓						
	RAD116	Computer principles1	Basic	✓	✓			✓	✓						
	RAD117	Human rights and democracy	Basic	✓	✓			✓	✓			✓	✓		
	RAD118	English	Basic	✓	✓			✓	✓						

Year (**1**) / Level (**2**)	RAD121	Anatomy of body systems	Basic	✓	✓			✓	✓							
	RAD123	Atom physics	Basic	✓	✓			✓	✓							
	RAD124	Systemic Physiology	Basic	✓	✓			✓	✓							
	RAD125	Radiobiology	Basic	✓	✓			✓	✓							
	RAD126	Principle of Nursing	Basic	✓	✓			✓	✓							
	RAD127	Computer principles 2	Basic	✓	✓			✓	✓							
	RAD128	Medical terms	Basic	✓	✓			✓	✓							
	RAD129	Arabic	Basic	✓	✓			✓	✓							
	RAD211	Special radiological procedures 1	Basic	✓	✓			✓	✓							
Year (**2**) / Level (**1**)	RAD212	Radiological anatomy of head and upper limbs	Basic	✓	✓			✓	✓							
	RAD213	Radiographic	Basic	✓	✓			✓	✓							

		techniques 1													
	RAD214	Radiological medical equipment technologies1	Basic	✓	✓			✓	✓						
	RAD215	Principles of radiation physics	Basic	✓	✓			✓	✓						
	RAD216	Fundamentals of radiation protection	Basic	✓	✓			✓	✓						
Year (**2**) / Level (**2**)	RAD221	Special radiological procedures of biliary and reproductive system	Basic	✓	✓			✓	✓						
	RAD222	Radiological anatomy of lower limbs	Basic	✓	✓			✓	✓						
	RAD223	Radiographic techniques for	Basic	✓	✓			✓	✓						

		lower limbs													
	RAD224	Computed Tomography Equipment Techniques	Basic	✓	✓			✓	✓						
	RAD225	Physics of Computed Tomography	Basic	✓	✓			✓	✓						
Year (**3**)	RAD311	Special radiological procedures 2	Basic	✓	✓			✓	✓						
	RAD312	Radiological anatomy ‖	Basic	✓	✓			✓	✓						
	RAD313	Radiographic techniques 2	Basic	✓	✓			✓	✓						
	RAD314	Computer applications	Basic	✓	✓			✓	✓						
	RAD315	Radiation Protection	Basic	✓	✓			✓	✓						
	RAD316	Radiation Physics	Basic	✓	✓			✓	✓						
	RAD317	General	Basic	✓	✓			✓	✓						

		pathology														
	RAD411	Principle of Medicine and Surgery	Basic	✓	✓			✓	✓							
	RAD412	English Language	Basic	✓	✓			✓	✓							
	RAD413	Biostatistics	Basic	✓	✓			✓	✓							
Year (**3**)	RAD414	Computed tomography	Basic	✓	✓			✓	✓							
	RAD415	MRI	Basic	✓	✓			✓	✓							
	RAD416	Ultrasound imaging	Basic	✓	✓			✓	✓							
	RAD417	Research project	Basic	✓	✓			✓	✓							

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

First Stage

First Semester

Anatomy of Skeleton

Course Description Form

1. Course Name:

Anatomy of skeleton

2. Course Code:

RAD111

3. Semester / Year:

First/ first

4. Description Preparation Date:

16/2 /2024

5. Available Attendance Forms:

weekly

6. Number of Credit Hours (Total) / Number of Units (Total)

75 hours - 3 units

7. Course administrator's name (mention all, if more than one name)

Name: *Assist Prof. Dr*. Hayder Dawood Saleem
Email: : hayderdawood@uomanara.edu.iq

8. Course Objectives

1 The general anatomy of the upper limbs skeleton.
2. The general anatomy of the chest skeleton.
3. The general anatomy of the vertebral column.
4. The general anatomy of the lower limbs skeleton.
5. The general anatomy of the upper & lower limbs muscles.
6. The general anatomy of the joints, type of joints & mechanism of movement.
7. The general anatomy of the skull, facial bones & paranasal sinuses.

9. Teaching and Learning Strategies

Strategy	Lectures Reports Exams

10. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1.	2	Understanding and assimilation	Introduction, definition: - surface anatomy & anatomical position, - vertical & horizontal lines & planes of abdominal organs, - cell & tissues, - Types	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Skeleton of the upper limb: - shoulder girdle: (clavicle and scapula bones)	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	The humerus, - radius ulna bones	Lecture	Theoretical exam and classroom

					activities
4.	2	Understanding and assimilation	The hand	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Joints: - type of joints - mechanism of movement	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Skeleton of the chest: - Ribs, sternum and segments of the spinal co	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	Vertebrate - (cervical, thoracic, lumbar, sacrum and coccyx) - intervertebral disc	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Skeleton of the lower limb: - bony pelvis (pelvic girdle)	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	The femur, tibia and fibula bones	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	The foot	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	The muscles of lower limbs	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Skull: - bone of the skull	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	- Facial bones, - mandible - TMJ	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Nasal cavity & - paranasal sinus	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	The mid brain, cerebral hemisphere, ventricles of the brain	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	--VanPutte, C. L., Regan, J. L., Russo, A. F., Seeley, R. R., Stephens, T., & Tate, P. (2017). Seeley's anatomy & physiology. McGraw-Hill.

	(Eleventh edition). -Abrahams, P. H., Spratt, J. D., Loukas, M., & VanSchoor, A. (2018). Abrahams' and McMinn's Clinical Atlas of Human Anatomy.
Main references (sources)	--Netter, F. H. (2018). Atlas of Human Anatomy. --Drake, R., Vogl, A. W., & Mitchell, A. W. (2014). Gray's anatomy for students. (Third edition).
Recommended books and references (scientific journals, reports...)	- Marieb. Wihelm. Mallat. Human anatomy. Eighth edition. -S. Hombach-Klonish, T. Klonish, J. Peeler. Sob clinical atlas of human anatomy. First edition
Electronic References, Websites	

General physics

Course Description Form

1. Course Name:
General physics
2. Course Code:
RAD112
3. Semester / Year:
First/ first
4. Description Preparation Date:
16/2/2024
5. Available Attendance Forms:
weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
75 hours/ 3 unit
7. Course administrator's name (mention all, if more than one name)
Name: Muhanna Al- Batat Email: albatathani7@gmail.com
8. Course Objectives

The objectives of the course are to provide the student with the knowledge to identify physical quantities and their units of measurement and to explain life phenomena physically.	• Providing students with the skills of scientific analysis of phenomena... • Identify physical quantities through their units • Teaching students about units of measurement and distinguishing between conservative and non-conservative forces

9. Teaching and Learning Strategies	
Strategy	Lectures Reports Quizes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Standard units of of measurements -Length -Mass -Time	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	electricity Electrostatics -Electrostatic Laws Electric potential - electrodynamics Electrical circuits - electrical power	Lecture	Theoretical exam and classroom activities

			Magnetism Electromagnetism Electromagnetic induction Electro-mechanical devices(transformer)		
3.	2	Understanding and assimilation	Mechanics Velocity - Acceleration	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	Newton's laws of motion Earth's gravitational field - weight Friction – force and acceleration	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Momentum - Impulse - Impulse and collisions Momentum-impulse relationship Law of conservation of momentum	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Work – energy - types of energy energy conservation	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	-Energy-work relation -Power Conservative and non-conservative forces – Gravitational potential	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	- Periodic motion Simple harmonic motion - -- spring mass System simple pendulum -Physical pendulum	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Dynamics of rotational motion Moment of inertia Angular position -angular velocity Angular acceleration Torque	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Torque – angular acceleration relation -Static equilibrium - -- Rotational Kinematics -Work done by torque	Lecture	Theoretical exam and classroom activities

11.	2	Understanding and assimilation	Rotational kinetic energy - angular momentum -Static equilibrium experiments -Rotationalmotion - -- problems	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	-Damped and riv driven oscillation - - periodicmotion experiment	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	-Gravitational Potential energy -Escape velocity	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Heat - temperature Latent heat Specific heat Methods of heat eat transferring	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Gases Volume and pressure Pressure laws	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

General Physiology

Course Description Form

1- Course Name:
General Physiology
2- Course Code:
RAD113
3- Semester / Year:
First/ first
4- Description Preparation Date:
21/2/2024
5- Available Attendance Forms:
Weekly
6- Number of Credit Hours (Total) / Number of Units (Total)
75 hours /3 units
7- Course administrator's name (mention all, if more than one name)
Name: Hussein humedy chalib Email: Husseinhumedy@gmail.com
8- Course Objectives

Course Objectives:	1.Understand the main physiologic concepts of cells and their component. 2. Understand the factors of homeostasis regulation in human body 3. Understand the physiologic mechanisms of blood flow, gases exchange and gastric secretions
9- Teaching and Learning Strategies	
Strategy	• Lectures • Quizzes ○ Reports

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Cell components and organelles Blood: -Blood Functions blood components: blood plasma, plasma proteins function	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Formed elements: leukocytes (types and function), Platelets, and Erythrocytes, Erythropoietin Role in Erythrocytes Production	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Blood+- Clotting: clotting factors and Mechanism of Blood Clot	Lecture	Theoretical exam and classroom

			Formation Staining of blood film		activities
4.	2	Understanding and assimilation	Fluid Compartments in the Body: ICF,ECF, interstitial fluid and transcellular fluids, compositions of body fluids	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Fluid shift: Diffusion, Osmosis, hydrostatic pressure, filtration & Active Transport Across Cell Membranes	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Homeostasis: Blood glucose homeostasis, excretion homeostasis and Body Temperature Regulation	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	Heart and blood vessels: -Heart function -Blood vessels function	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Circulations: systemic circulation, pulmonary circulation, Cardiac cycle, cardiac output, a	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Blood Pressure: -Mean arterial blood pressure and its regulation	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Measurement of lung function: -Lung Hemocytometry	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	GI tract general functions -Oral cavity function, Salivary glands function, stomach function, small intestine and large intestine function	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Physiology of Pregnancy: Parturition, stages of labor hormonal stimulation of parturition and lactation	Lecture	Theoretical exam and classroom activities

11- Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	**1. *Seeleys anatomy*** and physiology (eleven edition) Cinnamon L. VanPutte , Jennifer L. Regan , and Andrew F. Russo (2017) 2-Essentials of Human Anatomy & Physiology, Global Edition Suzanne Keller Elaine Marieb (2017)

	3-Human Anatomy and Physiology, Global Edition [Sep 14, 2015] Erin, C. Amerman 4-Study Guide ***to Human Anatomy and Physiology*** 1 (2012) Michael Harrell M.S
Recommended books and references (scientific journals, reports...)	• Macedonian Journal of Medical Sciences • Iraqi Journal of Biotechnology/University of Baghdad • Journal of the College of Science, Al-Nahrain University • Journal of the College of Science, Department of Biotechnolc University of Baghdad • Journal of the College of Science for Girls/University Baghdad Journal of Basra Sciences/University of Basra
Electronic References, Websites	

Biology

Course Description Form

1. Course Name:
Biology
2. Course Code:
RAD114
3. Semester / Year:
First/ first
4. Description Preparation Date:
16-2-2024
5. Available Attendance Forms:
weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
75 houe / 3 units
7. Course administrator's name (mention all, if more than one name)
8. Course Objectives
1. Understand the level of organization among living organisms. 2. Be able to recognize and describe cell morphology and components. 3. Understand the Nucleic acid structure and role.
9. Teaching and Learning Strategies

Strategy	• Lectures • Reports • quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Introduction to Biology -History and General concepts of Biology -Cell theory - Comparing Prokaryotic and Eukaryotic Cells	lecture	Oral and written Examination
2.	2	Understanding and assimilation	Introduction to the Chemistry of Life -Cells chemistry and Chemical bonds -Water -pH, Salts and ions	lecture	Oral and written Examination
3.	2	Understanding and assimilation	Biologically Important Molecules: - Carbohydrates -Lipids -Proteins -Nucleic Acids	lecture	Oral and written Examination
4.	2	Understanding and assimilation	Introduction to Cell Structure and Function - Plasma Membrane , Passive transport, active transport, factors effect on permeability - Cytoplasm	lecture	Oral and written Examination
5.	2	Understanding and assimilation	Introduction to Cell Structure and Function - Cytoskeleton -Microfilaments, Intermediate Filaments, Microtubules, Flagella and Cilia	lecture	Oral and written Examination

6.	2	Understanding and assimilation	Eukaryotic cell organelles: - Mitochondria (morphology, structure), -lysosomes (types, function).	lecture	Oral and written Examination
7.	2	Understanding and assimilation	Eukaryotic cell organelles: - Golgi complex (morphology, function)	lecture	Oral and written Examination
8.	2	Understanding and assimilation	Eukaryotic cell organelles: -Endoplasmic reticulum (smooth & rough) and their function. -Vesicles and Vacuoles -Ribosome (protein synthesis).	lecture	Oral and written Examination
9.	2	Understanding and assimilation	Eukaryotic cell organelles: - The nucleus, nuclear envelope.	lecture	Oral and written Examination
10.	2	Understanding and assimilation	Eukaryotic cell organelles: Chromosome structure - changes (duplication, translocation, inversion)	lecture	Oral and written Examination
11.	2	Understanding and assimilation	DNA Replication and protein synthesis -The structure of the DNA	lecture	Oral and written Examination
12.	2	Understanding and assimilation	DNA Replication and protein synthesis - Transcription	lecture	Oral and written Examination
13.	2	Understanding and assimilation	DNA Replication and protein synthesis - Translation	lecture	Oral and written Examination
14.	2	Understanding and assimilation	Introduction to Reproduction at the Cellular Levels -The Cell Cycle -Mitosis	lecture	Oral and written Examination
15.	2	Understanding and assimilation	Introduction to Reproduction at the Cellular Levels -Meiosis -Prokaryotic Cell Division	lecture	Oral and written Examination

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports ....etc

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Elizabeth o Grady, Jason Cashmore, Marsha, Carol Wismer(2018). Principles of Biology- An introduction to Biological Concepts . second Edition. 2. Peter Raven (2016) Biology. Elven Edition. 3. VJ. Bekish, Yu.T. Nikulin (2006) Practical Book on Medical Biology.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

General chemistry

Course Description Form

1- Course Name:

General Chemistry

2- Course Code:

RAD115

3- Semester / Year: 1/1

First/ first

4- Description Preparation Date:

16/1/2024

5- Available Attendance Forms:

Weekly

6- Number of Credit Hours (Total) / Number of Units (Total) 2 Credit/30 hours

75 hours/ 3 unite

7- Course administrator's name (mention all, if more than one name)

Name: Yehya M. Ahmed, PhD
Email: yehyamuneeb@uomanara.edu.iq

Course Objectives

introduce the student to the science of chemistry; how to deal with chemical materials; skills for developing Algorithmic (math) problem solving

1. Teaching and Learning Strategies

Lectures
• Reports
• quizzes

2. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding and assimilation	The atom molecular structure electronically distribution Chemical bonding	lecture	Oral and written Examination
2	2	Understanding and assimilation	Liquid mixture, Buffer solutions-types	lecture	Oral and written Examination
3	2	Understanding and assimilation	Quant & qualitative analysis methods	lecture	Oral and written Examination
4	2	Understanding and assimilation	Molar & normal concentrations & method. Problems & discussion	lecture	Oral and written Examination
5	2	Understanding and assimilation	Acids, base –examples.	lecture	Oral and written Examination
6	2	Understanding and assimilation	Oxidation & reduction.	lecture	Oral and written Examination
7	2	Understanding and assimilation	Principles of organic chemistry Hydrocarbons Alkenes	lecture	Oral and written Examination

			preparation properties reactions		
8	2	Understanding and assimilation	Alcohols – Ketones - Aldehydes - Carboxylic acids classification & properties	lecture	Oral and written Examination
9	2	Understanding and assimilation	Aromatic hydrocarbons Carbohydrates –classification & reactions	lecture	Oral and written Examination
10	2	Understanding and assimilation	Amines aryl amines	lecture	Oral and written Examination
11	2	Understanding and assimilation	Introduction to biochemistry, and the machinery of life	lecture	Oral and written Examination
12	2	Understanding and assimilation	Biochemistry and nutrition	lecture	Oral and written Examination
13	2	Understanding and assimilation	Sugars, starches and fibers	lecture	Oral and written Examination
14	2	Understanding and assimilation	Isomers, classifications	lecture	Oral and written Examination
15	2	Understanding and assimilation	Electrolytes, electrochemistry	lecture	Oral and written Examination

3. Course Evaluation

4. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	• *Solutions for General Chemistry: Principles and Modern Applications* 11th Ralph H. Petrucci, F. Geoffrey Herring, Jeffry D. Madura, Carey Bissonnette • *Solutions for CHEMISTRY: The Molecular Nature of Matter and Change* 7th Martin S. Silberberg, Patricia G. Amateis
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Computer principles1

Course Description Form

1- Course Name:
Computer principles 1
2- Course Code:
RAD116
3- Semester / Year:
first / first
4- Description Preparation Date:
16/2/2024
5- Available Attendance Forms:
weekly
6- Number of Credit Hours (Total) / Number of Units (Total)
24 hours/2 units
7- Course administrator's name (mention all, if more than one name)
Name: Hameed Hassan Khalf Email: hameedre334@gmail.com
8- Course Objectives

Providing the student with knowledge in managing and using various computer applications.	• Providing the student with the skills of dealing with basic office applications and creating office files and documents. • The use of the operating system as well as the basics of working within the digital environment.
9- Teaching and Learning Strategies	
Strategy	• Lectures • Reports • quizzes

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
.1	2	Understanding and assimilation	Computer Fundamentals, computer concept, phases of the computer life cycle, development of computer generations	lecture	Oral and written Examination
.2	2	Understanding and assimilation	Computer advantages and areas of use. Computer classification in terms of purpose, size and data type.	lecture	Oral and written Examination
.3	2	Understanding and assimilation	Computer components The physical parts of the computer Software entities.	lecture	Oral and written Examinati

					on
.4	2	Understanding and assimilation	your personal computer, the concept of computer security and licenses The programs.	lecture	Oral and written Examination
.5	2	Understanding and assimilation	Computer Safety & Software Licenses.	lecture	Oral and written Examination
.6	2	Understanding and assimilation	Ethics of the electronic world, forms of abuse, security Computer, computer privacy.	lecture	Oral and written Examination
.7	2	Understanding and assimilation	computer software licenses and their types, intellectual property, Electronic hacking, malware, the most important The necessary steps to protect against hacking operations, Computer harms to health.	lecture	Oral and written Examination
.8	2	Understanding and assimilation	Introduction to Operating system, functions, goals, classification examples For some operating systems.	lecture	Oral and written Examination
.9	2	Understanding and assimilation	operating systems Windows 7 operating system.	lecture	Oral and written Examination
.10	2	Understanding and assimilation	Desktop components Start menu Taskbar.	lecture	Oral and written Examination
.11	2	Understanding and assimilation	folders and files, icons, scientific.	lecture	Oral and written Examination
.12	2	Understanding and assimilation	performing operations on windows, desktop backgrounds.	lecture	Oral and written Examination
.13	2	Understanding and assimilation	Control Panel, Windows Control Panel, Category Groups.	lecture	Oral and written Examination
.14	2	Understanding and assimilation	: Two hours from the Defragment control panel, organizing files inside the computer, installing and deleting programs.	lecture	Oral and written Examination

.15	2	Understanding and assimilation	Some common conditions and settings in the computer, managing the printer, setting time and date, maintaining primary disks.	lecture	Oral and written Examinati on

11- Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

English language

Course Description Form

1. Course Name:
English language
2. Course Code:
RAD118
3. Semester / Year:
First/ first
4. Description Preparation Date:
16-2-2024
5. Available Attendance Forms:
weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
45 hours/ 3 unite
7. Course administrator's name (mention all, if more than one name)
Name: Fatima Raheem
8. Course Objectives

9. Teaching and Learning Strategies	
Strategy	• Lectures • Reports • quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Tense system	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Auxiliary verbs	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Model auxiliary verbs and full verbs	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	English tense usage	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Reading and speaking	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Introduction to the present perfect, simple and continuous	Lecture	Theoretical exam and classroom activities

7.	2	Understanding and assimilation	Narrative tenses	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Questions forms	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Introduction to the future forms	Lecture	Theoretical exam and classroom activities
10	2	Understanding and assimilation	Present simple for timetables	Lecture	Theoretical exam and classroom activities
11	2	Understanding and assimilation	Reading and speaking	Lecture	Theoretical exam and classroom activities
12	2	Understanding and assimilation	Reading and speaking	Lecture	Theoretical exam and classroom activities
13	2	Understanding and assimilation	Tense system	Lecture	Theoretical exam and classroom activities
14	2	Understanding and assimilation	Auxiliary verbs	Lecture	Theoretical exam and classroom activities
15	2	Understanding and assimilation	Model auxiliary verbs and full verbs	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports ....etc

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

First Stage

Second semester

Anatomy of body system

Course Description Form

1- Course Name:

Anatomy of body system

2- Course Code:

RAD121

3- Semester / Year:

Second/ first

4- Description Preparation Date:

2023-2024

5- Available Attendance Forms:

weekly

6- Number of Credit Hours (Total) / Number of Units (Total)

75 hours - 3 units

7- Course administrator's name (mention all, if more than one name)

Name: *Assist Prof. Dr*. Hayder Dawood Saleem
Email: : hayderdawood@uomanara.edu.iq

8- Course Objectives

1 The general anatomy of the upper limbs skeleton.
2. The general anatomy of the chest skeleton.
3. The general anatomy of the vertebral column.
4. The general anatomy of the lower limbs skeleton.
5. The general anatomy of the upper & lower limbs muscles.
6. The general anatomy of the joints, type of joints & mechanism of movement.
7. The general anatomy of the skull, facial bones & paranasal sinuses.

9- Teaching and Learning Strategies

Strategy	Lectures Reports Exams

10- Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1.	2	Understanding and assimilation	The mid brain, cerebral hemisphere, ventricles of the brain	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	The hind brain: Cerebellum, pons and medulla oblongata	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Meninges, and spinal meninges.	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	The cranial nerves.	Lecture	Theoretical exam and classroom activities

5.	2	Understanding and assimilation	Lumber and sacral plexuses	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Respiratory system: lung, bronchial tree, vascular supply.	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	Cardiovascular system: heart, heart chambers, major vessels	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Digestive system: pharynx, esophagus, and stomach	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Digestive system: small intestine, and blood supply to abdominal wall.	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Digestive system: Large intestine.	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Liver, biliary system, pancreas, and spleen	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Urinary system: Kidney, ureter, urinary bladder, urethra & blood supply.	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	The breast: general anatomy, lobular structures	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Male reproductive system	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Female reproductive system.	Lecture	Theoretical exam and classroom activities

11- Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	--VanPutte, C. L., Regan, J. L., Russo, A. F., Seeley, R. R., Stephens, T., & Tate, P. (2017). Seeley's anatomy & physiology. McGraw-Hill. (Eleventh edition). -Abrahams, P. H., Spratt, J. D., Loukas, M., & VanSchoor, A. (2018). Abrahams' and McMinn's Clinical Atlas of Human Anatomy.
Main references (sources)	--Netter, F. H. (2018). Atlas of Human Anatomy. --Drake, R., Vogl, A. W., & Mitchell, A. W. (2014). Gray's anatomy for students. (Third edition).
Recommended books and references	- Marieb. Wihelm. Mallat. Human anatomy. Eighth edition.

(scientific journals, reports...)	-S. Hombach-Klonish, T. Klonish, J. Peeler. Sobota clinical atlas of human anatomy. First edition
Electronic References, Websites	

Physics of atom

Course Description Form

1. Course Name:

Physics of atom

2. Course Code:

RAD123

3. Semester / Year:

Second/ first

4. Description Preparation Date:

16/2/2024

5. Available Attendance Forms:

weekly

6. Number of Credit Hours (Total) / Number of Units (Total)

75 hours/ 3 unit

7. Course administrator's name (mention all, if more than one name)

Name: Muhanna Al- Batat
Email: albatathani7@gmail.com

8. Course Objectives

1. Define the atomic and Nuclear Structure.
2. Learn the types of the ionization radiation.
3. Know the mechanism of radiation interaction with matter.
4. Define the interaction scatter radiation with matter.
5. Discuss the types of attenuation coefficient.
8. Define nanotechnology science, types of nanomaterials synthesis, and their applications.
9. To inform students as to the importance of renewable energy in the energy mix required for generation within nations.
10. The students will acquire sharp knowledge on nanotechnology based alternate source of energy.
11. The students may work on advanced materials for renewable and green energy.
12. The students will get a clear understanding of Solar technology.
14. They will also understand the importance of energy storage techniques.
15. They will be clear about the role of nanotechnology in improving the efficiency in energy usage.

9. Teaching and Learning Strategies

Strategy	Lectures Reports And the Quizes

10. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1.	2	Understanding and assimilation	Atomic and Nuclear Structure. – Fundamental particles – Nuclear Binding energy – Nuclear Stability– Auger electrons	Lecture	Theoretical exam and classroom activities

2.	2	Understanding and assimilation	Radioactive Decay – Radioactive materials – Activity – Half life	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	•Types of radiation – Alpha particles Beta particles Gamma radiation Others, Decay models	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	Classification of Radiation – Electromagnetic radiation – Particulate radiation – Ionizing and non-ionizing radiations Electromagnetic Energy – Velocity and Amplitude – Frequency and Wavelength	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Wave Model: Visible Light Particle Model: Quantum Theory Matter and energy • Interactions of photons with matter • Mechanisms of Energy Loss – Photoelectric effect – Thomson scattering – Coherent (Rayleigh) scattering	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Incoherent scattering – Pair and triplet production – Compton scattering by free electrons – Scattering and energy transfer coefficients – stopping power	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	• Photon Attenuation Coefficients – Linear attenuation coefficient – Exponential attenuation – Mass attenuation coefficient – Energy-Absorption coefficient	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Interactions of electrons with matter – Ionizational (collisional) interactions – Radiative Interactions – stopping power	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Introduction of Nanomaterials – Properties of nanoparticles – Types of nanoparticles	Lecture	Theoretical exam and classroom activities

10.	2	Understanding and assimilation	Synthesis Routes – Bottom-Up Approaches – Top-Down Approaches – Applications of nanomaterials in medicine & biology	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Nanotechnology in renewable energy systems – Energy transport, conversion and storage – Nano, micro and meso scale phenomena and devices. Energy sector products using nanomaterials – Light emitting diodes – Batteries – Catalytic reactors Capacitors, Super capacitors	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Nanotechnology to Hydrogen Production – Photocatalytic Water Splitting Reaction Nano Semiconductor Materials for Photocatalytic Water Splitting – Photolytic H2 Evolution Based on Nanoenhanced Materials	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	Nanomaterials for the Conversion of Carbon Dioxide into Renewable Fuels and Value-Added Products – Theoretical Potentials for Electrochemical Reduction of CO2 – Effect of Particle Size on Electrode Performance in Electrochemical CO2 Reduction Reaction	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Nanomaterials and Direct Air Capture of CO2 – Capture or Separation Technologies – New Roads into CO2 Capture: Direct Air Capture and Nanomaterials	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Solar energy technology – Availability of solar radiation – Photovoltaic devices – Dye sensitized solar cells – Photoelectrochemical cells for hydrogen production	Lecture	Theoretical exam and classroom activities
11.Course Evaluation					

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Systemic Physiology

Course Description Form

1- Course Name:
systemic Physiology
2- Course Code:
RAD124
3- Semester / Year:
Second/ first
4- Description Preparation Date:
21/2/2024
5- Available Attendance Forms:
Weekly
6- Number of Credit Hours (Total) / Number of Units (Total)
75 hours /3 units
7- Course administrator's name (mention all, if more than one name)
Name: Hussein humedy chalib Email: Husseinhumedy@gmail.com
8- Course Objectives

Course Objectives:	1.Understand the main physiologic concepts of cells and their component. 2. Understand the factors of homeostasis regulation in human body 3. Understand the physiologic mechanisms of blood flow, gases exchange and gastric secretions
9- Teaching and Learning Strategies	
Strategy	• Lectures • Quizzes ○ Reports

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Physiology of cardiovascular system	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Physiology of Respiratory system: Pulmonary ventilation, elastic recoil, pressure changes during inspiration and expiration	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Physiology of Digestive system: stomach, gastric juice	Lecture	Theoretical exam and classroom activities

4.	2	Understanding and assimilation	Physiology of Pancreas and sm and large intestine: pancreatic juice contains and function	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Physiology of liver and gallbladder	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Physiology of renal system:	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	Selective process of urine formation: Tubular reabsorption, Regulation of urine concentration and volume, Micturition	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Female reproductive system Male reproductive system	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Physiology of nervous system: Tract of spinal cord:	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Endocrine control mechanism	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Physiology of cardiovascular system	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Physiology of Respiratory system: Pulmonary ventilation, elastic recoil, pressure changes during inspiration and expiration	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	Physiology of Digestive system: stomach, gastric juice	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Physiology of Pancreas and small and large intestine: pancreatic juice contains and function	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Physiology of liver and gallbladder	Lecture	Theoretical exam and classroom activities
11- Course Evaluation					

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12- Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	**1**. Seeleys anatomy and physiology (eleven edition) Cinnamon L. VanPutte , Jennifer L. Regan , and Andrew F. Russo (2017) 2-Essentials of Human Anatomy & Physiology, Global Edition Suzanne Keller Elaine Marieb (2017) 3-Human Anatomy and Physiology, Global Edition [Sep 14, 2015] Erin, C. Amerman 4-Study Guide to Human Anatomy and Physiology 1 (2012) Michael Harrell M.S
Recommended books and references (scientific journals, reports...)	• Macedonian Journal of Medical Sciences • Iraqi Journal of Biotechnology/University of Baghdad • Journal of the College of Science, Al-Nahrain University • Journal of the College of Science, Department of Biotechnology, University of Baghdad • Journal of the College of Science for Girls/University of Baghdad Journal of Basra Sciences/University of Basra
Electronic References, Websites	

Radiobiology

Course Description Form

1. Course Name:
Radiobiology
2. Course Code:
RAD125
3. Semester / Year:
Second/ first
4. Description Preparation Date:
16-2-2024
5. Available Attendance Forms:
weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
75 houe / 3 units
7. Course administrator's name (mention all, if more than one name)
Assistant teacher Nussaiba Khaled Saddam
8. Course Objectives
1- Understand the radiobiological effect of radiation on cells, tissues. 2- Understand the different responses of normal and tumor cells to radiation effect. 3- Study the effect of ionization radiation in radiotherapy.
9. Teaching and Learning Strategies

Strategy	• Lectures • Reports • quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Introduction to Radiobiology Radiation chemistry: - Initial physical event - Radiolysis of water - Direct Effect of Radiation - Indirect Effect of Radiation	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Oxygen Effect (OER) - Radiosensitizers - RadioProtectors (DMF) □ Irradiation-induced damage and the DNA damage response - The DNA damage response - Sensors of damage	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Cell death after irradiation: - programmed cell death - Apoptosis - Autophagy - Necrosis, Senescence - mitotic catastrophe	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	Molecular Repair of DNA Damage - Base Excision Repair - Homologous Recombination - Nonhomologous and Joining □ Target theory - Single target - Single hit, - Multiple target- single hit	Lecture	Theoretical exam and classroom activities

5.	2	Understanding and assimilation	Cell survival curves - Recovery - Cell-Cycle Effects - Radiation Effect Modification	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Types of Cellular Damage due to Radiation Lethal Damage - Potential Lethal Damage	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	Radiobiology of Tissue and Organs Response to Radiation - The Most Sensitive - Sensitive - Moderately Sensitive - Less Sensitive	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	The severity of radiation effect: - Subacute Effects - Acute Effects - Chronic Effects	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Tumor Response to Radiation - Therapeutic index (combined radiation and drug treatments) - Tumor control probability - Normal Tissue complication Probability	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Introduction to Biosafety and Security - Key components of Biorisk Management - Components of safety in all laboratories - Universal safety precautions	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Biosafety barriers in laboratories - Personal protective equipment(PPE) - Facility Design	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Biological Agents - Routs of infection - Basis for control Measures - Hazard group classification system - A Biosafety cabinet (BSC)	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	Biorisk and biohazards - Control of substances hazardous to health - Assessing risk for work with human blood and tissues hazards - Control measures for work with human blood and tissue - Containment level	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	□ Types of biological wastes - Categories of biological wastes - Decontamination of biological wastes	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Transportation of biological wastes - International Transport Regulations - The Basic Triple Packaging System	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports ....etc

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1.Beyzaeoglu, M, ;Ozyigit, G. and Ebruli, C. (2010). Basic Radiation Oncology. Springer, Berlin, Heidelberg. 2. Elizabeth o Grady, Jason Cashmore, Marsha, Carol Wismer (2018) Principles of Biology- An introduction to Biological

	Concepts, second edition. 3. international Atomic Energy Agency. Radiation Biology : A Hand book for Teacgers and students (2010). Series no.42.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Principle of Nursing

Course Description Form

1. Course Name:
Principle of Nursing
2. Course Code:
RAD126
3. Semester / Year:
Second/ first
4. Description Preparation Date:
16-2-2024
5. Available Attendance Forms:
weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
90 hours/ 4 unite
7. Course administrator's name (mention all, if more than one name)
Assistant teacher Ammar Abdel Karim
8. Course Objectives
1. To introduce the students to the most important ways of dealing with patients. 2. To inform them how maintain the health of the patient and providing care for them. 3. To prepare the patients for different radiographic examinations, first aid methods and civil defense.
9. Teaching and Learning Strategies

Strategy	• Lectures • Reports • quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Nursing, its importance and development among societies, the qualifications of nurse	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Temperature measurement routs, heart pulse characteristics and measurement sits	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Respiratory rate and respiratory types, blood pressure and blood pressure types	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	Body mechanism , Patient positions types Patient positions types technique (erect,supine, dorsal recumbent, fowler's, lateral, pron, sim's, lithotomy, knee-chest, semi-fowler's , trendelenberge and reverse trendelenberge positions)	Lecture	Theoretical exam and classroom activities

5.	2	Understanding and assimilation	Drug administration routs (mouth, inhalation, rectum & vagina , injection) drugs storage , weights and measures	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Basic principles of medical and surgical sterilization and disinfection	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	Urinary catheterization and enema types	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Gastric lavage and artificial feeding	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Role of nurse in patient preparation for general radiography and special GIT and urinary system radiography	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Fundamental and application of first aid, artificial respiration types and CRP	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Wounds and hemorrhage types, arterial pressure points Dressing and bandages types and uses , surgical sutures types	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Poisoning , asphyxia and foreign bodies types Fractures and burns types, electrical shock War injuries types and principles of the civil defense	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	Introduction to Biosecurity - Risks Characterization in biosecurity - Vulnerability assessment13 - Component o14f Laboratory Biose15curity Biosafety level - Risk Assessment Strategy - Hazard groups, biosafety levels, practices and equipment - Standard practices required in biology laboratories.	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Biorisk management system - Assess the capability of the laboratory staff to control hazards - Relation of risk groups to biosafety levels , practices of and equipment - Mitigation Control Measures - Sustainability of the bio-risk management system - Strengthening biorisk management	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Accident response - spill cleanup procedure - Investigation of an accident inside the laboratory. Biosafety training	Lecture	Theoretical exam and classroom activities

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports ....etc

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Computer principles 2

Course Description Form

1- Course Name:
Computer principles 2
2- Course Code:
RAD127
3- Semester / Year:
Second/ first
4- Description Preparation Date:
16/2/2024
5- Available Attendance Forms:
weekly
6- Number of Credit Hours (Total) / Number of Units (Total)
24 hours/2 units
7- Course administrator's name (mention all, if more than one name)
Name: Hameed Hassan Khalf Email: hameedre334@gmail.com
8- Course Objectives

Providing the student with knowledge in managing and using various computer applications.	• Providing the student with the skills of dealing with basic office applications and creating office files and documents. • The use of the operating system as well as the basics of working within the digital environment.
9- Teaching and Learning Strategies	
Strategy	• Lectures • Reports • quizzes

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
.1	2	Understanding and assimilation	Microsoft Word 2010 Run Microsoft Word 2010	Practical lecture	Oral exams
.2	2	Understanding and assimilation	Microsoft Word 2010 interface	Practical lecture	Oral exams
.3	2	Understanding and assimilation	File tab, Home tab	Practical lecture	Oral exams
.4	2	Understanding and assimilation	Page Layout tab, Display tab	Practical lecture	Oral exams
.5	2	Understanding and assimilation	Inserting objects in Microsoft Word 2010	Practical lecture	Oral exams

.6	2	Understanding and assimilation	Insert Tab, Page group	Practical lecture	Oral exams
.7	2	Understanding and assimilation	Tables group	Practical lecture	Daily exam.
.8	2	Understanding and assimilation	Tables group	Practical lecture	Oral exams
.9	2	Understanding and assimilation	Collection of illustrations	Practical lecture	Oral exams
.10	2	Understanding and assimilation	Links group, Header & Footer group	Practical lecture	Oral exams
.11	2	Understanding and assimilation	Text set, Symbols set	Practical lecture	Oral exams
.12	2	Understanding and assimilation	Additional tasks for Microsoft Word 2010	Practical lecture	Oral exams
.13	2	Understanding and assimilation	Microsoft PowerPoint 2010 Open a new file And store it on your desktop. Add and edit slides (title slide - Title with content, subtitle, two contents , compare, title only, blank segment, Content with caption, image with caption).	Practical lecture	Oral exams
.14	2	Understanding and assimilation	Adding a theme. Master view group -Add movements and adjust time and Repetition for the entire period Slides and differently for each slide.	Practical lecture	Oral exams
.15	2	Understanding and assimilation	Adding animations to slides	Practical lecture	Daily exam.

11- Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Second Stage

First Semester

Special radiological procedures 1

Course Description Form

1. Course Name:
Special radiological procedures 1
2. Course Code:
RAD211
3. Semester / Year:
First/ Second
4. Description Preparation Date:
16/2/2024
5. Available Attendance Forms:
Weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours/2 units
7. Course administrator's name (mention all, if more than one name)
Name: Ayoob Dinar Abdullah Email: ayoobdinara81@gmail.com
8. Course Objectives

Providing the student with knowledge in managing and using various x-ray equipment applications. Teaching the student how to use coloring material and conduct radiological examination of various body systems.	• Providing the student with the skills to deal with color radiographic examinations of all body organs. • The use of various x-ray devices to perform these examinations
9. Teaching and Learning Strategies	
Strategy	• Lectures • Reports • quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Historical development of radiographic agent.	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Adverse effect of I.V water soluble contrast media on specifc organs.	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Methods of imagings of GIT tract with barium water soluble contrast agents.	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	Barium examination: swallow and meal.	Lecture	Theoretical exam and

					classroom activities
5.	2	Understanding and assimilation	Barium examination: swallow and meal 2	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Computer Safety & Software Licenses	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	Barium examination: follow through, small bowel anemia	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Barium examine action: barium enema, instant enema, air enema	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Sonogram, retrograde ileogram, colostomy enema, lipogram, thermogram&	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Evacuating proctogram.	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Methods of imagings of hepatobiliary system.	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Methods of imagings of hepatobiliary system.	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	C.T for the liver biliary tree	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	MRI of the liver	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Intraoperative & postoperative T- t tube, cholangiography	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily

oral, monthly, or written exams, reports .... etc	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Chapman Nakielny's Guide to Radiological Procedures by Nick Watson, Hefin Jones (z-lib.org)
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Radiological anatomy of head and upper limbs

Course Description Form

1- Course Name:
Radiological anatomy of head and upper limbs
2- Course Code:
RAD212
3- Semester / Year:
First/ Second
4- Description Preparation Date:
2023-2024
5- Available Attendance Forms:
weekly
6- Number of Credit Hours (Total) / Number of Units (Total)
120 hours - 3 units
7- Course administrator's name (mention all, if more than one name)
Name: *Assist Prof. Dr*. Hayder Dawood Saleem Email: : hayderdawood@uomanara.edu.iq
8- Course Objectives
9- Teaching and Learning Strategies

Strategy	Lectures Reports Exams

10- Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1.	2	Understanding and assimilation	Normal anatomy of the skull (cranial) bones	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Radiological features of the skull (cranial) bones.	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Normal anatomy of the facial bones.	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	Radiological features of the facial bones.	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Normal anatomy of nasal cavity & paranasal sinuses. Radiology of the nasal cavity and paranasal sinuses.	Lecture	Theoretical exam and classroom activities

6.	2	Understanding and assimilation	shoulder girdle (scapula and clavicle bones). Radiological features of the scapula and clavicle bones. Ossification centers.	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	Normal anatomy of the humerus, radiological features of the humerus. Ossification center.	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Normal anatomy of the radius and ulna bones, radiological features of the radius and ulna bone. Ossification centers	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Normal anatomy of the hand, radiological features of the hand. Ossification centers.	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Shoulder joint: components, type of joint, articulating surfaces, joint capsule, labrum, ligaments, radiological features of shoulder joint	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Elbow joint: components, articulating surfaces, ligaments & radiological feature of the elbow joint.	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Wrist joint: components, articulating surfaces, ligaments & radiological features of the wrist joint.	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	Blood supply of upper limbs: Arteries of the upper limb.	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Radiological features of the upper limb arteries.	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Veins of the upper limb, Radiological features of the upper limb veins.	Lecture	Theoretical exam and classroom activities

11- Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	. Ryan, S., McNicholas, M., & Eustace, S. (2011). ***Anatomy for diagnostic imaging.*** .
Main references (sources)	Kelley, L. L., & Petersen, C. (2018). ***Sectional***

	Anatomy for Imaging Professionals. Third & fourth edition
Recommended books and references (scientific journals, reports...)	Lazo, D. L. (2015). ***Fundamentals of sectio anatomy: an imaging approach***
Electronic References, Websites	

Radiographic techniques 1

Course Description Form

1- Course Name:
Radiographic techniques for
2- Course Code:
RAD213
3- Semester / Year:
First/ Second
4- Description Preparation Date:
17/2/2024
5- Available Attendance Forms:
Weekly
6- Number of Credit Hours (Total) / Number of Units (Total)
60 hours (Theoretical)/8 units 150 hours (practical)
7- Course administrator's name (mention all, if more than one name)
Name: Alaa Sabeeh Shenawa Email: alaaunisydney@gmail.com
8- Course Objectives
Course Objectives: To teach the students how to direct the patient in particular way to photograph to see diseases in the best way for uppe limbs and lower limbs
9- Teaching and Learning Strategies

Strategy	Lectures Practice on different x-ray machine Learning from practical viedio quizzes

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2	2 2	Understanding and assimilation	Terminology, body planes, section, Image quality	Lecture	Theoretical exam and classroom activities
3	2	Understanding and assimilation	Shoulder joint	Lecture	Theoretical exam and classroom activities
4	2	Understanding and assimilation	Glenohumeral joint positions	Lecture	Theoretical exam and classroom activities
5	2	Understanding and	Acromioclavicular joints	Lecture	Theoretical exam and

		assimilation			classroom activities
6	2	Understanding and assimilation	Clavicle positions	Lecture	Theoretical exam and classroom activities
7	2	Understanding and assimilation	Sternoclavicular joints	Lecture	Theoretical exam and classroom activities
8	2	Understanding and assimilation	Scapula	Lecture	Theoretical exam and classroom activities
9	2	Understanding and assimilation	Humerus	Lecture	Theoretical exam and classroom activities
10	2	Understanding and assimilation	Forearm	Lecture	Theoretical exam and classroom activities
11	2	Understanding and assimilation	Elbow joint	Lecture	Theoretical exam and classroom activities
12	2	Understanding and assimilation	Hand positions	Lecture	Theoretical exam and classroom activities
13	2	Understanding and assimilation	Thumb& fingers positions	Lecture	Theoretical exam and classroom activities
14	2	Understanding and assimilation	Scaphoid bone positions, shown structures	Lecture	Theoretical exam and classroom activities
15	2	Understanding and assimilation	Wrist positions, shown structures	Lecture	Theoretical exam and classroom activities

11- Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Radiological medical equipment technologies1

Course Description Form

1- Course Name:
Radiological medical equipment technologies1
Course Code:
RAD214
Semester / Year:first and second semester for second stage
First/ Second
Description Preparation Date:
13-4-2024
Available Attendance Forms:
weekly
Number of Credit Hours (Total) / Number of Units (Total)
60 hours \8 units
Course administrator's name (mention all, if more than one name)
Name: Hayder Qasim Alsaedi Email: hayderkalaf84@gmail.com
Course Objectives
from this study students will learn about X-Ray machine (Shapes and sizes) will explaine to them X-ray tube Operating consoleline compensation, autotransformer KVp adjustment, mA control Exposure timer, checking a timer High voltage transformer , voltage rectification phase power, high frequency generators Intensifying screens Screen characteristics, screen film combination, care of the screen ,Ultrasound transducer,Ultrasound transducer ,Mammography

13- Teaching and Learning Strategies	
Strategy	• Lectures • Reports • Quizes

14- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	X-Ray machine system: • Operating console: – line compensation, – autotransformer, – KVp adjustment, – mA control – Exposure timer	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	High voltage generators: – transformers, – voltage rectification, – phase power types, – x-ray circuits – Effect of waveform on radiation output & image quality	Lecture	Theoretical exam and classroom activities

3.	2	Understanding and assimilation	X-ray tube: – Basic design – Line focus principle – Heel effect	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	X-ray tube failure: – Causes of X-ray Tube Failure – Results – Remedy	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Construction of film, Intensifying screens, cassette. Processing the latent image: – Manually – Automatically	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Filters – Types – Half-value layers Control of scatter radiation: – Beam restrictors, – The grid (Characteristics of grid construction, grid ratio, grid frequency)	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	Grid types: – linear, crossed, focused, moving grids	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Digital radiography: Computed Radiography (CR): – System apparatus, – mechanism of work – Image processing	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Direct to digital radiography (DDR): • Flat Panel Detectors (DR): • Indirect conversion detector (a-Si) Direct conversion detector (a-Se)	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Image quality: – Contrast – Resolution – Noise	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Unsharpness – Magnification – Distortion – Artefacts	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Mammography: – Imaging system equipments, – Types of mammography systems. Film-sceen system	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	– Digital mammography (FFDM) – CEDM – Breast tomosynthesis – Computer-aided detection (CAD) – Scintimammography	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Fluoroscopy: – Traditional imaging system apparatus & mage Intensification – Digital Fluoroscopy – Digital subtraction angiography	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Bone density scan (DEXA scan): – Imaging system apparatus – Mechanism Orthopantomogram (OPG): – Types, – Mechanism	Lecture	Theoretical exam and classroom activities

15-

16-

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Fundamentals of radiation protection

Course Description Form

1. Course Name:

Fundamentals of radiation protection

2. Course Code:

RAD216

3. Semester / Year:

First/ Second

4. Description Preparation Date:

15-3-2024

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

75 hour- 3 unit

7. Course administrator's name (mention all, if more than one name)

Name: Hussein Ali Abdulhussein
Email: hussein.aldainy333@gmail.com

8. Course Objectives

Course Objectives 1. Explains the basic concepts of ionizaing radiation. 2. Define the Radiation Measurement Units & International SI Units. 3. List the principles of radiological protection (ALARA concept). 4. Explain the meaning of the concept of dose limits, and name the recommended dose limits for radiation workers and the public.	5. Discuss the dose management for pregnancy & obese peoples 6. Describe the types of radiation detectors and measurement. 7. Explain how to estimate the radiation dose in CT & fluoroscopy

9. Teaching and Learning Strategies

Strategy	• Lectures • Reports • quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
first	2	Understanding and assimilation	Classification of ionizing radiation Sources of ionization Radiation (background radiation) Natural sources– Human-made (artificial) sources– Comparison of Radiation Doses	Lecture	Theoretical exam and classroom activities
second	2	Understanding and	Radiation Measurement Units□ &	Lecture	Theoretical

		assimilation	International SI Units Activity– Exposure– Absorbed dose– Kerma– Equivlant dose– Effective dose– Committed Equivlant– & effective dose		exam and classroom activities
third	2	Understanding and assimilation	The Principles of Radiological Protection Justification of a practice– Optimisation of Protection (ALARA principles)– Timeϖ Distanceϖ Shieldingϖ	Lecture	Theoretical exam and classroom activities
fourth	2	Understanding and assimilation	Dose limits Maximum Permissible Occupational Doses– Maximum Permissible public Doses– Maximum Permissible patient Doses– Whole-Body Dose Limits–	Lecture	Theoretical exam and classroom activities
5	2	Understanding and assimilation	Radiation protection for classification of exposure: Occupational– Medical– Public– Whole body non-occupational exposure• Partial-body occupational exposure•	Lecture	Theoretical exam and classroom activities
6	2	Understanding and assimilation	Occupational Radiation Exposure in: Fluoroscopy– Mammography– Computed Tomography– Surgery–	Lecture	Theoretical exam and classroom activities
7	2	Understanding and assimilation	Patient Radiation Dose Descriptions Entrance Skin Exposure (ESE)– Mean Marrow Dose (MMD)–	Lecture	Theoretical exam and classroom activities
8	2	Understanding and assimilation	Dose and management principles in Special cases: X-ray and pregnancy– Pregnancy patientϖ Pregnancy technologistϖ X-ray and obesity– Obese patientϖ Obese technologistϖ	Lecture	Theoretical exam and classroom activities
9	2	Understanding and assimilation	Design of Protective Barriers in X-Ray Installations Design of Primary Protective Barrier– Design of Secondary Protective Barrier– Leakage Radiationϖ Scattered Radiationϖ	Lecture	Theoretical exam and classroom activities
10	2	Understanding and assimilation	Factors That Affect Barrier Thickness	Lecture	Theoretical exam and classroom activities

11	2	Understanding and assimilation	Radiation Detection and Measurement Ionization gases detectors (Gas-Filled Detectors)– Geiger Counters Proportional counting Ion Chambers	Lecture	Theoretical exam and classroom activities
12	2	Understanding and assimilation	Scintillation detectors– Organic Scintillators Inorganic Scintillators Semiconductor Detectors– Instrument Calibration	Lecture	Theoretical exam and classroom activities
13	2	Understanding and assimilation	Personnel Dosimeters Film Badges– Thermoluminescence Dosimeters (TLDs)– Optically stimulated luminescence (OSL)– Pocket Dosimeters– Direct Ion Storage (DIS)– Radiophotoluminescence– Electronic personal dosimeter (MOSFET dosimeters)–	Lecture	Theoretical exam and classroom activities
14	2	Understanding and assimilation	CT Dose Metrics and CalculationCT dose index (CTDI)– dose-length product(DLP)– Effective Dose– Factors affecting dose in CT	Lecture	Theoretical exam and classroom activities
15	2	Understanding and assimilation	Fluoroscopy dose: To patient– To staff– methods of minimizing fluoroscopy dose	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports ....etc

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Second Stage

Second Semester

Special radiological procedures o biliary and reproductive system

Course Description Form

1. Course Name:

Special radiological procedures of biliary and reproductive system

2. Course Code:

RAD221

3. Semester / Year:

Second/ Second

4. Description Preparation Date:

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

105 hours / 5 unite

7. Course administrator's name (mention all, if more than one name)

Name: Ayoob Dinar Abdullah
Email: ayoobdinara81@gmail.com

8. Course Objectives

To teach the students how to direct the patient in particular way to photograph to see diseases in the best way for lower limbs

9. Teaching and Learning Strategies

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method	
1.	2	Understanding and assimilation	Methods of imaging of hepatobiliary system	Lecture	Theoretical exam and classroom activities	
2.	2	Understanding and assimilation	U/S of the liver, gall bladder and biliary system	Lecture	Theoretical exam and classroom activities	
3.	2	Understanding and assimilation	CT for the liver biliary tree.	Lecture	Theoretical exam and classroom activities	
4.	2	Understanding and assimilation	MRI of the liver	Lecture	Theoretical exam and classroom activities	
5.	2	Understanding and assimilation	Intraoperative & postoperative T- t ube,cholangeography	Lecture	Theoretical exam and classroom activities	
6.	2	Understanding and assimilation	Biliary drainge	Lecture	Theoretical exam and classroom activities	
7.	2	Understanding and assimilation	Methods of imagings of urinary tracts Excretion urography	Lecture	Theoretical exam and classroom activities	
8.	2	Understanding and assimilation	CT urinary tract	Lecture	Theoretical exam and classroom activities	

9.	2	Understanding and assimilation	MRI of the urinaryc tract.	Lecture	Theoretical exam and classroom activities	
10.	2	Understanding and assimilation	Micturating cystourethrography	Lecture	Theoretical exam and classroom activities	
11.	2	Understanding and assimilation	Ascending urethrography in the male	Lecture	Theoretical exam and classroom activities	
12.	2	Understanding and assimilation	Retrograde pylouretrography Hystrosalpingography	Lecture	Theoretical exam and classroom activities	
13.	2	Understanding and assimilation	Precutaneous nephrostomy & nephrolithotomy.	Lecture	Theoretical exam and classroom activities	
14.	2	Understanding and assimilation	Methods of imagings of male & femals reproductive system.	Lecture	Theoretical exam and classroom activities	
15.	2	Understanding and assimilation	CT & MRI of the reproductive system.	Lecture	Theoretical exam and classroom activities	

Course Evaluation

11.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Watson, N. & Jones, H. chapman& Nakielnys ‘’Guide to Radiological procedures’’ , 7th edition, Elsevier Health Sciences, 2017.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Radiological anatomy of lower limbs

Course Description Form

1. Course Name:

Radiological anatomy of lower limbs

2. Course Code:

RAD222

3. Semester / Year:

Second/ Second

4. Description Preparation Date:

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

90 hours / 4 unite

7. Course administrator's name (mention all, if more than one name)

Name: *Assist Prof. Dr*. Hayder Dawood Saleem
Email: : hayderdawood@uomanara.edu.iq

8. Course Objectives

At the end of the course, the student will be able to know:
1. The general anatomy and radiological features of the lower limbs.
2. The general anatomy and radiological features of the lower limbs joints.
3. The general anatomy and radiological features of the arterial blood supply of lower limbs as well as venous drainage.

9. Teaching and Learning Strategies

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Bony pelvis (pelvic girdle): sacrum, coccyx & hip bones.	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Differences between male & female pelvis, Radiological features of the pelvic bones.	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Normal anatomy of the femur, radiological features of femur bone. Ossification centers.	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	Normal anatomy of the tibia bone, radiological features of tibia bone. Ossification centers.	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Normal anatomy of the fibula bone, radiological features of fibula bone. Ossification center. Normal anatomy of patella, radiological features of patella & ossification center	Lecture	Theoretical exam and classroom activities

			of patella.		
6.	2	Understanding and assimilation	Normal anatomy of the foot: components: tarsals, metatarsals & phalanges.	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	Radiological features of the foot: tarsal, metatarsal & phalanges.	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Hip joint: type of joint, articular surfaces, capsule & ligaments of hip joints.	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Hip joint: Radiological features of hip joint. Dislocation of hip joint.	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Knee joint: type of joint, articular surfaces, capsule, ligaments of knee joint.	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Knee joint: Internal structures of knee joint. Radiological features of knee joint.	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Ankle joint: type of joint, articular surfaces, capsule, ligament. Radiological features of ankle joint.	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	Blood supply of lower limbs: Arteries of the lower limb.	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Radiological features of the lower limb arteries.	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Veins of the lower limb, Radiological features of the lower limb veins.	Lecture	Theoretical exam and classroom activities

Course Evaluation

11.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Kelley, L. L., & Petersen, C. (2018). Sectional Anatomy for Imaging Professionals. Third & fourth edition. 2. Ryan, S., McNicholas, M., & Eustace, S. (2011). Anatomy for diagnostic imaging. 3. Lazo, D. L. (2015). Fundamentals of sectional anatomy: an imaging approach
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Radiographic techniques for lower limbs

Course Description Form

1. Course Name:

Radiographic techniques for lower limbs

2. Course Code:

RAD223

3. Semester / Year:

Second/ Second

4. Description Preparation Date:

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

7. Course administrator's name (mention all, if more than one name)

Name: Alaa Sabeeh Shenawa
Email: alaaunisydney@gmail.com

8. Course Objectives

To teach the students how to direct the patient in particular way to photograph to see diseases in the best way for lower limbs

9. Teaching and Learning Strategies

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Pelvis	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Ilium	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Symphysis pubis	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	Sacro-iliac joints	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Acetabulum	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Femur	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	hip joint, AP, Lateral , frog-leg infro-superior view , shown structure	Lecture	Theoretical exam and

					classroom activities
8.	2	Understanding and assimilation	Tibia & fibula ,AP, Lateral	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Knee joint AP, lateral,skyline for patella, erect AP	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Patella positions	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Foot , AP, lateral, oblique , shown structure	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Metatarsal–phalangeal sesamoid bones	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	Ankle joint , AP, lateral, oblique ,oblique & AP with inversion	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Subtalar joints	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Calcaneum positions	Lecture	Theoretical exam and classroom activities

Course Evaluation

11.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Whitley, A. S., Jefferson, G., Holmes, K., Sloane, C., Anderson, C., & Hoadley, G. (2015). Clark's Positioning in Radiography 13E. crc Press. 2. Bontrager, K. L., & Lampignano, J. (2013). Bontrager's handbook of radiographic positioning and techniques. Elsevier Health Sciences
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Computed Tomography Equipment Techniques

Course Description Form

1. Course Name:

Computed Tomography Equipment Techniques

2. Course Code:

RAD224

3. Semester / Year:

Second/ Second

4. Description Preparation Date:

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

105 hours/ 5 unite

7. Course administrator's name (mention all, if more than one name)

Name: Hayder Qasim Alsaedi
Email: hayderkalaf84@gmail.com

8. Course Objectives

1. List and describe the various generations of computed tomography (CT) imaging systems.
2. Relate the CT imaging system components to their functions. Discuss image reconstruction via interpolation, back projection, and iteration.
3. Explain the helical imaging & multidetector-row CT.
4. Describe CT image characteristics of image matrix.
5. Clarify the factors affects the CT image quality, as it relates to spatial resolution, contrast.
6. Determine the common CT image artefacts. 7. Identify other technical applications of CT Imaging.

9. Teaching and Learning Strategies

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	History of Computed Tomography – Limitations of conventional radiography	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Basic principles of CT Scanners : Generations of CT – First-generation – Second-generation – Third-generation – Fourth-generation – Fifth-generation CT , electron beam (EBCT)	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Helical/spiral CT Scanners: Requirements for Volume Scanning: – slip-ring teccnolgy – dual source	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	– Interpolation Algorithms – Pitch	Lecture	Theoretical exam and classroom activities

5.	2	Understanding and assimilation	Multislice Computed Tomography (MSCT) (multidetector-row) CT	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	CT system design: (SSCT & MSCT) – X-Ray imaging system (gantry): – X-Ray Tube , X-Ray tubes in MSCT (Straton x-ray tube)	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	– Collimation, – Filtration – Detector: Detector Characteristics & types	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	• Control Console • Computer system: image display, recording, storage, and communication system. • Patient Table or Couch	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Reconstruction methods: – Backprojection reconstruction – Filtered Backprojection	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	– Iterative reconstruction	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	□ CT image quality: – Image contrast – Spatial resolution	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	– Image noise	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	– Image artifacts: Types and causes Common artifacts and correction techniques	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	□ Positron Emission Tomography/CT (PET/CT) Single-Photon Emission/ CT (SPECT/CT)	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	□ Advanced technical CT applications: – CT Angiography – Cardiac CT Imaging – CT fluoroscopy	Lecture	Theoretical exam and classroom activities

Course Evaluation

11.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Stewart Carlyle Bushong, "Radiologic Science for Technologists Physics, Biology, and Protection" Elsevier, Inc. , 7th edition, 2017. 2. Chris Guy & Dominic ffytche, "An Introduction to The Principles of Medical Imaging" , Imperial College Press, 2005. 3. Perry Sprawls, "Physical principles of medical imaging", 2nd Edition 1996. 4. J. Hsieh, "Computed Tomography: Principles, Design, Artifacts, and Recent Advances", 2nd ed. Wiley Inter-science, Bellingham, Washington, USA, (2009)

	5. Euclid Seeram, " Computed tomography : physical principles, clinical applications, and quality control" 4 th edition, Elsevier Inc. 2016.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Physics of Computed Tomography

Course Description Form

1. Course Name:
Physics of Computed Tomography
2. Course Code:
RAD225
3. Semester / Year:
Second/ Second
4. Description Preparation Date:
16-2-2024
5. Available Attendance Forms:
weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
75 hours / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Hussein Ali Abdulhussein Email: hussein.aldainy333@gmail.com

8. Course Objectives

Course Objectives 1. Describe and illustrate the basic physics of the ray projection. 2. Describe the scan-and step slice acquisition method and the general characteristics of the data sets it produces. 3. Describe the helical/spiral volume acquisition method and the general characteristics of the data set it produces.	4. Describe and illustrate the general concept of the back-projection method of image reconstruction. 5. Explain the reconstruction methods. 6. Illustrate the concept of voxels that are formed during image reconstruction. 7. Describe and illustrate the general range of CT numbers for tissue and materials in a human body. 8. Explain how windowing contributes to high cont sensitivity

9. Teaching and Learning Strategies

Strategy	• Lectures • Reports • quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	Five	Understanding and assimilation	Introduction and overview	Lecture	Theoretical exam and classroom activities
2.	five	Understanding and assimilation	Basic Physics: - Projected ray - Radiation attenuation - Energy Dependence	Lecture	Theoretical exam and classroom activities

3.	Five	Understanding and assimilation	CT numbers: Accuracy & uniformity - Hounsfield unit, scale	Lecture	Theoretical exam and classroom activities
4.	Five	Understanding and assimilation	CT image: Windowing - Window width and level	Lecture	Theoretical exam and classroom activities
5.	Five	Understanding and assimilation	Data Acquisition, - basic concepts for data acquisition - sampling	Lecture	Theoretical exam and classroom activities
6.	Five	Understanding and assimilation	Data Acquisition Geometries: Data acquisition in: - first generation Scanners - second generation Scanners - third generation Scanners - fourth generation Scanners	Lecture	Theoretical exam and classroom activities
7.	Five	Understanding and assimilation	- fifth generation Scanners - Spiral-Helical Geometry - Dual source CT Scanner	Lecture	Theoretical exam and classroom activities
8.	Five	Understanding and assimilation	- Multislice Computed Tomography (MSCT	Lecture	Theoretical exam and classroom activities
9.	Five	Understanding and assimilation	Data Processing: - Image reconstruction - Views	Lecture	Theoretical exam and classroom activities
10.	Five	Understanding and assimilation	Data Flow in a CT Scanner - Sequence of Events	Lecture	Theoretical exam and classroom activities
11.	Five	Understanding and assimilation	Image Display, Storage, and Communication	Lecture	Theoretical exam and classroom activities
12.	Five	Understanding and assimilation	Format the CT image, - Image matrix - Pixel - Voxel	Lecture	Theoretical exam and classroom activities
13.	Five	Understanding and assimilation	Field Of View (FOV) in CT: - Display field of view (DFOV) - Scan field of view (sFOV)	Lecture	Theoretical exam and classroom activities
14.	Five	Understanding and assimilation	Basic CT Physics	Lecture	Theoretical exam and classroom activities
15.	Five	Understanding and assimilation	Image Axes	Lecture	Theoretical exam and classroom

					activities

11.Course Evaluation
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports ....etc

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Third Stage

Special radiological procedures 2

Course Description Form

1. Course Name:

Special radiological procedures 2

2. Course Code:

RAD311

3. Semester / Year:

Third

4. Description Preparation Date:

16-2-2024

5. Available Attendance Forms:

Weakly

6. Number of Credit Hours (Total) / Number of Units (Total)

180 hours/ 8 unite

7. Course administrator's name (mention all, if more than one name)

Name: Hayder Qasim Alsaedi
Email: hayderkalaf84@gmail.comhu

8. Course Objectives

9. Teaching and Learning Strategies

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding assimilation	**Methods of imaging of the heart and angiocardiography.**	Lecture	Theoretical exam and classroom activities
2	2	Understanding assimilation	**Coronary arteriography & cardiac C.T including coronary angiography.**	Lecture	Theoretical exam and classroom activities
3	2	Understanding assimilation	**Methods of imagings the arterial system &introduction to catheter techniques.**	Lecture	Theoretical exam and classroom activities
4	2	Understanding assimilation	**Femoral ,brachial &axilary punctures for catheterization .**	Lecture	Theoretical exam and classroom activities
5	2	Understanding assimilation	**General complications of catheter techniques.**	Lecture	Theoretical exam and classroom activities
6	2	Understanding assimilation	**Ascending aortoraphy and lower limb arteriography.**	Lecture	Theoretical exam and classroom activities
7	2	Understanding assimilation	**Balloon angiography .**	Lecture	Theoretical exam and classroom activities

8	2	Understanding assimilation	**Vascular emolization .**	Lecture	Theoretical exam and classroom activities
9	2	Understanding assimilation	**C.T &MRI angiography .**	Lecture	Theoretical exam and classroom activities
10	2	Understanding assimilation	**Methods of imaging the venous system &peripheral venography.**	Lecture	Theoretical exam and classroom activities
11	2	Understanding assimilation	**Central venography.**	Lecture	Theoretical exam and classroom activities
12	2	Understanding assimilation	**Portal venography.**	Lecture	Theoretical exam and classroom activities
13	2	Understanding assimilation	**Position emission tomography imaging .**	Lecture	Theoretical exam and classroom activities
14	2	Understanding assimilation	**18f-FDG PET scanning .**	Lecture	Theoretical exam and classroom activities
15	2	Understanding assimilation	**Lymph node imaging .**	Lecture	Theoretical exam and classroom activities
16	2	Understanding assimilation	**Imaging modalities of bones & joints.**	Lecture	Theoretical exam and classroom activities
17	2	Understanding assimilation	**Muscloskeletal MRI –general points .**	Lecture	Theoretical exam and classroom activities
18	2	Understanding assimilation	**Arthrography –general points .**	Lecture	Theoretical exam and classroom activities
19	2	Understanding assimilation	**Arthrography of the knee & hip .**	Lecture	Theoretical exam and classroom activities
20	2	Understanding assimilation	**Arthrography of the shoulder &elbow .**	Lecture	Theoretical exam and classroom activities
21	2	Understanding assimilation	**Arthrography of the wrist & ankle .**	Lecture	Theoretical exam and classroom activities
22	2	Understanding assimilation	**Radionuclide bone scan .**	Lecture	Theoretical exam and classroom activities
23	2	Understanding assimilation	**Method of imaging the brain .**	Lecture	Theoretical exam and classroom activities

24	2	Understanding assimilation	**C.T &MRI of the brain .**	Lecture	Theoretical exam and classroom activities
25	2	Understanding assimilation	**Cerebral &lumber myelography.**	Lecture	Theoretical exam and classroom activities
26	2	Understanding assimilation	**Methods of imaging the spine.**	Lecture	Theoretical exam and classroom activities
27	2	Understanding assimilation	**Cervical &lumber myelography.**	Lecture	Theoretical exam and classroom activities
28	2	Understanding assimilation	**Methods of imaging of the salivary glands .**	Lecture	Theoretical exam and classroom activities
29	2	Understanding assimilation	**Methods of imaging the thyroid &parathyroid glands with C.T & MRI of the thyroid and parathriod glands .**	Lecture	Theoretical exam and classroom activities
30	2	Understanding assimilation	**Methods of imaging of the breast & mammary glands .**	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Muir's textbook of pathology
Main references (sources)	Robin's basic pathology
Recommended books and references (scientific journals, reports...)	Ackermann's surgical pathology
Electronic References, Websites	Web path

Radiological anatomy ‖

Course Description Form

13. Course Name:

Radiological anatomy Ⅱ

14. Course Code:

RAD312

15. Semester / Year:

Third

16. Description Preparation Date:

2023-2024

17. Available Attendance Forms:

weekly

18. Number of Credit Hours (Total) / Number of Units (Total)

120 hours - 6 units

19. Course administrator's name (mention all, if more than one name)

Name: *Assist Prof. Dr*. Hayder Dawood Saleem
Email: : hayderdawood@uomanara.edu.iq

20. Course Objectives

1-Identify the components of the x-ray imaging system operating console.
2. Explain the operation of the high-voltage generator.
3. Define the essential components of X-ray tube.
4. Explain the important techniqes types used in radiographic imaging.
5. Determine the methods of scatter control in x-ray imaging system

21. Teaching and Learning Strategies

Strategy	Lectures Reports Exams

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Normal anatomy of brain: Cerebrum, cerebral cortex and lobes of brain. Radiological features of the cerebrum	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Normal anatomy of corpus callosum, Radiological features of corpus callosum	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Normal anatomy of basal ganglia, Radiological features of the basal	Lecture	Theoretical exam and classroom activities

			ganglia		
4.	2	Understanding and assimilation	Normal anatomy of thalamus, hypothalamus, pituitary and pineal glands, Radiological features of the thalamus, hypothalamus, pituitary and pineal gland	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Normal anatomy of brainstem, Radiological features of the brainstem	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Normal anatomy of cerebellum, Radiological features of the cerebellum	Lecture	Theoretical exam and classroom activities
7.	2	Understanding and assimilation	Normal anatomy of ventricles, cisterns, CSF production and flow ventricles	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Blood vessels of the brain	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Normal anatomy of the vertebral column: - Cervical vertebrae, - Thoracic vertebrae, - Lumbar vertebrae, Sacrum and coccyx	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Radiological features of vertebral column.	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Normal anatomy of joints and ligaments of the vertebral column, Radiological features of the joints and ligaments of the vertebral column, myelography.	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	The intervertebral discs, radiological features of the intervertebral discs	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	Normal anatomy of spinal cord, cross section of the spinal cord, spinal meninges.	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Radiological features of the spinal cord	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Blood vessels of the vertebral column and spinal cord	Lecture	Theoretical exam and classroom activities
16.	2	Understanding and assimilation	Normal anatomy of thoracic cage and sternum, radiological features of the thoracic cage and sternum.	Lecture	Theoretical exam and classroom activities
17.	2	Understanding and assimilation	Normal anatomy of trachea, lungs, bronchial tree and	Lecture	Theoretical exam and classroom activities

			pulmonary vessels, bronchial vessels, radiological features of the lung, trachea and bronchial tree.		
18.	2	Understanding and assimilation	Normal anatomy of heart, radiological features of the heart	Lecture	Theoretical exam and classroom activities
19.	2	Understanding and assimilation	Normal anatomy of the breast and radiological features of the breast	Lecture	Theoretical exam and classroom activities
20.	2	Understanding and assimilation	Normal anatomy of esophagus, peritoneal covering, anatomical relations of the esophagus, blood supply of esophagus, radiological features of esophagus	Lecture	Theoretical exam and classroom activities
21.	2	Understanding and assimilation	Normal anatomy of stomach, peritoneal covering, anatomical relations of the stomach, blood supply and venous drainage of the stomach, Radiological features of the stomach.	Lecture	Theoretical exam and classroom activities
22.	2	Understanding and assimilation	Normal anatomy of small intestine, peritoneal covering, anatomical relations of the small intestine, blood supply, venous drainage and lymphatic drainage of the small intestine, radiological features of small intestine	Lecture	Theoretical exam and classroom activities
23.	2	Understanding and assimilation	Normal anatomy of large intestine, peritoneal covering, anatomical relations of the large intestine, blood supply, venous drainage and lymphatic drainage of the large intestine, radiological features of large intestine.	Lecture	Theoretical exam and classroom activities
24.	2	Understanding and assimilation	Normal anatomy of the liver and biliary system, peritoneal covering, anatomical relations of the liver, lobes and segments of the liver, hepatic ducts and blood supply of the liver.	Lecture	Theoretical exam and classroom activities
25.	2	Understanding and assimilation	Radiological features of the liver and biliary system.	Lecture	Theoretical exam and classroom activities
26.	2	Understanding and assimilation	Normal anatomy of pancreas, peritoneal covering, anatomical relations of the pancreas, blood supply of pancreas, Radiological features of the pancreas.	Lecture	Theoretical exam and classroom activities

27.	2	Understanding and assimilation	Normal anatomy of spleen, peritoneal covering, anatomical relations of the pancreas, blood supply of spleen, radiological features of the spleen	Lecture	Theoretical exam and classroom activities
28.	2	Understanding and assimilation	Normal anatomy of kidney, site, peritoneal covering and anatomical relations of the kidneys, fascial spaces around the kidneys, Internal structures, arterial supply and venous drainage of the kidney, Radiological features of kidney	Lecture	Theoretical exam and classroom activities
29.	2	Understanding and assimilation	Normal anatomy of the female pelvic: uterus, ovarian, fallopian tubes, vagina, bladder, urethra, blood supply, radiological features of the female pelvic.	Lecture	Theoretical exam and classroom activities

23.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

24.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Radiographic techniques 2

Course Description Form

1- Course Name:
Radiographic techniques 2
25.Course Code:
RAD313
26.Semester / Year:
Third
27.Description Preparation Date:
17/2/2024
28.Available Attendance Forms:
Weekly
29.Number of Credit Hours (Total) / Number of Units (Total)
180 hours / 8 unite
30.Course administrator's name (mention all, if more than one name)
Name: Alaa Sabeeh Shenawa Email: alaaunisydney@gmail.com
31.Course Objectives

To teach the students how to direct the patient in particular way to photograph to see diseases in the best way for head chest, spinal cord and abdomen	

32.Teaching and Learning Strategies	
Strategy	Lectures Practice on different x-ray machine Learning from practical viedio quizzes

33. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2	2 2	Understanding and assimilation	Lines & planes of projection of the skull skull	Lecture	Theoretical exam and classroom activities
3	2	Understanding and assimilation	Sella turcica & Optic foramina and jugular	Lecture	Theoretical exam and classroom

			foramina		activities
4	2	Understanding and assimilation	Petrous &temporal bones	Lecture	Theoretical exam and classroom activities
5	2	Understanding and assimilation	Mastoid positions	Lecture	Theoretical exam and classroom activities
6	2	Understanding and assimilation	Face & sinuses	Lecture	Theoretical exam and classroom activities
7	2	Understanding assimilation	Mandible	Lecture	Theoretical exam and classroom activities
8	2	Understanding assimilation	TMJ view, maxillary bone	Lecture	Theoretical exam and classroom activities
9	2	Understanding assimilation	Paranasal sinuses	Lecture	Theoretical exam and classroom activities
10	2	Understanding assimilation	Vertebral level	Lecture	Theoretical exam and classroom activities
11	2	Understanding assimilation	Cervical spine	Lecture	Theoretical exam and classroom activities
12	2	Understanding assimilation	Cervico-thoracic region position	Lecture	Theoretical exam and classroom activities
13	2	Understanding assimilation	Thoracic spine	Lecture	Theoretical exam and classroom activities
14	2	Understanding assimilation	Lumber spine	Lecture	Theoretical exam and classroom activities
15	2	Understanding assimilation	Lumbo-sacral junction& Sacrum and Coccyx projections	Lecture	Theoretical exam and classroom activities

16	2	Understanding assimilation	pharynx and larynx	Lecture	Theoretical exam and classroom activities
17	2	Understanding assimilation	Trachea	Lecture	Theoretical exam and classroom activities
18	2	Understanding assimilation	Lungs	Lecture	Theoretical exam and classroom activities
19	2	Understanding assimilation	lordotic position	Lecture	Theoretical exam and classroom activities
20	2	Understanding assimilation	Heart	Lecture	Theoretical exam and classroom activities
21	2	Understanding assimilation	Bones of the thorax (upper ribs)	Lecture	Theoretical exam and classroom activities
22	2	Understanding assimilation	Bones of the thorax (lower ribs)	Lecture	Theoretical exam and classroom activities
23	2	Understanding assimilation	Sternum	Lecture	Theoretical exam and classroom activities
24	2	Understanding assimilation	Abdomen Planes	Lecture	Theoretical exam and classroom activities
25	2	Understanding assimilation	Abdomen positions	Lecture	Theoretical exam and classroom activities
26	2	Understanding assimilation	Urinary tract	Lecture	Theoretical exam and classroom activities
27	2	Understanding assimilation	Urinary bladder	Lecture	Theoretical exam and classroom activities

28	2	Understanding assimilation	Mammography Positioning terminology	Lecture	Theoretical exam and classroom activities
29	2	Understanding assimilation	Radiological considerations of mammography	Lecture	Theoretical exam and classroom activities
30	2	Understanding assimilation	Mammography main position, finding, image interpretation	Lecture	Theoretical exam and classroom activities

34.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

35.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Computer applications

Course Description Form

1. Course Name:
Computer applications
2. Course Code:
RAD314
3. Semester / Year:
The first and second semester of the third stage / 2023-2024
4. Description Preparation Date:
16/2/2024
5. Available Attendance Forms:
weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
45 hours/2 units
7. Course administrator's name (mention all, if more than one name)
Name: Zainab falih Email: zainabfalih90@gmail.com
8. Course Objectives

Providing the student with knowledge in managing and using various computer applications.	•
9. Teaching and Learning Strategies	
Strategy	• Lectures • Reports • Quotes, in addition to evaluating attendance and the style of discussion within t classroom

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	2	Understanding and assimilation	**Microsoft Word 2010 Run Microsoft Word 2010**	Lecture	Theoretical exam and classroom activities
3	2	Understanding and assimilation	Microsoft Word 2010 interface	Lecture	Theoretical exam and classroom activities
6-4	2	Understanding and assimilation	File tab, Home tab	Lecture	Theoretical exam and classroom activities
7-9	2	Understanding and assimilation	inserting objects in Microsoft Word 2010	Lecture	Theoretical exam and classroom activities
10-12	2	Understanding and assimilation	Tab Insert tab Pages group Giving practical examples of inserting objects. Training	Lecture	Theoretical exam and classroom activities

			on writing texts in a more professional manner.		
13	2	Understanding and assimilation	A link group, a header and footer group Header & Footer Text group, symbol group Symbols .	Lecture	Theoretical exam and classroom activities
14	2	Understanding and assimilation	Microsoft PowerPoint 2010 Open a new file and store it on your desktop	Lecture	Theoretical exam and classroom activities
15-30	2	Understanding and assimilation	Add animation to slides	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Radiation Protection

Course Description Form

1. Course Name:

Radiation Protection

2. Course Code:

RAD315

3. Semester / Year:

Year

4. Description Preparation Date:

5. Available Attendance Forms:

Weakly

6. Number of Credit Hours (Total) / Number of Units (Total)

90 hours/ 4 unite

7. Course administrator's name (mention all, if more than one name)

Name: Hussein Ali Abdulhussein
Email: hussein.aldainy333@gmail.com

8. Course Objectives

9. Teaching and Learning Strategies

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding and assimilation	**Review** Structure of the Atom Radiation Units ALARA principles	Lecture	Theoretical exam and classroom activities
2	2	Understanding and assimilation	Diagnostic X-Ray Room Measurement of Area Radiation Levels Leakage Radiation In-room Scattered Radiation Measurement Protective Barrier/Shielding Assessment Area Radiation Level Checklist	Lecture	Theoretical exam and classroom activities
3	2	Understanding and assimilation	Medical Sources: Occupational and Patient Doses Ionizing radiation interactions with tissue Radiobiological effects at the cellular and whole body level genetic and somatic effects of ionizing radiation deterministic effects stochastic effects	Lecture	Theoretical exam and classroom activities

			probability coefficients for tissues at risk effective dose Threshold and non-threshold effects.		
4	2	Understanding and assimilation	Radiation protection principles Justification Optimization Limitation	Lecture	Theoretical exam and classroom activities
5	2	Understanding and assimilation	Radiation protection principles applied to medical diagnostic procedures Radiation protection of patients who are or might be pregnant Practical measures for the reduction of patient dose Some dose-saving equipment Some dose-saving techniques High-risk examinations	Lecture	Theoretical exam and classroom activities
6	2	Understanding and assimilation	Risks from radiological examinations Explaining radiation risks to patients Personal protection and personal monitoring - how, why, when, where dose limits typical doses to staff and associated risks protection of staff and members of the public protection of patients	Lecture	Theoretical exam and classroom activities
7	2	Understanding and assimilation	physical factors affecting radio-sensitivity 1. Linear energy transfer 2. Relative biologic effectiveness 3. Fractionation and protraction	Lecture	Theoretical exam and classroom activities
8	2	Understanding and assimilation	Biologic factors affecting Radio sensitivity 1. Oxygen effect 2. Age effect 3. Sex effect 4. Recovery 5. Chemical agents	Lecture	Theoretical exam and classroom activities
9	2	Understanding and assimilation	Early effects of Radiation Acute radiation syndrome Hematologic syndrome Gastrointestinal syndrome Central nervous system syndrome Local tissue damage Skin Gonads Extremities Hematologic depression	Lecture	Theoretical exam and classroom activities

			Cytogenetic damage		
10	2	Understanding and assimilation	Late effects of radiation Leukemia Other malignant disease Effect of fetal irradiation Prenatal death Neonatal death Congenital malformation Childhood malignancy Fetuses irradiated in utero	Lecture	Theoretical exam and classroom activities
11	2	Understanding and assimilation	Radiation dose-response relationships Linear dose-response relationships Non- Linear dose-response relationships Constructing a dose-response relationships Linear, quadratic dose-response relationships Radiolysis of water Direct and indirect	Lecture	Theoretical exam and classroom activities
12	2	Understanding and assimilation	Maximum permissible dose whole body non-occupational exposure Partial-body occupational exposure X-ray and pregnancy 1. The pregnant technologist 2. Management principles 3. The pregnant patient	Lecture	Theoretical exam and classroom activities
13	2	Understanding and assimilation	Designing for radiation protection Design of X-ray apparatus Design of protective barrier thickness	Lecture	Theoretical exam and classroom activities
14	2	Understanding and assimilation	Factors affecting barrier thickness Occupational Exposure	Lecture	Theoretical exam and classroom activities
15	2	Understanding and assimilation	Patient dose Patient dose in special examinations Reduction of occupational exposure Reduction of unnecessary patient dose Unnecessary examinations	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

12.Learning and Teaching Resources

Required textbooks (curricular books any)	Muir's textbook of pathology
Main references (sources)	Robin's basic pathology
Recommended books and references (scientific journals, reports...)	Ackermann's surgical pathology

Electronic References, Websites	Web path

Radiation Physics

Course Description Form

1- Course Name:
Radiation Physics
2- Course Code:
RAD316
3- Semester / Year:
Third
4- Description Preparation Date:
18/2/2024
5- Available Attendance Forms:
Weekly
6- Number of Credit Hours (Total) / Number of Units (Total)
120 hours/6 credits
7- Course administrator's name (mention all, if more than one name)
Dr. Malik Hadi
8- Course Objectives
On completing the year, the student will: **• Have a broad overview of MRI & US systems and basic MRI & US physics** **• Acquire a basic understanding of how MR & US images are created** **• Develop knowledge of MRI & US pulse sequences** **• Obtain a detailed background in MRI & US physics and paradigm design**
9- Teaching and Learning Strategies

Strategy	• Lectures (theoretical + practice) • Reports • quizzes

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	2	Understanding and assimilation	PHYSICS OF ULTRASOUND Definition Physical Definition Medical Definition Properties of Ultrasound Type of Waves Depends on the Medium Phase Velocity–Group Velocity 1. Phase velocity 2. Group Velocity 3. Wavelength and Speed of Propagation	Lecture	Theoretical exam and classroom activities

3-4	2	Understanding and assimilation	Diagnostic Ultrasound Piezoelectric Materials Historical Piezoelectric Crystals or Materials Piezoelectric Effect Reverse Piezoelectric Effect Detection of Ultrasound	Lecture	Theoretical exam and classroom activities
5-6	2	Understanding and assimilation	ULTRASOUND IMAGING SYSTEMS Ultrasound Transducers Ultrasonic Transducer Structures Types of Ultrasound Transducers 1. Linear Transducer 2. Sector Transducer 3. Convex Transducer Amplification Scan Generator Scan Converter Image Processor Display	Lecture	Theoretical exam and classroom activities
7-8	2	Understanding and assimilation	Things to Consider Thickness Range Geometry Temperature Accuracy Ultrasound Modalities Ultrasound Pulse Generator Short Pulse Continuous Wave Mode	Lecture	Theoretical exam and classroom activities
9-10	2	Understanding and assimilation	Ultrasound Characteristics Frequency Velocity Wavelength Amplitude Intensity and Power Temporal Characteristics Spatial Characteristics Temporal/Spatial Combinations Interactions of Ultrasound with Tissue Attenuation Refraction **Reflection** Scattering Absorption	Lecture	Theoretical exam and classroom activities

11-12	2	Understanding and assimilation	Acoustic Impedance Ultrasound Contrast Agents Spatial Resolution Lateral resolution Axial resolution Beam forming and transducers Ultrasound Field Transducer Focusing Dynamic Receive Focus Ultrasonic Phased Arrays Unfocused Transducers Fixed Focus Adjustable Transmit Focus Time Gain Compensation (TGC)	Lecture	Theoretical exam and classroom activities
13-14	2	Understanding and assimilation	ULTRASOUND TECHNIQUES Modes Ultrasound A-mode B-Mode M-mode or TM-mode B-scan, Two-dimensional Three- and four-dimensional techniques B-flow Doppler Effect **Basic principles** The Doppler Equation Spectral Doppler	Lecture	Theoretical exam and classroom activities
15-16	2	Understanding and assimilation	Pulsed and Continuous Wave Doppler Continuous Wave Doppler The advantage of CW Doppler The disadvantage of CW Doppler High PRF Color Flow Mapping Pulsed Wave Doppler Nyquist Limit HPRF Doppler Angle of Incidence Aliasing	Lecture	Theoretical exam and classroom activities
17-18	2	Understanding and assimilation	CHAPTER ELEVEN: MAGNETIC RESONANCE IMAGING Historical introduction The Hardware	Lecture	Theoretical exam and classroom activities

			Magnet Types Permanent Magnets Resistive Magnets Superconducting Magnets RF Coils Volume RF Coils Surface Coils Quadrature Coils Phased Array Coils		
19-20	2	Understanding and assimilation	Other Hardware Atomic Structure Magnetization Magnetic Moments Excitation Relaxation T1 Relaxation T1 Relaxation Curves T2 Relaxation Phase and Phase Coherence T2 Relaxation Curves T2* Relaxation	Lecture	Theoretical exam and classroom activities
21-22	2	Understanding and assimilation	Acquisition Computing and Display Gradient Coils	Lecture	Theoretical exam and classroom activities
23-24	2	Understanding and assimilation	Signal Coding Slice Encoding Gradient Phase Encoding Gradient Frequency Encoding Gradient Gradient Specifications MRI Image Quality, Artifacts, and Imaging Parameters Signal to Noise and Contrast Resolution Pixel, Voxel, Matrix Slice Thickness Receiver Bandwidth Inter-slice gap Size of the (image) matrix	Lecture	Theoretical exam and classroom activities
25-30	2	Understanding and assimilation	Scan parameters (TR, TE, flip angle) Number of acquisitions Selection of the transmit and receive coil (RF coil) Field of View Number of Excitations MRI Contrast Agents K-Space	Lecture	Theoretical exam and classroom activities

			Filling k-Space K-Space Symmetry		

11- Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

General pathology

Course Description Form

1. Course Name:

General pathology

2. Course Code:

RAD317

3. Semester / Year:

Third

4. Description Preparation Date:

April 25, 2024

5. Available Attendance Forms:

Weakly

6. Number of Credit Hours (Total) / Number of Units (Total)

120 hours/ 6 unite

7. Course administrator's name (mention all, if more than one name)

Name: Assist. Prof. Dr. Mukhallad A. Ramadhan
Email: Pathomedref@gmail.com

8. Course Objectives

The course aim to learn the students the principles of the diseases starting from the cause of the diseases wither it is infections and genetic, the pathogenesis of the diseases, gross and histopathoilogical changes that lead to disturb the function of the organs and systems which expressed as the clinical manifestations of the disease.

9. Teaching and Learning Strategies

Learning strategies includes including the lecture, interactive discussions and preparation of the reports about different pathological topics to encourage the students on the search and getting the information.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Understanding and assimilation	Cell injury	Lecture	Theoretical exam and classroom activities
2.	2	Understanding and assimilation	Inflammation	Lecture	Theoretical exam and classroom activities
3.	2	Understanding and assimilation	Repair	Lecture	Theoretical exam and classroom activities
4.	2	Understanding and assimilation	Hemodynamics disorders	Lecture	Theoretical exam and classroom activities
5.	2	Understanding and assimilation	Immunopathology	Lecture	Theoretical exam and classroom activities
6.	2	Understanding and assimilation	Genetic diseases	Lecture	Theoretical exam and classroom activities

7.	2	Understanding and assimilation	Nutritional diseases	Lecture	Theoretical exam and classroom activities
8.	2	Understanding and assimilation	Environmental diseases	Lecture	Theoretical exam and classroom activities
9.	2	Understanding and assimilation	Infectious pathology	Lecture	Theoretical exam and classroom activities
10.	2	Understanding and assimilation	Neoplasia	Lecture	Theoretical exam and classroom activities
11.	2	Understanding and assimilation	Heart pathology	Lecture	Theoretical exam and classroom activities
12.	2	Understanding and assimilation	Pathology of vascular system	Lecture	Theoretical exam and classroom activities
13.	2	Understanding and assimilation	Pathology of respiratory system	Lecture	Theoretical exam and classroom activities
14.	2	Understanding and assimilation	Pathology of renal system	Lecture	Theoretical exam and classroom activities
15.	2	Understanding and assimilation	Pathology of hematopoietic system	Lecture	Theoretical exam and classroom activities
16.	2	Understanding and assimilation	Pathology of lymphoid system	Lecture	Theoretical exam and classroom activities
17.	2	Understanding and assimilation	Bleeding disorders	Lecture	Theoretical exam and classroom activities
18.	2	Understanding and assimilation	Pathology of oral cavity	Lecture	Theoretical exam and classroom activities
19.	2	Understanding and assimilation	Pathology of elementary canal	Lecture	Theoretical exam and classroom activities
20.	2	Understanding and assimilation	Pathology ofand liver and gall bladder	Lecture	Theoretical exam and classroom activities
21.	2	Understanding and assimilation	Pathology of pancreas	Lecture	Theoretical exam and classroom activities
22.	2	Understanding and assimilation	Pathology of endocrine system	Lecture	Theoretical exam and classroom activities
23.	2	Understanding and assimilation	Pathology of CNS	Lecture	Theoretical exam and classroom activities
24.	2	Understanding and assimilation	Pathology of PNS	Lecture	Theoretical exam and classroom activities
25.	2	Understanding and assimilation	Pathology of muscular system	Lecture	Theoretical exam and classroom activities
26.	2	Understanding and assimilation	Pathology of skeletal system	Lecture	Theoretical exam and classroom activities
27.	2	Understanding and assimilation	Pathology of skin	Lecture	Theoretical exam and classroom activities
28.	2	Understanding and assimilation	Pathology of eye	Lecture	Theoretical exam and classroom activities
29.	2	Understanding and assimilation	Pathology of prostate	Lecture	Theoretical exam and classroom activities
30.	2	Understanding and assimilation	Breast pathology	Lecture	Theoretical exam and classroom activities

11.Course Evaluation	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Muir’s textbook of pathology
Main references (sources)	Robin’s basic pathology
Recommended books and references (scientific journals, reports...)	Ackermann’s surgical pathology
Electronic References, Websites	Web path

English Language

Course Description Form

1. Course Name:

English language

2. Course Code:

RAD318

3. Semester / Year:Years

Third

4. Description Preparation Date:

16/2/2024

5. Available Attendance Forms:

Weekly

6. Number of Credit Hours (Total) / Number of Units (Total) 60 hour

30 hours / 4 unite

7. Course administrator's name (mention all, if more than one name)

Name: Mohammed Jawad Atwan
Email: alnoory683@gmail.com

8. Course Objectives

Language preparation / reading / reports / translation / pronunciation

9. Teaching and Learning Strategies

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding and assimilation	Basics of English	Lecture	Theoretical exam and classroom activities
2	2	Understanding and assimilation	\Sounds and pronunciation method	Lecture	Theoretical exam and classroom activities
3	2	Understanding and assimilation	Parts of speech	Lecture	Theoretical exam and classroom activities
4	2	Understanding and assimilation	sentences parts. The noun of the verb with the object of the first object and the object of the second and its complement	Lecture	Theoretical exam and classroom activities
5	2	Understanding and assimilation	Types of sentences	Lecture	Theoretical exam and classroom activities
6	2	Understanding and assimilation	Getting to know you. Present simple terms. Present continuous.. have /have got	Lecture	Theoretical exam and classroom activities
7	2	Understanding and	The way we live.	Lecture	Theoretical exam and

		assimilation	Present simple		classroom activities
8	2	Understanding and assimilation	It all wrong Questions	Lecture	Theoretical exam and classroom activities
9	2	Understanding and assimilation	Let's go shopping. Much and many Afew A literature	Lecture	Theoretical exam and classroom activities
10	2	Understanding and assimilation	What do you want it like. Conjugation of verbs	Lecture	Theoretical exam and classroom activities
11	2	Understanding and assimilation	Tell me What is it like. Going to will	Lecture	Theoretical exam and classroom activities
12	2	Understanding and assimilation	Unit 7: fame present perfect. From. Sins	Lecture	Theoretical exam and classroom activities
13	2	Understanding and assimilation	Unit 8 Do and don't Have l have got Should moust	Lecture	Theoretical exam and classroom activities
14	2	Understanding and assimilation	Going place Unit 9	Lecture	Theoretical exam and classroom activities
15	2	Understanding and assimilation	Unit 10 scared to death/ varb patterns infinitives	Lecture	Theoretical exam and classroom activities
16	2	Understanding and assimilation	Things that changed that words. Passive	Lecture	Theoretical exam and classroom activities
17	2	Understanding and assimilation	Unit 12 Dreams and realits	Lecture	Theoretical exam and classroom activities
18	2	Understanding and assimilation	Unit 13 Earning A living present perfect continuous and present perfect simple	Lecture	Theoretical exam and classroom activities
19	2	Understanding and assimilation	Unit 14 family ties Writinig story	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Fourth Stage

Principle of Medicine and Surgery

Course Description Form

1- Course Name:
Principle of Medicine and Surgery
2- Course Code:
RAD411
3- Semester / Year:
Fourth
4- Description Preparation Date:
18/2/2024
5- Available Attendance Forms:
Weekly
6- Number of Credit Hours (Total) / Number of Units (Total)
150 hours/ 7 unite
7- Course administrator's name (mention all, if more than one name)
Ahmed waheed Al Rubaye ahmedrn83@gmail.com
8- Course Objectives
Introducing the student to most internal and surgical diseases, their causes, symptoms, and how to diagnose them.
9- Teaching and Learning Strategies

Strategy	• Lectures (theoretical + practice) • Reports • quizzes

10- Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
.1	2	Understanding and assimilation	Headache - Types - Imaging of headache	Lecture	Theoretical exam and classroom activities
.2	2	Understanding and assimilation	Cerebrovascular accident (CVA): imaging in CVA	Lecture	Theoretical exam and classroom activities
.3	2	Understanding and assimilation	Bone disease: - Infection - Tumor	Lecture	Theoretical exam and classroom activities
.4	2	Understanding and assimilation	Respiratory tract diseases: - Infections , - Chest trauma, - Lung masses	Lecture	Theoretical exam and classroom activities

.5	2	Understanding and assimilation	- Pulmonary embolism, - pneumothorax, - pleural effusion	Lecture	Theoretical exam and classroom activities
.6	2	Understanding and assimilation	Urinary tract infection: imaging in UTI	Lecture	Theoretical exam and classroom activities
.7	2	Understanding and assimilation	GIT: diseases of esophagus	Lecture	Theoretical exam and classroom activities
.8	2	Understanding and assimilation	Diseases of the stomach: - Gastric mass, - Ulcer	Lecture	Theoretical exam and classroom activities
.9	2	Understanding and assimilation	- GIT: diseases of esophagus.	Lecture	Theoretical exam and classroom activities
.10	2	Understanding and assimilation	Diseases of duodenum : Duodenal ulcer (DU)	Lecture	Theoretical exam and classroom activities
.11	2	Understanding and assimilation	Diseases of jejunum & ileum	Lecture	Theoretical exam and classroom activities
.12	2	Understanding and assimilation	Diseases of colon	Lecture	Theoretical exam and classroom activities
.13	2	Understanding and assimilation	Liver : Hepatitis, Jaundice,	Lecture	Theoretical exam and classroom activities
.14	2	Understanding and assimilation	Cholecystitis, Portal hypertension	Lecture	Theoretical exam and classroom activities
.15	2	Understanding and assimilation	Diseases of vascular system	Lecture	Theoretical exam and classroom activities
.16	2	Understanding and assimilation	Head injury: the role of imaging in head injury	Lecture	Theoretical exam and classroom activities
.17	2	Understanding and assimilation	Paranasal sinuses: imaging in paranasal sinuses diseases	Lecture	Theoretical exam and classroom activities
.18	2	Understanding and assimilation	The orbit: imaging in orbital diseases	Lecture	Theoretical exam and classroom activities
.19	2	Understanding and assimilation	The spine : imaging of spinal lesions	Lecture	Theoretical exam and classroom activities
.20	2	Understanding and assimilation	The neck : role of imaging in neck masses	Lecture	Theoretical exam and classroom activities

.21	2	Understanding and assimilation	Bone fracture: types & imaging	Lecture	Theoretical exam and classroom activities
.22	2	Understanding and assimilation	Urinary tract obstruction: - causes, - clinical features - imaging.	Lecture	Theoretical exam and classroom activities
.23	2	Understanding and assimilation	Renal & vesical tumors: types, features, imaging.	Lecture	Theoretical exam and classroom activities
.24	2	Understanding and assimilation	• Cystic diseases of kidney. • congenital anomalies of urinary tract.	Lecture	Theoretical exam and classroom activities
.25	2	Understanding and assimilation	Hepatic masses: role of imaging	Lecture	Theoretical exam and classroom activities
.26	2	Understanding and assimilation	Breast masses: benign & malignant	Lecture	Theoretical exam and classroom activities
.27	2	Understanding and assimilation	Female reproductive system: - infertility - causes & role of imaging	Lecture	Theoretical exam and classroom activities
.28	2	Understanding and assimilation	Tumors of uterus & ovaries	Lecture	Theoretical exam and classroom activities
.29	2	Understanding and assimilation	Male reproductive system: infertility, causes & role of imaging	Lecture	Theoretical exam and classroom activities
.30	2	Understanding and assimilation	Prostate : - Diseases, prostate enlargement - Methods of treatments	Lecture	Theoretical exam and classroom activities

11- Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	***"Principles and Practice of Surgery" 7th Edition*** ***Davidson Principles & Practice of Medicine"***, 23rd edition
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

English Language

Course Description Form

1. Course Name:

English Language

2. Course Code:

RAD412

3. Semester / Year:

Fourth

4. Description Preparation Date:

19/2/2024

5. Available Attendance Forms:

Weekly

6. Number of Credit Hours (Total) / Number of Units (Total)

30 hours / 4 unite

7. Course administrator's name (mention all, if more than one name)

Name: Asst. Lect. Yazen Basil Hassan
Email: yazenbasilhassanl-rubaie9@uomanara.edu.iq

8. Course Objectives

Preparing the student at a high level of proficiency in the English language in the four skills, especially the skill of speaking and reading, which helps him in studying medicine and specialist in general.

9. Teaching and Learning Strategies

1. Lectures
2. Reports
3. Quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	1	Understanding assimilation	Tenses(present simp past simple, Future simple.)	Theoretical lecture	Quiz
Second	1	Understanding assimilation	Pronunciation rules	Theoretical lecture	Quiz
Third-Fifteenth	1	Understanding assimilation	Part of speech	Theoretical lecture	Quiz
Sixteeenth- Thirty	1	Understanding assimilation	Speaking task (How to introduce yourself, Film, Books)	Theoretical lecture	Speaking Quiz

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned,Mid- term and final exam, also reports .

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1.English for Medicine and health Sciences. 2. Oxford books for learning English.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Merriam-Webster

Biostatistics

Course Description Form

1- Course Name:
Biostatistics
2- Course Code:
RAD413
3- Semester / Year:
Fourth
4- Description Preparation Date:
18/2/2024
5- Available Attendance Forms:
Weekly
6- Number of Credit Hours (Total) / Number of Units (Total)
120 hours/ 6 unite
7- Course administrator's name (mention all, if more than one name)
8- Course Objectives
9- Teaching and Learning Strategies

Strategy	• Lectures • Reports • quizzes

10- Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2	Understanding and assimilation	General introduction: definition of scientific research, classification of research, definition of medical and health surveys, types of surveys, selection of research topics, scientific research methods.	Lecture	Theoretical exam and classroom activities
3–2	2	Understanding and assimilation	Scientific research plan: its preparation, elements, parts of the research when writing, stages of the statistical method and its importance.	Lecture	Theoretical exam and classroom activities
7–4	2	Understanding and assimilation	Methods of collecting information and data, classifying and tabulating them, methods of displaying data (frequency tables, graphs, measures of central tendency, relative and absolute anchorage measures) with applied examples.	Lecture	Theoretical exam and classroom activities
10–8	2	Understanding and assimilation	Introduction to probability: formulation of probability, types of probability, and their	Lecture	Theoretical exam and

			application in the medical and health field. With applied examples		classroom activities
–11 12	2	Understanding and assimilation	Measures of torsion and effacement: Definition of measures of torsion, definition of measures of effacement, methods of calculating them. With applied examples.	Lecture	Theoretical exam and classroom activities
–13 14	2	Understanding and assimilation	Time series: its components, methods for calculating the general trend, and its application in the field of medical and health research. With applied examples.	Lecture	Theoretical exam and classroom activities
–15 16	2	Understanding and assimilation	Estimation: Point estimate, Confidence interval estimate. With applied examples.	Lecture	Theoretical exam and classroom activities
–17 21	2	Understanding and assimilation	Significant tests: the concept of tests, errors of the first and second types, level of significance, degrees of freedom, tests based on the normal distribution, tests based on the Student (1) distribution, tests based on the (F) distribution, tests based on the Chi-square distribution. With applied examples.	Lecture	Theoretical exam and classroom activities
–22 24	2	Understanding and assimilation	Analysis of variance: one criterion, two criteria (Anova). With applied examples.	Lecture	Theoretical exam and classroom activities
–25 26	2	Understanding and assimilation	Simple correlation coefficient, simple regression coefficient. With applied examples.	Lecture	Theoretical exam and classroom activities
–27 30	2	Understanding and assimilation	Vital statistics: rates and ratios of life phenomena (birth rates, death rates, fertility rates)	Lecture	Theoretical exam and classroom activities

11- Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Computed tomography

Course Description Form

1- Course Name:

Computed tomography

2- Course Code:

RAD414

3- Semester / Year:

Fourth

4- Description Preparation Date:

18/2/2024

5- Available Attendance Forms:

Weekly

6- Number of Credit Hours (Total) / Number of Units (Total)

150 hours/8 unite

7- Course administrator's name (mention all, if more than one name)

Name: Saud Kadhim Abbas Al-Jaberi
Email: saud.mcm@uomisan.edu.iq

8- Course Objectives

9- Teaching and Learning Strategies

Strategy	• Lectures • Reports • quizzes

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
.1	2	Understanding and assimilation	General Principles of Computerized Tomography (CT) : conventional (non-helical) CT , Spiral (Helical) CT.	Lecture	Theoretical exam and classroom activities
.2	2	Understanding and assimilation	Types of CT scanners: first, second, third, fourth generation scanners.	Lecture	Theoretical exam and classroom activities
.3	2	Understanding and assimilation	Basic terms used in CT scanning	Lecture	Theoretical exam and classroom activities
.4	2	Understanding and assimilation	Artifacts in multislice scanning	Lecture	Theoretical exam and classroom activities
.5	2	Understanding and assimilation		Lecture	Theoretical exam and classroom activities
.6	2	Understanding and assimilation	Principles of contrast medium delivery and scan timing in MDCT.	Lecture	Theoretical exam and classroom activities
.7	2	Understanding and assimilation	Cranial CT scanning : routine CT of the brain	Lecture	Theoretical exam and classroom activities

.8	2	Understanding and assimilation	Imaging of stroke	Lecture	Theoretical exam and classroom activities
.9	2	Understanding and assimilation	CT of paranasal sinuses and facial skeleton	Lecture	Theoretical exam and classroom activities
.10	2	Understanding and assimilation	CT of the neck	Lecture	Theoretical exam and classroom activities
.11	2	Understanding and assimilation	Thoracic CT	Lecture	Theoretical exam and classroom activities
.12	2	Understanding and assimilation	High resolution CT of the lungs	Lecture	Theoretical exam and classroom activities
.13	2	Understanding and assimilation	Cardiac CT	Lecture	Theoretical exam and classroom activities
.14	2	Understanding and assimilation	CT pulmonary angiography	Lecture	Theoretical exam and classroom activities
.15	2	Understanding and assimilation	CT : of the gastro-intestinal tract	Lecture	Theoretical exam and classroom activities
.16	2	Understanding and assimilation	CT colonography	Lecture	Theoretical exam and classroom activities
.17	2	Understanding and assimilation	Virtual CT colonoscopy	Lecture	Theoretical exam and classroom activities
.18	2	Understanding and assimilation	CT scanning of the liver:non-enhanced CT, single phase contrast enhanced CT,dual phase & triple phase enhanced CT.	Lecture	Theoretical exam and classroom activities
.19	2	Understanding and assimilation	CT of the pancreas: CT in pancreatic tumors, CT in pancreatitis.	Lecture	Theoretical exam and classroom activities
.20	2	Understanding and assimilation	CT scan of the urinary tract: non-enhanced CT scanning in urinary tract obstruction. CT urography. CT scanning in bladder injury	Lecture	Theoretical exam and classroom activities
.21	2	Understanding and assimilation	Musculoskeletal CT	Lecture	Theoretical exam and classroom activities
.22	2	Understanding and assimilation	CT of trauma patients.	Lecture	Theoretical exam and classroom activities

11- Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

MRI

Course Description Form

1. Course Name:
MRI
2. Course Code:
RAD415
3. Semester / Year:
Fourth
4. Description Preparation Date:
18/2/2024
5. Available Attendance Forms:
Weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
180 hours/8 unite
7. Course administrator's name (mention all, if more than one name)
Name: Saud Kadhim Abbas Al-Jaberi Email: saud.mcm@uomisan.edu.iq
8. Course Objectives
9. Teaching and Learning Strategies

Strategy	• Lectures (theoretical + practice) • Reports • quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
.1	2	Understanding and assimilation	**MRI terms**	Lecture	Theoretical exam and classroom activities
.2	2	Understanding and assimilation	**MRI basic principles**	Lecture	Theoretical exam and classroom activities
.3	2	Understanding and assimilation	**Image weighting and contrast**	Lecture	Theoretical exam and classroom activities
.4	2	Understanding and assimilation	**Encoding and parameters**	Lecture	Theoretical exam and classroom activities
.5	2	Understanding and assimilation	**Pulse sequences**	Lecture	Theoretical exam and classroom activities
.6	2	Understanding and assimilation	**Artifacts and their components**	Lecture	Theoretical exam and classroom activities
.7	2	Understanding and assimilation	**Safety**	Lecture	Theoretical exam and classroom activities
.8	2	Understanding and assimilation	**MRI of the brain**	Lecture	Theoretical exam and classroom activities

.9	2	Understanding and assimilation	**MRI of the pituitary gland**	Lecture	Theoretical exam and classroom activities
.10	2	Understanding and assimilation	**MRI of the spinal cord**	Lecture	Theoretical exam and classroom activities
.11	2	Understanding and assimilation	**MRI of the neck**	Lecture	Theoretical exam and classroom activities
.12	2	Understanding and assimilation	**MRI of the abdomen**	Lecture	Theoretical exam and classroom activities
.13	2	Understanding and assimilation	**MRI of the live & biliary system**	Lecture	Theoretical exam and classroom activities
.14	2	Understanding and assimilation	**Mid-year examination**	Lecture	Theoretical exam and classroom activities
.15	2	Understanding and assimilation	**MRI of the pancreas**	Lecture	Theoretical exam and classroom activities
.16	2	Understanding and assimilation	**MRI of the pelvis**	Lecture	Theoretical exam and classroom activities
.17	2	Understanding and assimilation	**role of MRI in obstetrics**	Lecture	Theoretical exam and classroom activities
.18	2	Understanding and assimilation	**Second term examination**	Lecture	Theoretical exam and classroom activities
.19	2	Understanding and assimilation	**MRI of the thorax (lung, mediastinum, heart, breast)**	Lecture	Theoretical exam and classroom activities
.20	2	Understanding and assimilation	**MRI of the musculoskeletal system**	Lecture	Theoretical exam and classroom activities
29-21	2	Understanding and assimilation	**MRI of the hip & Knee joints**	Lecture	Theoretical exam and classroom activities
30	2	Understanding and assimilation	**Final examination**	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Ultrasound imaging

Course Description Form

1. Course Name:

Ultrasound imaging

2. Course Code:

RAD416

3. Semester / Year:

The first and second semester of the Fourth stage / 2023-2024

4. Description Preparation Date:

18/2/2024

5. Available Attendance Forms:

Weekly

6. Number of Credit Hours (Total) / Number of Units (Total)

180 hours/8 credits

7. Course administrator's name (mention all, if more than one name)

Name: Saud Kadhim Abbas Al-Jaberi
Email: saud.mcm@uomisan.edu.iq

8. Course Objectives

9. Teaching and Learning Strategies

Strategy	• Lectures • Reports • quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
.1	2	Understanding and assimilation	Basic principle of US , terms in US, gray scale	Lecture	Theoretical exam and classroom activities
.2	2	Understanding and assimilation	Liver scan , normal pattern	Lecture	Theoretical exam and classroom activities
.3	2	Understanding and assimilation	Liver abnormality	Lecture	Theoretical exam and classroom activities
.4	2	Understanding and assimilation	GB and billiard tract , GB abnormalities	Lecture	Theoretical exam and classroom activities
.5	2	Understanding and assimilation	Peritoneal cavity and gastrointestinal tract	Lecture	Theoretical exam and classroom activities
.6	2	Understanding and assimilation	Spleen & pancreas	Lecture	Theoretical exam and classroom activities
.7	2	Understanding and assimilation	Kidneys and ureters	Lecture	Theoretical exam and classroom activities
.8	2	Understanding and assimilation	Renal pathology	Lecture	Theoretical exam and classroom activities

.9	2	Understanding and assimilation	Urinary bladder	Lecture	Theoretical exam and classroom activities
.10	2	Understanding and assimilation	Pelvic US , Uterus and ovaries non pregnant female	Lecture	Theoretical exam and classroom activities
.11	2	Understanding and assimilation	Scrotum and testis	Lecture	Theoretical exam and classroom activities
.12	2	Understanding and assimilation	Neonates US	Lecture	Theoretical exam and classroom activities
.13	2	Understanding and assimilation	Brest US	Lecture	Theoretical exam and classroom activities
.14	2	Understanding and assimilation	Ultrasound in therapy	Lecture	Theoretical exam and classroom activities
.15	2	Understanding and assimilation	Midyear exam	Lecture	Theoretical exam and classroom activities
.16	2	Understanding and assimilation	Obstetrics US , indication of US	Lecture	Theoretical exam and classroom activities
.17	2	Understanding and assimilation	Early pregnancy(first trimester US), main finding and measurement,	Lecture	Theoretical exam and classroom activities
.18	2	Understanding and assimilation	Main abnormalities in the first trimester	Lecture	Theoretical exam and classroom activities
.19	2	Understanding and assimilation	Second trimester US, normal finding and measurement	Lecture	Theoretical exam and classroom activities
.20	2	Understanding and assimilation	Abnormalities in the second trimester	Lecture	Theoretical exam and classroom activities
.21	2	Understanding and assimilation	Second trimester US, normal finding and measurement	Lecture	Theoretical exam and classroom activities
.22	2	Understanding and assimilation	Second terms exams	Lecture	Theoretical exam and classroom activities
.23	2	Understanding and assimilation	Third trimester, abnormalities	Lecture	Theoretical exam and classroom activities
.24	2	Understanding and assimilation	Multiple pregnancy	Lecture	Theoretical exam and classroom activities
.25	2	Understanding and assimilation	Congenital anomalies 1st	Lecture	Theoretical exam and classroom activities
.26	2	Understanding and assimilation	Congenital anomalies 2nd	Lecture	Theoretical exam and classroom activities
-27 29	2	Understanding and assimilation	Placental and amniotic fluid abnormalities	Lecture	Theoretical exam and classroom activities
30	2	Understanding and assimilation	Final exam	Lecture	Theoretical exam and classroom activities

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily

oral, monthly, or written exams, reports .... etc	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	