Academic program Description form

(2026_2025)

University Name : National University of Science and Technology

College Name : Health and medical technologies

Name of academic or professional program :Bachelors

Name of final degree: Bachelor of radiology technology

Study system : Quarterly

Description preparation date : 5/9/2025

File completion date : 15/9/2025

Name of the Dean of the college :

Date : 15/9/2025 **signature :**

Name of the scientific Assistant :

Date : 15/9/2025 **signature:**

File checked by

Quality Assurance and university performance Division

Name of director of Quality Assurance and university performance Division : Ashjan Rashed Neama

Date : 15/9/2025

Signature :

Deans approval

:Program vision

Achieving academic excellence by applying global standards in the fields of education and scientific research, while adhering to Islamic values and principles. The department seeks to develop and disseminate modern imaging technologies to provide outstanding educational opportunities for students and trainees. We work to graduate a leading generation distinguished "theoretically and practically" and competent in the field of radiology and sonography at the national level. The department seeks to raise its outputs to the level of health services to cover the labor market and push forward the scientific research journey in our dear country. The department also aspires to deepen the sense of .professional and union belonging among its graduates

:Program message

Providing a distinguished and stimulating academic environment to establish .qualified and competent medical support staff in their respective fields Developing a spirit of fair competition among students for academic and .professional excellence and creativity through practical application

Raising the quality of education in the field of radiology to develop students' skills and ensure access to knowledge through following and innovating the best .methods and programs for study, teaching, and training

To graduate distinguished cadres scientifically and professionally who are able to deal with complex and advanced technologies in the field of radiology, ultrasound and radiography in general, by encouraging fourth-year students to advance their research and work to make it applied, beneficial to the community .and important in the labor market

:Program objectives

Preparing and graduating radiology technicians who are professionally and ethically committed to practicing the profession and providing the required .medical care to patients in the public and private sectors

The department strives to develop curricula that keep pace with scientific .advancements and meet local and international accreditation standards

Developing a spirit of cooperation among members of the medical sector to .improve the level of medical service

Preparing and graduating scientifically competent personnel in the field of .scientific research in a way that supports and enhances technical education

Keeping up with developments and emerging technologies in radiography, such as artificial intelligence applications, to enhance the accuracy and ease of .diagnosis and improve patient outcomes

:Program accreditation

Ministry of Higher Education and Scientific Research Program

:Other external influences

Ministry of Health

:Program structure

Observations	Percentage	Study unit	Number of courses	Program structure
essential	24%	7	4	Institutional requirements
essential	76%	38	13	College requirements
essential	76%	38	13	Department requirements

a description :Program

Credit Hours		Course name	Course code	Year / Level
theoretical	practical			
2	3	Skeletal anatomy		First Stage/First Semester
2	3	General Physiology		
2	3	General Physics		
2	3	General Chemistry		
2	3	Biology		
1	2	Computer Principles 1		
1	-	Human rights and democracy		
3	-	English language		
2	3	Anatomy of body systems		First stage/Second semester
2	3	Functional physiology		

2	**3**	Atomic physics		
2	**4**	radiobiology		
2	**4**	Foundations of Nursing		
2	**-**	Medical terminology		
1	**2**	Computer Principles 2		
2	**-**	Arabic		

: Expected learning outcomes for the program

:Knowledge

➤ The student is expected to learn about the types of X-ray machines, their operating principles, and how to perform their routine .maintenance ➤ The student will be able to identify the components of an X-ray machine and understand the function of each main and auxiliary part. ➤ The student gains an understanding of the basics of radiography and the techniques used for radiation protection. ➤ The student is able to understand the anatomical structure of the human body and relate it to radiographic images. ➤ The student learns about the types of contrast media and how to use them safely in medical imaging. ➤ The student learns how traditional developing equipment works and how to handle radiographic films. ➤ The student will be familiar with the latest technologies in medical imaging and the developments in digital and modern devices.	• Knowledge and understanding of the types of radiation devices and how to operate, use, .maintain and preserve them • Knowledge and understanding of the main parts and accessories of X-ray machines and .the function of each part • Knowledge and understanding of the principles of medical imaging, dealing with radiation and how to avoid its harmful .effects • Knowledge and understanding of human .anatomy and its functions • Knowledge and understanding of how to .use coloring materials • Knowledge and understanding of the types of old developing machines and how to .operate and work with them • Knowledge and understanding of the developments in X-ray equipment and .keeping up with them
:Skills	
• The student uses the scientific method and pursues professional development independently. • It analyzes technical malfunctions and suggests appropriate solutions. • He applies precise imaging techniques to obtain clear images. • It performs the required shooting modes according to each situation. • He adheres to safety procedures during filming and use of materials.	• Thinking based on sound scientific principles and the ability to learn .independently • Working to solve technical problems in a scientific and intellectual manner within his .field of specialization • The ability to take radiographic images .correctly and with high quality • Applying different modes of radiographic .imaging with high accuracy • Avoid damage caused by radiation and .coloring materials
:Values	
• The student is committed to professional and ethical conduct at the university and at work. • The student demonstrates initiative and works effectively as part of a team. • The student manages his time and organizes his priorities with flexibility and efficiency. • The student develops his personal skills and participates effectively within work teams. • The student accepts others and participates positively in community service.	• Promoting integrity, ethics, and mutual respect among students, faculty, and administrative staff within the university environment, and among technicians and their colleagues. His subordinates and .patients in the work environment • Dedication to hard work, cooperation and .effective communication • Achieving a balance between academic, .professional and personal life • Building self-confidence, personal .development, teamwork, and leadership • Respect for diversity and peaceful .coexistence, and contribution to society

:Teaching and learning strategies

.Theoretical lectures •
.Practical laboratories •
.Systematic training at the university and the radiology department •
.Summer training in government and private hospitals and private clinics •

: Evaluation methods

. Oral tests •
. Except for the semester exams •
. Except for the final exams •
. Scientific reports •
. Extracurricular activities •

: Faculty

Faculty members

Faculty preparation		Special requirements or skills	Specialization		academic rank
lecturer	angel		private	general	
-	6	-	1	5	PhD
-	3	-	1	2	Master's

: Professional development

Orienting new faculty members

New faculty members are guided through a specific orientation program for new members at the university . This aims to
The program aims to guide and assist them in understanding the work environment, . available resources, policies, and procedures
The academy . Academic mentors are also appointed to help guide and develop new . members

Professional development of faculty members

Conducting numerous training programs, courses, and workshops for new faculty members in the department, including
Training programs in teaching skills, scientific research, academic advising , and leadership development . Also
Working to involve them in collaborative research and projects; such as preparing joint research with their colleagues at the university, or in
Academic conferences, to enhance academic skills and expertise, expand knowledge and . develop research skills

: Admission criteria

The admission criteria are determined according to the admission criteria of the
: Ministry of Higher Education and Scientific Research
The student's overall average in preparatory school .1
Student's desire .2
Department capacity .3

: Key sources of information about the program

1. The textbooks developed by the Ministry of Higher Education and Scientific Research, as the college will be subject to the twinning program With the Middle Technical College / Baghdad
2. Updating the curricula according to what scientific curricula are based on
3. Search the internet for the latest scientific developments

: Program development plan

1. Reviewing recent developments and using video lectures on the display screen
2. Using the internet to present old and used methods in the field of X- ray equipment
3. Using electronic simulation programs to illustrate medical imaging methods and the mechanism of operation of imaging devices
4. Training on X-ray equipment within the university and increasing medical imaging skills

Program Skills Plan

Learning outcomes required from the program

Values				Skills				Knowledge				Essential or optional	Course Name	Course code	Year / Level
Part 4	Part 3	Part 2	Part 1	B4	B3	B2	B1	A4	A3	A2	A1				
												essential	Skeletal anatomy		First Stage / First Semester
			✓									essential	General Physiology		
			✓									essential	General Physics		
			✓									essential	General Chemistry		
			✓									essential	Biology		
			✓									essential	Computer Principles 1		
			✓									essential	Human rights and democracy		

			✓									essential	English language		
			✓									essential	Anatomy of body systems		First stage / Second semester
			✓									essential	Functional physiology		
			✓									essential	Atomic physics		
			✓									essential	radiobiology		
			✓									essential	Foundations of Nursing		
			✓									essential	Medical terminology		
			✓									essential	Computer Principles 2		
			✓									essential	Arabic		

Academic Program Description

Radiology Technology Department

First stage

First course

1. Skeletal Anatomy :Course Name	
2. : Course code	
3. Semester /Year : First Semester 2025-2026	
4. prepared was Date this description: 15/9/2025	
5. .Available attendance formats : lecture in the classroom + laboratory	
6. Total study hours / Total unit hours : 5 hours / 3 unit hours	
7. : Name of the course coordinator (if there is more than one, please state)	
:EmailReda.Fabhd2204m@ihcoedu.uobaghdad.edu.iq	Dr. Hassan Ba Al-Riyahi

8. Course Objectives

1. Understanding natural phenomena– explaining how the world around us works by studying motion, energy, and matter. 2. Applying physical laws– using Newton's laws, thermodynamics, and electromagnetism in analyzing different systems. 3. Developing analytical skills– promoting critical thinking, problem-solving, a logical reasoning through the application of physical concepts. 4. Technological innovation– contributing to the development of electronic devices, renewable energy, and modern communications. 5. Enhancing scientific research– enabling students to conduct experiments, analyze data, and draw accurate scientific conclusions. 6. Applying physics in everyday life– understanding physical principles in field such as medicine, engineering, space, and industry. 7. Stimulating creativity and discovery– supporting scientific exploration and innovation in new fields such as quantum physics and nuclear physics. 8. Studying general physics provides students with a strong scientific foundatio that enables them to understand the physical world and apply this knowledge various scientific and technological fields.	Course Objecti

9. Learning and teaching strategies

.1 Using appropriate teaching and learning strategies contributes to improving the quality of education, increasing student motivation, and enhancing critical thinking and problem-solving skills. The choice between these strategies depends on the educational objectives, the nature of the content, and the characteristics of the learners.

.2 Learning, in both its theoretical and practical aspects, depends on cooperation between the student and the professor to understand the lesson as much as possible and to overcome obstacles that hinder the student's understanding or impede the conduct of his experiments in the laboratory.

.3 Students were urged to use books and scientific articles, whether physical or electronic, as they greatly help in retaining information and allow for discussion and conclusions.

.4 Teaching atomic physics requires effective teaching strategies that help students understand abstract and complex concepts. Here are some effective teaching strategies.

.5 Problem-based learning: Posing open-ended questions about atomic phenomena such as quantum mechanics or the modern atomic model to stimulate critical thinking.

.6 Research projects: Encouraging students to research topics such as nanotechnology or medical applications of atomic physics.

10. Course structure (theoretical - practical)

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	*Introduction, Definition:*	To understand the importance Study of t skeleton Human being and their various divisions.	2 N + C 3	the firs
Daily exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	*Upper limb structure*	Understanding the structure of the main bones of the upper limb and their role in movement.	2 N + C 3	the second
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	*The humerus bone, - the radius and ulna bones*	Understanding the structure of the humer bone and the bones of the radius and ulna A its functions.	2 N + C 3	the thi
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	*hand*	Identifying the major bones In the hand and role in Motor performance.	2 N + C 3	Fourth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	upper limb muscles	Studying the muscles responsible for arm a hand movements.	2 N + C 3	Fifth

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***joints***	**Understanding the typ of joints in the upper limb and how they wo .**	**2 N + C 3**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Chest structure***	**Identifying the bones of the chest and the structure of the rib cage.**	**2 N + C 3**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Vertebrates***	**Studying the structure the vertebrae and thei functions in supportin and protecting the bo**	**2 N + C 3**	**Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Lower limb structure: - Bony pelvis (pelvic girdle)**	**Understanding the structure of the pelvic bone and its role in supporting the body a movement.**	**2 N + C 3**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***femur, tibia, and fibula***	**Identifying the femur bones, The tibia and fibula and their functions in movemen and walking.**	**2 N + C 3**	**tenth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***foot***	**Identifying and studyi The bony, muscular, a ligament structures of the foot The main one with an understanding its functions Vitality i movement and balan**	**2 N + C 3**	**atheist ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**lower limb muscles**	**Identifying groups Th major muscle in the lower limbs, and a description of its origi And its origin, and its work, In addition to identifying its innervation.**	**2 N + C 3**	**the second ten**
Exams and discussions	**The lecture was presented via PowerPoint and followed by .discussion**	***skull***	**Identifying the bones that make up the main skull, with an understanding of their points of connection (suscus) and their role in protecting the brain and shaping the face .**	**2 N + C 3**	**the thi ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Facial bones, - lower jaw - temporomandibular joint***	**Describe the bony structures of the face and lower jaw, identify the components of the temporomandibular joint, and understand its movement and function in chewing and speech.**	**2 N + C 3**	**Fourth ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Nasal cavity and sinuses***	**Defining the boundari of the nasal cavity and the surrounding sinus He described its functions in moisturiz Air purification and effect On the sound.**	**2 N + C 3**	**Fifth ten**
Course Evaluation .11					
.Daily exams, monthly and final theoretical and practical exams, and classroom discussions					

Learning and teaching resources .12	
Required textbooks (methodology)	
Main references (sources)	
Recommended supporting books and references (scientific journals, reports, etc.)	
Electronic references, websites	
1. General Physics :Course Name	
2. General Physics : Course code	
3. Year : First Semester 2025-2026 /	
4. prepared was Date this description: 15/9/2025	
5. .Available attendance formats : lecture in the classroom + laboratory	
6. Total study hours / Total unit hours : 5 hours / 3 unit hours	
7. : Name of the course coordinator (if there is more than one, please state)	
:EmailReda.Fabhd2204m@ihcoedu.uobaghdad.edu.iq	M.M. Reda Fahd Hannoun
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10. Course structure (theoretical part)

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	*Standard units of measurement*	Understanding phenomena and apply laws	2	the firs

Daily exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Electricity, magnetism***	**Understanding phenomena** and **applyi laws**	**2**	**the second**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Mechanics***	**Understanding phenomena** and **applyi laws**	**2**	**the thi**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Newton's Laws of Motion***	**Understanding phenomena** and **applyi laws**	**2**	**Fourth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Momentum**	**Understanding phenomena** and **applyi laws**	**2**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Work and energy***	**Understanding phenomena** and **applyi laws**	**2**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***The relationship between work and energy***	**Understanding phenomena** and **applyi laws**	**2**	**Sevent**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Periodic motion***	**Understanding phenomena** and **applyi laws**	**2**	**Eighth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Rotational motion dynamics***	**Understanding phenomena** and **applyi laws**	**2**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***The relationship between torque and angular acceleration***	**Understanding phenomena** and **applyi laws**	**2**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Rotational kinetic energy***	**Understanding phenomena** and **applyi laws**	**2**	**atheist ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Damped and driven oscillation***	**Understanding phenomena** and **applyi laws**	**2**	**the second ten**
Exams and discussions	**The lecture was presented via PowerPoint and followed .by discussion**	***gravitational potential energy***	**Understanding phenomena** and **applyi laws**	**2**	**the thi ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Heat and temperature***	**Understanding phenomena** and **applyi laws**	**2**	**Fourth ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Gases, pressure, and volume***	**Understanding phenomena** and **applyi laws**	**2**	**Fifth ten**
.11 Course structure (practical part)					

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Instructions for students, important notes about the laboratory***	**Experimental accurac data analysis, Scientifi conclusion**	**3**	**the firs**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Measurement accuracy and uncertainty***	**Experimental accurac data analysis, Scientifi conclusion**	**3**	**the second**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Measurements and Instruments***	**Experimental accurac data analysis, scientifi conclusion**	**3**	**the thi**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Ohm's Law***	**Experimental accurac data analysis, scientifi conclusion**	**3**	**Fourth**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Determining the effect of force on a mass***	**Experimental accurac data analysis, scientifi conclusion**	**3**	**Fifth**

Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Energy conservation***	**Experimental accurac data analysis, Scientifi conclusion**	**3**	**Sixth**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Study of the fall of an object in a viscous medium***	**Experimental accurac data analysis, scientifi conclusion**	**3**	**Sevent**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Hooke's Law and Simple Harmonic Oscillators***	**Experimental accurac data analysis, scientifi conclusion**	**3**	**Eighth**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Simple pendulum determines the rotational inertia of a body***	**Experimental accurac data analysis, scientifi conclusion**	**3**	**Ninth**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***moment of inertia of the gyroscope***	**Experimental accurac data analysis, scientifi conclusion**	**3**	**tenth**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Measuring the effect of torque acting on a rotating mass***	**Experimental accurac data analysis, scientifi conclusion**	**3**	**atheist ten**

Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***damped and forced oscillators***	**Experimental accurac data analysis, scientifi conclusion**	**3**	**the second ten**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Measuring Young's modulus of wire***	**Experimental accurac data analysis, scientifi conclusion**	**3**	**the thi ten**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***specific heat of metal***	**Experimental accurac data analysis, scientifi conclusion**	**3**	**Fourth ten**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools with the .students**	***Boyle's Law***	**Experimental accurac data analysis, Scientifi conclusion**	**3**	**Fifth ten**
Course Evaluation .12					
.Daily exams, monthly and final theoretical and practical exams, and classroom discussions					
Learning and teaching resources .13					
ministerial portfolio			**Required textbooks (methodology)**		

Human Biology :Course Name .1	
: Course code .2	
Term /Year : 2025-2026	
description was prepared this Date .4: 15/9/2025	
Available forms of attendance : Lecture in the classroom + in the laboratories in the practical .section	
Total study hours / Total unit hours : 2 hours for the theoretical part / 6 hours for the practical part / 3 unit hours	
: Name of the course coordinator (if there is more than one, please state) .7	
:Email	Dr. Ali Hussein Sabih Ibrahim

Course Objectives .8

1- Understanding the level of organization among living organisms 2- The ability to recognize the morphology, components, an characteristics of a living organism 3- The ability to identify cell components that are essential for buildi Living organisms and identifying their components and the function each 4- Introducing students to basic concepts in biology such as cel .genetics, and the mechanism of action of tissues and organs 5- To introduce students to the extent to which life sciences are relat to all sciences and to define each From these sciences 6- Understanding the structure and role of nucleic acids	Course Objectives

:Learning and teaching strategies .9

1. Using multimedia such as scientific images, videos, and 3D models to understand the cell's cellular structure and components
2. Interacting with students during lectures by asking questions and engaging in discussions to ensure a deeper understanding of the topics.
3. Using educational tools such as scientific pictures and models that make the material more accessible to students.
4. Encouraging students to engage in self-learning through books, scientific articles, and electronic resources that promote understanding and contribute to enriching knowledge.
5. Use continuous assessments such as quizzes, assignments, and classroom discussions to periodically assess students' understanding.

Course structure (theoretical part) .10

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Introduction to Biology, Cell Theory Prokaryotes ' and 'Eukaryotes	Understanding cell theory and its importance in biology Introductio to the basic principles of cell theor The role of the cell as the basic unit structure and function in living organisms.	2	the firs
Daily exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Introduction to the Chemistry of Life.	Definition of basic biomolecules an their importance* - Identifying carbohydrates, lipids, proteins, an nucleic acids Understanding the r of these molecules in the structure and functions of cells and living organisms.	2	the second

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Biologically important molecules, carbohydrates, fats**	**Carbohydrates: Structure and Function Identifying the types of carbohydrates (monosaccharides, disaccharides, polysaccharides). Understanding their role as a primary source of energy (such as glucose) and as structural components (such as cellulose in plants).Fats: Diversity and Vital Functions**	**2**	**the thi**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Introduction to cell structure and function**	**The basic components of the cell and their functions Identifying the main organelles (nucleus, mitochondria, endoplasmic reticulum, Golgi apparatus) Understanding the vital functions of each organelle and its role in cell survival**	**2**	**Fourth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Cell structure and function**	**Basic components of a living cell Identifying the structural components of the cell (plasma membrane, cytoplasm, nucleus) Understanding the functions of the main organelles (mitochondrion, endoplasmic reticulum, ribosomes**	**2**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Eukaryotic cell organelles mitochondrial) (lysozyme -**	**Mitochondria: the cell's powerhouses Understanding the internal structure of mitochondria inner and outer membranes, matri) and comprehending the process o cellular respiration andATP production as a primary energy .source Understanding the theory intrinsic symbiosis of the mitochondrial origin**	**2**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Eukaryotic cell organelles Golgi complex) morphology-) - ((function**	**The student should describe the structure and function of the Golgi apparatus in the cell. Comprehensive coverage of) morphology and function in a very (brief manner**		**Seventh**

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Eukaryotic cell organelles endoplasmic) reticulum - vesicles -) ((ribosomes.	The student should describe the structure and function of the rougl endoplasmic reticulum. (and smoo cells), vesicles, and ribosomes in th eukaryotic cell.	2	Eighth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The organelles of a eukaryotic cell (nucleus - nuclear (envelope.	The student should describe the structure and function of the nucle and nuclear envelope in the cell.	2	Ninth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Eukaryotic cell organelles chromosome) structure replication,) translocation, ((inversion.	The student should describe the structure of the ball Tags and thei functions The basics of The eukaryotic cell, with a focus on tw processes Replication and reflex .transfer of genetic material	2	tenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	DNA replication and protein synthesis	The student should explain the mechanism of*DNA replication* a the stages of *synthesis*. Protein* (transcription and translation) in t cell.	2	atheist ten
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	DNA replication and protein synthesis	DNA double-strand separation. Building a new strand that complements each original strand using theDNA polymerase enzym	2	the second ten

Exams and discussions	The lecture was presented via PowerPoint and followed by .discussion	DNA replication and protein synthesis	DNA replication is the process of genetic material duplication prior cell division. .Protein synthesis Transcription: ConvertingDNA t mRNA – Translation: Converting mRNA to a protein strand	2	the thi ten
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Introduction to cell reproduction	Understanding the importance of c proliferation in growth and repair And reproduction.Distinguishing between mitosis (equal division) A meiosis.	2	Fourth ten
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Introduction to cell reproduction (meiosis)	Understanding the importance of meiosis In the formation of gamete (sex cells) Distinguishing the stage of mitosis The mediator* (first and second divisions) And the results o each stage.	2	Fifth ten
Course structure (practical part)					
Evaluation Method	**Learning method**	**Unit or topic name**	**Required learning outcomes**	**Hours**	**Week**
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Identifying the parts of a light microscope and their functions	The student should identify the ba parts of a light microscope.To describe the function of each part the microscope in detail.To use th light microscope correctly in laboratory examination.	2	the firs

Daily exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Using a light microscope to view prokaryotic cells**	**The student should be able to distinguish between prokaryotic ar eukaryotic cells in terms of structu and content.To prepare microscop slides Suitable for observing bacte Prokaryotic cells.**	**2**	**the second**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Using a light microscope to view (or slice) eukaryotic cells**	**The student should be able to ident the basic characteristics of eukaryo cells.To prepare slides suitable for viewing animal or plant cells.**	**2**	**the thi**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Identifying the different stages of mitosisusing microscope slides**	**The student should explain the concept Equal division and its importance in Cellular growth and reproduction.To distinguish between the main stages of mitosis prophase, metaphase, anaphase,) (telophase.To prepare suitable slic (Such as onion root cells) to observ the stages of division under a microscope.**	**2**	**Fourth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**To learn about the different stages of mitosis using microscope slides**	**The student should explain the concept Mitosis and its importance cell growth and reproduction.To distinguish between the main stage of mitosis (prophase, metaphase, (anaphase, telophase.To prepare suitable slices (Such as onion root cells) to observe the stages of divisi under a microscope.To differentia between a cell in interphase and a in one of the division phases.**	**2**	**Fifth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Using slides to study and distinguish the morphological characteristics and types of human cells**	**The student should be able to ident the different types of human cells such as muscle cells, blood cells,) (epithelial cells, and nerve cells.To distinguish between the morphological characteristics of ea of these cell types using a microsco .Use permanent or pre-prepared microscope slides to clearly observ these cells.**	**2**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Using slides to understand the structure of cellular components: mitochondria, Golgi apparatus, endoplasmic reticulum**	**The student should be able to defir the function and importance of eac of the following: mitochondria, the Golgi apparatus, and the endoplasmic reticulum within the .To locate these components within the cell using a microscope and stained slides.To distinguish between the structural form of eac component (mitochondrion: doubl membrane, Golgi: in the form of flattened sacs, endoplasmic (reticulum: rough or smooth. To link the structure and function of each cellular organelle. To use special staining techniques to highlight organelles under the microscope**		**Seventl**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Using slides to understand the structure of the nucleus, nucleoplasm, nucleolus, and nuclear envelope**	**The student should identify the location of the nucleus and its components within the cell using stained microscope slides.To distinguish between the componen of the nucleus: the nuclear envelop the nucleoplasm, the nucleolus, an the genetic material.The microsco is used to observe the variation between nuclear parts in terms of shape and density.To apply appropriate coloring techniques to increase the visibility of the kernel and its components.**	**2**	**Eighth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Using potato slices to observe the osmosis phenomenon**	**The student should define the conc of osmosis as the movement of wat molecules across a semi-permeable membrane from a lower concentration to a higher one.To conduct an experiment using potat slices and solutions of different concentrations (such as pure water dilute saline solution, concentrated (saline solution.To observe change in the length or weight of potato sli resulting from water migration.To interpret the results based on the principle of osmosis (swelling or shrinking of the slides according to (the concentration of the solution.**	**2**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Osmosis study: Using vinegar to dissolve eggshells**	**The student should explain how th process of osmosis occurs in living cells.To describe the effect of vinegar (acetic acid) in dissolving t calcium carbonate that makes up t eggshell.It should be noted that th outer shell has been removed and t semi-permeable membrane surrounding the egg has appeared To place the egg, after removing th shell, in solutions of different concentrations (pure water, sugar solution or salt solution) to demonstrate the movement of wat To explain the swelling or shrinkin of the egg as a result of the movem of water across the membrane (osmosis).**	**2**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Using slides to understand chromosome types based on centromere location**	**The student should be able to defin the centromere and its role in chromosome structure.To describ the different types of chromosomes based on the location of the centromere (mid-terminal, termina (near-terminal, central.To use microscopic slides to observe chromosomes during cell division.**	**2**	**atheist ten**

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	DNA extraction experiment from bananas	The student should explain the concept of DNA and its importance living organisms.To know the materials and equipment used in t extraction process.To follow the steps of the DNA extraction experiment from banana tissue precisely.To explain the role of ea material used (e.g., dishwashing solution, salt, alcohol) in the proce The presence of DNA should be observed in the form of white or gelatinous threads.	2	the second ten
Exams and discussions	The lecture was presented via PowerPoint and followed by .discussion	Use slides to understand copying steps and organization factors	The student should explain the concept of transcription and its rol in gene expression.To identify the main steps of transcription: initiati , elongation, andtermination.	2	the thi ten
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Using slides to understand translation steps and organizational factors	The student should explain the concept of translation and its role i protein synthesis.To identify the main steps of translation: Initiatio Elongation, andTermination.To identify the factors involved in eac stage, such as messenger RNA (mRNA) transfer RNA ,(tRNA) , ribosomes, and initiationfactors.	2	Fourth ten
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Using slides to understand the steps of the cell cycle	The student should explain the sta of the cell cycle: Interphaseand M phase.To identify the stages of the interphase: G1, S, G2.To distingui between mitosisand meiosisusing slides.To explain the role of checkpointsin monitoring cell cycl progress	2	Fifth ten
Course evaluation					

.Daily exams, monthly and final theoretical and practical exams, and classroom discussions General and transferable skills (other skills related to employability and personal -1 .(development The student acquired general skills through practical experience in collecting pathological - 2 .samples and methods of handling them Self-development through keeping up with the latest developments in the field of - 3 specialization and contributing to and participating in training courses, lectures and scientific .seminars prepared for this purpose	
Learning and teaching resources	
Essential Cell Biology by Alberts, Bray, Hopkin, Johnson, Lewis Biology by Neil A. Campbell & Jane B. Re	Required textbooks (methodology)
Biology of Plants by Peter H. Raven, Ray F. Evert, and Susan E. Eichhorn Introduction to Plant Biology by Murray W. Nabors Plant Physiology by Lincoln Taiz and Eduardo Zeige	Main references (sources)
	Recommended supporting books and references (scientific (.journals, reports, etc
https://www.ncbi.nlm.nih.gov	,Electronic references Internet sites

Course Name .1
General Physiology
Course Code .2
Term/Year .3
First Course 2026-2025
Date the description was prepared .4
15/9/2025
Available forms of attendance .5
theoretical
Number of hours (total) / Number of units (total) .6
Two hours for the theoretical aspect / 6 hours for the practical aspect per week
Name of course coordinator (if more than one is used, please provide their .7 .(name and university email address
Dr. Duha Jihad Muhammad
Course Objectives (Subject Matter Objectives) .8
The student knows the science of physiology -1 **Knows the types of body systems and organs-2** **Understanding the relationship between physiology and other sciences -3** **He understands the overlap between the functions of the body's -4 .systems and the interrelationship between them** **The student knows the normal function of each of the body's -5 systems** **The student distinguishes between a normal condition and a -6 .pathological condition** **The student acquires the skill to conduct laboratory tests -7**
Teaching and learning strategies .9
Teaching and learning strategies for general physiology **Teaching physiology requires effective strategies that integrate in-depth understanding, practical application, and active interaction between students and teachers. Here are some of the most important :strategies used** **Using multimedia such as scientific images, videos, and 3D models .1 to understand the cell's cellular structure and components** **Interacting with students during lectures by asking questions and .2 engaging in discussions to ensure a deeper understanding of the .topics** **Using educational tools such as scientific pictures and models that .3 .make the material more accessible to students** **Encouraging students to engage in self-learning through books, .4 scientific articles, and electronic resources that promote .understanding and contribute to enriching knowledge** **Use continuous assessments such as quizzes, assignments, and .5 . classroom discussions to periodically assess students' understanding**

Course structure (theoretical part) .10					
Evaluation Method	**Learning method**	**Unit or topic name**	**Required learning outcomes**	**Hours**	**Week**

oral tests	**Theoretical and practical lectures**	**Introduction to Physiology**	**Understanding an introduction to human physiology - cell components and organelles**	**2**	**the first**
oral test	**Presentation and discussion**	**blood**	**Blood - Blood functions, Blood components: Blood plasma, Plasma proteins**	**2**	**the second**
oral test	**Active learning and practical applications**	**blood**	**The components that make up blood: white blood cells their types and) functions), platelets, red blood cells, and the role of erythropoietin in the production of red .blood cells**	**2**	**the third**
Written test	**Active learning**	**blood clotting**	**Blood clotting: clotting factors and the mechanism of blood clot formation**	**2**	**Fourth**
oral test	**Presentations and images**	**Types of body fluids**	**Understanding fluids in the body: intracellular fluid (ICF) extracellular , fluid(ECF ,(interstitial fluid, and .transcellular fluid**	**2**	**Fifth**
oral test	**Clinical case studies**	**Mechanisms of transport across the cytoplasmic membrane**	**Fluid transport: diffusion, osmosis, hydrostatic pressure, filtration, and active transport across cell membranes**	**2**	**Sixth**
Tests and oral questions	**Lectures**	**Cellular balance**	**Understanding cellular homeostasis Blood .and its types glucose balance, excretion balance, and body temperature .regulation**	**2**	**Seventh**

Tests and oral questions	**Presentations and lectures**	**Identifying the circulatory system**	**Understanding the cardiovascular system: heart function, blood vessel function, heart valves, and heart sounds**	**2**	**Eighth**
oral test	**Presentations and lectures**	**Blood circulation and regulation**	**Understanding the circulatory system: systemic circulation, pulmonary circulation, cardiac circulation, cardiac output, and electrical characteristics of the .heart**	**2**	**Ninth**
oral test	**Analysis of clinical cases**	**blood pressure**	**Understanding blood pressure: Mean arterial blood pressure and its regulation, the role of the kidneys in regulating blood pressure**	**2**	**tenth**
Written test	**Lecture and discussions**	**Respiratory**	**Respiratory function testing: Lung volume and capacity, blood gas exchange and transport**	**2**	**eleventh**
Tests	**Self-learning and presentation**	**Digestive system**	**Understanding the digestive system: General functions of the digestive system, functions of the mouth, salivary glands, stomach, small and large .intestines**	**2**	**twelfth**
oral test	**presentation**	**Digestive mechanism**	**Understanding the mechanism of digestion, digestive enzymes, and their properties**	**2**	**thirteenth**

Written test	**presentation**	**Pregnancy mechanism**	**Understanding the mechanisms of pregnancy and fertilization, childbirth, stages of labor, hormonal stimulation of labor, .and breastfeeding**	**2**	**fourteenth**
Comprehensive written test	**presentation**	**Recognizing birth and child development**	**Understanding the stages of fetal development: the newborn, the first year after birth, aging and death, up to the point of birth and postnatal .growth**		**fifteenth**
Course structure (practical part) .10					
Evaluation Method	**Learning method**	**Unit or topic name**	**Required learning outcomes**	**Hours**	**Week**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Microscope parts & uses**	Understanding the different **components of a microscope** and the function of each part, as well as being able to use it correctly for microscopic observations.	**6**	**the first**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Finger puncture – blood Smear**	Learn **the correct technique for taking a blood sample** from the finger to prepare a blood smear, taking into account safety and hygiene.	**6**	**the second**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**blood preparation smear: slide method**	Mastering **the steps for preparing a good blood smear** on a glass slide, and ensuring its quality for subsequent analyses.	**6**	**the third**

Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Staining of blood film**	Understanding **the importance of stains** in blood analysis, and applying **blood smear . staining techniques** (Such as Wright's or Giemsa stain) to differentiate between cells.	**6**	**Fourth**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Sahli method for hemoglobin estimation**	Learn **the Sahli principle and method for estimating hemoglobin** levels in the blood, and understand its diagnostic importance .	**6**	**Fifth**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Packed cell volume(PCV)**	Understanding **the concept and calculation of stacked cell volume (PCV)** As a percentage of total blood volume, and an interpretation of its results.	**6**	**Sixth**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Scientific film about blood & circulating system**	Gaining **a comprehensive understanding of the components and** functions of blood, as well as **the mechanism of the .circulatory system**(The heart and blood vessels).	**6**	**Seventh**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Blood grouping & Rh Facto**	Understanding **the major blood group systems(ABO)** And **the Rh factor** and **,** understanding its importance in blood transfusions.	**6**	**Eighth**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Determination of Bleeding Time**	Understanding **the concept of bleeding time** and applying **the techniques used to determine it** , and assessing platelet and blood vessel function.	**6**	**Ninth**

Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Determination of Clotting Time**	Understanding **the concept of clotting time** and applying **the techniques used to determine it** , and evaluating the function of blood clotting factors.	**6**	**tenth**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Hemocytometry**	Learn **the basics of measuring blood cells** using blood counters, and understand their importance in diagnosis.	**6**	**eleventh**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Red blood cell count**	Learn **how to perform an accurate red blood cell(RBC) count** and , understand the importance of this count in assessing cases of anemia or polycythemia.	**6**	**twelfth**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Differential count of white blood cell (WBC) and Total White blood cell Count**	The ability to **distinguish between different types of white blood cells (WBCs)** Conducting **differential and total enumerations** , and understanding the implications of changes in their numbers.	**6**	**thirteenth**
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Scientific film about bleeding & transfusion**	Understanding **the mechanisms of bleeding** , recognizing **the principles and procedures of blood transfusion** , and the precautions that must be taken to ensure patient safety.	**6**	**fourteenth**

Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	**Erythrocyte sedimentation rate (ESR)**	Understanding **the principle of the erythrocyte sedimentation rate (ESR) test** applying , **the necessary techniques to perform it** , and interpreting its results disease.	**6**	**fifteenth**

Course Evaluation .11
The grade out of 100 is distributed according to the tasks assigned to the student, such as daily .preparation, daily oral and written exams, reports, etc
Learning and teaching resources .12

Merrill's Atlas of Radiographic Positions & Radiologic Procedures Radiographic Positioning & Related Anatomy	**Required textbooks (methodology, if applicable)**
Vander's Human PhysiologyBerne and Levy Physiology	**Main references (sources)**
www.physiology.org (American Physiological Society) **www.ncbi.nlm.nih.gov/pubmed (PubMed for research articles)** **www.khanacademy.org (Khan Academy - Biology and Physiology)** **www.medicalnewstoday.com (Medical News & Updates)**	**Electronic references and websites**

Course Name .1
Computer Application
Course Code .2
Term/Year .3
2026-2025
Date the description was prepared .4
2025/9/15
Available forms of attendance .5
In-person lectures
Number of hours (total) / Number of units (total) .6
Name of course coordinator (if more than one is required): Name and university email address .7
Dr. Mazen Riyad Mansour mazin-r.al-hameed@nust.edu.iq **M.M. Amin Hamid Sakhi** **alsalhyamyn21@gmail.com**
Course Objectives (Subject Matter Objectives) .8

This course aims to:

1. To provide students with the basic skills to use computer applications in academic and professional fields.
2. Developing a comprehensive understanding of operating systems and productivity software such as word processors, spreadsheets, and presentations.
3. Teaching students the basics of the internet, email, and information security.
4. Enhance online research and data analysis skills using digital tools.
5. Enabling students to use specialized software in the field of medical and health .technologies

Teaching and learning strategies .9

- **. Theoretical lectures and practical applications in laboratories**
- **. Interactive learning via digital platforms**
- **. Presentations and practical projects**
- **. Practical exercises and problem-solving**

Course Structure: Theoretical Part .10

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Theoretical and practical lecture	Introduction to Computers and Operating Systems	Understanding basic computer concepts	**2**	**the first**
Practical exercise	Lecture and laboratory	Introduction to operating systems (Windows, Linux)	Understanding the operating systems environment	**2**	**the second**
mini project	practical application	Microsoft Word basics	Using word processors	**2**	**the third**
Practical exercise	practical application	Microsoft Excel basics	Using electronic spreadsheets	**2**	**Fourth**
presentation	Lecture and practical work	Microsoft PowerPoint Basics	Creating presentations	**2**	**Fifth**
Practical exercise	Practical lecture	Search and email tools	Online search and email management	**2**	**Sixth**

a test	Discussion and practical application	Digital security concepts	Understanding cybersecurity and data protection	**2**	**Seventh**
Practical exercise	practical application	Data analysis usingExcel/SPSS	graphical analysis using software	**2**	**Eighth**
project	practical lecture	Software used in medical and health technologies	Understanding computer applications in the health field	**2**	**Ninth**
practical control	Lecture and practical application	Introduction to Programming usingPython	Basic programming training	**2**	**tenth**
group exercise	practical application	UseGoogle Drive andTeams	Collaborative work and project management	**2**	**eleventh**
presentation	workshop	Advanced PowerPoint techniques	Developing professional presentations	**2**	**twelfth**
Achievement test	interactive	Comprehensive course review	Evaluating student performance and reviewing content	**2**	**thirteenth**
Project evaluation	Project submission	Final applied project	Final practical application	**2**	**fourteenth**
Final assessment	Open discussion	Conclusions and Recommendations	Comprehensive discussion and evaluation	**2**	**fifteenth**
Course structure: practical section .1					

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Introduction to Microsoft Word	Familiarizing yourself * with the program interface .and its basic components Distinguishing between * the different toolbars Home, Insert, Layout,) .(.etc Knowing the function of * each button and tool .within the interface Understanding the * program structure: title bar, menu bar, status bar, .ruler, workspace The ability to open, save, * and edit a new document .in basic terms	2	the first
Daily exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Main bar	Saving documents in * .different formats Edit the text (font, size, * .(color, style Paragraph formatting * alignment, spacing, bullet) .(points and numbering Execute copy, cut, and * .paste commands Printing and preparing * .the page for printing	2	the second

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**drawer strip**	**Saving documents in * .different formats** **Edit the text (font, size, * .(color, style** **Paragraph formatting * alignment, spacing, bullet) .(points and numbering** **Execute copy, cut, and * .paste commands** **Printing and preparing the .page for printing**	**2**	**the third**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Planning bar**	**Change the paper * orientation .(vertical/horizontal)** **.Adjusting page margins** **Choose the appropriate * .paper size for printing** **Preparing the page for * display or printing according to specific .requirements**	**2**	**Fourth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Reference bar**	**.Add footnotes** **Include quotations and * .sources** **Automatically generates * .the reference list** **Inserting automatic * .indexes and titles**	**2**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Preview bar**	**Preview the document * .before printing** **Spelling and grammar * .checking of texts** **.Using translation tools*** **Add comments and * .feedback for review**	**2**	**Sixth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Display strip**	**Navigating between * different display modes print layout, reading,) .(.etc** **.Use the zoom in/out tool*** **Hide or show tools such * as the ruler and layout .grid**	**2**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**drawer strip**	**Use the ribbon to insert * .mathematical equations** **Include graphs and * .explanatory data** **Inserting tables, images, * .and interactive elements** **Learning about the * different insertion tools and applying them practically in the .document**	**2**	**Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Create a folder**	**The learner should be * able to distinguish between .files and folders** **To create a new folder * .and name it** **To move or copy a file to * .a folder** **To rename a file or * .folder** **To delete a folder using * the appropriate .commands** **Use the "View" toolbar to * change how files are .displayed**	**2**	**Ninth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Introduction to PowerPoint**	**The learner should * become familiar with the components of the PowerPoint program interface (ribbon, slide .(...panel, status bar** **To open a new * .presentation** **To create a new segment * .within the presentation** **To distinguish between * the main tabs in the .ribbon** **To use basic menus such as (File, Insert, Design) as .required**	**2**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Main strip**	**To use the cut, copy and paste commands for texts .and elements** **To format the texts * .(color, size, font type)** **To apply bullet points or * .numbering to the texts** **To insert a new slide and * .rearrange it** **To change the alignment * .of the text within the slide** **To use "editing" tools * .such as search or replace**	**2**	**eleventh**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Design strip**	**To choose a ready-made *) designTheme) for the .presentation** **To adjust the colors and * fonts to match the content .of the presentation** **To change the * .background of the slide** **The formatting can be * applied to all slides or to a .specific slide** **To employ a design * appropriate to the subject .of the presentation**	**2**	**twelfth**
Exams and discussions	**The lecture was presented via PowerPoint and followed by .discussion**	**Slideshow transition bar**	**To distinguish between Transitionsand Animations.** **To apply a transition effect between two or more .slices** **To specify the duration of .the transfer** **To display the slides with a .transition preview** **To specify the timing of the transition (manual or .(automatic click**	**2**	**thirteenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**drawer strip**	**Use the ribbon to insert .mathematical equations** **Include graphs and .explanatory data** **Insert tables, images, and .interactive elements** **Learn about the different insertion tools and apply them practically in the .document**	**2**	**fourteenth**

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Transition bar Display strip Preview bar	Add video and audio clips; and view and preview .slides	2	fifteenth

Course evaluation	
The grade out of 100 is distributed according to the tasks assigned to the student, such as daily .preparation, daily oral and written exams, reports, etc	
Learning and teaching resources	
Microsoft office Professional 2016, BY Linda Foulkes, Senior Editor	Required textbooks (methodology, if (applicable
Microsoft office professional 2010; BY Joyce Cox, Jo an Lambert & Curtis Frge	Main references (sources)
	Electronic references and websites

:Course Name .1
General Chemistry
: Course code .2
:Term/Year .3
6 202 - 5 202

:Date this description was prepared .4	
15/9/2025	
: Available forms of attendance .5	
.lectures in the classroom + in laboratories in the practical department - Official working hours	
: Total number of study hours / Total number of units .6	
Two hours for the theoretical part / 6 hours for the practical part per week / 3 units	
: Name of the course coordinator (if there is more than one, please state) .7	
:Emailghoufrankw@gmail.c ghoufran.kawass@nust.edu.	Dr. Ghufran Muhammad Mu Qawas M.B. Ahmed Mohamed Rash
Course Objectives .8	
• .Introducing the student to the science of chemistry • .How to handle chemicals • terial detection and separation, and preparation of standard .materials • lls for developing algorithmic (mathematical) problem-solving .abilities • .Analyzing and constructing concepts • .Writing objective reports and statements • .Use of laboratory equipment/safety	Course Objectives

:Learning and teaching strategies .9

.1 Using multimedia such as scientific images, videos, and 3D models to understand .chemical structure and its compounds

.2 Interacting with students during lectures by asking questions and engaging in .discussions to ensure a deeper understanding of the topics

.3 Using educational tools such as scientific pictures and models that make the material .more accessible to students

.4 Encouraging students to learn independently through books, scientific articles, and electronic resources that promote understanding and contribute to enriching .knowledge

.5 Use continuous assessments such as quizzes, assignments, and classroom discussions . to periodically evaluate students' understanding

Course Structure (Theoretical Part) - First Semester .10

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Daily exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The atom, molecular structure, electron configuration, and chemical bonds	Composition	2	the first

Daily exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Types of liquid mixtures and buffer solutions**	**Composition**	**2**	**the second**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Methods of quantitative and qualitative analysis**	**Analysis**	**2**	**the third**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Molar and normal concentrations and how to calculate them** **Issues and discussions**	**Molar methods**	**2**	**Fourth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Acids and bases - examples**	**Chemical analysis a reactions**	**2**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Oxidation and reduction**	**Analysis**	**2**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Principles of Organic Chemistry Hydrocarbons,) Alkenes, Properties of Preparation, (Reactions**	**Preparation, reactio and synthesis**		**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Alcohols - Ketones - Aldehydes - Carboxylic Acids - Classification and Properties.**	**Preparation, reactio and synthesis** **and classification**	**2**	**Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Aromatic hydrocarbons** **Carbohydrates - Classification and .Interactions**	**Preparation, reactio and synthesis** **and classification**	**2**	**Ninth**

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Arianes and Arianes	Preparation and assembly	2	tenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Introduction to Biochemistry and the Mechanism of Life	Interactions and mechanisms	2	eleventh
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Biochemistry and Nutrition	Reactions and composition	2	twelfth
Exams and discussions	The lecture was presented via PowerPoint and followed .by discussion	Sugars, starches, and fiber	Examples and structures	2	thirteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Isomers, their .classifications	classification	2	fourteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Electrolytes, electrochemistry	Examples, structure and classification	2	fifteenth
11. Course structure (practical part)					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Evaluation Method	Learning method	Laboratory instructions, laboratory instruments & glassware	Learn about laboratory glasswar equipment, and how use it. Understanding basi laboratory safety ru .	2	the first

Daily exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Preparation of standard solutions, percentage solutions, molar solutions & dilution methods	The ability to calcul and prepare differe types of solutions (molar, centigrade) Mastering the meth of accurately dilutir solutions.	2	the second
Daily exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Normal solutions.	Understanding the concept ofnormalit and its uses. Preparing standard solutions accurately	2	the third
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Buffer - acid, base.	Understanding the mechanism of actio of buffer solutions. The ability to prepa an acidic or basic buffer solution.	2	Fourth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Perception titration.	Understanding the principle of precipitation reacti and their applicatio in titration. The ability to determine the endpoint in precipitation calibration.	2	Fifth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Oxidation titration,	Understanding the principle of oxidati reduction reactions and their applicatio in titration. Perform the redox titration correctly.	2	Sixth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Separation & purification of organic compounds	Identifying methods for separating and purifying organic compounds. Applying technique such as distillation a crystallization.	2	Seventh

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Aldehyde & ketoses identification, reactions Alcohols-identification, reactions**	**The ability to distinguish between aldehydes, ketones, and alcohols.** **Understanding the chemical reactions characteristic of eac group.**	**2**	**Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Reactions of carbohydrates & identification of types.**	**Understanding carbohydrate reactions.** **The ability to distinguish between different types of sugars (mono, dis, (polysaccharides.**	**2**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Reactions of carbohydrates & identification of types.**	**Understanding the chemical reactions characteristic of fat (lipids).** **Applying tests to identify lipid types.**	**2**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Lipids-identifications& reactions.**	**Understanding the chemical reactions characteristic of fat (lipids).** **Applying tests to identify lipid types.**	**2**	**eleventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Identification of protein.**	**The ability to condu chemical tests to identify the presenc of proteins.** **Understanding the basic properties of proteins.**	**2**	**twelfth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**blood glucose**	**The ability to measu glucose levels in a blood sample.** **Understanding the importance of measuring blood glucose.**	**2**	**thirteenth**

Exams and discussions	The lecture was presented via PowerPoint and followed .by discussion	Unknown test	Applying theoretica and practical knowledge to identi an unknown compound. Analyze the data to reach a correct conclusion.	2	fourteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Determination of some elements Ca+, Cl-	For the ability to perform qualitative chemical tests to determine the presence of calcium and chloride ions. Understanding the principle of ion detection reactions	2	fifteenth

Course Evaluation .12

- **Daily exams, monthly and final theoretical and practical exams, and classroom .discussions**
- **General and transferable skills (other skills related to employability and personal .(development**
- **The student acquires general skills through practical application of collecting .samples and methods of handling them**
- **Self-development through keeping up with the latest developments in the field of specialization and contributing to and participating in training courses, lectures and . scientific seminars prepared for this purpose**
- **The grade out of 100 is distributed based on the tasks assigned to the student such as .daily preparation, daily and oral exams, monthly written exams, reports, etc**

Learning and teaching resources .13

Principles of General Chemistry, Morrison and Boyd's Organic Chemistry, Book Harpers in Biochemistry (Lectures)	**Required textbooks (methodology)**
***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.**	**Main references (sources)**
Scientific journals from the internet, reports, and scientific researc .from the internet	**Recommended supporting books and references scientific journals, reports,) (.etc**
Scientific journals from the internet , reports, and scientific researc .from the internet	**,Electronic references** **Internet sites**

1. Course Name: Human Rights
2. Course code :
Term /Year : 2025-2026
4. this Date description was prepared: 15/9/2025
5. Available attendance formats : Lecture in the classroom
6. Total study hours / Total unit hours : 2 hours / 2 unit hours
7. Name of the course coordinator (if there is more than one, please state) :
M.M. Sabreen Ghali Aliwi
8. Course Objectives

Course Objectives	.1 give an overview of human rights that were created with the formation of humankind, and to understand the importance of those rights and how to preserve and protect them. .2 Training students on the importance of participating in different aspects of life, such as promoting respect for human rights principles. Active participation in various aspects of life .3 Understanding human rights contributes to achieving justice and equality within society. Student-led education is a platform for this. .4 Studying human rights leads to improved and more positive student behavior, which in turn contributes to fewer conflicts and disputes. .5 Studying human rights leads to understanding those rights in the Iraqi constitution and the constitutions of other countries, and to becoming familiar with them. On organizations and agreements that promote those rights Ba'ath Party crimes .6 Introducing the student to the crimes committed by that defunct regime and their brutality .7 Understanding the extent of the economic losses caused by the international embargo that lasted for many years. The system that is not a system, in addition to the wars in which it participated .8 Understanding the psychological and physical losses inflicted by this regime on all segments of Iraqi society .9 familiarize students with the brutality of the former regime in order to prevent its recurrence in the future by selecting individuals The qualified candidates should undergo a detailed study before being selected. .10 To give a brief overview of a horrific era that Iraq went through for approximately 33 years, during which the people suffered greatly. It has material and moral consequences and many losses of life.
.9 Learning and teaching strategies:	
	.1 The education in this program includes theoretical instruction that focuses on studying scientific problems in a purely scientific manner, aiming to understand the root of the problem and to find solutions for it. .2 Learning depends on cooperation between the student and the teacher to understand the lesson as much as possible and to overcome the obstacles that hinder the student's understanding. .3 Students were encouraged to use books and scientific articles, whether physical or electronic, as these greatly help in retaining information and allow for discussion and conclusions.
.10 Course structure (theoretical part)	

Evaluation Method	Learning method	Required learning outcomes	Unit or topic name	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	*Understanding the basic definition* of human rights .and its principles Recognizing that human rights are universal, inalienable, and . indivisible	Understanding what human rights are	2	the first
Daily exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	To become familiar with the most important international human rights conventions and . agreements Understanding the role of these charters in protecting rights . globally	Human rights, charters and agreements International	2	second
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The ability to identify Iraqi constitutional texts that guarantee . human rights Understanding the relationship between the constitution and international . conventions	Human rights and the Iraqi constitution	2	he third
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Recognizing fundamental rights such as the right to life, . liberty, and dignity Understanding civil, political, economic, social, and cultural . rights	rks that are considered rights man	2	Fourth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Understanding national and international human rights protection mechanisms . Understanding the role of individuals and civil society in defending . these rights	How to protect human rights	2	Fifth

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Identifying the most prominent international and local organizations concerned with human . rights Understanding the role of these organizations in monitoring, documentation, and . advocacy	human rights organizations	2	Sixth
		Distinguishing between a democratic and a . dictatorial system Understanding the characteristics of each system and its impact on . freedoms and rights	Definition of democracy and dictatorship	2	The seventh
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Familiarity with the historical stages of . governance in Iraq Understanding political and social transformations . throughout the ages	Stages of governance in Iraq	2	e eighth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Identifying the most prominent human rights violations committed by . the Baath regime Understanding the nature of these violations and . their impact on society	Violations committed by the party The Baath	2	he ninth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Understanding the negative effects of the Ba'ath regime on the psychological and social . condition Recognizing the economic damage caused by the . regime's policies	impact of the Ba'ath regime's behavior on Psychological and social field economic	2	he tenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Understanding the environmental and human consequences of repression and armed . conflict Understanding how wars affect natural resources and . infrastructure	The impact of oppression and wars on the environment and the population	2	Al Hady ten

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Identifying strategies for overcoming the legacy of . oppressive regimes Understanding the importance of transitional justice and building . democratic institutions	ting rid of the remnants of the old regime	2	e second ten
Course Evaluation .11					
.Daily exams, monthly and final theoretical and practical exams, and classroom discussions					
Learning and teaching resources .12					
Educational curriculum			quired textbooks (methodology)		
			Main references (sources)		
			Recommended supporting books and references scientific journals, reports,) (.etc		
			Electronic references, websites		

Academic Program Description

Radiology Technology Department

First stage

Second course

Anatomy of Body Systems :Course Name
: Course code
Semester/ Year : 2025-2026
prepared was Date this description: 15/9/2025
.Available attendance formats : lecture in the classroom + laboratory

Total study hours / Total unit hours : 5 hours / 3 unit hours
: Name of the course coordinator (if there is more than one, please state)

:Email Reda.Fabhd2204m@ihcoedu.uobaghdad.edu.iq	**Dr. Hassan Ba Al-Riyahi**

Course Objectives

1. Understanding natural phenomena– explaining how the world around us works by studying motion, energy, and matter. **2. Applying physical laws– using Newton's laws, thermodynamics, and electromagnetism in analyzing different systems.** **3. Developing analytical skills– promoting critical thinking, problem-solving, a logical reasoning through the application of physical concepts.** **4. Technological innovation– contributing to the development of electronic devices, renewable energy, and modern communications.** **5. Enhancing scientific research– enabling students to conduct experiments, analyze data, and draw accurate scientific conclusions.** **6. Applying physics in everyday life– understanding physical principles in field such as medicine, engineering, space, and industry.** **7. Stimulating creativity and discovery– supporting scientific exploration and innovation in new fields such as quantum physics and nuclear physics.** **8. Studying general physics provides students with a strong scientific foundatio that enables them to understand the physical world and apply this knowledge various scientific and technological fields.**	**Course Objecti**

:Learning and teaching strategies

Using appropriate teaching and learning strategies contributes to improving the quality of education, increasing student motivation, and enhancing critical thinking and problem-solving skills. The choice between these strategies depends on the educational objectives, the nature of the content, and the characteristics of the learners.

.1 Learning, in both its theoretical and practical aspects, depends on cooperation between the student and the professor to understand the lesson as much as possible and to overcome obstacles that hinder the student's understanding or impede the conduct of his experiments in the laboratory.

.2 Students were urged to use books and scientific articles, whether physical or electronic, as they greatly help in retaining information and allow for discussion and conclusions.

.3 Teaching atomic physics requires effective teaching strategies that help students understand abstract and complex concepts. Here are some effective teaching strategies.

.4 Problem-based learning: Posing open-ended questions about atomic phenomena such as quantum mechanics or the modern atomic model to stimulate critical thinking.

.5 Research projects: Encouraging students to research topics such as nanotechnology or medical applications of atomic physics.

Course structure (theoretical part)

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	*Introduction, Definition:*	To understand the importance Study of the skeleton Human beings and their various divisions.	2	the firs
Daily exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	*Upper limb structure*	Understanding the structure of the main bones of the upper limb and their role in movement. □	2	the second
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	*The humerus bone, - the radius and ulna bones*	Understanding the structu of the humerus bone and the bones of the radius and ulna And its functions.	2	the thi
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	*hand*	Identifying the major bone In the hand and its role in Motor performance.	2	Fourth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	upper limb muscles	Studying the muscles responsible for arm and ha movements.	2	Fifth

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***joints***	**Understanding the types of joints in the upper limb an how they work.**	**2**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Chest structure***	**Identifying the bones of the chest and the structure of the rib cage.**	**2**	**Seventl**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Vertebrates***	**Studying the structure of t vertebrae and their functio in supporting and protecti the body.**	**2**	**Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Lower limb structure: - Bony pelvis (pelvic girdle)**	**Understanding the structu of the pelvic bone and its r in supporting the body and movement.**	**2**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***femur, tibia, and fibula***	**,Identifying the femur bon The tibia and fibula and th functions In movement and walking.**	**2**	**tenth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***foot***	**Understanding the structure of the foot and its function in movement and balance.**	**2**	**atheisti ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**lower limb muscles**	**Identifying the main muscles of the lower limbs and their functions .**	**2**	**the second ten**
Exams and discussions	**The lecture was presented via PowerPoint and followed by .discussion**	***skull***	**Identifying the bones of the skull and their function in protecting the brain.**	**2**	**the thir ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Facial bones, - lower jaw - temporomandibular joint***	**Understanding the anatomy of the facial bones, lower jaw, and temporomandibular joint, and their function.**	**2**	**Fourth ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Nasal cavity and sinuses***	**Knowledge of the nasal cavity and sinuses and their respiratory .functions**	**2**	**Fifth ten**
Course structure (practical part)					

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students			2	the first
Daily exams and discussions	The lecture was presented via PowerPoint and discussed with the .students			2	the second
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students			2	the third
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students			2	Fourth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students			2	Fifth

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**			**2**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**			**2**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**			**2**	**Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**			**2**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**			**2**	**tenth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**		**Identifying and study The bony, muscular, and ligament structur of the foot The main one, with an understanding of its functions Vitality in movement and balan**	**2**	**atheistic ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**		**Identifying groups Th major muscle in the lower limbs, and a description of its origi And its origin, and its work, In addition to identifying its innervation.**	**2**	**the second ten**
Exams and discussions	**The lecture was presented via PowerPoint and followed by .discussion**			**2**	**the third ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**			**2**	**Fourth ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**			**2**	**Fifth ten**
Course evaluation					
Daily exams, monthly and final theoretical and practical exams, and .classroom discussions					

Learning and teaching resources
Required textbooks (methodology)
Main references (sources)
Recommended supporting books and references (scientific journals, reports, etc.)
Electronic references, websites

Atomic Physics (Second Course) :Course Name .1	
: Course code .2	
Term /Year : 2025-2026	
description was prepared this Date .4: 15/9/2025	
.Available attendance formats : lecture in the classroom + laboratory .5	
Total study hours / Total unit hours : 5 hours / 3 unit hours .6	
: Name of the course coordinator (if there is more than one, please state) .7	
:EmailReda.Fabhd2204m@ihcoedu.uobaghdad.edu.iq	**M.M. Reda Fa Hannoun**
Course Objectives .8	

Course Objecti	.1 Understanding the structure of the atom – studying the components of the atom such as the nucleus (protons and neutrons) and electrons, how they are arranged and their effect on the physical and chemical properties of materials . .2 Atomic interactions and energy – understanding how atoms interact with each other and with different radiations, such as absorbing or emitting energy, contributes to the development of multiple applications such as lasers and electronic devices . .3 Nuclear applications – the study of nuclear fission and nuclear fusion, which helps in the production of nuclear energy and development Technologies such as nuclear reactors and nuclear weapons . .4 Modern technology – contributing to the development of precision Computers Used in devices such as transistors and integrated circuits and modern communications . .5 Exploring the Universe – Applying concepts of atomic physics to the study of space, such as analyzing the spectra of stars and galaxies to Its composition and age understand . .6 Medical applications – the use of radioactive isotopes in medical diagnosis and treatment, such as radiation therapy for patients Cancer and X-ray imaging . .7 Advances in quantum mechanics – deepening the understanding of the fundamental principles of quantum mechanics that govern the behavior of atoms and subatomic particles, leading to scientific discoveries and new technologies such as quantum computing. The study of atomic physics in general aims to expand scientific knowledge and achieve technological advancements that contribute to improving life. Humanity in different fields .

.9 Learning and teaching strategies:

.1 Using appropriate teaching and learning strategies contributes to improving the quality of education, increasing student motivation, and enhancing critical thinking and problem-solving skills. The choice between these strategies depends on the educational objectives, the nature of the content, and the characteristics of the learners .

.2 Learning, in both its theoretical and practical aspects, depends on cooperation between the student and the professor to understand the lesson as much as possible and to overcome obstacles that hinder the student's understanding or impede the conduct of his experiments in the laboratory.

.3 Students were urged to use books and scientific articles, whether physical or electronic, as they greatly help in retaining information and allow for discussion and conclusions.

.4 Teaching atomic physics requires effective teaching strategies that help students understand abstract and complex concepts. Here are some effective teaching strategies.

.5 Problem-based learning: Posing open-ended questions about atomic phenomena such as quantum mechanics or the modern atomic model to stimulate critical thinking.

.6 Research projects: Encouraging students to research topics such as nanotechnology or medical applications of atomic physics.

.10 Course structure (theoretical part)

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Atomic and nuclear structure***	**Understanding the structure and technica applications**	**2**	**the firs**
Daily exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***radioactive decay***	**Understanding the structure and technica applications**	**2**	**the second**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Types of radiation***	**Understanding the structure and technica applications**	**2**	**the thi**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Radiation classification***	**Understanding the structure and technica applications**	**2**	**Fourth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Wave model: visible light**	**Understanding the structure and technica applications**	**2**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Particle model: quantum theory***	**Understanding the structure and technica applications**	**2**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Photonic attenuation coefficients***	**Understanding the structure and technica applications**	**2**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Electron interactions with matter***	**Understanding the structure and technica applications**	**2**	**Eighth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Introduction to Nanomaterials***	**Understanding the structure and technica applications**	**2**	
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Methods of synthesizing nanomaterials***	**Understanding the structure and technica applications**	**2**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Nanotechnology in renewable energy systems***	**Understanding the structure and technica applications**	**2**	**atheist ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Nanotechnology for hydrogen production***	**Understanding the structure and technica applications**	**2**	**the second ten**
Exams and discussions	**The lecture was presented via PowerPoint and followed by .discussion**	***Nanomaterials for converting carbon dioxide to Renewable fuels and value-added products***	**Understanding the structure and technica applications**	**2**	**the thi ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Nanomaterials and capturing carbon dioxide directly from the air***	**Understanding the structure and technica applications**	**2**	**Fourth ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Solar energy technology***	**Understanding the structure and technica applications**	**2**	**Fifth ten**
Course structure (practical part)					
Evaluation Method	**Learning method**	**Unit or topic name**	**Required learning outcomes**	**Hours**	**Week**

Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	**Gamma source activity**	**Conducting experimer .interpreting results practical application**	**3**	**the firs**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	**Beta decay of the nuclei**	**Conducting experimer .interpreting results practical application**	**3**	**the second**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	**Effect of magnetic field on radiation Electromagnetica, ß, y**	**Conducting experimer .interpreting results practical application**	**3**	**the thi**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	**Beta particle deflection**	**Conducting experimer .interpreting results practical application**	**3**	**Fourth**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	**Wave model: visible light**	**Conducting experimer .interpreting results practical application**	**3**	**Fifth**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	***Particle model: quantum theory***	**Conducting experimer .interpreting results practical application**	**3**	**Sixth**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	***Photonic attenuation coefficients***	**Conducting experimer .interpreting results practical application**	**3**	**Seventl**

Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	***Electron interactions with matter***	**Conducting experimer .interpreting results practical application**	**3**	**Eighth**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	***Introduction to Nanomaterials***	**Conducting experimer .interpreting results practical application**	**3**	**Ninth**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	***Methods of synthesizing nanomaterials***	**Conducting experimer .interpreting results practical application**	**3**	**tenth**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	***Nanotechnology in renewable energy systems***	**Conducting experimer .interpreting results practical application**	**3**	**atheist ten**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	***Nanotechnology for hydrogen production***	**Conducting experimer .interpreting results practical application**	**3**	**the second ten**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	***Nanomaterials for converting carbon dioxide to Renewable fuels and value-added products***	**Conducting experimer .interpreting results practical application**	**3**	**the thi ten**
Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	***Nanomaterials and capturing carbon dioxide directly from the air***	**Conducting experimer .interpreting results practical application**	**3**	**Fourth ten**

Exams, discussions, and reports	**The lecture was presented using PowerPoint, discussion, and educational tools .with the students**	***Solar energy technology***	**Conducting experimer .interpreting results** **practical application**	**3**	**Fifth** **ten**
Course evaluation					
.Daily exams, monthly and final theoretical and practical exams, and classroom discussions					
Learning and teaching resources					
ministerial portfolio			**Required textbooks (methodology)**		
			Main references (sources)		
			Recommended supporting books and references (scientific journals, (.reports, etc		
			Electronic references, websites		

Functional physiology
Course Code .2
Term/Year .3
Second semester 2025-2026
Date the description was prepared .4
15/9/2025
Available forms of attendance .5
theoretical
Number of hours (total) / Number of units (total) .6
Two hours for the theoretical aspect / 6 hours for the practical aspect per week
Name of course coordinator (if more than one is used, please provide their name and .7 .(university email address
Dr. Duha Jihad Muhammad
Course Objectives (Subject Matter Objectives) .8
Students generally distinguish between physiology and other sciences. Physiology .1 (the study of the functions of living organisms) differs from other sciences in that it focuses on how living organisms, their systems, and organs function to maintain their vital functions. While some other sciences focus on structure (such as anatomy), chemical reactions (such as biochemistry), or the effects of drugs (such as pharmacology), physiology studies normal biological processes such as respiration, .digestion, excretion, nerve impulse transmission, and blood pressure regulation **In other words, physiology is concerned with describing "how the body works," .2 while other sciences may focus on "what the body is made of?" or "how it changes ". when sick or due to drugs**
Teaching and learning strategies .9
1. Using multimedia such as scientific images, videos, and 3D models to understand .chemical structure and its compounds
2. Interacting with students during lectures by asking questions and engaging in .discussions to ensure a deeper understanding of the topics
3. Using educational tools such as scientific pictures and models that make the material .more accessible to students
4. Encouraging students to learn independently through books, scientific articles, and electronic resources that promote understanding and contribute to enriching .knowledge
Use continuous assessments such as quizzes, assignments, and classroom discussions .5 . to periodically evaluate students' understanding

Course structure (theoretical part)

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
oral test	Presentations and lectures	circulatory system	Introduction to the cardiovascular system: Anatomy of the heart and blood vessels. Contraction and relaxation	2	the first

Written test	**Lectures and presentations**	**Respiratory**	**The respiratory system and its components: the mechanism of gas exchange and transport in the blood**	**2**	**the second**
oral test	**Presentation and discussion**	**Digestive system**	**Understanding the digestive system and its components, digestive enzymes, and the mechanisms of digestion and .absorption**	**2**	**the third**
Written test	**Active learning**	**How the digestive system works**	**Understanding how the pancreas, small intestine, and large intestine work in the processes of digestion and .metabolism**	**2**	**Fourth**
Written test	**A lecture in the form of a presentation**	**Liver and gallbladder functions**	**Understanding the role of the liver and gallbladder and how they work**	**2**	**Fifth**
oral test	**Presentations and images**	**excretory system**	**Understanding the components of the excretory system, the mechanism of renal filtration, and the regulation of blood pressure .and fluids**	**2**	**Sixth**
Written test	**Theoretical lecture and realistic simulation**	**The mechanism of urine formation and associated disorders of the excretory system**	**Understanding the mechanism of urine formation and excretion, and disorders of the urinary system**	**2**	**Seventh**
a test	**Presentations**	**The connection between the nervous system and the excretory system**	**Understanding the mechanism of urination regulation and the role of the nervous system**	**2**	**Eighth**

Written test	**Lectures**	**female reproductive system**	**Understanding how the female reproductive system works. Understanding how the menstrual cycle and hormones are .regulated**	**2**	**Ninth**
Written test	**Presentations**	**female reproductive system**	**Understanding how the male reproductive system works, how sperm and male hormones are produced, and the mechanisms that maintain fertility and sexual .function**	**2**	**tenth**
oral test	**Analysis of clinical cases**	**nervous system**	**Knowledge and understanding of how the nervous system works in transmitting nerve signals and regulating the nervous system's various bodily .functions**	**2**	**eleventh**
Written test	**Theoretical lectures and presentations**	**Sensory and motor pathways**	**Understanding how nerve signals are transmitted through the spinal cord. And knowing the ascending (sensory) and descending (motor) pathways in the .spinal cord**	**2**	**twelfth**
Written test	**Presentations**	**spinal reflex**	**Understanding spinal reflexes and the role of the spinal cord in sensation and movement**	**2**	**thirteenth**

Written test	**Theoretical lectures and presentations**	**endocrine glands**	**Knowledge of the endocrine glands, and in particular the adrenal gland and the hormones .it secretes**	**2**	**fourteenth**
Written test	**Self-learning and presentation**	**Endocrine glands and the hormones they secrete**	**Understanding the pituitary gland and the hormones it secretes**	**2**	**fifteenth**

Course structure (practical part)					
Evaluation Method	**Learning method**	**Unit or topic name**	**Required learning outcomes**	**Hours**	**Week**
Exams and discussions	**The lecture was delivered via PowerPoint and included a discussion with the .students**	**Examination of Arterial Pulse**	**Identifying and clinically evaluating the characteristics of a normal pulse.**	**6**	**the first**
Exams and discussions	**The lecture was delivered via PowerPoint and included a discussion with the .students**	**A film about Stethography: recording normal movement of respiration**	**Identifying normal breathing patterns using a stethograph.**	**6**	**the second**
Exams and discussions	**The lecture was delivered via PowerPoint and included a discussion with the .students**	**A film about Stethography: modified movements of respiration**	**Identifying changes in abnormal breathing patterns.**	**6**	**the third**
Exams and discussions	**The lecture was delivered via PowerPoint and included a discussion with the .students**	**Film about determining vital capacity and effect of posture on vital capacity**	**Understanding the effect of posture on lung vital capacity.**	**6**	**Fourth**

Exams and discussions	**The lecture was delivered via PowerPoint and included a discussion with the .students**	**Thermometer & its uses**	**Understanding the types of thermometers and their clinical uses .**	**6**	**Fifth**
Exams and discussions	**The lecture was delivered via PowerPoint and included a discussion with the .students**	**Arterial blood pressure Estimation**	**Measuring arterial blood pressure and interpreting the values.**	**6**	**Sixth**
Exams and discussions	**The lecture was delivered via PowerPoint and included a discussion with the .students**	**Examination of Heart Sounds**	**Identifying normal and abnormal heart sounds.**	**6**	**Seventh**
Exams and discussions	**The lecture was delivered via PowerPoint and included a discussion with the .students**	**Electrocardiogram (ECG)**	**Interpreting a basic electrocardiogram (ECG).**	**6**	**Eighth**
Exams and discussions	**The lecture was delivered via PowerPoint and included a discussion with the .students**	**Pulmonary volume Estimation**	**Measuring and interpreting different lung volumes**	**6**	**Ninth**
Exams and discussions	**The lecture was delivered via PowerPoint and included a discussion with the .students**	**Artificial respiration**	**Understanding the steps and methods of artificial respiration.**	**6**	**tenth**

Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	General urine	Urine analysis and interpretation of key indicators.	6	eleventh
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	Experiments on movement coordination	Assessing motor coordination and understanding neural control mechanisms.	6	twelfth
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	Film about muscles	Identifying the types and functions of muscles.	6	thirteenth
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	Film about joints	Understanding the types of joints and their movement.	6	fourteenth
Exams and discussions	The lecture was delivered via PowerPoint and included a discussion with the .students	Taste sensation Examination	Testing the sense of taste and identifying the nerves responsible .	6	fifteenth

Course Evaluation .11

The grade out of 100 is distributed according to the tasks assigned to the student, such as daily .preparation, daily oral and written exams, reports, etc

Learning and teaching resources .12

Merrill's Atlas of Radiographic Positions & Radiologic Procedures Radiographic Positioning & Related Anatomy	**Required textbooks (methodology, if applicable)**
Vander's Human Physiology Berne and Levy Physiology	**Main references (sources)**

www.physiology.org (American Physiological Society) **www.ncbi.nlm.nih.gov/pubmed (PubMed for research articles)** **www.khanacademy.org (Khan Academy - Biology and Physiology)** **www.medicalnewstoday.com (Medical News & Updates)**	**Electronic references and websites**

Course Name: Radiobiology .1	
radiobiology	
: Course code .2	
Term / Year : Second Term 2025-2026	
description was prepared this Date .4: 15/9/2025	
.Available attendance formats : lecture in the classroom + laboratory .5	
Total study hours : 8 hours / Number of units: 4 units .6	
: Name of the course coordinator (if there is more than one, please state) .7	
:Emailimad07751@gmail.com	**Dr. Emad Sakban Av**
Course Objectives .8	

Course Objectives	.1 To give a general overview of radiation and its effects on cells and tissues .2 Building a scientific foundation around the course topics enables students to expand their ideas and understanding by consulting relevant scientific sources. .3 Understanding the importance of radiation in our daily lives by studying some of the conditions it causes and by finding treatments for some of the problems. .4 Studying modern tests that play a key role in the early diagnosis of some radiation-induced diseases .5 Expanding scientific and academic research and attempting to create unique and useful scientific research that enables both students and professors to enter the labor market.

.9 Learning and teaching strategies:

.1 The education in this program includes theoretical education that focuses on studying scientific problems in a purely scientific manner aimed at understanding the basis of the problem and searching for solutions to it, and practical education that provides practical experience in conducting experiments and research through the use of methods approved in conducting scientific research.

.2 Learning, in both its theoretical and practical aspects, depends on cooperation between the student and the professor to understand the lesson as much as possible and to overcome obstacles that hinder the student's understanding or impede the conduct of his experiments in the laboratory.

.3 Students were urged to use books and scientific articles, whether physical or electronic, as they greatly help in retaining information and allow for discussion and conclusions.

.10 Course structure (theoretical part)

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	*Introduction to radiobiology*	The student will be able to defi radiobiology and explain its importance, distinguish betwee ionizing and non-ionizing radiatic and understand the effects o radiation on cells and DNA, includi the mechanisms of cell damage a repair. The student is also expected understand the relationship betwe radiation dose and biological effe differentiate between acute an chronic effects of radiation, and familiar with the medical applicatic of radiobiology and the principles radiation protection.	2	the firs

Daily exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***-Oxygen effect (OER) Radiosensitizer***	**The student will be able to defi radiobiology and explain its importance, distinguish betwee ionizing and non-ionizing radiatic and understand the effects c radiation on cells and DNA, includi the mechanisms of cell damage a repair. The student is also expected understand the relationship betwe radiation dose and biological effe differentiate between acute an chronic effects of radiation, and familiar with the medical applicatic of radiobiology and the principles .radiation protection**	**2**	**the second**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Cell death after irradiation***	**The student will be able to defi radiobiology and explain its importance, distinguish betwee ionizing and non-ionizing radiatic and understand the effects c radiation on cells and DNA, includi the mechanisms of cell damage a repair. The student is also expected understand the relationship betwe radiation dose and biological effe differentiate between acute an chronic effects of radiation, and familiar with the medical applicatic of radiobiology and the principles .radiation protection**	**2**	**the thi**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Molecular repair of DNA damage***	**The student will be able to defi radiation-induced DNA damage a distinguish its types, such as sing and double breaks in theDNA stra The student is also expected t explain the main mechanisms of DI repair, such as basal excision rep (BER) nucleotide excision repai (NER) base mismatch repai (MMR) and double break repair vi non-symmetric terminal ligat (NHEJ) or homologous recombination(HR). Furthermor the student will understand th importance of the timing an efficiency of repair in determini cell fate after radiation exposure, a the role of these mechanisms resistance to radiotherapy and can development.**	**2**	**Fourth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	*- Cell survival curves cell cycle effector*	**The student will be able to interp the concept of cell survival curv after radiation exposure, explain t relationship between radiation do and the percentage of cells th survive, and understand the equations used, such as theline quadratic model. The student is a expected to explain how cell cyc phases(G1, S, G2, M) affect c sensitivity to radiation, with cel being most sensitive during th division phase(M) and least sensit during the DNA synthesis phase Furthermore, the student wil recognize the importance of survi curves in determining therapeut doses and understanding the respo of normal and cancerous tissues radiation therapy.**	**2**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Types of cellular damage due to radiation***	**The student is expected to be able define radiation-induced cellula damage and explain its basic typ including DNA damage (such a single-strand and double-stran breaks), cell membrane damage, a damage to proteins and organell such as mitochondria. The student also expected to differentiate betwe direct damageresulting from th direct interaction between radiati and biomolecules, and indirec damageresulting from free radica and explain the effect of thes damages on cell function an survival, in addition to understandi the role of these damages in induci cell death or cancer, and the importance in therapeutic an preventive applications.**	**2**	**Sixth**

		Radiobiology of tissue and organs response to radiation	**The student is expected to expla how different tissues and orga respond to radiation based on th biological and physiological characteristics. The student i expected to explain the differen between tissues that divide rapid and those that divide slowly in th sensitivity to radiation, and to expl concepts such as specific radiosensitivityand the ability repair and regenerate. The stude should also understand the types radiation responses (acute an chronic) and the effect of dose a time on these responses, in addition recognizing the principles of th direct and indirect effects of radiat on living tissues, and the importan of this knowledge in designin radiation therapy plans to minimi damage to healthy tissues an improve treatment outcomes.**		**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	*The severity of radiation effect*	**The student will be able t understand the factors that determ the intensity of radiation's effects tissues and cells, such as radiati dose, type of radiation, delivery ra and the biological characteristics the exposed tissues. The student also expected to explain th differences between acute an chronic radiation effects and understand how the intensity of t effect affects clinical symptoms a organ function. Furthermore, th student will learn about th relationship between dose an biological outcome (dose respons and how to assess the intensity of t effect in medical and environmen applications.**	**2**	**Eighth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Tumer response to radiation***	**The student will be able to expla how radiation affects cancer cells a identify factors that influence tum sensitivity to radiation, such as tum type, cell division rate, and oxyg availability. The student is als expected to explain the mechanis of cancer cell death followin radiation exposure and understa the role of cell survival curves assessing the effectiveness o radiation therapy. Furthermore, t student will learn about th challenges of tumor resistance radiation and how radiosensitize can be used to improve treatme response.**	**2**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Introduction to biosafety and security***	**The student will be able to define t concepts of biosafety and biosecuri and explain their importance i laboratories, research facilities, a medical settings. The student expected to explain various biologi hazards (such as infectious microorganisms and hazardou biological materials) and understa the principles and methods o prevention to minimize exposure these hazards, including sterilizati procedures, personal protectiv equipment, and safe sample handli The student will also become famil with the regulations and law governing biosafety and biosecuri and the importance of ongoin awareness and training to maintai safe working environment an protect public health.**	**2**	**tenth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Biosafety barriers in laboratories***	**The student will be able to defi biological barriers and their vario types used in laboratories, such physical barriers (apparatus, cag glass partitions) and technica barriers (personal protective equipment, ventilation systems). T student is expected to explain the r of each type of barrier in preventi the spread of infectious biologic agents and protecting workers a the community, and to understa the classifications of biosafety le (BSL 1-4) and the precautions spec to each level. The student should a recognize the importance of usi barriers as an integrated part of comprehensive laboratory safet system to ensure a safe and effecti working environment.**	**2**	**atheist ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Biological agents***	**The student will be able to defi biological agents and their vario types, such as bacteria, viruses, fun and parasites. The student is expec to explain the characteristics of ea type, their modes of transmission, a their mechanisms of action on livi organisms, as well as classify the according to their biological haza and level of infection. The stude should also understand the heal risks associated with exposure biological agents, methods o prevention, and the importance adhering to biosafety procedures minimize the transmission of the agents within laboratories an medical environments.**	**2**	**the second ten**

Exams and discussions	**The lecture was presented via PowerPoint and followed by .discussion**	***Biorisk and biohazard***	**The student will be able to define t concepts of bioriskand biohazard and understand the differenc between them. The student i expected to explain the sources biorisks in laboratories and medi environments, such as exposure infectious microorganisms and hazardous biological materials. T student will also learn how to ass and manage these risks to preve accidents and injuries, explai appropriate control and containm procedures, and understand th importance of training and awaren to ensure biosafety and prote workers and the environment.**	**2**	**the thi ten**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	***Types of biological wastes***	**The student will be able to define a classify biological waste into differ types, such as infectious waste, sha (needles and scalpels), chemical wa associated with biological materia and general non-hazardous wast The student is expected to explain t distinguishing characteristics of ea type of waste, describe the associat health and environmental risks, a understand methods for its sa collection, storage, and transportation, as well as approv methods for its treatment an disposal in accordance with biosaf and environmental standards.**	**2**	**Fourth ten**
Exams and discussions	**The lecture was presented via PowerPoint and followed by a discussion with the ,students along with some assessments .**	***Transporation of biological wastes***	**The student will be able t understand the importance o transporting biological waste safely prevent contamination and th spread of infection. The student expected to explain the basi requirements for waste transpo including proper packaging usi sealed, leak-proof containers, a clearly labeling waste according to type and level of hazard. The stud will also learn about the laws a regulations governing transpo operations, the preventive measu that must be followed by worke and safe temporary storage befo transport and final disposal to ensu the protection of the environment a public health.**		**Fifth ten**

Course structure (practical part)					
Evaluation Method	**Learning method**	**Unit or topic name**	**Required learning outcomes**	**Hours**	**Week**
Exams and discussions	**The lecture was presented via PowerPoint and followed by a discussion with the students, along with some assessments .**	**Examination of eukaryotic cells structure and types**	**The student will be able to define eukaryotic cells and differentiate them from prokaryotic cells, and explain the detailed structure of th most important cell components, su as the nucleus, plasma membrane, mitochondria, endoplasmic reticulum, and Golgi apparatus. Th student is also expected to describe the basic functions of each of these organelles and understand the diversity of eukaryotic cell types based on their function, such as animal, plant, and fungal cells, whi highlighting the key differences between them. In addition, the student will become familiar with t techniques used to examine and stu these cells, such as the light microscope and the electron microscope.**	**6**	**the firs the second**
Exams and discussions	**The lecture was presented via PowerPoint and followed by a discussion with the students, along with some assessments .**	**Examination of the effects of radiation on cells**	**The student will be able to explain how radiation affects cells at both t molecular and cellular levels, and describe the types of damage it causes, such as DNA damage, chan in the cell membrane, and disruptio to cellular functions. The student is also expected to explain the mechanisms that lead to cell death survival after radiation exposure, a understand the relationship betwee radiation dose and its effect on the percentage of damaged cells. Furthermore, the student will learn how to assess the effects of radiatio using various laboratory technique and the importance of this knowled in the fields of radiation therapy an radiation protection.**	**6**	**the thi Fourth**

Exams and discussions	**The lecture was presented via PowerPoint and followed by a discussion with the students, along with some assessments .**	**Representation of cell cycle phases and checkpoints**	**The student will be able to describe the different phases of the cell cycle (G1, S, G2, M) and explain the key biological events in each phase. The student is also expected to explain the role of checkpointsin monitoring the cell cycle and ensuring the integrity DNA before it progresses to the next phase, such as theG1/S ,G2/M, and mitosis checkpoints. Furthermore, the student will understand the importance of these checkpoints in preventing abnormal cell division and their impact on the cellular response to radiation, which helps maintain genome stability and prevent cancer development.**	**6**	**Fifth Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and followed by a discussion with the students, along with some assessments .**	**Stages of mitosis**	**The student's ability to identify and explain the different stages of mitosis namely: prophase, metaphase, anaphase, and telophase. The student is also expected to describe the cellular changes that occur in each stage, such as chromosome condensation, their alignment in the metaphase row, separation of sister chromatids, and remodeling of the nuclear membrane, in addition to understanding the importance of mitosis in growth, cell renewal, and maintaining a stable chromosome number.**	**6**	**Seventh Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and followed by a discussion with the students, along with some assessments .**	**Examination of DNA and repair**	**The student is expected to explain the structure of DNAand its importance in storing genetic information, and describe the types of damage that DNA can undergo such as single and double strand breaks and mutations. The student is also expected to explain the different molecular mechanisms of DNA repair, such as base excision repair, nucleotide excision repair, mismatch repair, and double strand repair via terminal splicing or homologous recombination. Furthermore, the student is expected to understand the role of these processes in maintaining genome stability and preventing diseases such as cancer.**	**6**	**Ninth tenth**

Exams and discussions	The lecture was presented via PowerPoint and followed by a discussion with the students, along with some assessments .	Examination of target theory and survival curves	The student will be able to explain t fundamentals of target theory in radiation biology, which explains h radiation causes cell death by targeting specific molecular targets within the cell. The student will als be expected to explain the concept cell survival curves and how these curves represent the relationship between radiation dose and the percentage of cells that survive exposure. Furthermore, the studen will understand the mathematical models used to describe these curv such as the single-target model and thelinear-quadratic model and the role of these concepts in designing radiation therapy plans and evaluating their effectiveness.	6	atheist ten the second ten
Exams and discussions	The lecture was presented via PowerPoint and followed by a discussion with the students, along with some assessments .	Examination of cellular damage due to radiation	The student will be able to identify the types of damage radiation caus to cells, such as direct DNA damag cell membrane damage, and the formation of free radicals that lead indirect damage. The student is als expected to explain the effects of th damage on vital cellular functions, such as cell division arrest, cell dea or genetic mutations. Furthermore the student will understand the relationship between radiation dos intensity and the type of damage resulting, and the importance of studying this damage in the fields o radiation therapy and radiation protection.	6	the thi ten

Exams and discussions	The lecture was presented via PowerPoint and followed by a discussion with the students, along with some assessments .	Examination of different responses of tissue and organs to radiation	The student is expected to be able t describe how different tissues and organs respond to radiation based their biological characteristics, suc as cell regeneration rate and radiation sensitivity. The student is also expected to differentiate betwe acute and chronic responses and explain the effect of dose and exposure rate on the type of respon Furthermore, the student is expect to understand the differences betwe tissues that divide rapidly and thos that divide slowly in terms of radiation tolerance, and explain th importance of this knowledge in planning radiation therapy to minimize damage to healthy tissue and improve treatment effectivene	6	Fourth ten Fifth ten

Course Evaluation .11		
.Daily exams, monthly and final theoretical and practical exams, and classroom discussions		
Learning and teaching resources .12		
ministerial portfolio	Required textbooks (methodology)	
Basic radiation oncology 2	Main references (sources)	
Principle of biology – an introduction to biology concept Radiation biology	Recommended supporting books and references scientific journals, reports,) (.etc	
Course Name: Radiology Department / Principles of Nursing (Theory + Practical) .1		
Course Code .2		
Term / Year : Second Term 2025-2026		
15/9/2025 :preparation description Date of4.		
Lecture in the classroom + laboratory :Available forms of attendance .5		
Total hours / Total units: 6 practical / 2 theoretical .6		
Name of course coordinator (if more than one is required): Name and university email address .7		
M.M. / Zaman Naeem Attiazamannaeem99 .@gmail.com		
:Course Objectives (Subject Matter Objectives) .8		

1. To give a general idea about the material, given that it is part of a basic protocol within hospitals and health centers.
2. To familiarize the student with the most important methods of dealing with patients.
3. Teaching the student how to maintain the health and safety of the patient and provide medical services.
4. The student's knowledge in preparing the patient for various examinations in the correct scientific manner approved globally and within the Ministry of Health system.
5. The student should know how to prevent exposure to health risks.

9. Teaching and learning strategies

1. The education in this program includes theoretical education that focuses on studying the scientific material in a purely scientific manner aimed at a basic understanding of the material and discussing it, and practical education that provides practical experience in applying it within scientific laboratories through the use of approved methods in observing and applying it.
2. Learning, in both its theoretical and practical aspects, depends on cooperation between the student and the professor to understand the material as much as possible.
3. Encouraging students to develop information that opens the way for them to learn and develop their scientific and practical skills by reviewing scientific books and websites.

10. Course structure (theoretical part)

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exam and discussion	Present the lecture using PowerPoint	The importance of the fundamentals of nursing science	Understanding the essential role of nursing in patient care Recognizing the importance of applying scientific principles in nursing practice.	2	the first
Exam and discussion	Present the lecture using PowerPoint	Methods of measuring temperature and pulse	The ability to accurately measure temperature and pulse.Understanding the normal and abnormal rates for each.	2	the second
Exam and discussion	Present the lecture using PowerPoint	Methods for measuring respiration and blood pressure	Mastering the correct methods of measuring respiration and blood pressure.Analyzing the measurement results and determining whether they are normal or not.	2	the third
Exam and discussion	Present the lecture using PowerPoint	Body mechanisms with different body positions	Understanding how the body works during movement and changing positions.The ability to help the patient change position safely.	2	Fourth

Exam and discussion	**Present the lecture using PowerPoint**	**Methods of administering treatment**	**Learn about the different methods of administering medications (oral, injection, (.etc.Mastering the correct procedures for administering treatment safely.**	**2**	**Fifth**
Exam and discussion	**Present the lecture using PowerPoint**	**Basic medical principles and sterilization methods**	**Understanding the principles of infection control and sterilization. Applying sterilization and hygiene techniques in the medical environment.**	**2**	**Sixth**
Exam and discussion	**Present the lecture using PowerPoint**	**Urinary catheterization and types of enema**	**Understanding the reasons for using urinary catheters and their procedures.Learn about the types of enemas and how to administer them .**	**2**	**Seventh**
Exam and discussion	**Present the lecture using PowerPoint**	**Gastric lavage and artificial feeding**	**Understanding gastric lavage procedures. Understanding and managing artificial feeding methods.**	**2**	**Eighth**
Exam and discussion	**Present the lecture using PowerPoint**	**The role in preparing the patient for specialized radiographic imaging of the digestive and urinary .systems**	**Preparing the patient psychologically and physically for radiological examinations. Understanding the procedures required before the examination.**	**2**	**Ninth**
Exam and discussion	**Present the lecture using PowerPoint**	**Basics and application of first aid and artificial respiration**	**The ability to provide basic first aid. Mastering the procedure of artificial respiration in emergency situations**	**2**	**tenth**

Exam and discussion	**Present the lecture using PowerPoint**	**Types of wounds and bleeding, arterial pressure points, types of surgical sutures and dressings**	**Distinguishing between different types of wounds and bleeding.Applying methods to stop bleeding and dress wounds correctly.**	**2**	**eleventh**
Exam and discussion	**Present the lecture using PowerPoint**	**Poisoning, suffocation, and foreign bodies**	**Identifying the symptoms of poisoning and suffocation. Implementing the necessary procedures to deal with these cases.**	**2**	**twelfth**
Exam and discussion	**Present the lecture using PowerPoint**	**Introduction to Biosecurity and Biosafety Levels**	**Understanding the importance of biosecurity in laboratories.Identifying the different levels of biosafety.**	**2**	**thirteenth**
Exam and discussion	**Present the lecture using PowerPoint**	**Risk Management System**	**Understanding the concept of risk management in the medical environment.The ability to identify potential risks and develop plans to deal with them**	**2**	**fourteenth**
Exam and discussion	**Present the lecture using PowerPoint**	**Incident response**	**Develop an effective plan for responding to accidents and emergencies.Understanding the necessary protocols in the event of an accident.**	**2**	**fifteenth**

Course structure (practical aspect)

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week

Exams, discussions, and writing the practical report	**The lecture was presented via PowerPoint and discussed with the .students**	**Methods of measuring temperature and types of medical thermometers**	**The ability to measure temperature using different methods (oral, (underarm, rectal. Distinguishing between the types of medical thermometers and their uses.**	**6**	**the first**
Exams, discussions, and writing the practical report	**The lecture was presented via PowerPoint and discussed with the .students**	**Methods for measuring respiratory rate and blood pressure**	**Mastering the accurate measurement of respiratory rate and blood pressure.Understanding the normal and abnormal rates for each.**	**6**	**the second**
Exams, discussions, and writing the practical report	**The lecture was presented via PowerPoint and discussed with the .students**	**Types of patient body positioning mechanisms**	**Identifying the different positions of the patient lying down, sitting, on the) (side.Applying the correct positioning to the patient according to their medical condition.**	**6**	**the third**
Exams, discussions, and writing the practical report	**The lecture was presented via PowerPoint and discussed with the .students**	**Methods of administering treatment**	**Understanding the different methods of administering medications oral, injection,) (intravenous.Mastering the procedures necessary to administer treatment safely.**	**6**	**Fourth**
Exams, discussions, and writing the practical report	**The lecture was presented via PowerPoint and discussed with the .students**	**Mechanisms for handwashing, wearing a mask, head covering, surgical gloves, and surgical gown**	**Applying sterilization and personal hygiene techniques in the medical environment. Understanding the importance of each procedure in preventing the spread of infection.**	**6**	**Fifth**

Exams, discussions, and writing the practical report	**The lecture was presented via PowerPoint and discussed with the .students**	**How urinary catheterization and enemas work**	**Understanding the indications for using urinary catheters and enemas.Mastering the correct procedures for implementing them.**	**6**	**Sixth**
Exams, discussions, and writing the practical report	**The lecture was presented via PowerPoint and discussed with the .students**	**Gastric lavage and artificial feeding techniques**	**Learn about gastric lavage procedures. Understanding and managing types of artificial feeding.**	**6**	**Seventh**
Exams, discussions, and writing the practical report	**The lecture was presented via PowerPoint and discussed with the .students**	**How to prepare patients for radiological, urological, and gastrointestinal imaging**	**Preparing the patient psychologically and physically for radiological examinations. Understanding the specific procedures required before each examination.**	**6**	**Eighth**
Exams, discussions, and writing the practical report	**The lecture was presented via PowerPoint and discussed with the .students**	**How artificial respiration works and methods of resuscitation**	**Mastering the basic artificial respiration procedure.Understanding the steps of cardiopulmonary resuscitation(CPR).**	**6**	**Ninth**
Exams, discussions, and writing the practical report	**The lecture was presented via PowerPoint and discussed with the .students**	**First aid methods for wounds and bleeding in different parts of the body**	**To differentiate between types of wounds and bleeding.Applying methods to stop bleeding and dress wounds in various parts of the body.**	**6**	**tenth**

Exams, discussions, and writing the practical report	The lecture was presented via PowerPoint and discussed with the .students	Techniques for changing dressings, suturing wounds, removing surgical sutures, and .using bandages	Mastering the procedure of changing dressings in a sterile manner. Understanding the steps for suturing wounds and removing surgical sutures.	6	eleventh
Exams, discussions, and writing the practical report	The lecture was presented via PowerPoint and discussed with the .students	First aid methods for poisoning, suffocation, foreign objects, fractures, burns, and electric shock	Identifying the signs and symptoms of each condition.Implementing the necessary procedures to deal with each type of emergency.	6	twelfth
Exams, discussions, and writing the practical report	The lecture was presented via PowerPoint and discussed with the .students	Introduction to Biosecurity	Understanding the concept of biosecurity in laboratories and healthcare facilities. Recognizing its importance in protecting individuals and the environment.	6	thirteenth
Exams, discussions, and writing the practical report	The lecture was presented via PowerPoint and discussed with the .students	Biological Risk Management System	understand how to identify biological hazardsand are able to develop plans to control and reduce these hazards.	6	fourteenth
Exams, discussions, and writing the practical report	The lecture was presented via PowerPoint and discussed with the .students	Incident response	Understanding the procedures and protocols required in the event of a biological incident or emergency.The ability to implement an effective response plan.	6	fifteenth

Course Evaluation .11

Discussions within the classroom as well as within the laboratories, along with daily practical .exams, weekly reports, monthly exams, and final theoretical exams

Learning and teaching resources .12

	Required textbooks (methodology, if (applicable
✓	**Main references (sources)**
✓	**Electronic references Internet sites**

Medical Terminology :Course Name .2
Course code .3

.4	Semester/Year: Second Semester 2025-2026
.5	2025/9/15 Date of preparation of description
.6	Available attendance formats: Lecture in the classroom
.7	Total hours / Total units: 2 hours
.8	Name of course coordinator (if there is more than one, please list them): Name and university email
	D. Sami Ibrahim Abbas
.9	Course objectives (subject matter objectives)
.1	Explaining the importance of medical terminology for specialists in the medical field
.2	Explaining the components of the term
.3	How to create medical terminology
.4	Giving students an idea of the most important medical terms
.5	Enabling students to become familiar with the most important terms used in the medical field
.10	Teaching and learning strategies
-	The education in the medical terminology course includes enabling the student to understand the term and how to create an accurate and expressive term for the anatomical and physiological state of the human body through theoretical lectures that include illustrative images to bring medical concepts closer to the student's mind.
-	Each lecture is accompanied by a set of questions to assess students' understanding of the lecture.
-	Encouraging students to participate during lectures by completing scientific reports on some medical terms.

Course Structure .10

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussion	PowerPoint presentation and discussion with students	Structural analysis: basic elements of a medical word	They are the roots, prefixes, and suffixes of medicine. - Recognizing common *Greek and Latin* roots(such as heart"-" = cardio ," skin-" = dermo). Distinguish between *prefixes* - = "-(such as "overhyper , = "-below"hypo) and suffixes = "such as "-inflammation)itis , = "excision-"ectomy).	2	the first
Exams and discussion	PowerPoint presentation and discussion with students	Suffixes	Identifying the types of medical appendages and their functions	2	the second

Exams and discussion	**PowerPoint presentation and discussion with students**	**Prefixes**	**Understanding the functions and importance of medical prefixes**	**2**	**the third**
Exams and discussion	**PowerPoint presentation and discussion with students**	**Roots, Word terminals, Conditions**	**Understanding basic medical principles and their applications**	**2**	**Fourth**
Exams and discussion	**PowerPoint presentation and discussion with students**	**Terms concerning Body Structure**	**Understanding the basic terminology of human body structure and its anatomical applications**	**2**	**Fifth**
Exams and discussion	**PowerPoint presentation and discussion with students**	**Terms concerning Integral system**	**Understanding the basic terminology of the structure and functions of the integumentary apparatus**	**2**	**Sixth**
Exams and discussion	**PowerPoint presentation and discussion with students**	**Terms concerning Digestive System**	**Understanding the basic terminology of the structure and function of the digestive system**	**2**	**Seventh**
Exams and discussion	**PowerPoint presentation and discussion with students**	**Terms concerning Respiratory System**	**Anatomical terminology of the respiratory system and physiological process terminology Terminology of respiratory disorders anddiseases**	**2**	**Eighth**
Exams and discussion	**PowerPoint presentation and discussion with students**	**Terms concerning Skin and its appendages**	**Understanding the basic terminology related to the skin and its appendages (hair, nails, (glands**	**2**	**Ninth**

Exams and discussion	PowerPoint presentation and discussion with students	Terms concerning Cardiovascular System	Anatomical terms (heart, blood (vessels - Functional terms (circulatory (system, blood pressure - Disease terms (atherosclerosis, (heart failure.	2	tenth
Exams and discussion	PowerPoint presentation and discussion with students	Terms concerning Blood, Lymph, and Immune system	- Anatomical terminology (bones, muscles, joints) - Functional terms (movement, (contraction, balance - Terms for disorders osteoporosis, muscle tears,) (arthritis	2	eleventh
Exams and discussion	PowerPoint presentation and discussion with students	Terms concerning Musculoskletal System	Anatomical terminology (major endocrine glands and their (hormones - Functional terms (hormonal (regulation, feedback - Terminology of disorders diabetes, hyperthyroidism and) (hypothyroidism	2	twelfth
Exams and discussion	PowerPoint presentation and discussion with students	Terms concerning Endocrine System	Anatomical terms (eye, ear, (nose, tongue - Functional terms (vision, (hearing, smell, taste - Terms for disorders (myopia, deafness, loss of smell, (dysgeusia	2	thirteenth
Exams and discussion	PowerPoint presentation and discussion with students	Terms concerning Special senses	Anatomical terminology (major endocrine glands and their (hormones - Functional terms (hormonal (regulation, feedback - Terminology of disorders diabetes, hyperthyroidism and) (hypothyroidism	2	fourteenth
Exams and discussion	PowerPoint presentation and discussion with students	Terms concerning Oncology	The student will become familiar with the basic terminology in oncologyin both English and Arabic, understand the difference between benign and malignant tumors, and comprehend various diagnostic and treatment methods such as chemotherapy, radiotherapy, .and immunotherapy	2	fifteenth

Course Evaluation .11	
The grade out of 100 is distributed according to the tasks assigned to the student, such as daily .preparation, daily oral and written exams, and reports	
Learning and teaching resources .12	
PowerPoint lectures	Required textbooks (methodology, if applicable)

- "Grey's Anatomy" by Henry Gray - “Clinically Oriented Anatomy” by Keith L. Moore - Chabner, D. E. (2020). The Language of Medicine. Elsevier - Fremgen, B. F., & Frucht, S. S. (2019). Medical Terminology: A Living Language. Pearson.	Main references (sources)
- Online resources: MedlinePlus, Merriam-Webster Medical Dictionary.	Electronic references and websites

Arabic Language :Course Name .1
: Course code .2

Term / Year : Second Term 2025-2026
4. description was prepared this Date : 15/9/2025
5. Available attendance methods : In person
6. Total study hours / Total unit hours : 2 hours / 2 unit hours
7. Name of the course coordinator (if there is more than one, please state) :
M.M. Mansour Jaber Faleh
8. Course Objectives

Course Objectives	
Course Objectives	1. The purpose of studying Arabic is for the student to develop love for the Arabic language, which is the language of the Quran.
	2. The aim of the study is to learn some basic rules that form the basis of each department in universities. These are basic rules for every university student.
	3. The student's mastery of Arabic sentence structure and increasing their vocabulary, with a focus on developing skills The critic
	4. Getting acquainted with some Arab poets and understanding their poetic imagery, which is fundamental to Arab culture.

9. Learning and teaching strategies:

1. The education in this program includes theoretical instruction that focuses on studying scientific problems in a purely scientific manner, aiming to understand the root of the problem and to find solutions for it.
2. Learning depends on cooperation between the student and the teacher to understand the lesson as much as possible and to overcome the obstacles that hinder the student's understanding.
3. Students were urged to use books and scientific articles, whether physical or electronic, as they greatly help in retaining information and allow for discussion and conclusions.

10. Course Structure

Week	Hours	Unit or topic name	Required learning outcomes	Learning method	Evaluation Method

Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Recognizing the basic diacritical marks (damma, fatha, kasra, sukun). Being able to apply them correctly in sentences.	Original diacritical marks	2	Arabic he first
Daily exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Understanding the components of a verbal sentence. Distinguishing between the subject and the passive subject and using them correctly.	he verbal sentence and the subject and his deputy	2	the second
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Understanding the verbs of being and their function in nominal sentences. The ability to use them with the subject and predicate and change their grammatical case.	Kana and its "sisters"	2	e third
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Understanding the characteristics and grammatical inflection of the present tense verb (nominative, accusative, and jussive). Mastering the conjugation of the present tense verb in its various forms.	present tense verb	2	Fourth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Distinguishing between the sounds and letters ض and ظ. Being able to write words containing these two letters correctly.	The letters ض and ظ and the difference between them	2	Fifth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Understanding the characteristics and themes of pre-Islamic poetry. The ability to analyze a pre-Islamic poem and identify its most important features.	re-Islamic Poetry: A Study Analysis	2	Sixth

Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	To learn about the biographies of the two poets Imru' al-Qays and Antar al-Absi. To understand the poetic style of each and to analyze examples of their poems.	Imru' al-Qays Antar al-Absi	2	eventh
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Understanding the stories and lessons contained in Surah Al-Kahf. Recognizing the importance of the Surah and its moral and religious themes.	Surah Al-Kahf	2	Eighth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	To learn about the different types of Arabic poetry (classical, free verse, and syllabic verse). To distinguish between these different poetic styles.	Poetry examples		Ninth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Understanding the origins and development of poetry in the Islamic era. Identifying its most prominent features and themes.	Islamic poetry		tenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	A general understanding of the history and development of Arabic poetry. Familiarity with its different periods and the most important poets of each period.	Arabic poetry		theistic ten
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Understanding "inna" and its sisters and their function in nominal sentences. The ability to introduce them to the subject and predicate and change their grammatical case.	nna and its sisters		the second ten

Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Understanding the characteristics of the past tense. Mastering the verb conjugation of the past tense. verb in its various forms	past tense		e third ten
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Mastering the rules for writing the hamza at the beginning, middle, and end of a word. The ability to apply the rules correctly.	The hamza		Fourth ten
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	Understanding the subject and predicate as the two pillars of a nominal sentence. The ability to identify the subject and predicate and analyze them correctly.	Subject and predicate		Fifth ten

Course Evaluation .11	
.Daily exams, monthly and final theoretical and practical exams, and classroom discussions	
Learning and teaching resources .12	
Educational curriculum	Required textbooks (methodology)
	Main references (sources)
	Recommended supporting books and references (.scientific journals, reports, etc)
	Electronic references, websites

Academic Program Description

Radiology Technology Department

Phase Two

First course

1. Course Name	
Basics of radiation protection	
2. Course code	
3. / the chapter	
First 2025-2026	
4. Date this description was prepared	
2025/09/15	
5. Available forms of attendance	
Classroom + Laboratory	
6. /Number of study hours (total)	
hours / 4 units 6	
7. .Name of the course coordinator (if there is more than one, please mention it) The email address of the instructor (university, if applicable)	
8. objectives Course	
1. Introducing the student to the concept of ionizing radiation and its natural and industrial sources. 2. To enable the student to understand the units of radiation measurement and their basic meanings. 3. Explaining the principles of radiation protection (time, distance, shielding) and theALARA concept . 4. Informing the student about the limits of permissible doses for workers, patients, and the general public. 5. Training the student on methods of measuring doses and using radiation detection devices. 6. Enabling the student to apply protection principles in radiology departments, especially in special cases such as pregnancy or obesity. 7. Developing student awareness of the importance of protective barrier design and the principles of reducing radiation exposure.	**Course objectives**
9. Teaching and learning strategies	
.1 . Interactive lectures using anatomical images and X-rays .2 . Problem-based learning through radiological case analysis .3 . Collaborative learning through small student groups .4 . Visual learning using 3D models and software .5 Practical application in the laboratory and study of real models and . images .6 . Digital simulation to illustrate anatomical structure .7 Short quizzes and classroom discussions to review understanding and . promote participation	**strategy**
10. Course structure	

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Classification of ionizing radiation	Sources of ionizing radiation (background radiation) - Natural sources - Industrial (artificial) sources - Comparison of radiation doses	6	the first
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Radiation measurement units and International (SI) Units	Radioactivity – Exposure – Absorbed Dose – Kerma– Equivalent Dose – Effective Dose – Committed Equivalent and EffectiveDose	6	the second
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Principles of radiation protection	Justification for the practice: Improved protection(ALARA principle) – Time – Distance – Shielding	6	the third
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	radiation dose limits	Maximum permissible limits for radiation workers; Maximum permissible limits for the general public; Maximum permissible limits for patients; Total body dose limits	6	Fourth

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Dosage limits for tissues and organs**	**Radiation protection according to exposure classification: - Occupational exposure - Medical exposure - General exposure - Total non-occupational exposure - Partial occupational exposure**	**6**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Occupational exposure to radiation**	**Fluoroscopy – Mammography – Computed Tomography Surgical Procedures –**	**6**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Prescribe radiation doses for the patient**	**Skin exposure upon entry(ESE) and average dose to the bone marrow(MMD)**	**6**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Dosage and administration in special cases**	**X-rays and pregnancy pregnant patient,) pregnant technician) X-rays and obesity (obese patient, obese (technician**	**6**	**Eighth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Design of protective barriers in radiology departments**	**Primary shielding barrier design; Secondary shielding barrier design; Leakage radiation – Scattered radiation**	**6**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Factors affecting barrier thickness**	**Factors that affect the thickness of radiation barriers and understanding their relationship to the type and amount of radiation and the protective materials used.**	**6**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Radiation detection and measurement**	**Gas-filled detectors – Geiger counter – proportional counting – ionization chambers**	**6**	**eleventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Scintillation Detectors**	**Organic – Inorganic Semiconductor Reagents – Instrument Calibration**	**6**	**twelfth**

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Personal Dosimeters	Film Badges, Thermal Luminometer(TLD), Optical Stimulated) LuminometerOSL) , Pocket Dosimeter, Direct Ionic Storage (DIS), Photonic Dosimeter(RPL), Personal Electronic Surgeon(MOSFET Dosimeter)	6	thirteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Dose measurements in computed tomography(CT) scans	CT Dose Index(CTDI) Dose Length Output (DLP)	6	fourteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Effective dose and factors affecting dose in computed tomography	Fluoroscopy dose (for patient and staff) and methods to reduce the fluoroscopy dose	6	fifteenth

11. Course evaluation

The grade is distributed out of 100 according to the tasks assigned to the student, such as daily .preparation, daily oral, monthly or written exams, and weekly reports

12. Learning and teaching resources

M. Radhi Al-Qurayshi and H. Qasim. AL-Mosawi "Radiation Physics and its applications in diagnostic radiological techniques", Middle Technical University (MTU), Iraq, (2015)

WR Hendee and ER Ritenour, "Medical Imaging Physics", 4th Edition, Wiley-Liss, Inc., (2002)

Allisy-Roberts PJ, Williams J. Farr's "physics for medical imaging". Elsevier Health Sciences; 20 Nov 14.

Stewart Carlyle Bushong, "Radiologic Science for Technologists Physics, Biology, and Protection' Elsevier, Inc. , 7th edition, 2017.

13. Course Name
Radiographic techniques for the lower extremities
14. Course code
15. / the chapter

First 2025-2026

16. Date this description was prepared

2025/9/15

17. Available forms of attendance

Classroom + Laboratory

18. /Number of study hours (total)

hours / 4 units 6

19. .Name of the course coordinator (if there is more than one, please mention it)
The email address of the instructor (university, if applicable)

20. objectives Course

1. Understanding the skeletal anatomy of the lower limb: Enabling the student to know the anatomy of the pelvis, femur, leg, foot, and patella. **2. Knowledge of the lower limb joints: Introducing the student to the hip, knee, ankle, and subtalar joints, including their components, articular surfaces, ligaments, and different positions.** **3. Recognizing radiographic images: Training the student to interpret frontal, posterior, lateral, oblique, and positional images of bones and joints in the lower limb.** **4. Knowledge of sesamoid bones and their importance : Enabling the student to identify small bones such as the sesamoid bones in the foot and the importance of determining their positions radiographically.** **5. Developing clinical skills: Linking anatomical knowledge with radiographic evidence to enhance the ability to perform clinical and diagnostic analysis of the lower extremities.**	**Course objectives**

21. Teaching and learning strategies

.8 . Interactive lectures using anatomical images and X-rays **.9 . Problem-based learning through radiological case analysis** **.10 . Collaborative learning through small student groups** **.11 . Visual learning using 3D models and software** **.12 Practical application in the laboratory and study of real models and . images** **.13 . Digital simulation to illustrate anatomical structure** **.14 Short quizzes and classroom discussions to review understanding and . promote participation**	**strategy**

22. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Basin**	**The student describes the anatomy of the pelvis.**	**6**	**the first**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**bone of the iliac fossa)**	**The student explains the anatomy of the ilium (bone).**	**6**	**the second**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Common pubic symphysis (Symphysis pubis)**	**The student explains the common pubic symphysis (Symphysis pubis) and its anatomy.**	**6**	**the third**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Sacroiliacjoints**	**The student identifies the sacroiliac joints and their anatomical and radiographic characteristics.**	**6**	**Fourth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**The acetabulum**	**The student describes the acetabulumand its associated structures.**	**6**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**thigh bone)**	**The student explains the anatomy of the femur.**	**6**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**(AP) radiographs lateral ,(Frog-leg) position , and visible structures**	**The student interprets images of the hip joint (AP, Lateral, Frog-leg, Inro-superior) and the structures visible in it.**	**6**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Tibiaand Fibula , anterior and posterior (AP) images , lateral (Lateral)**	**The student describes the tibia and fibula and interprets their anterior and lateral radiographs.**	**6**	**Eighth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Knee joint: Anterior and posterior(AP) images lateral , (Lateral) , Skyline image of the patella, and anterior standing image(Erect AP)**	**The student explains the knee joint, front, back ,and side imagesSkyline image of the patella, and AP image while standing .**	**6**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Patella positions**	**The student identifies the patella positionsand explains their radiographic significance .**	**6**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Foot: Anterior and posterior (AP) images , lateral(Lateral) , oblique(Oblique) and visible ,**	**The student explains the anatomy of the foot and interprets the frontal, lateral, oblique, and visible structures.**	**6**	**eleventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Metatarsal bones and toes, sesamoid bones**	**The student describes the metatarsal bones, toes, and sesamoid bones.**	**6**	**twelfth**

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Ankle joint: Anterior and posterior(AP) images lateral , (Lateral) , oblique(Oblique) oblique and , with inversion (Inversion)	The student interprets images of the ankle joint (AP, Lateral, Oblique, Inversion) and the visible structures.	6	thirteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Subtalarjoints	The student identifies the subtalar joints and interprets their radiographic images.	6	fourteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Calcaneum positions	The student explains the positions of the heel bone (Calcaneum positions) and the associated radial changes.	6	fifteenth

23. Course evaluation

The grade is distributed out of 100 according to the tasks assigned to the student, such as daily .preparation, daily oral, monthly or written exams, and weekly reports

24. Learning and teaching resources

Whitley, A. S., Jefferson, G., Holmes, K., Sloane, C., Anderson, C., & Hoadley, G. (2015). Clark's Positioning in Radiography 13E. crcPress.

Bontrager, K. L., & Lampignano, J. (2013). Bontrager's handbook of radiographics positioning and techniques. Elsevier Health Scien

25. Course Name
Computer Application
26. Course code
27. / the chapter
First semester 2025-2026
28. Date this description was prepared
2025/9/15
29. Available forms of attendance
In-person lectures
30. Total number of study hours/2

31. .Name of the course coordinator (if there is more than one, please mention it) The email address of the instructor (university, if applicable)

M.M. Amin Hamid Sakhi

Ameen.h.sekhi@nust.edu.iq

32. objectives Course

Course objectives

1. To provide students with the basic skills to use computer applications in academic and professional fields.

2. veloping a comprehensive understanding of operating systems and productivity software such as word processors, spreadsheets, and others.

3. Enhancing internet research skills and data analysis using digital tools.

4. The student was able to use specialized software in the field of medical and health technologies.

5. Promoting a culture of digital security and responsibility in handling information.

1. Teaching and learning strategies

1. Theoretical lectures and practical applications in laboratories.

2. Interactive learning via digital platforms.

3. Scientific presentations and projects.

4. Practical exercises and problem-solving.

2. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short quiz + oral questions + short research assignment	Presentation + Classroom Discussions + Real-Life Examples	Introduction to Computers and Operating Systems	The student defines the concept of computers and operating systems.It distinguishes between different types of operating systems.It explains the relationship between the user and the operating system.	2	the first

Business inheritance + classroom discussions	**Brainstorming presentation + of practical images and videos**	**Computer advantages and areas of use**	**The student lists the most important advantages of the computer. Explains the use of computers in medicine and education It compares different fields**	**2**	**the second**
Simple practical test + explanatory questions	**Practical demonstration of computer parts + explanatory video**	**Computer components**	**It distinguishes between computer hardware and software components. Describes the functions of each component**	**2**	**the third**
Short * report **Behavioral * assessment for participation**	**Group discussion + case studies**	**Ethics of the digital world**	**The concept of internet ethics is explained. Electronically interpreted rules of conduct apply Evaluates unethical practices online**	**2**	**Fourth**
Objective * test **Simple * presentation**	**Interactive lecture + practical examples**	**Digital security concepts and software licenses**	**Digital security is defined and its importance It distinguishes between different types of software licenses. Personal data protection measures are applied**	**2**	**Fifth**

Short research **Objective * test**	**Analysis of * simplified legal texts** **Discussions of * real-life cases**	**Computer software licenses, their types, and intellectual property**	**Explaining the concept of digital intellectual property It distinguishes between free, open, and closed licenses. It defines hacking practices and their legal .implications**	**2**	**Fifth**
Written test **Practical exercise**	**Theoretical * explanation** **Computer test***	**Definition of operating systems, functions, and objectives**	**The operating system and its basic functions**	**2**	**Sixth**
practical * control **Monitoring * student performance during the application**	**Hands-on * training on the equipment** **Demonstration***	**Windows 10 operating system**	**It identifies the features of the Windows 10 system. It uses the system's .basic tools**	**2**	**Seventh**
Practical exercise **Application * question**	**Direct * explanation** **Practical application**	**Desktop components and Start menu**	**Identify desktop components Use the Start menu to access programs Organizes the desktop work environment**	**2**	**Eighth**
Practical assessment **Practical * questions**	**Practical application** **Group exercise**	**Folders, files and icons**	**It distinguishes between files and folders. Creates, renames, and moves folders Icons are used to launch programs. Icons are used to launch programs and .files**	**2**	**Ninth**

Short practical test	**Hands-on * training on the Windows interface**	**Performing operations on windows and desktop backgrounds**	**Opens, closes, and minimizes windows Changes desktop background and personal settings User interface customization is applied**	**2**	**tenth**
practical control * Simple homework	**Practical explanation Overview of * Control Panel Tools**	**Windows Control Panel**	**Learning on control panel functions It changes system settings such as language and .date**	**2**	**eleventh**
Collective * Report Written test	**Interactive discussions Real-world * case studies**	**Digital security concepts**	**It explains the importance of protecting personal data. He applies security strategies Identifying types of malware**	**2**	**twelfth**
practical * control Practical exercise	**Practical explanation Live practical * training**	**Printer management, time setting, and other functions on the computer**	**Adjusts printer and time settings Adds new peripherals Performs basic system maintenance operations**	**2**	**thirteenth**
Written test Short research	**Interactive discussions * Demonstration**	**Applications of artificial intelligence in problem solving**	**The student explains the concept of research It applies simple search algorithms**	**2**	**fourteenth**
Achievement test	**interactive**	**Comprehensive course review**	**Evaluate student performance and review content**	**2**	**fifteenth**
3. Course evaluation					

4. Learning and teaching resources	
	Computer basics and office applications

1. Course Name
Radiographic anatomy of the lower limbs
2. Course code
3. / the chapter
2025-2026 Second
4. Date this description was prepared
2025/9/15
5. Available forms of attendance
Classroom + Laboratory
6. /Number of study hours (total)
5 hours/ 4 units
7. .Name of the course coordinator (if there is more than one, please mention it) **The email address of the instructor (university, if applicable)**

Hassan Badr Al-Riyahi	
8. objectives Course	
.1 . Identifying the main bones of the lower limb .2 Identifying the joints of the lower limb and their . functions .3 Knowledge of the muscles and tendons that are important . for the lower limb .4 . Assessment of fractures and various injuries .5 Distinguishing between normal and pathological . conditions .6 . Surgical and therapeutic planning for the lower limb .7 Acquiring skills in reading radiological images• ,(X-ray ...MRI) ,CT	Course objectives
9. Teaching and learning strategies	
.1 Theoretical lectures : Explanation of bones, joints, muscles and . blood vessels with the presentation of radiographic images .2 Practical radiographic images :, X-ray and CT analysis to MRI . differentiate between normal and pathological structures .3 Interactive learning : using group discussions and solving real . clinical cases .4 Practical laboratory : Studying anatomical models and models . before looking at radiographic images .5 Digital education : Using 3D applications and simulators for . muscles and joints .6 Continuous assessment : short tests, practical questions, and . review of radiographic images to reinforce information .7 Case-based learning• : Linking anatomy to actual injuries or . diseases to facilitate understanding and memorization	strategy

10. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The bony pelvis (pelvic girdle): the sacrum, coccyx, and hip bones.	Understanding the properties of radiological anatomy	5	the first
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Differences between the male and female pelvis. Radiographic features of the pelvic bones.	Distinguishing the mechanisms of radiation generation	5	the second

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Normal anatomy of the femur. Radiographic features of the femur. Ossification centers.**	**Explanation of the interaction of radiation with matter**	**5**	**the third**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Normal anatomy of the tibia. Radiographic features of the tibia. Ossification centers.**	**Analysis of the quality of the radiographic image**	**5**	**Fourth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Normal anatomy of the fibula. Radiographic features of the fibula.The ossification center. Normal anatomy of the patella. Radiographic features of the patella and its ossification center.**	**Applying the principles of radiation protection**	**5**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Normal foot anatomy: Components: carpal bones, metatarsal bones, and phalanges**	**Operating imaging systems**	**5**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**- Radiographic characteristics of the foot: carpal bones, metatarsal bones, and phalanges.**	**Estimating the patient's radiation dose**	**5**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Hip joint: Joint type, articular surfaces, capsule, and ligaments in hip joints**	**Understanding the basic principles of radiation**	**5**	**Eighth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Hip joint: Radiographic characteristics of the hip joint. Hip .dislocation**	**Classification of radioactive species and sources**	**5**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**The knee joint: joint type, articular surfaces, capsule, and ligaments of the knee joint**	**Interpreting radioactive behavior within matter**	**5**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**The knee joint: Internal structures of the knee joint. Radiographic characteristics of .the knee joint**	**Estimation of radiation doses and risks**	**5**	**eleventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Ankle joint: Joint type, articular surfaces, capsule, ligaments. Radiographic characteristics of .the ankle joint**	**Applying radiation protection requirements**	**5**	**twelfth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Blood supply to the lower extremities: arteries of the lower extremities**	**Operation and calibration of measuring instruments**	**5**	**thirteenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Radiographic characteristics of lower limb arteries**	**Analysis of experimental measurement results**	**5**	**fourteenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Lower limb veins, radial characteristics of lower limb veins**	**Compliance with international regulatory standards**	**5**	**fifteenth**
11. Course evaluation					

The grade is distributed 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	
ministerial file	**Klee and Petersen, C. (2018). Computed Tomography for Imaging Professionals. 3 Ray N., S., McNichollas, M. & Eustice, S. (2011). Anatomy for .and 4th editions Diagnostic Imaging.Lazo, D. L. (2015). Fundamentals of tomographic anatomy: a imaging-based methodology.**

1. Course Name
Fundamentals of Radiation Physics
2. Course code
3. / the chapter
2025-2026 Chapter One
4. Date this description was prepared
2025/9/15
5. Available forms of attendance
Classroom + Laboratory
6. /Number of study hours (total)
5 hours / 3 units
7. .Name of the course coordinator (if there is more than one, please mention it) The email address of the instructor (university, if applicable)
Reda Fahad Hannoun, Email: Reda.Fabhd2204m@ihcoedu.uobaghdad.edu.iq

8. objectives Course	
•Understanding the nature, types, and physical properties of radiation. Learning how radiation is produced and generated inside anX-ray tube. Studying the interaction of radiation with matter and its effects on atoms and tissues. Applications of radiation in medical fields such as diagnosis and treatment. Understanding methods of radiation protection and ensuring radiation safety. Learning how to use radiation detectors and accurately measure doses. Developing scientific thinking and the ability to practically apply radiation concepts.	Course objectives

9. Teaching and learning strategies	
• Using lectures to explain basic theoretical concepts. • Employing presentations and visual aids to explain equipment and radiation processes. Conducting practical laboratory sessions using radiation measurement and detection equipment. • Applying problem - based learning to connect knowledge with practical realities. • Encouraging collaborative learning and teamwork among students. Using e-learning and virtual simulation to simplify complex concepts . Providing demonstrations of how to operate radiation equipment and radiation protection methods. Implementing continuous assessment through short quizzes and practical reports.	strategy

10. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	exposure ,generation timing, load drop, filament voltage	Understanding the properties of X-rays	5	the first
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Limitations of the X-focal point of ray tube Rotating anode the line Thermal tube classification	Distinguishing the mechanisms of radiation generation	5	the second

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Heating and cooling of the X-ray tube; heat capacity; factors affecting heat capacity; focal area; focal volume; anode rotation speed; anode body**	**Explanation of the interaction of radiation with matter**	**5**	**the third**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**X-ray production, characteristic radiation, braking radiation, emission spectrum, braking radiation, its importance in imaging and dose determination, electron energy effect, target material effect, filtering effect**	**Analysis of the quality of the radiographic image**	**5**	**Fourth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Characteristic radiation, electron energy effect, target material effect, filtration effect**	**Applying the principles of radiation protection**	**5**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**X-ray fluorescence is the phenomenon of .fluorescence in X-rays**	**Operating X-ray systems**	**5**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Electron tube energy; factors affecting electron emission spectrum; mA and mA kV peak voltage waveform; target material; additional filtration**	**Estimating the patient's radiation dose**	**5**	**Seventh**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**X-ray emission: Factors affecting X-ray spectra and output; X-ray quantity; X-ray intensity; Factors affecting the quantity of X-rays**	**Understanding the basic principles of radiation**	**5**	**Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**X-ray quality, transmittance, photon range, filtration, half-value layer**	**Classification of radioactive species and sources**	**5**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Linear attenuation coefficient of X-rays; interaction of X-rays with materials; photoelectric absorption; Compton process (modulated scattering) scattering ; angle effect; unmodulated scattering**	**Interpreting radioactive behavior within matter**	**5**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Factors affecting image contrast include the patient's linear attenuation coefficient, photon energy(kVp), soft tissue X-ray imaging, calcium, iodine and barium contrast media, and .scattering radiation**	**Estimation of radiation doses and risks**	**5**	**eleventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**X-ray attenuation by: patient and contrast media**	**Applying radiation protection requirements**	**5**	**twelfth**

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Differential absorption depends on the atomic number and mass .density	Operation and calibration of measuring instruments	5	thirteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Ensuring the quality of exposure parameters: X-ray tube output kilovolts, milliampere-) seconds), automatic exposure control, filtration, focal length .measurement	Analysis of experimental measurement results	5	fourteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Equipment tests, film processor speed	Compliance with international regulatory standards	5	fifteenth

11. Course evaluation

The grade is distributed 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

ministerial file	Radhi Al-Quraishi and H. Qasim Al-Mousawi, "Radiation Physics and its Applications in Radiological Diagnostic Techniques," Middle Technical Universit Iraq, (2015). Stuart Carlyle Bushong, "Radiation Science for Technicians: Physic Biology, and Protection," Elsevier, 7th ed., 2017. Perry Sprouls, "Physical Princip .of Medical Imaging," 2nd ed., 1996

1. :Course name

Specialized radiological examinations of the digestive system and bones

2. Course code

3. :the chapter
First 2025-2026
4. : Date this description was prepared
2025/9/15
5. Available forms of attendance
In person in classrooms and practical laboratories
6. /Number of study hours (total)
2
7. Name of course coordinator (if more than one is used, please specify): Dr. Ali Shaker Mahmoud **:The email address of the instructor (university faculty, if applicable)** **dr.ali.shakir.moh@gmail.com**
8. objectives Course:

Teaching students how to use contrast materials and perform .radiographic examinations of the digestive system and bones	**Course objectives**

9. Teaching and learning strategies	
PowerPoint presentations Interactive lectures supported by .1 **. Group discussions and classroom participation to promote critical thinking .2** **. Clinical case-based learning .3** **. Practical sessions / laboratory work .4** **. Duties and reports, both individual and group work .5** **. Student presentations and seminars .6** **ing electronic resources and e-learning platforms to support the learning process .7** **.** **. Continuous feedback and regular academic guidance .8**	**strategy**

10. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Intravascular contrast medi Adverse effect of Intravenous (water soluble contrast media specific organs	Acquiring the basic knowledge and skills related to the course subject	2	1

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Contrast Agents in Magn Resonance Imaging Mechanism Action Gadolinii Gastrointestinal Contrast Age	Acquiring the basic knowledge and skills related to the course subject	2	2
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Methods of imaging's of Gastrointestinal tract (GIT) with barium water soluble contras agents	Acquiring the basic knowledge and skills related to the course subject	2	3
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Barium examination: swallow meal Barium examination: fol through, small bowel ane	Acquiring the basic knowledge and skills related to the course subject	2	4
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Barium examination: barium enema, intestinal enema, air enema.	Acquiring the basic knowledge and skills related to the course subject	2	5

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Reduction of intussusception**	**Acquiring the basic knowledge and skills related to the course subject**	**2**	**6**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Computed Tomography of the Gastrointestinal Tract**	**Acquiring the basic knowledge and skills related to the course subject**	**2**	**7**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Magnetic Resonance Imaging of the Gastrointestinal Tract**	**Acquiring the basic knowledge and skills related to the course subject**	**2**	**8**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Imaging modalities of bones & joints.**	**Acquiring the basic knowledge and skills related to the course subject**	**2**	**9**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Imaging modalities of bones & joints.**	**Acquiring the basic knowledge and skills related to the course subject**	**2**	**10**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Arthrography – general points**	**Acquiring the basic knowledge and skills related to the course subject**	**2**	**11**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Arthrography of the knee & hip**	**Acquiring the basic knowledge and skills related to the course subject**	**2**	**12**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Arthrography of the shoulder & elbow**	**Acquiring the basic knowledge and skills related to the course subject**	**2**	**13**

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Arthrography of the wrist & ankle	Acquiring the basic knowledge and skills related to the course subject	2	14
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Arthrography of the wrist & ankle	Acquiring the basic knowledge and skills related to the course subject	2	15

11. Course evaluation

The distribution of marks out of 100 is based on the tasks assigned to the student, such as daily .preparation, daily oral tests, monthly or written tests, reports, and others

12. Learning and teaching resources

Watson, N. & Jones, H. Chapman & Nakielnys *"Guide to Radiological Procedures"* , 7th edition , Elsevier Health Sciences, 2017.

1 Course Name .

Computed tomography (CT) imaging techniques

2 Course code .

3 / the chapter .

First semester2025-2026

4 Date this description was prepared .

2025/9/15

5 Available forms of attendance .

classroom and laboratory

6 / Total number of study hours .

2 + Theory 5 Practical	
7. Name of the course coordinator (if more than one is mentioned) and the instructor's university .email address (if available)	
Sadiq Younis Kazem Moussa Al-Omari sadeqyuoneskadhimAlomeri@gmail.com	
8 Course objectives .	
Course objectives	**.1 Understanding the basic principles and .components of medical imaging systems .2 Identifying the technical aspects and operation of X-ray and computed .tomography (CT) imaging equipment .3 Explaining the process of capturing, reconstructing, and quality control images in computed tomography (CT) .scanning .4 Understanding safety standards and .radiation protection procedures .5 Developing practical skills in handling .and maintaining imaging equipment**
Learning strategy	
strategy	**.1 . Lectures with multimedia presentations .2 Practical demonstrations and hands-on . training .3 . Group discussions and case studies .4 Assignments and short quizzes to assess . understanding .5 Using real filming equipment for practical training**

Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	the time	Asb and A
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Understanding the Evolution of Photography Computed tomography .(CT) scan	History of computed tomography	5	the first

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Defining the restrictions Main For conventional .X-rays	Limitations of conventional radiography Basic principles of devices Computed tomography (CT) scans: their generations First generation , second generation , third generation fourth , generation , fifth generation: Electron beam computed) tomography EBCT (	5	the second
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Explanation of principles and generations of devices Computed tomography Computerize .d	Computed tomography (CT) scanners Computerized helical/spiral: Requirements for quantitative surveying: Dual source	5	the third
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	to understand requirements spiral scan Photography .Volumetric	pitch interpolation algorithms	5	Fourth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Design description Imaging system Computed tomography .multi Slides	Computed) tomography MSCT Multi-Slice) Multi-Detector -) (Rows	5	Fifth

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Identifying components Imaging systems Computed tomography Single and multiple .Slides	Design of a tomography imaging system Computerized: Computed tomography (CT) scan)SSCT computerized per second) and CT scan( )MSCT) Computerized per second X-ray imaging system (bridge): X-ray tube, X-ray tubes in computed ( ) tomography MSCT tube per second (Stratton (X-ray	5	Sixth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Explanation of the functions of a tube X-rays and platform .Photography	Settlement and filtering detector: Properties and types of detectors	5	Seventh
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Getting to know Types and characteristics devices The .revelation	control unit Computer system: an offer Images, recording, storage, and communication system. Patient table or couch	5	Eighth

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Unit operation Image control sectional Computeri .zed	Reconstruction methods Back projection reconstruction; filtered back projection	5	Ninth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Display Management the pictures And storing it And .deliver it	CT scan image quality and image contrast spatial accuracy	5	tenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Understanding the situation the patient in Photography sectional Computerize .d	View, store, and share images	5	eleventh
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Explanation of techniques Rebuilding .The picture	Image blurring	5	twelfth

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Quality assessment Image and factors The influential .one	Image distortions: Its types and causes Common deformities and correction techniques	5	thirteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Identifying defects The rumor And methods of .correction	Positron Emission Tomography/Computed Tomography (PET/CT Imaging) Single Photon Emission Tomography/Tomography (Computerized SPECT/CT)	5	fourteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Understanding the principles Photography nuclear Hybridization and photography sectional computerized	Advanced computed tomography (CT) imaging applications: Computed tomography angiography, Computed tomography cardiac imaging Computed tomography fluoroscopy	5	Eleventh

11 Course evaluation .
The grade is distributed out of100 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 (if any)	**Stuart Carlyle Bushong, "Radiology for :Technicians** **Physics, Biology, and Protection," Elsevier .Publishing, Edition Seventh, 2017** **Chris Guy and Dominic Vecchi, "An Introduction to Principles Medical Imaging," .Imperial College Press, 2005** **Perry Sprouls, "Physical Principles of Medical .Imaging," Second edition, 1996** **J. Hsieh, "Computed Tomography: Principles, Design, Instruments, and Recent Advances," 2nd ed., Wiley Inter-Science, Bellingham .Washington, USA)2009(** **Euclid Ceram, "Computed Tomography: Physical Principles, Clinical Applications, and Quality Control" Fourth edition, Elsevier .Publishing House, 2016**

Arabic Language :Course Name .1	
: Course code .2	
Term/Year: First Term 2025-2026 .3	
Date this description was prepared: 15/9/2025 .4	
Available attendance methods : In person .5	
Total study hours / Total unit hours : 2 hours / 2 unit hours .6	
: Name of the course coordinator (if there is more than one, please state) .7	
	M.M. Mansour Jaber Faleh
Course Objectives .8	
.1 The purpose of a student studying Arabic is to develop a love for the Arabic language, which is the language of the Quran. And to recognize its beauty, as it is considered one of the most important features of the Arab-Islamic personality. **.2 The aim of the study is to learn some basic rules that form the basis of each university department. These are basic rules for every university student.** **.3 The student's mastery of Arabic sentence structure and increasing their vocabulary, with a focus on developing skills. The critic** **.4 Getting to know some Arab poets and their poetic imagery, which is fundamental to Arab culture.**	**Course Objectives**

:Learning and teaching strategies .9

.1 The education in this program includes theoretical instruction that focuses on studying scientific problems in a purely scientific manner, aiming to understand the root of the problem and to find solutions for it.

.2 Learning depends on cooperation between the student and the teacher to understand the lesson as much as possible and to overcome the obstacles that hinder the student's understanding.

.3 Students were urged to use books and scientific articles, whether physical or electronic, as they greatly help in retaining information and allow for discussion and conclusions.

Course structure (theoretical part) .10

Evaluation Method	Learning method	Required learning outcomes	Unit or topic name	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	The student knows the original grammatical markers in the Arabic sentence and their uses.	Original diacritical marks	2	the first
Daily exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	The student distinguishes between the verbal sentence, the subject and its substitute, explaining their grammatical functions. In the formation of a nominal sentence.	The verbal sentence, the subject, and its substitute	2	the second
Exams and discussions	The lecture was presented via PowerPoint and discussed with the students.	The student explains the use of kana" and its " sisters and their effect on the grammatical analysis in the sentence.	Kana and its " "sisters	2	the third

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The student explains the rules and regulations of the present tense verb in the Arabic language.	present tense verb	2	Fourth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The student distinguishes in ظ and ض between terms of pronunciation, writing, and usage.	ظ and ض The letters and the difference between them	2	Fifth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The student analyzes examples of pre-Islamic poetry and studies its themes and style .	Pre-Islamic Poetry: A Study and Analysis	2	Sixth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The student learns about the life and poetry of Imru' al-Qais and Antarah al-Absi and their role in Arab heritage.	Imru' al-Qais and Antarah ibn Shaddad	2	Seventh

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**The student reads Surah Al-Kahf and interprets its rhetorical and educational contents .**	**Surah Al-Kahf**	**2**	**Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**The student analyzes selected examples of ancient and modern Arabic poetry.**	**Hair models**	**2**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**The student learns the characteristics of Islamic poetry and its role in expressing religious and social values.**	**Islamic poetry**	**2**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**The student learns the characteristics of Arabic poetry and its linguistic and rhetorical features throughout different eras.**	**Arabic poetry**	**2**	**eleventh**

Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The student explains the use of inna" and its " sisters and their effect on sentence structure and grammatical analysis.	Inna and its sisters	2	twelfth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The student explains the rules of the past tense and its uses in the Arabic language.	past tense	2	thirteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The student distinguishes the hamza, its types, and the rules for writing it.	The hamza	2	fourteenth
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The student identifies the subject and predicate. Their role in forming the nominal sentence.	Subject and predicate	2	fifteenth

Course Evaluation .12	
.Daily exams, monthly and final theoretical and practical exams, and classroom discussions	
Learning and teaching resources .13	
Educational curriculum	Required textbooks (methodology)
	Main references (sources)

	Recommended supporting books and references (scientific journals, (.reports, etc
	Electronic references, websites

33. Course Name
Crimes of the Ba'ath Party regime in Iraq
34. Course code
35. / the chapter
First 2025-2026
36. Date this description was prepared
2025/09/15
37. Available forms of attendance
Classroom + Laboratory
38. /Number of study hours (total)
hours / 2 units 2
39. .Name of the course coordinator (if there is more than one, please mention it) **The email address of the instructor (university, if applicable)**
40. objectives Course

General objective: To familiarize the student with the crimes committed by the Ba'ath regime in Iraq. 1 Specific objective: To familiarize the student with the crimes committed by the Ba'athist regime in Iraq, to provide insight into what happened, and to instill in them the responsibility of preventing its recurrence. 2	Course objectives

41. Teaching and learning strategies

1. Interactive lectures using anatomical images and X-rays. 2. Problem-based learning through radiological case analysis. 3. Collaborative learning through small student groups. 4. Visual learning using 3D models and software. 5. Practical application in the laboratory and study of real models and images. 6. Digital simulation to illustrate anatomical structure. 7. Short quizzes and classroom discussions to review understanding and promote participation.	strategy

42. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
The lecture was delivered using PowerPoint. He discussed it with the students.	Exams and discussions	crimes system The Baath according to law The court criminal Iraqi Upper general 5 200 m	concept Crimes and its sections identification The crime language Technically Sections Crimes crimes system The Baath according to documentation law The court criminal Iraqi Upper general 5 200 m Types Crimes International Decisions Issued from The court criminal Upper	2	First + Second

The lecture was delivered using PowerPoint. He discussed it with the .students	Exams and discussions	Crimes Psychology social And it .provoked it And he highlighted violations order Baathist in Iraq	Crimes Psychology mechanisms Crimes Psychology Traces of crimes Psychology Crimes social militarization the society position order Baathist from Religion violations Laws Iraqi name Material In the language Arabic crimes system The Baath in Iraq Stage First	2	Third+ Fourth + Fifth+ Sixth
The lecture was delivered using PowerPoint. He discussed it with the .students	Exams and discussions	Crimes environmental For the system The Baath in Iraq	pollution Al-Harbi and radioactive explosion Landmines destruction cities and villages(policy the earth Burnt) □ drying The marshes□ dredging orchards Palm and trees and crops	2	Seventh+ Eighth+ Ninth + tenth
The lecture was delivered using PowerPoint. He discussed it with the .students	Exams and discussions	Crimes cemeteries collective	events cemeteries genocide collective The perpetrator from The system□ Baathist in Iraq Classification Time for graves genocide collective in Iraq For the duration 19 3 6 m□ 2003 .M	2	atheistic ten + second ten + Third ten + fourth ten
		exam Seeking			Fifth ten

43. Course evaluation

The grade is distributed out of100 according to the tasks assigned to the student, such as daily .preparation, daily oral, monthly, or written exams, reports, etc

44. Learning and teaching resources	

Academic Program Description

Radiology Technology Department

Phase Two

Second course

13. Course Name
Radiographic anatomy of the head and upper limbs
14. Course code
15. / the chapter
Second 2025-2026
16. Date this description was prepared
2025/09/15
17. Available forms of attendance
Classroom + Laboratory
18. /Number of study hours (total)
hours / 4 units 6
19. .Name of the course coordinator (if there is more than one, please mention it) **The email address of the instructor (university, if applicable)**
20. objectives Course

1. Understanding skeletal anatomy: Enabling the student to know the normal anatomy of the bones of the skull, face, upper limb, and their joints. 2. Identifying radiographic features: Training the student to interpret radiographic images of the bones of the face, skull, and upper limb, including joints, arteries, and veins. 3. Knowledge of ossification centers: Introducing the student to the ossification centers of the main bones in the upper limb. 4. Understanding the joints of the upper limb: To provide the student with accurate information about the shoulder, elbow, and wrist joints, including components, articular surfaces, ligaments, and joint capsule. 5. Identifying the blood supply to the upper limb: Enabling the student to identify the main arteries and veins and explain the radiographic features associated with them. 6. Developing clinical interpretation skills: Linking anatomical knowledge with radiological evidence to enhance the ability to analyze clinically and diagnostically.	Course objectives

21. Teaching and learning strategies

.1 . Interactive lectures using anatomical images and X-rays .2 . Problem-based learning through radiological case analysis .3 . Collaborative learning through small student groups .4 . Visual learning using 3D models and software .5 . Practical application in the laboratory and study of real models and images .6 . Digital simulation to illustrate anatomical structure .7 ort quizzes and classroom discussions to review understanding and promote participation .	strategy

22. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	The normal anatomy of the skull bones (cranial (bones.	The student describes the normal anatomy of the cranial skull bones.	6	the first

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Radiographic appearances of skull bones (cranial (bones.**	**The student explains the radiographic features of the cranial skull bones.**	**6**	**the second**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**The normal anatomy of facial bones.**	**The student explains the normal anatomy of the facial bones.**	**6**	**the third**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Radiographic features of facial bones.**	**The student explains the radiographic features of the facial bones.**	**6**	**Fourth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**The normal anatomy of the nasal cavity and the paranasal sinuses, and their radiographic features.**	**The student explains the anatomy of the nasal cavity and sinuses and interprets their radiographic features.**	**6**	**Fifth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Shoulder girdle scapula and) clavicle) – radiographic features of the shoulder and clavicle bones – ossification centers .**	**The student identifies the anatomy of the shoulder girdle scapula and) clavicle) and interprets the radiographic features and ossification centers.**	**6**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Normal anatomy of the humerus bone – radiographic features of the humerus bone – ossification center.**	**The student describes the anatomy of the humerus bone and explains the radiographic features and the ossification center.**	**6**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Normal anatomy of the radius and ulna bones – their radiographic appearances – ossification centers .**	**The student explains the anatomy of the radius and ulna bones and interprets the radiographic features and ossification centers.**	**6**	**Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Normal anatomy of the hand – radiographic features of the hand – ossification centers.**	**The student identifies the anatomy of the hand and interprets the radiographic features and ossification centers.**	**6**	**Ninth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Shoulder joint: components, joint type, articular surfaces, articular capsule, cartilage labrum, ligaments, and radiographic features of the shoulder joint.**	**The student describes the shoulder joint: components, joint type, capsule, labrum, ligaments, and radiographic features.**	**6**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Elbow joint: components, articular surfaces, ligaments, and radiographic features of the elbow joint.**	**The student explains the joint of the elbow: components, articular surfaces, ligaments, and radiographic features.**	**6**	**eleventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**The wrist joint: components, articular surfaces, ligaments, and radiographic features of the wrist joint.**	**The student explains the wrist joint: components, articular surfaces, ligaments, and radiographic features.**	**6**	**twelfth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Blood supply to the upper limb: the main arteries of the upper limb.**	**The student describes the main arteries of the upper limb and how they are supplied with blood.**	**6**	**thirteenth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Radiographic features of the arteries of the upper limb.**	**The student explains the radiographic features of the arteries of the upper limb.**	**6**	**fourteenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Veins of the upper limb and their radiographic features.**	**The student identifies the veins of the upper limb and interprets their radiographic features.**	**6**	**fifteenth**

23. Course evaluation

The grade is distributed out of 100 according to the tasks assigned to the student, such as daily .preparation, daily oral, monthly or written exams, and weekly reports

24. Learning and teaching resources

Kelley, L. L., & Petersen, C. (2018). ***Sectional Anatomy for Imaging Professionals .*** **Third & fourth edition.**

Ryan, S., McNicholas, M., & Eustace, S. (2011). ***Anatomy for diagnostic imag***

Lazo, D. L. (2015). ***Fundamentals of sectional anatomy: an imaging approc***

25. Course Name
Upper limb radiography techniques
26. Course code
27. / the chapter
Second 2025-2026
28. Date this description was prepared
2025/09/15
29. Available forms of attendance
Classroom + Laboratory
30. /Number of study hours (total)
hours / 4 units 6
31. .Name of the course coordinator (if there is more than one, please mention it) **The email address of the instructor (university, if applicable)**
32. objectives Course

1. Introducing the student to the basic anatomical and radiological terms used in imaging the upper limb. 2. To enable the student to understand the principles of radiographic image formation and the factors affecting its quality (exposure, contrast, resolution). 3. Practical training for the student on the correct positions for imaging the joints and bones of the upper limb (shoulder, elbow, wrist, hand, fingers). 4. To qualify the student to recognize normal anatomical structures in radiographic images and to distinguish between pathological conditions or fractures. 5. Enhancing the student's skills in applying radiation safety principles during radiological examinations. 6. Developing the student's ability to analyze and interpret radiographic images in a professional and accurate manner. 7. Developing technical proficiency in the use of radiology equipment and adjusting imaging parameters to ensure image quality and patient safety.	Course objectives

33. Teaching and learning strategies

.1 . Interactive lectures using anatomical images and X-rays .2 . Problem-based learning through radiological case analysis .3 . Collaborative learning through small student groups .4 . Visual learning using 3D models and software .5 ractical application in the laboratory and study of real models and . images .6 . Digital simulation to illustrate anatomical structure .7 rt quizzes and classroom discussions to review understanding and . promote participation	strategy

34. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Medical terminology: body planes, sections, lines, body positions, and special projections	Learn about anatomical terms, projections, and basic body positions.	6	the first

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Radiographic image quality: factors of exposure, brightness, contrast, sharpness (resolution), distortion, and noise (noise)**	**Understanding the factors affecting the quality of a radiographic image (exposure, contrast, (resolution.**	**6**	**the second**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Shoulder joint: Anteroposterior (AP) position , Lateral , Superinferior, and Oblique**	**Applying imaging techniques to the shoulder joint and identifying visible anatomical structures.**	**6**	**the third**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Positions of the glenohumeral joint**	**Identifying the specific positions of the acetabulum joint and interpreting the resulting images.**	**6**	**Fourth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Acromioclavicular joints**	**Imaging of the acromioclavicular joint and identifying its anatomical components.**	**6**	**Fifth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Clavicle positions**	**Performing clavicle imaging positions and identifying common fractures .**	**6**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Sternoclavicular joints**	**Applying imaging techniques for the sternoclavicular joint and differentiating between normal and pathological conditions.**	**6**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Scapulaand Coracoid process – Radial positions**	**Scapula imaging and coracoid process and determination of their radiographic features.**	**6**	**Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**proximal and distal humerus fractures**	**Identifying proximal and distal humerus fractures and methods of imaging them.**	**6**	**Ninth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**The forearm (ulna and radius) and the types of fractures in them**	**Applying forearm imaging positions (ulna and radius) and diagnosing types of fractures.**	**6**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Elbow joint: Anteroposterior (AP) Lateral „ Oblique, and the structures visible in each**	**Performing imaging of the elbow joint and identifying the visible radiographic structures.**	**6**	**eleventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Hand positions and structures visible in radiographic images**	**Photographing the hand and identifying anatomical structures in different positions .**	**6**	**twelfth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**thumb and finger positions**	**Application of thumb and finger imaging modes and fracture identification.**	**6**	**thirteenth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**scaphoid bone and visible structures**	**Imaging the scaphoid bone and identifying specific positions to detect fractures .**	**6**	**fourteenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Wrist positions and structures visible in radiographic images**	**Performing imaging of the wrist joint and interpreting radiographic changes.**	**6**	**fifteenth**

35. Course evaluation

The grade is distributed out of 100 according to the tasks assigned to the student, such as daily .preparation, daily oral, monthly or written exams, and weekly reports

36. Learning and teaching resources

Whitley, A. S., Jefferson, G., Holmes, K., Sloane, C., Anderson, C., & Hoadley, G. (2015). Clark's Positioning in Radiography 13E. crcPress.

Bontrager, K. L., & Lampignano, J. (2013). Bontrager's handbook of radiographic positioning a techniques. Elsevier Health Scien

1. Course Name
Physics of computed tomography
2. Course code
3. / the chapter
2025-2026 Second
4. Date this description was prepared
2025/9/15
5. Available forms of attendance
Classroom + Laboratory
6. /Number of study hours (total)
5 hours / 3 units
7. .Name of the course coordinator (if there is more than one, please mention it) The email address of the instructor (university, if applicable)
Hassan Badr Al-Riyahi
8. objectives Course

• Understanding the basic physical principles of computed tomography, including X-ray attenuation/absorption and image formation. • Identify and describe the main components of a computed tomography (CT) scanner, such as the X-ray tube, detectors, gantry (frame), and patient table. • Understanding the evolution of tomography technology from the first generations to modern multi-slice, helical/spiral, and dual-source systems. • Understanding image quality standards such as spatial resolution, contrast resolution, noise, and homogeneity. • Learn how to assess and optimize the radiation dose delivered to the patient(CTDI ,DLP and dose reduction strategies ,). • Identifying common defects in computed tomography (CT) scans, understanding their causes, and knowing how to reduce or correct them.	Course objectives

9. Teaching and learning strategies

• Using lectures to explain basic theoretical concepts. • Utilize presentations and visual aids to explain devices and radiation processes . • Conducting practical laboratory sessions using radiation measurement and detection devices. • Applying problem-based learning to utilize knowledge in real-life scenarios. • Encouraging collaborative learning and teamwork among students. • Using e-learning and virtual simulation to simplify complex concepts. • Providing demonstrations of how to operate computed tomography (CT) scanners and radiation protection methods. • Implementing continuous assessment through short tests and practical reports .	strategy

10. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Exams and discussions	The lecture was presented via PowerPoint and discussed with the .students	Introduction and Overview	Understanding the properties of CT scans	5	the first

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Fundamentals of Physics** **projected ray** **Radiation attenuation** **Energy dependence**	**Distinguishing the mechanisms of radiation generation**	**5**	**the second**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Computed tomography (CT) scan figures: accuracy and consistency** **Hounsfield unit, scale**	**Explanation of the interaction of radiation with matter**	**5**	**the third**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Computed tomography image: Windows** **Window width and level**	**Analysis of the quality of the radiographic image**	**5**	**Fourth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Data collection** **Basic concepts of data collection** **sampling**	**Applying the principles of radiation protection**	**5**	**Fifth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Data Acquisition Engineering: Data Acquisition in:** **First-generation scanners** **Second generation scanners** **Third-generation scanners** **Fourth generation scanners**	**Operating computerized video recording systems**	**5**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**- generation scanners** **Helical spiral geometry** **Dual-source computed tomography (CT) scanner**	**Estimating the patient's radiation dose**	**5**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Multislice computed tomography (MSCT)**	**Understanding the basic principles of radiation**	**5**	**Eighth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Data processing** **Image reconstruction** **The scenes**	**Classification of radioactive species and sources**	**5**	**Ninth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Data flow in a computed tomography (CT) scanner** **sequence of events**	**Interpreting radioactive behavior within matter**	**5**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**View, store, and share images**	**Estimation of radiation doses and risks**	**5**	**eleventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Computed tomography image format** **Image matrix** **pixel** **Voxel**	**Applying radiation protection requirements**	**5**	**twelfth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Field of view(FOV) in computed tomography (CT) scans:** **Display Field of View(DFOV)** **Scanning Field of View(sFOV)**	**Operation and calibration of measuring instruments**	**5**	**thirteenth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Basic Physics of Computed Tomography**	**Analysis of experimental measurement results**	**5**	**fourteenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Image axes**	**Compliance with international regulatory standards**	**5**	**fifteenth**

11. Course evaluation

The grade is distributed 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

ministerial file	**M. Radhi Al-Quraishi and H. Qasim Al-Mousawi, *Radiation Physics and its Applications in Diagnostic Radiography Techniques* , Middle Technical University Iraq, 2015.** **WR Hendee andER Ritenour ,.*Physics of Medical Imaging* , 4th ed ,Wiley-Liss, I ,2002.** **Stewart Carlyle Bushong *Radiological Science for Professionals: Physics, Biology, , and Protection*Elsevier, Inc. 7th ed., 2017 ,.** **Chris Guy andDominic Ffytche , *Introduction to the Principles of Medical Imagi* Imperial College Press ,2005.** **Perry Sprawls *The Physical Principles of Medical Imaging* , 2nd ed., 1996 ,.** **Euclid Seeram *Computed Tomography: Physical Principles, Clinical Applications ,.and Quality Control* , 4th edElsevier Inc. ,2016**

45. Course Name

Technologies Devices radial traditional

46. Course code

47. / the chapter

Second 2025-2026

48. Date this description was prepared

2025/09/15

49. Available forms of attendance

Classroom + Laboratory

50. /Number of study hours (total)

hours / 4 units 6

51. .Name of the course coordinator (if there is more than one, please mention it)
The email address of the instructor (university, if applicable)

52. objectives Course

1. Identifying the components of the X-ray imaging system control panel. 2. Explanation of the working mechanism of the high-voltage generator in an X-ray machine. 3. Definition of the basic components of an X-ray tube. 4. Explanation of the most important techniques used in radiography. 5. Determining methods for controlling scattered radiation in an X-ray imaging system.	Course objectives

53. Teaching and learning strategies

. Interactive lectures using anatomical images and X-rays .15 Problem-based learning through radiological case analysis .16 . Collaborative learning through small student groups .17 . Visual learning using 3D models and software .18 Practical application in the laboratory and study of real .19 . models and images . Digital simulation to illustrate anatomical structure .20 Short quizzes and classroom discussions to review .21 . understanding and promote participation	strategy

54. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**OperatingConsole**	**The student becomes familiar with the control panel of the X-ray machine, understands how to adjust the voltage, current, and exposure time, and how to use these settings to obtain a suitable X-ray image in accordance with safety and quality standards.**	**6**	**the first**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**High Voltage Generators**	**The student becomes able to understand high-voltage generators and their components, how to rectify voltage, the difference between different power systems, and understands the effect of the shape of the electrical wave on the quality of the radiation and the resulting image .**	**6**	**the second**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**X-ray tube**	**The student gains a clear knowledge of the structure of the X-ray tube and the nature of its operation, and understands the principle of linear focus and the heel effect, and how these concepts affect the clarity of the image and the distribution of radiation intensity.**	**6**	**the third**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**X-ray tube failure**	**The student learns about the causes of X-ray tube failure and the resulting effects on performance and image quality, and becomes able to suggest appropriate procedures for prevention and reduction of malfunctions.**	**6**	**Fourth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Components of radiographic films, condenser screens, and cassettes**	**The student understands the components of radiographic films and condensing screens, methods of processing the underlying image manually and automatically, and learns about the factors that affect the appearance of a clear image on the film.**	**6**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Filters**	**The student becomes able to understand the function of filters, their types and their importance in improving beam quality, in addition to grasping the concept of half-absorption value and how it is used to estimate filtering efficiency.**	**6**	**Sixth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Scatter Radiation Control** **Grid Types**	**The student learns how to control scattered rays and the role of beam limiters and grid blocking in improving image quality. He also gains the ability to distinguish between different types of blocking and choose the most appropriate one for each examination.**	**6**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Digital radiography– CR (Computed Radiography)**	**The student understands how the computerized CR imaging system works and its components, the mechanism for recording the image on phosphor plates, in addition to understanding the steps of image processing using digital systems.**	**6**	**Eighth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**DigitalRadiography (DDR) Flat PanelDetectors (DR)**	**(DR) detectors , the difference between direct and indirect conversion detectors, and understands the advantages of these systems compared toCR in terms of quality, speed, and radiation dose.**	**6**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Image Quality**	**The student understands the elements of image quality such as contrast, resolution, and noise, and becomes able to interpret the effect of each element on radiographic results and how to improve it to obtain a clearer image.**	**6**	**tenth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Unsharpness** **Magnification** **• Distortion** **Artifacts**	**The student learns about the geometric factors that affect image quality, such as lack of sharpness, magnification, and distortion, and understands how artifacts appearand how to avoid them.**	**6**	**eleventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**breast imaging)**	**The student gains a clear understanding of the principles of mammography, the components of breast imaging equipment, the difference between the film-screen system and modern systems, and how to choose the appropriate settings for diagnostic examination.**	**6**	**twelfth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**□ Digital Breast Imaging(FFDM)** **□ Contrast-enhanced imaging(CEDM) technology** **□ Breast tomosynthesis** **□ Computer-Aided Detection(CAD)** **□ Breast scintigraphy (Scintimammography)**	**The student learns advanced digital techniques in breast imaging, including full digitalFFDM imaging , contrast-enhanced imaging, tomosynthesis, as well as the role ofCAD systems in the early detection of cancer.**	**6**	**thirteenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Fluoroscopy**	**The student understands the components of a conventional fluoroscopy device and the mechanism of operation of the light amplifier, grasps the differences between conventional and digital systems, and understands how digital background-subtracting imaging(DSA) works in vascular examinations.**	**6**	**fourteenth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Bone density scan (DEXA Scan)** **Dental panoramic (OPG)**	**The student learns about the DEXA bone density measurement device and how it works, in addition to understanding the OPG dental panoramic imaging system its types, and , the method of rotating the tube and receiver to produce a panoramic image of the teeth and jaws.**	**6**	**fifteenth**

55. Course evaluation

The grade is distributed out of 100 according to the tasks assigned to the student, such as daily .preparation, daily oral, monthly, or written exams, reports, etc

56. Learning and teaching resources

Stewart Carlyle Bushong, " *Radiologic Science for Technologists Physics, Biology, and Protection"* Elsevier, Inc., 7th edition, 2017.

Chris Guy & Dominic ffytche, *"An Introduction to The Principles of Medical Imaging"* , Imperial College Press, 20

Perry Sprawls, *"Physical principles of medical imaging"* , 2nd Edition 19

57. Course Name

tests radial For the device especially biliary and reproductive
58. Course code
59. / the chapter
Second 2025-2026
60. Date this description was prepared
2025/09/15
61. Available forms of attendance
Classroom + Laboratory
62. /Number of study hours (total)
hours / 4 units 6
63. .Name of the course coordinator (if there is more than one, please mention it) **The email address of the instructor (university, if applicable)**
64. objectives Course

• **Teaching students how to perform radiological examinations of the biliary and reproductive systems .**	**Course objectives**
• **Studying the anatomical and pathological foundations upon which these radiological examinations are based .**	
• **Understanding the features of each imaging technique, its uses, and its diagnostic limitations .**	
• **Interpreting different radiographic images and distinguishing normal from pathological conditions .**	

65. Teaching and learning strategies	
22. Interactive lectures using anatomical images and X-rays . **23. Problem-based learning through radiological case analysis** **24. Collaborative learning through small student groups .** **25. Visual learning using 3D models and software** **26. Practical application in the laboratory and study of real models and images .** **27. Digital simulation to illustrate anatomical structure .** **28. Short quizzes and classroom discussions to review understanding and promote participation .**	**strategy**

66. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Imaging techniques specific to the hepatobiliary system.**	**The student becomes able to understand the different imaging methods of the hepatobiliary system, the nature of each method and when it is used in diagnosis, while being aware of the advantages and limitations of each technique.**	**6**	**the first**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Ultrasound imaging of the liver, gallbladder and biliary system.**	**The student gains the ability to interpret ultrasound images of the liver, gallbladder and bile ducts, and to identify normal and pathological anatomical features within this system.**	**6**	**the second**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Computed tomography(CT) scan of the liver and bile duct tree.**	**CT scans in evaluating the liver and bile duct tree, and to recognize how common diseases appear within this context.**	**6**	**the third**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Magnetic resonance imaging(MRI) of the liver.**	**The student becomes able to understand the role of magnetic resonance imaging (MRI) in assessing liver diseases, and to differentiate between different MRI sequences and their diagnostic significance .**	**6**	**Fourth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Imaging of the bile ducts during and after surgery using aT-tube (T-Tube Cholangiography).**	**The student learns about the concept of imaging the bile ducts using aT- tube during and after operations, and understands how to read the images and identify blockages or bile leaks.**	**6**	**Fifth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Bile duct drainage procedures.**	**The student gains knowledge of bile duct drainage methods, the most important interventional procedures used, and their role in treating bile obstructions.**	**6**	**Sixth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Methods of imaging the urinary system, including excretory urography.**	**The student understands the methods of imaging the urinary system, with a focus on excretory urography, and how to interpret the images and identify disease indicators.**	**6**	**Seventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Computed tomography(CT) scan of the urinary system.**	**CT scans of the urinary system, and learns the details of the anatomy of the system and the appearance of diseases such as stones and masses.**	**6**	**Eighth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Magnetic resonance imaging(MRI) of the urinary system.**	**The student becomes able to understand the role of MRI (Magnetic Resonance Imaging) of the urinary system, and to know the cases in whichMRI is preferred overCT.**	**6**	**Ninth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Micturating Cystourethrograph y (imaging the bladder and urethra .(during urination**	**The student gains the ability to interpret images of bladder and urethral imaging during urination, and understands how to assess vesicoureteral reflux and functional problems.**	**6**	**tenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**urethrography in males. Retrograde pyelonephrography.**	**The student learns the steps of ascending urethral imaging in males, understands the role of this examination in assessing injuries or strictures, and learns about retrograde pyelonephrography and its uses.**	**6**	**eleventh**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**HSG).**	**HSG (hysterosalpingography know how to assess ,(infertility, and differentiate between normal and abnormal conditions.**	**6**	**twelfth**

Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Percutaneous Nephrostomy & Nephrolithotomy.**	**The student gains knowledge of percutaneous nephrostomy procedures and stone removal, and understands the role of imaging in guiding these operations and interpreting their results.**	**6**	**thirteenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Methods of imaging the male and female reproductive system .**	**The student learns about the different methods of imaging the male and female reproductive system, and understands how to choose the appropriate method according to the clinical situation.**	**6**	**fourteenth**
Exams and discussions	**The lecture was presented via PowerPoint and discussed with the .students**	**Computed tomography(CT) and magnetic resonance imaging (MRI) of the reproductive system .**	**The student becomes able to interpretCT andMRI images of the reproductive system, and identify common diseases such as tumors, infections, and anatomical disorders.**	**6**	**fifteenth**

67. Course evaluation

The grade is distributed out of 100 according to the tasks assigned to the student, such as daily .preparation, daily oral, monthly, or written exams, reports, etc

68. Learning and teaching resources

Watson, N. & Jones, H. Chapman & Nakielnys *''Guide to Radiological Procedures''* , 7th edition, Elsevier Health Sciences, 2017.