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

Academic Program and Course Description Guide

2024-2025

Introduction:

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

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

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

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

Concepts and terminology:

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

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

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

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

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

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

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

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

Academic Program Description Form

University Name: Alkitab University

Faculty/Institute: Medical Technology College

Scientific Department: Radiological Techniques

Academic or Professional Program Name Radiological Techniques

Final Certificate Name: Bachelor's of Medical laboratory Technology

Academic System courses and yearly

Description Preparation Date: The approved program is prepared by the Sectorial committee in the Ministry of Higher Education and Scientific Research

File Completion Date: 2024

Signature:

Ass. Pro. Dr. Azhy Mohmmed Dewana

Head of Department Name:

Date: 31/5/2025

Signature:

Scientific Associate Name:

Dr. Saifaddin Babir Ali

Date: 31-5-2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 2/6/2025

Signature:

Al Kitab University College of Medical Techniques

Approval of the Dean

Prof. Dr. Salam Dawod Alkhafagy

31/5/2025

1. Program Vision

Preparing and qualifying students to meet the requirements of the public and private sector labor market for Radiological Techniques through diversification of methods of learning and education and training students to apply the acquired knowledge and skills to solve health problems.

2. Program Mission

Providing distinguished academic programs in the field of theoretical and practical, in order to comply with international standards of academic quality.

2. Encouraging and developing scientific research in the fields

3. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills

4. - Building and developing partnership with the governmental and private sectors and the community with all its various institutions

3. Program Objectives

Preparing specialized cadres with high skill aspects specialized in analysis Radiological Techniques, with efficiency and high quality of theoretical and practical education.

4. Program Accreditation

Ministry of Higher Education and Scientific Research and corresponding colleges

5. **Other external influences**
There is no external sponsor for the program

6. **Program Structure**				
Program Structure	**Number of Courses**	**Credit hours**	**Percentage**	**Reviews***
Institution Requirements	**11**	**26**	**%28.9**	
College Requirements	**9**	**37**	**%23.6**	
Department Requirements	**16**	**128**	**%42.1**	
Summer Training	**1**	**1**	**%2.6**	
Other				

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

7. **Program Description**				
Year/Level	**Course Code**	**Course Name**	**Credit Hours**	
First year first semester			**theoretical**	**practical**
FIRST	KU MT RAD 111	Anatomy of skeleton	2	3
FIRST	KU MT RAD 112	General Physics	2	3
FIRST	KU MT RAD 113	General Physiology	**2**	3
FIRST	KU MT RAD 114	Biology	2	**3**
FIRST	KU MT RAD 115	General Chemistry	2	3
FIRST	KU MT RAD 116	**Computer principles 1**	**1**	**2**

FIRST	KU MT RAD 117	Human Rights and democracy	**1**	–
FIRST	KU MT RAD 118	English language	3	-
		First year Second semester		
FIRST	KU MT RAD 121	Anatomy of body systems	**2**	**3**
FIRST	KU MT RAD 122	physics of atom	**2**	**3**
FIRST	KU MT RAD 123	Systemic physiology	2	**3**
FIRST	KU MT RAD 124	Radiobiology	2	**4**
FIRST	KU MT RAD 125	Principles of Nursing	2	**4**
FIRST	KU MT RAD 126	Computer principles 2	**1**	2
FIRST	KU MT RAD 127	Medical Terminology	2	–
FIRST	KU MT RAD 128	Arabic Language	2	-
FIRST	KU MT RAD 129	جرائم حزب البعث البائد	1	-
		Second year first semester		
SECOND	KU MT RAD 211	Conventional Radiological Equipment techniques	2	5
SECOND	KU MT RAD 212	Radiographic techniques for upper limbs	2	**5**
SECOND	KU MT RAD 213	Special radiological procedures of gastrointestinal tract and bones	2	**5**
SECOND	KU MT RAD 214	Radiological anatomy of head and upper limbs	2	**4**
SECOND	KU MT RAD 215	Fundamentals of radio-physics	2	**3**
SECOND	KU MT RAD 216	Fundamentals of radiation protection	2	**3**

		Second year second semester		
SECOND	KU MT RAD 221	Computed tomography Equipment techniques	2	**5**
SECOND	KU MT RAD 222	Radiographic techniques for lower limbs	2	5
SECOND	KU MT RAD 223	Special radiological procedures of biliary and reproductive system	2	5
SECOND	KU MT RAD 224	Radiological anatomy of lower limbs	2	4
SECOND	KU MT RAD 225	Physics of computed tomography	2	3
		Third year First semester		
THIRD	KU MT RAD 311	Equipment techniques of magnetic resonance imaging	2	4
THIRD	KU MT RAD 312	Radiographic techniques for head and spinal cord	2	4
THIRD	KU MT RAD 313	Special radiological procedures of the head, breast and respiratory system	2	4
THIRD	KU MT RAD 314	Radiological anatomy of the brain and spinal column	2	2
THIRD	KU MT RAD 315	General pathology	2	2
THIRD	KU MT RAD 316	Physics of magnetic resonance	1	3
THIRD	KU MT RAD 317	Biological radiation hazards	2	3

THIRD	KU MT RAD 318	Computer applications1	1	2
		Third year Second semester		
THIRD	KU MT RAD 321	Ultrasound equipment techniques	2	4
THIRD	KU MT RAD 322	Radiographic techniques of thorax and abdomen	2	4
THIRD	KU MT RAD 323	Special radiological procedures of the cardiovascular and central nervous system	2	4
THIRD	KU MT RAD 324	Radiological anatomy of thorax and abdomen	2	2
THIRD	KU MT RAD 325	Systemic pathology	2	2
THIRD	KU MT RAD 326	Physics of ultrasound	1	3
THIRD	KU MT RAD 327	Computer applications2	1	2
		Fourth year		
FOURTH	KU MT RAD 4.1	**Principle of Medicine & surgery**	2	3
FOURTH	KU MT RAD 4.2	**Computed tomography**	2	4
FOURTH	KU MT RAD 4.3	**MRI**	2	4
FOURTH	KU MT RAD4.4	**Ultrasound imaging**	2	4
FOURTH	KU MT RAD 4.5	**Graduation Research Project**	--	--

8. Expected learning outcomes of the program

A- Knowledge and Understanding

1- Identification of chemical compound and how to handle with them
2- the relationships between the chemistry and the specialized materials of X-ray equipments
3- to commit themselves with special chemistry which studied with X-ray

.

Learning Outcomes 1	Learning Outcomes Statement 1

Skills	
1-from practical study in lab. The students acquisition different Marathi esp. with treated chemicals with care and patient 2- student may received an experience in the writing and publishing of researches 3- susceptibility in the field of scientific development and the broad thinking and solving problem	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
The use of current advanced means to connect the theoretical material to the student through recent lectures from international universities and display of documentary films related to the lecture. Practical part in the laboratory and conduct important experiments for the student himself in obtaining and analyzing the results	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. **Teaching and Learning Strategies**
- Active participation in the classroom is evidence of the student's commitment and responsibility 2 - Semester and final tests express commitment and cognitive and skill

achievement
3 - Commitment to the specified deadline in preparing the required duties and reports

10. Evaluation methods

1- Interaction inside the lecture hall
2- Homework assignments
3- Active participation in the lesson
4- Commitment to the specified time in attending lectures and laboratories
5 - After daily, semester and final tests on commitment and desire to achieve knowledg

11. Faculty

Faculty Members

Academic Rank	Specialization	Special Requirements/Skills (if applicable)	Number of the teaching staff

	General	Special			Staff	Lecturer
Professor	1				1	
Assistant Professor	3				1	2
Teacher	15				12	3
assistant teacher	3				2	1

Professional Development

Mentoring new faculty members

1- Adopting practical workshops to increase teaching skills in scientific and educational aspects.
2- Using modern means to search for new scientific information (scientific and medical websites)
3- Participation in scientific seminars and conferences to learn about the most important
developments in the field of laboratories .

Professional development of faculty members

1. Involve teachers in courses that help in building a supportive organizational culture.
2. Utilize advanced scientific and educational techniques and encourage teachers to attend
training programs.
3. Encourage teachers to participate in scientific courses.
4. Encourage teachers to partake in the college's scientific conferences.
5. Develop a sustainable program for organizing scientific seminars in the department.
6. Organize research and discussion sessions.

12. Acceptance Criterion

According to the controls specified by the Ministry of Higher Education through admissioncentral

13. **The most important sources of information about the program**
1- Ministry of Higher Education and Scientific Research 2- University Registration Directorate 3- Department management 4 – The college's official website on the International Information Network (Internet

14. Program Development Plan
1- Holding introductory seminars about the program 2- Holding professional development courses for department departments 3- Vocational training in government or private laboratories recognized by health departments

Program Skills Outline																
				Required program Learning outcomes												
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	
The first stage/first semester	KU MT RAD 111	Anatomy of skeleton	Basic	√	√	√	√									
	KU MT RAD 112	General Physics	Basic	√	√	√	√									
	KU MT RAD 113	General Physiology	Basic	√	√	√	√	√	√	√	√					
	KU MT RAD 114	Biology	Basic	√	√	√	√									
	KU MT RAD 115	General Chemistry	optional	√	√	√	√	√	√							
	KU MT RAD 116	Computer principles 1	optional	√	√		√									
	KU MT RAD 117	Human Rights and democracy	optional	√	√	√										

Program Skills Outline	
	Required program Learning outcomes

Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First stage / second semester	KU MT RAD 121	Anatomy of body systems	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 122	physics of atom	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 123	Systemic physiology	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 124	Radiobiology	Basic												
	KU MT RAD 125	Principles of Nursing	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 126	Computer principles 2	optional	√	√	√	√								
	KU MT RAD 127	Medical Terminology	optional	√	√	√	√	√							
	KU MT RAD 128	Arabic Language	optional												
	KU MT RAD 129	جرائم حزب البعث البائد	optional												

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

Program Skills Outline																
				Required program Learning outcomes												
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	
The second stage/first semester	KU MT RAD 211	Anatomy of skeleton	Basic	√	√	√	√									
	KU MT RAD 212	General physics	Basic	√	√	√	√									
	KU MT RAD 213	Biology	Basic	√	√	√	√	√	√	√	√					
	KU MT RAD 214	General chemistry	Basic	√	√	√	√									
	KU MT RAD 215	Computer principles 1	optional	√	√	√	√	√	√							
	KU MT RAD 216	Human rights and democracy	optional	√	√		√									
	KU MT RAD 211	English language	optional	√	√	√										

Program Skills Outline						
				Required program Learning outcomes		
Year/Level	Course Code			Knowledge	Skills	Ethics

		Course Name	Basic or optional	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Second stage /second semester	KU MT RAD 221	Computed tomography Equipment techniques	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 222	Radiographic techniques for lower limbs	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 223	Special radiological procedures of biliary and reproductive system	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 224	Radiological anatomy of lower limbs	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 225	Physics of computed tomography	Basic	√	√	√	√	√	√						
	KU MT RAD 221	Computed tomography Equipment techniques	Basic	√	√	√	√	√	√	√	√				

Program Skills Outline															
				Required program Learning outcomes											
Third year First semester	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
	KU MT RAD 311	Equipment techniques of magnetic resonance imaging	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 312	Radiographic techniques for head and spinal cord	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 313	Special radiological procedures of the head, breast and respiratory system	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 314	Radiological anatomy of the brain and spinal column	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 315	General pathology	Basic	√	√	√	√								
	KU MT RAD 316	Physics of magnetic resonance	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 317	Biological radiation hazards	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 311	Equipment techniques of magnetic	Basic	√	√	√	√	√	√	√	√				

		resonance imaging													
	KU MT RAD 318	Computer applications1	**Optional**	√	√	√	√								

Program Skills Outline															
				Required program Learning outcomes											
Third year second semester	**Course Code**	**Course Name**	**Basic or optional**	**Knowledge**				**Skills**				**Ethics**			
				A1	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**
	KU MT RAD 321	Ultrasound equipment techniques	**Basic**	√	√	√	√	√	√	√	√				
	KU MT RAD 322	Radiographic techniques of thorax and abdomen	**Basic**	√	√	√	√	√	√	√	√				
	KU MT RAD 323	Special radiological procedures of the cardiovascular and central nervous system	**Basic**	√	√	√	√	√	√	√	√				
	KU MT RAD 324	Radiological anatomy of thorax and abdomen	**Basic**	√	√	√	√	√	√	√	√				
	KU MT RAD 325	Systemic pathology	**Basic**	√	√	√	√								
	KU MT RAD 326	Physics of ultrasound	**Basic**	√	√	√	√	√	√	√	√				
	KU MT RAD 327	Computer applications2	**Optional**	√	√	√	√	√	√	√	√				

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
	KU MT RAD 4.1	Principle of Medicine & surgery	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 4.2	Computed tomography	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 4.3	MRI	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD4.4	Ultrasound imaging	Basic	√	√	√	√	√	√	√	√				
	KU MT RAD 4.5	Graduation Research Project	Basic	√	√	√	√								

Course Description

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al-Kitab University
2. University Department	Al-Kitab University / Radiological Techniques
3. Course title/code	Physiology
4. Programme(s) to which it contributes	The theoretical study at hall class and practical in chemistry lab.
5. Modes of Attendance offered	Weekly
6. Semester/Year	
7. Number of hours tuition (total)	120

8. Date of production/revision of this specification	2024
9. Aims of the Course	
The student learn the principles and basic concepts of physiology and the importance of functional science in medical study ,in addition to learn the mechanism function of cell,tissue,organ,and system to ability to how the body do its function in normal and abnormal distributions of elements in body.	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

A1. the student was knowledge what we mean physiological science
A2.the student knowledge the importance of phsiologyand its relation with various medical studies
A3.knowledge thought to how explanation the body functions and their mechanisms
A4.
A5.
A6 .

B. Subject-specific skills

B1. learn to do some of blood examination
B2. Learn to dohow take the vital signs measurement's
B3.learn how discus his results and write the scientific report

Teaching and Learning Methods

Use the devices and instruments present in department for theoretical and practical in addition to scientific film and videos

Assessment methods

Through theoretical and practical tests in the hall class and laboratory with write the reports and discussion.

C. Thinking Skills

C1.continued attention by lecturer to the student make an affinity scientific article
C2. Scientific linking and connection with life and explain how the body function.
C3. Understanding the patients suffers and pains and how to help them

Teaching and Learning Methods

Learn and educations are important theoretical lecture and the particle part also in the laboratory.

Assessment methods

Through theoretical and practical tests in the hall class and laboratory with write

the reports and discussion.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1 the student knowledge information's about how the body can do all the functions in general rhythmic normal health

D2. Receiving an experiences in solving the problems facing the future

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2th.+2 pra.		**Introduction to physiology,cells,cell components and functions**	Lectures/data show	quiz
2	2th.+2 pra.		**Blood ,serum,plasma,plasma proteins function**	Lectures/data show	quiz
3	2th.+2 pra.		**Platelets, Erythrocytes , erythropoietin function and importance**	Lectures/data show	quiz
4	2th.+2 pra.		**Blood clotting, mechanism of bleed closing**	Lectures/data show	quiz
5	2th.+2 pra.		**Physiology of circulatory system, Heart anatomy , heart as a pump**	Lectures/data show	quiz
6	2th.+2 pra.		**Heart sounds and Cardiac output**	Lectures/data show	quiz
7	2th.+2 pra.		**Blood pressure**	Lectures/data show	quiz
8	2th.+2 pra.		**Digestive system**	Lectures/data show	quiz
9	2th.+2 pra.		**Salivary glands & its function**	Lectures/data show	quiz
10	2th.+2 pra.		**Liver& its function**	Lectures/data show	quiz
11	2th.+2 pra.		**Physiology of nervous system**	Lectures/data show	quiz
12	2th.+2 pra.		**Sensory system**	Lectures/data show	quiz
13	2th.+2 pra.		**Motor system**	Lectures/data show	quiz
14	2th.+2 pra.		**Anatomic of nervous system**	Lectures/data show	quiz
15	2th.+2 pra.		**Endocrine control mechanism,pituitary gland**	Lectures/data show	quiz
16	2th.+2 pra.		**First exam**	Lectures/data show	quiz
17	2th.+2 pra.		**Adrenal gland, endocrine pancreas**	Lectures/data show	quiz
18	2th.+2 pra.		**Function of respiratory system**	Lectures/data show	quiz

19	2th.+2 pra.		**Lung volume, exchange & transport of gases in the body**	Lectures/data show	quiz
20	2th.+2 pra.		**Physiology of renal system**	Lectures/data show	quiz
21	2th.+2 pra.		**Kidney structure & function**	Lectures/data show	quiz
22	2th.+2 pra.		**Role of kidney in regulation blood pressure**	Lectures/data show	quiz
23	2th.+2 pra.		**Second examination**	Lectures/data show	quiz
24	2th.+2 pra.		**Urine formation**	Lectures/data show	quiz
25	2th.+2 pra.		**Female reproductive system**	Lectures/data show	quiz
26	2th.+2 pra.		**Male reproductive system**	Lectures/data show	quiz
27	2th.+2 pra.		**Physiology of pregnancy**	Lectures/data show	quiz
28	2th.+2 pra.		**fetal development[**	Lectures/data show	quiz
29	2th.+2 pra.		**Parturition, lactation**	Lectures/data show	quiz
30	2th.+2 pra.		**Regulation of body temperature**	Lectures/data show	quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	Text book of human physiology Guyton

Community-based facilities (include for example, guest Lectures , internship , field studies)	**Review of Medical physiology** **Gonang**

13. Admissions	
Pre-requisites	
Minimum number of students	100
Maximum number of students	240

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al-Kitab University
2. University Department	Al-Kitab University / Radiological Techniques
3. Course title/code	Radiation protection
4. Programme(s) to which it contributes	The theoretical study at hall class and practical in chemistry lab.
5. Modes of Attendance offered	weekly
6. Semester/Year	
7. Number of hours tuition (total)	120
8. Date of production/revision of this specification	2024
9. Aims of the Course	
Students get a valuable information in the subject of theoretical and applied radiation protection in the laboratory to benefit from it in the jurisdiction	
Use of the information, which trains the student in the lab and linked, especially in places that ontain radiation sources, such as hospitals and units in nuclear medicine and other centers to its competence.	
and to ensure that the peaceful applications of radioactive sources, a modern technology sources are for human well-being without being exposed to any risks that may result from	

these applications.
This is done by providing information and guidance adequate for officials and employees in various areas of ionizing radiation on the foundations of preventive methods to be followed when dealing with ionizing radiation.

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
A- Knowledge and Understanding A1. .- First, gain knowledge in the important subject of science A2. Its application in the field of work A3.- Obtaining the new ideas can be combined with competence .
B. Subject-specific skills B1. The student from the practical side in the laboratory and theoretical terms of the development of foreign language development B2. Solving the problems faced by students in the field of employment through fly his mind in thinking to solve the problem B3.learn how discus his results and write the scientific report
Teaching and Learning Methods
The use of current advanced means to connect the theoretical material to the student through recent lectures from international universities and display of documentary films related to the lecture. Practical part in the laboratory and conduct important experiments for the student himself in obtaining and analyzing the results
Assessment methods
Through theoretical and practical tests in the laboratory
C. Thinking Skills C1. Continued attention by the professor to the student make an affinity scientific article C2. Continuous follow-up by using modern means of delivering scientific material to the student C3.Linking scientific material reality of life is important

Teaching and Learning Methods
Education is important theoretical lecture And the practical part also in the laboratory
Assessment methods
Theoretical and practical tests

D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Students get valuable information in the subject of theoretical chemistry D2. Students get hands-on experience in the practical side as a prelude to its competence

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2th.+2 pra.		**Review** – Structure of the Atom – Radiation Units – ALARA principles	Lectures/data show	quiz
2	2th.+2 pra.		Diagnostic X-Ray Room Measurement of Area Radiation Levels Leakage Radiation In-room Scattered Radiation Measurement Protective Barrier/Shielding Assessment Area Radiation Level Checklist	Lectures/data show	quiz
3	2th.+2 pra.		Medical Sources: Occupational and Patient Doses Ionizing radiation interactions with tissue Radiobiological effects at the cellular and whole body level genetic and somatic effects of ionizing radiation • deterministic effects • stochastic effects • probability coefficients for tissues at risk • effective dose Threshold and non-threshold effects.	Lectures/data show	quiz
4	2th.+2 pra.		Radiation protection principles • Justification • Optimization	Lectures/data show	quiz

			• Limitation		
5	2th.+2 pra.		Radiation protection principles applied to medical diagnostic procedures Radiation protection of patients who are or might be pregnant Practical measures for the reduction of patient dose Some dose-saving equipment Some dose-saving techniques High-risk examinations	Lectures/data show	quiz
6	2th.+2 pra.		Risks from radiological examinations Explaining radiation risks to patients Personal protection and personal monitoring - how, why, when, where dose limits typical doses to staff and associated risks protection of staff and members of the public protection of patients	Lectures/data show	quiz
7	2th.+2 pra.		physical factors affecting radio-sensitivity 1. Linear energy transfer 2. Relative biologic effectiveness 3. Fractionation and protraction	Lectures/data show	quiz
8	2th.+2 pra.		Biologic factors affecting Radio sensitivity 1. Oxygen effect 2. Age effect 3. Sex effect 4. Recovery 5. Chemical agents	Lectures/data show	quiz
9	2th.+2 pra.		Early effects of Radiation Acute radiation syndrome	Lectures/data show	quiz

			• Hematologic syndrome • Gastrointestinal syndrome • Central nervous system syndrome Local tissue damage • Skin • Gonads • Extremities Hematologic depression Cytogenetic damage		
10	2th.+2 pra.		Late effects of radiation • Leukemia • Other malignant disease Effect of fetal irradiation • Prenatal death • Neonatal death • Congenital malformation • Childhood malignancy Fetuses irradiated in utero	Lectures/data show	quiz
11	2th.+2 pra.		Radiation dose-response relationships Linear dose-response relationships Non- Linear dose-response relationships Constructing a dose-response relationships Linear, quadratic dose-response relationships Radiolysis of water Direct and indirect	Lectures/data show	quiz
12	2th.+2 pra.		Maximum permissible dose whole body non-occupational exposure Partial-body occupational exposure X-ray and pregnancy 1. The	Lectures/data show	quiz

			pregnant technologist 2. Management principles 3. The pregnant patient		
13	2th.+2 pra.		Designing for radiation protection Design of X-ray apparatus Design of protective barrier thickness	Lectures/data show	quiz
14	2th.+2 pra.		Factors affecting barrier thickness Occupational Exposure	Lectures/data show	quiz
15	2th.+2 pra.		Patient dose Patient dose in special examinations Reduction of occupational exposure Reduction of unnecessary patient dose Unnecessary examinations	Lectures/data show	quiz
16	2th.+2 pra.		**Review** – Structure of the Atom – Radiation Units – ALARA principles	Lectures/data show	quiz
17	2th.+2 pra.		Diagnostic X-Ray Room Measurement of Area Radiation Levels Leakage Radiation In-room Scattered Radiation Measurement Protective Barrier/Shielding Assessment Area Radiation Level Checklist	Lectures/data show	quiz
18	2th.+2 pra.		Medical Sources: Occupational and Patient Doses Ionizing radiation interactions with tissue Radiobiological effects at the cellular and whole body level	Lectures/data show	quiz

			genetic and somatic effects of ionizing radiation • deterministic effects • stochastic effects • probability coefficients for tissues at risk • effective dose Threshold and non-threshold effects.		
19	2th.+2 pra.		Radiation protection principles • Justification • Optimization • Limitation	Lectures/data show	quiz
20	2th.+2 pra.		Radiation protection principles applied to medical diagnostic procedures Radiation protection of patients who are or might be pregnant Practical measures for the reduction of patient dose Some dose-saving equipment Some dose-saving techniques High-risk examinations	Lectures/data show	quiz
21	2th.+2 pra.		Risks from radiological examinations Explaining radiation risks to patients Personal protection and personal monitoring - how, why, when, where dose limits typical doses to staff and associated risks protection of staff and members of the public protection of patients	Lectures/data show	quiz
22	2th.+2		physical factors	Lectures/data	quiz

	pra.		affecting radio-sensitivity 1. Linear energy transfer 2. Relative biologic effectiveness 3. Fractionation and protraction	show	
23	2th.+2 pra.		Biologic factors affecting Radio sensitivity 1. Oxygen effect 2. Age effect 3. Sex effect 4. Recovery 5. Chemical agents	Lectures/data show	quiz
24	2th.+2 pra.		Early effects of Radiation Acute radiation syndrome • Hematologic syndrome • Gastrointestinal syndrome • Central nervous system syndrome Local tissue damage • Skin • Gonads • Extremities Hematologic depression Cytogenetic damage	Lectures/data show	quiz
25	2th.+2 pra.		Late effects of radiation • Leukemia • Other malignant disease Effect of fetal irradiation • Prenatal death • Neonatal death • Congenital malformation • Childhood malignancy	Lectures/data show	quiz

			Fetuses irradiated in utero		
26	2th.+2 pra.		Radiation dose-response relationships Linear dose-response relationships Non- Linear dose-response relationships Constructing a dose-response relationships Linear, quadratic dose-response relationships Radiolysis of water Direct and indirect	Lectures/data show	quiz
27	2th.+2 pra.		Maximum permissible dose whole body non-occupational exposure Partial-body occupational exposure X-ray and pregnancy 1. The pregnant technologist 2. Management principles 3. The pregnant patient	Lectures/data show	quiz
28	2th.+2 pra.		Designing for radiation protection Design of X-ray apparatus Design of protective barrier thickness	Lectures/data show	quiz
29	2th.+2 pra.		Factors affecting barrier thickness Occupational Exposure	Lectures/data show	quiz
30	2th.+2 pra.		Patient dose Patient dose in special examinations Reduction of occupational exposure Reduction of unnecessary patient dose Unnecessary examinations	Lectures/data show	quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Stewart C. Bushong , Sc.D., FACR,FACMP Houston, Texas ,"Radiologic Science for Technologists" , Fifth edition, 1993. - P.A. Robert, J.Williamas, Europe “Farr’s Physics for medical imaging” second edition.
Special requirements (include for example workshops, periodicals, IT software, websites)	***- RADIATION HEALTH SERIES*** ***GUIDANCE NOTES ON RADIATION PROTECTION FOR DIAGNOSTIC RADIOLOGY*** Radiation Health Unit /Department of Health. ***- Radiation Protection 136*** ***European guidelines on radiation protection in dental radiology*** *The safe use of radiographs in dental practice.* Directorate-General for Energy and Transport Directorate H — Nuclear Safety and Safeguards Unit H.4 — Radiation Protection 2004. ***-Factors affecting patient dose in diagnostic*** radiology , J L Poletti /NRL Report.
Community-based facilities (include for example, guest Lectures , internship , field studies)	***- Physics of diagnostic imaging for medical students.*** - James E. Martin ***Physics for Radiation Protection.*** A Handbook. James E. Martin Copyright _ 2006 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim ISBN: 3-527-40611-5 ***- Nuclear Science—A Guide to the Nuclear Science****, Wall Chart ©2003 Contemporary Physics Education Project (CPEP)*

13. Admissions	
Pre-requisites	Continue with the ongoing scientific sources and continuous updating of curricula on an annual basis

Minimum number of students	100
Maximum number of students	240

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al-Kitab University
2. University Department	Al-Kitab University / Radiological Techniques
3. Course title/code	Radiological equipment technologies
4. Programme(s) to which it contributes	The theoretical study at hall class and practical in chemistry lab.
5. Modes of Attendance offered	weekly
6. Semester/Year	
7. Number of hours tuition (total)	180
8. Date of production/revision of this specification	2024
9. Aims of the Course	
Introduce students to the constituent parts of the MRI and CT devices and how they work, also process reconstruction images by technical's MRI & CT	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding A1. To learn the students the all the x-ray machines and their equipments . A2. To learn the students the parts of x-ray machines and how it works A3- have knowledge of x-ray machine failures and errors
B. Subject-specific skills B1. To learn how to deals with all the x-ray machines B2. To learn how to use the x-ray machines and to get a diagnostic images. B3- dealing with x-ray machine failures and errors
Teaching and Learning Methods
1/ Theoretically : through lectures . 2/ Practically :Through practical lectures in hospital and in lab .
Assessment methods
1/Theoretically Exams: daily ,monthly and annually. 2/ practical Exams.: daily ,monthly and annually.
C. Thinking Skills C1. to learn the different between all the x-ray machines . C2. to join the skill of reaching to final diagnosis . C3- Understanding the patients suffers and pains and how to help them
Teaching and Learning Methods
1/ Theoretically : through lectures . 2/ Practically :Through practice lectures in hospitals and in lab. .
Assessment methods

1/Theoretically Exams: daily ,monthly and annually.
2/ practical Exams.: daily ,monthly and annually.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. To use al the knowledges they learn to the field work

D2 . having knowledge in their field

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2th.+4 pra.		**Historical introduction The Hardware**	Lectures/data show	quiz
2	2th.+4 pra.		**Magnet Types Permanent magnets**	Lectures/data show	quiz
3	2th.+4 pra.		**Resistive Magnets Superconducting magnets**	Lectures/data show	quiz
4	2th.+4 pra.		**RF Coils Volume RF Coils**	Lectures/data show	quiz
5	2th.+4 pra.		**Surface coils Quadrature Coils**	Lectures/data show	quiz
6	2th.+4 pra.		**Phased Array Coils Other Hardware**	Lectures/data show	quiz
7	2th.+4 pra.		**Acquisition Computing and Display**	Lectures/data show	quiz
8	2th.+4 pra.		**Gradient Coils Signal Coding**	Lectures/data show	quiz
9	2th.+4 pra.		**Slice Encoding Gradient Phase Encoding Gradient**	Lectures/data show	quiz
10	2th.+4 pra.		**Frequency Encoding Gradient Gradient Specifications**	Lectures/data show	quiz
11	2th.+4 pra.		**Pixel, Voxel, Matrix Slice Thickness**	Lectures/data show	quiz
12	2th.+4 pra.		**Receiver bandwidth Inter-slice gap**	Lectures/data show	quiz
13	2th.+4 pra.		**Size of the (image) matrix pixel size,**	Lectures/data show	quiz
14	2th.+4 pra.		• **the field of slice thickness.**	Lectures/data show	quiz
15	2th.+4 pra.		**Matrices types:** • **Coarse matrices:** • **Fine matrices:**	Lectures/data show	quiz
16	2th.+4 pra.		**Number of acquisitions Selection of the transmit and receive coil (RF coil)**	Lectures/data show	quiz
17	2th.+4 pra.		**Field of View Number of Excitations**	Lectures/data show	quiz

18	2th.+4 pra.		**About CT Scan History of Computed Tomography Operating steps**	Lectures/data show	quiz
19	2th.+4 pra.		**Different Generations of CT Scanners First-generation CT Second-generation**	Lectures/data show	quiz
20	2th.+4 pra.		**Third-generation CT Fourth-generation CT Fifth-generation CT** (Electron-beam)	Lectures/data show	quiz
21	2th.+4 pra.		**CT image Principles of helical CT scanning operation**	Lectures/data show	quiz
22	2th.+4 pra.		**Data acquisition: Patient positioning:**	Lectures/data show	quiz
23	2th.+4 pra.		**Basic CT scanner components** • **Scanning unit (gantry)** • **X-Ray Tube, Collimation, Filtration**	Lectures/data show	quiz
24	2th.+4 pra.		• **Detector** • **Control Console**	Lectures/data show	quiz
26	2th.+4 pra.		**Data Acquisition System (DAS) CT Patient Table or Couch**	Lectures/data show	quiz
27	2th.+4 pra.		**Scanner Design X-ray tubes and collimators**	Lectures/data show	quiz
28	2th.+4 pra.		**Computed tomography radiation detectors First-and second-generation scanners Electron-beam computed tomography**	Lectures/data show	quiz
29	2th.+4 pra.		**Axial computed tomography scanning Helical (spiral) computed tomography**	Lectures/data show	quiz
30	2th.+4 pra.		**Multislice computed tomography Computed**	Lectures/data show	quiz

			tomography fluoroscopy		
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER			1. RF Farr and PJ Allisy-Roberts "Physics for Medical Imaging", Saunders, 4th edition (2001). 2-S.C. Bushong "Radiologic Science For Technologists", Mosby, Fifth edition (1988).		
Special requirements (include for example workshops, periodicals, IT software, websites)					
Community-based facilities (include for example, guest Lectures , internship , field studies)					

13. Admissions	
Pre-requisites	
Minimum number of students	100
Maximum number of students	240

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al-Kitab University
2. University Department	Al-Kitab University / Radiological Techniques
3. Course title/code	general anatomy
4. Programme(s) to which it contributes	The theoretical study at hall class and practical in chemistry lab.
5. Modes of Attendance offered	weekly
6. Semester/Year	
7. Number of hours tuition (total)	120
8. Date of production/revision of this specification	2024
9. Aims of the Course	
1- To study the anatomical positions and its relation with other organs .	
2-To learn the importance of location of the organ in the body.	

3-To learn the structures of the organs and blood,lymphatic and nerve supply of these organs .
.

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
A- Knowledge and Understanding A1. To learn the students the importance of general anatomy . A2. To learn the students the knowlage skill in the function of the organ . A3.To develop the ability of students for differential diagnosis .
B. Subject-specific skills B1 To write the important anatomical terms . B2. To understand the importance of organ functions in human body. B3.To join the scientific knowlage with another sciences .
Teaching and Learning Methods
1/To learn the students in the practicle works for diagnosis and study the anatomical structures of all organ in the body. 2/Visit the practicle lab . by academic staff.
Assessment methods
1/Daily Exame. 2/Daily practicle Exame. 3/ Saminars . 3/homework
C. Thinking Skills C1. Study all the changesat the cellular levels. C2.To allow the students to determines parts and anatomical structures. C3. Understanding the patients suffers and pains and how to help them
Teaching and Learning Methods
1/To learn the students in the practicle works for diagnosis and study the anatomical structures of all organ in the body.

2/Visit the practicle lab . by academic staff.

Assessment methods

1/Daily Exame.
2/Daily practicle Exame.
3/ Saminars .
3/homework

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. .To develop the ability of students in determine the anatomical differences .
D2.To study the importance of human anatomy and its relation ship with another sciencs.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2th.+2 pra.		**Introduction, definition, surface anatomy &anatomical position, vertical& horizontal lines & planes of abdominal organs, cell & tissues, types.**	Lectures/data show	quiz
2	2th.+2 pra.		**Skeleton of upper limbs, muscles of upper limbs**	Lectures/data show	quiz
3	2th.+2 pra.		**The Hand**	Lectures/data show	quiz
4	2th.+2 pra.		**Skeleton of lower limbs, muscles of lower limbs**	Lectures/data show	quiz
5	2th.+2 pra.		**The foot**	Lectures/data show	quiz
6	2th.+2 pra.		**Joints, type of joints, and mechanism of movement**	Lectures/data show	quiz
7	2th.+2 pra.		**Skeleton of the chest: Ribs & sternum, segments of the spinal cord**	Lectures/data show	quiz
8	2th.+2 pra.		**Vertebrate, intervertebral disc.**	Lectures/data show	quiz
9	2th.+2 pra.		**Sacrum and coccyx, pelvis, bony pelvis.**	Lectures/data show	quiz
10	2th.+2 pra.		**Skull: bone of the skull.**	Lectures/data show	quiz
11	2th.+2 pra.		**Skull base, skull vault.**	Lectures/data show	quiz
12	2th.+2 pra.		**Facial bones, mandible and TMJ.**	Lectures/data show	quiz
13	2th.+2 pra.		**The Orbit**	Lectures/data show	quiz
14	2th.+2 pra.		**Nasal cavity paranasal sinus.**	Lectures/data show	quiz
15	2th.+2 pra.		**Meninges, and spinal meninges.**	Lectures/data show	quiz
16	2th.+2 pra.		**The mid brain, cerebral hemisphere, ventricles of the brain.**	Lectures/data show	quiz
17	2th.+2 pra.		**The hind brain: Cerebellum, pons and medulla oblongata.**	Lectures/data show	quiz

18	2th.+2 pra.		**Brain stem & spinal cord.**	Lectures/data show	quiz
19	2th.+2 pra.		**The cranial nerves**	Lectures/data show	quiz
20	2th.+2 pra.		**Lumber and sacral plexuses.**	Lectures/data show	quiz
21	2th.+2 pra.		**Respiratory system: lung, bronchial tree, vascular supply.**	Lectures/data show	quiz
22	2th.+2 pra.		**Cardiovascular system: heart, heart chambers, major vessels.**	Lectures/data show	quiz
23	2th.+2 pra.		**Digestive system: pharynx, esophagus, and stomach.**	Lectures/data show	quiz
24	2th.+2 pra.		**Digestive system: small intestine, and blood supply to abdominal wall.**	Lectures/data show	quiz
25	2th.+2 pra.		**Digestive system: Large intestine,**	Lectures/data show	quiz
26	2th.+2 pra.		**Liver, biliary system, pancreas, and spleen.**	Lectures/data show	quiz
27	2th.+2 pra.		**Urinary system: Kidney, ureter, urinary bladder, urethra & blood supply.**	Lectures/data show	quiz
28	2th.+2 pra.		**The breast: general anatomy, lobular structures.**	Lectures/data show	quiz
29	2th.+2 pra.		**Male reproductive system.**	Lectures/data show	quiz
30	2th.+2 pra.		**Female reproductive system**	Lectures/data show	quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Principle of Human anatomy by Gerard.J.Tortora Mark Nielson .
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	Continue with the ongoing scientific sources and continuous updating of curricula on an annual basis
Minimum number of students	100
Maximum number of students	240

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al-Kitab University
2. University Department	Al-Kitab University / Radiological Techniques
3. Course title/code	Pathology
4. Programme(s) to which it contributes	The theoretical study at hall class and practical in chemistry lab.
5. Modes of Attendance offered	weekly
6. Semester/Year	
7. Number of hours tuition (total)	120
8. Date of production/revision of this specification	2024
9. Aims of the Course	
1- To learn the general pathology and its relation with other organ functions	
2-To study the pathological lesion and the most important pathological lesion .	
3- To understand types of infections due to different microorganisms .	
4- To understand the histological changes of all diseases .	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

A1. To learn the students the importance of general pathology .

A2. To learn the students the knowledge skill in diseases ,causes and diagnostic procedures .

A3.To develop the ability of students for differential diagnosis .

B. Subject-specific skills

B1 To learn the pathology ,pathogenesis and diagnosis of the disease .

B2. To understand the importance of differential diagnosis and compare with other disease .

B3.To study the effects of the disease on public health

Teaching and Learning Methods

1/ Theoratically : through lectures .

2/ Practically :Through practicle lectures in lab.

Assessment methods

1/Theoratically Exame: daily ,monthly and annualy.

2/ practicle Exame.: daily ,monthly and annualy.

C. Thinking Skills

C1 to learn the disease

C2.to study the clinical .

C3. to join the skill of reaching to final diagnosis .

Teaching and Learning Methods

1/ Theoratically : through lectures .

2/ Practically :Through practicle lectures in lab.

Assessment methods

1/Theoratically Exame: daily ,monthly and annualy.
2/ practicle Exame.: daily ,monthly and annualy.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. To learn the pathology ,pathogenesis and diagnosis of the disease .

D2. To understand the importance of differential diagnosis and compare with other disease .

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2th.+2 pra.		**Necrosis –cell death**	Lectures/data show	quiz
2	2th.+2 pra.		**Inflammation**	Lectures/data show	quiz
3	2th.+2 pra.		**Repair process**	Lectures/data show	quiz
4	2th.+2 pra.		**Infection**	Lectures/data show	quiz
5,6	2th.+2 pra.		**Body response to infection**	Lectures/data show	quiz
7	2th.+2 pra.		**Carcinogenesis**	Lectures/data show	quiz
8	2th.+2 pra.		**Radiation effect –early**	Lectures/data show	quiz
9	2th.+2 pra.		**Radiation effect – late**	Lectures/data show	quiz
10	2th.+2 pra.		**Homodynamic disorders**	Lectures/data show	quiz
11	2th.+2 pra.		**Blood disorders- WBC, RBC**	Lectures/data show	quiz
12	2th.+2 pra.		**Blood disorders - coagulation**	Lectures/data show	quiz
13	2th.+2 pra.		**Diseases of bones & joints**	Lectures/data show	quiz
14	2th.+2 pra.		**Bone fracture**	Lectures/data show	quiz
15	2th.+2 pra.		**Pathological diseases of the kidneys**	Lectures/data show	quiz
16	2th.+2 pra.		**Pathological diseases of the ureters& Urinary bladder**	Lectures/data show	quiz
17	2th.+2 pra.		**Pathological diseases of the esophagus & stomach**	Lectures/data show	quiz
18	2th.+2 pra.		**Pathological diseases of the small & large bowel**	Lectures/data show	quiz
19	2th.+2 pra.		**Pathological diseases of the liver**	Lectures/data show	quiz
20	2th.+2 pra.		**Pathological diseases of the lung & pleura**	Lectures/data show	quiz

21	2th.+2 pra.		**Pathological diseases of the upper respiratory tract**	Lectures/data show	quiz
22	2th.+2 pra		**Pathological diseases of the brain**	Lectures/data show	quiz
23	2th.+2 pra		**Pathological diseases of the spinal cord**	Lectures/data show	quiz
24	2th.+2 pra		**Pathological diseases of the gall bladder & biliary tract**	Lectures/data show	quiz
25	2th.+2 pra		**Pathological diseases of the cardiovascular system**	Lectures/data show	quiz
26	2th.+2 pra		**Pathological diseases of the endocrine system**	Lectures/data show	quiz
27	2th.+2 pra		**Pathological diseases of the pituitary gland & adrenals**	Lectures/data show	quiz
28	2th.+2 pra		**Pathological diseases of the lymphatic system**	Lectures/data show	quiz
29	2th.+2 pra		**Pathological diseases of the female reproductive system**	Lectures/data show	quiz
30	2th.+2 pra		**Pathological diseases of the breast**	Lectures/data show	quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Robbins Basic Pathology KumarAbbas 9th Edition
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	Continue with the ongoing scientific sources and continuous updating of curricula on an annual basis
Minimum number of students	100
Maximum number of students	240

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al-Kitab University
2. University Department	Al-Kitab University / Radiological Techniques

3. Course title/code	Principle Of Medical & surgical
4. Programme(s) to which it contributes	The theoretical study at hall class and practical in chemistry lab.
5. Modes of Attendance offered	weekly
6. Semester/Year	
7. Number of hours tuition (total)	150 hours
8. Date of production/revision of this specification	2024
9. Aims of the Course	
Give the students all the practical and theoretical information about how to take care of patients and how to collect the important data to evaluate the cases in addition to use the most recent methods in diseases diagnosis	
Learn students all about diseases and their clinical manifestations	
Learn students the physiology of diseases incidence and their etiological factors with routs of transmission and epidemiology	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
A- Knowledge and Understanding A1. enable the students to gain the knowledge about the human internal disease , their rout of transmission , clinical manifestations , etiological agents A2. enable the students to know the diagnosis methods particularly those depend on X-ray , ultrasound or MRI…etc A3. enable the students to know the important surgical intervention that help in some diseases diagnosis
B. Subject-specific skills B1. .learn students how to collect the data of case history for different diseases B2.learn students how to take care of patients physically and psychiatrically particularly those who need for surgical interventions B3.learn students to get and read the radiological images and different ultrasound and MRI device
Teaching and Learning Methods
By lectures, data show, scientific films for surgical interventions, by visiting some hospitals and learn about diseases and their diagnosis practically

Assessment methods
Through questions and discussions during the lecture, quizzes ,give degrees for scientific activities
C. Thinking Skills C1. help students to adapt the hospital duties C2.enable students to understand patients suffers and pains and help them C3.develop students ability to treat with and bear different diseases cases
Teaching and Learning Methods
By lectures, data show, scientific films for surgical interventions, by visiting some hospitals and learn about diseases and their diagnosis practically
Assessment methods
Through questions and discussions during the lecture, quizzes ,give degrees for scientific activities

D. General and Transferable Skills (other skills relevant to employability and personal development) D1.help students to develop their ability continuously through training session D2.help students pass employment meeting .

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1,2	3p +2t		**Headache :types & imaging of headache**	Lectures/data show	quiz
3	3p +2t		**Head injury : the role of imaging in head injury**	Lectures/data show	quiz
4,5	3p +2t		**Cerebrovascular accident(CVA):imaging in CVA**	Lectures/data show	quiz
6	3p +2t		**Paranasal sinuses: imaging in paranasal sinuses diseases**	Lectures/data show	quiz
7	3p +2t		**The orbit: imaging in orbital diseases**	Lectures/data show	quiz
8	3p +2t		**The spine : imaging of spinal lesions**	Lectures/data show	quiz
9	3p +2t		**The neck : role of imaging in neck masses**	Lectures/data show	quiz
10,11	3p +2t		**Bone disease: infection, tumor .**	Lectures/data show	quiz
12	3p +2t		**Bone fracture: types & imaging**	Lectures/data show	quiz
13	3p +2t		**Respiratory tract diseases: infections, chest trauma, lung masses .**	Lectures/data show	quiz
14	3p +2t		**Pulmonary embolism, pneumothorax, pleural effusion.**	Lectures/data show	quiz
15	3p +2t		**Urinary tract obstruction: causes, clinical features & imaging.**	Lectures/data show	quiz
16	3p +2t		**Urinary tact infection: imaging in UTI**	Lectures/data show	quiz
17	3p +2t		**Renal & vesical tumors : types, features, imaging.**	Lectures/data show	quiz
18	3p +2t		**Cystic diseases of kidney , congenital anomalies of urinary tract.**	Lectures/data show	quiz
19	3p +2t		**GIT: diseases of esophagus.**	Lectures/data show	quiz
20	3p +2t		**Diseases of the stomach: gastric mass, ulcer**	Lectures/data show	quiz
21	3p +2t		**Diseases of duodenum : Duodenal ulcer (DU).**	Lectures/data show	quiz

22	3p +2t		**Diseases of jejunum & ileum.**	Lectures/data show	quiz
23	3p +2t		**Diseases of colon**	Lectures/data show	quiz
24	3p +2t		**Liver : hepatitis, jaundice , cholecystitis , portal hypertension.**	Lectures/data show	quiz
25	3p +2t		**Hepatic masses: role of imaging**	Lectures/data show	quiz
26	3p +2t		**Female reproductive system: infertility, causes & role of imaging.**	Lectures/data show	quiz
27	3p +2t		**Tumors of uterus& ovaries**	Lectures/data show	quiz
28	3p +2t		**Breast masses :benign & malignant**	Lectures/data show	quiz
29	3p +2t		**Diseases of vascular system**	Lectures/data show	quiz
30	3p +2t		**Final examination**	Lectures/data show	quiz

12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Textbook of medical –surgical nursing , Brunner and Suddarth's . 8th ed. 1996 by Suzanne C. Smeltzer : Brenda G. Bane , Lippincott-raven publishers Assessement and management of clinical problems , Lewis, Heitkeper, Dirksen. 6th.ed. 2004 Mosby, Inc. Medical –surgical nursing, critical thinking for collaborate care. Donna D. Ignatavicius; M.Linda Workman. 5th. Ed. 2006 Elsevier Saunders Inc.
Special requirements (include for example workshops, periodicals, IT software, websites)	Anatomy for diagnostic imaging , second edition , Stephanie ryan
Community-based facilities (include for example, guest Lectures , internship , field studies)	http://www.fda.gov/RadiationEmittingProducts/RadiationEmittingProductsandProcedures/MedicalImaging/ucm200086.htm

13. Admissions

Pre-requisites	
Minimum number of students	100
Maximum number of students	240

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al-Kitab University
2. University Department	Al-Kitab University / Radiological Techniques
3. Course title/code	Fundamental of nursing
4. Programme(s) to which it contributes	The theoretical study at hall class and practical in chemistry lab.
5. Modes of Attendance offered	weekly
6. Semester/Year	
7. Number of hours tuition (total)	90 hours
8. Date of production/revision of this specification	2024
9. Aims of the Course	
Give the students all the practical and theoretical information about how to take care of patients and how to collect the important data to evaluate the cases in addition to put a suitable planes to follow the physician information in patients care	
Learn students all about nursing history and the most famous scientist in this field	
teach students the nurse role in society	
Teach students and learn them how to examine patients to get his vital signs in addition to different routs of drugs administration	
Learn students some methods that use in samples collection to send them to the lab for analysis	
Teach students methods of first aid in peace and war time	
Inform students about the importance and role of recent radiological device in diseases diagnosis	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

B- A1 Knowledge and Understanding

A1. enable the students to know drugs methods of administration and first aid in different emergency cases

A2. enable the students to know the important surgical intervention that help in some diseases diagnosis

A3 . enable the students to know how prepare patient for clinical physical examination and for radiological examine

B. Subject-specific skills

B1.learn students how to collect the data of case history for different diseases

B2.learn students how to take care of patients physically and psychiatrically particularly those who need for surgical interventions

B3.learn students to prepare patient to get radiological images and different ultrasound and MRI devices and put planes to explain the case to patient and his family

Teaching and Learning Methods

By lectures, data show, scientific films for surgical interventions, by visiting some hospitals and learn about patient examination practically

Assessment methods

Through questions and discussions during the lecture, quizzes ,give degrees for scientific activities

C. Thinking Skills

C1.help students to adapt the hospital duties

C2.enable students to understand patients suffers and pains and help them

C3.develop students ability to treat with and bear different diseases cases

Teaching and Learning Methods

By lectures, data show, scientific films for surgical interventions, by visiting some hospitals and learn about patient examination practically

Assessment methods

Through questions and discussions during the lecture, quizzes ,give degrees for

scientific activities

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1 D1.inform students about the most recent diagnostic device

D2.help students to develop their ability continuously through training session

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This course offers an in-depth exploration of the **biological effects of ionizing radiation** and the **principles of radiobiology** essential for students in radiologic and health technology disciplines. It aims to provide students with the knowledge to **evaluate radiation risks**, understand the **mechanisms of radiation-induced damage**, and apply safety principles in clinical and occupational settings.

The course covers **physical, chemical, and biological factors affecting radiosensitivity**, including critical concepts such as **LET (Linear Energy Transfer)**, **RBE (Relative Biological Effectiveness)**, **dose-response relationships**, and the **Bergonie and Tribondeau Law**. Students will analyze both **deterministic** and **stochastic effects** of radiation, ranging from **local tissue damage** to **radiation-induced malignancies**, and explore **cytogenetic changes**, **in-utero effects**, and **hereditary impacts** of exposure.

Practical components emphasize laboratory exercises and case discussions on **risk estimation**, **dose-response analysis**, and **preventive measures**, enhancing real-world understanding of radiobiological effects in diagnostic and therapeutic radiology.

1. Teaching Institution	Al-Kitab University
2. University Department/Centre	Radiology and ultrasonography technique
3. Course title/code	**Biological Radiation hazards**
4. Programme(s) to which it contributes	Bachelor's Degree in Radiology and ultrasonography
5. Modes of Attendance offered	**Credit Units:** 3
6. Semester/Year	Third year/ first semester

7. Number of hours tuition (total)	2 hours theory +3 years practical
8. Date of production/revision of this specification	28/05/2025

9. Aims of the Course

1. Know the biological effects of ionization radiation.
2. Estimate of and explain the basis for possible risk of injury, illness, or death resulting from occupational radiation exposure.
3. Describe the physical & chemicalfactors that affect radiation response.
4. Estimate of radiation risk and comparisons with other types of risk
5. Define the Stochastic & Deterministic effects of the ionizing radiation.
6. Discuss the radiation-induced malignancy.
7. Explain the effect of ionization radiation the Embryo, Fetus & Central Nervous System.

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

Students will gain a solid understanding of how ionizing radiation interacts with biological tissues, including the physical and biological factors influencing radiosensitivity. They will learn to differentiate between deterministic and stochastic effects and understand dose-response relationships, radiation-induced malignancies, and effects on embryos, fetuses, and the central nervous system. The course also enables students to evaluate radiation risks and apply safety principles in clinical practice.

B. Subject-specific skills

Students will develop the ability to assess radiation exposure risks in medical and occupational settings. They will apply knowledge of radiosensitivity and biological response in planning radiation safety protocols. Additionally, students will be able to interpret dose-response data, identify chromosomal changes due to radiation, and recognize clinical symptoms of radiation damage.

Teaching and Learning Methods

- **Lectures**: To deliver theoretical foundations.
- **Practical sessions**: Hands-on activities related to dose measurement, cytogenetic analysis, and case discussions.
- **Case-based learning**: To explore real-world examples of radiation exposure and effects.

- **Group discussions and presentations**: To reinforce collaborative learning and critical evaluation of risks.

Assessment methods

- **Written exams**: To assess theoretical understanding and knowledge application.
- **Practical exams**: To evaluate hands-on skills and interpretation of radiobiological data.
- **Assignments and reports**: For in-depth analysis of specific topics.
- **Oral presentations**: To assess communication of complex scientific concepts.

C. Thinking Skills

Students will develop critical thinking by analyzing dose-response relationships, evaluating the biological effects of different radiation types, and comparing radiation risks with other hazards. They will also be trained to make informed decisions regarding radiation protection based on scientific evidence.

Teaching and Learning Methods:

- **Problem-solving exercises**: Applied scenarios to encourage decision-making.
- **Case studies**: Real-life situations to analyze and discuss radiation incidents and outcomes.
- **Research activities**: Encouraging students to investigate current literature on radiation hazards.

Assessment methods:

- **Scenario-based questions in exams**
- **Critical review assignments**
- **Research projects and group discussions** assessing analytical and reasoning abilities.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1- Monitoring scientific developments by connecting with international universities via the Internet.

D2- Developing the student's ability to access information via the Internet.

D3- Developing the student's ability to engage in dialogue and discussion.

Finally:

Students completing the **Biological Radiation Hazards** course will develop a range of general and transferable skills that enhance their employability and personal growth. These include analytical and problem-solving abilities essential for evaluating radiation risks and applying safety measures in medical and occupational settings. The course also strengthens communication skills through written reports, oral presentations, and group discussions, enabling students to

clearly convey complex radiobiological concepts. Teamwork is fostered through collaborative practical sessions and case studies, while digital literacy is enhanced through the use of radiologic tools and scientific research. Additionally, students gain time management and organizational skills by balancing theoretical and practical coursework. Ethical and professional awareness is emphasized, particularly in handling radiation exposure in vulnerable populations. Finally, the course promotes lifelong learning and adaptability, preparing students to keep pace with advances in radiobiology and radiation safety standards.

TEMPLATE FOR COURSE SPECIFICATION

Dr. Sardar Qader Othman

COURSE SPECIFICATION

This course offers an in-depth exploration of the **biological effects of ionizing radiation** and the **principles of radiobiology** essential for students in radiologic and health technology disciplines. It aims to provide students with the knowledge to **evaluate radiation risks**, understand the **mechanisms of radiation-induced damage**, and apply safety principles in clinical and occupational settings.

The course covers **physical, chemical, and biological factors affecting radiosensitivity**, including critical concepts such as **LET (Linear Energy Transfer)**, **RBE (Relative Biological Effectiveness)**, **dose-response relationships**, and the **Bergonie and Tribondeau Law**. Students will analyze both **deterministic** and **stochastic effects** of radiation, ranging from **local tissue damage** to **radiation-induced malignancies**, and explore **cytogenetic changes**, **in-utero effects**, and **hereditary impacts** of exposure.

Practical components emphasize laboratory exercises and case discussions on **risk estimation**, **dose-response analysis**, and **preventive measures**, enhancing real-world understanding of radiobiological effects in diagnostic and therapeutic radiology.

1. Teaching Institution	Al-Kitab University

2. University Department/Centre	Technical Radiology
3. Course title/code	**Biological Radiation hazards/ ( )**
4. Programme(s) to which it contributes	Bachelor's Degree in Radiology and ultrasonography
5. Modes of Attendance offered	Normal/Face to Face –Hall Lecture
6. Semester/Year	First semester/ 3rd year
7. Number of hours tuition (total)	2 hours theory +3 years practical=5
8. Date of production/revision of this specification	25/05/2025

9. Aims of the Course

1. Know the biological effects of ionization radiation.
2. Estimate of and explain the basis for possible risk of injury, illness, or death resulting from occupational radiation exposure.
3. Describe the physical & chemicalfactors that affect radiation response.
4. Estimate of radiation risk and comparisons with other types of risk
5. Define the Stochastic & Deterministic effects of the ionizing radiation.
6. Discuss the radiation-induced malignancy.
7. Explain the effect of ionization radiation the Embryo, Fetus & Central Nervous System.

10· Learning Outcomes, Teaching ,Learning and Assessment Method

B- Knowledge and Understanding

Students will gain a solid understanding of how ionizing radiation interacts with biological tissues, including the physical and biological factors influencing radiosensitivity. They will learn to differentiate between deterministic and stochastic effects and understand dose-response relationships, radiation-induced malignancies, and effects on embryos, fetuses, and the central nervous system. The course also enables students to evaluate radiation risks and apply safety principles in clinical practice.

B. Subject-specific skills

Students will develop the ability to assess radiation exposure risks in medical and occupational settings. They will apply knowledge of radiosensitivity and biological response in planning radiation safety protocols. Additionally, students will be able to interpret dose-response data, identify chromosomal changes due to radiation, and recognize clinical symptoms of radiation damage.

Teaching and Learning Methods

To achieve the course objectives and intended learning outcomes for *Biological Radiation Hazards*, the following teaching and learning strategies will be employed:

1. Lectures

- Deliver core theoretical knowledge about ionizing radiation, its biological effects, and risk estimation.
- Use visual aids such as slides, animations, and diagrams to explain key topics (e.g., dose-response relationships, RBE, LET).

2. Interactive Seminars and Group Discussions

- Promote critical thinking by discussing radiation safety scenarios, deterministic vs. stochastic effects, and radiation-induced malignancies.
- Encourage group interaction through case-based questions and comparative risk analysis.

3. Laboratory Demonstrations / Hands-on Workshops

- Engage students in practical sessions using radiation detection instruments and cytogenetic analysis tools.
- Conduct simulations of radiation dose distribution and cellular damage.
- Demonstrate radiation shielding techniques and protective procedures.

4. Case-based Learning

- Present clinical and occupational exposure cases for students to analyze biological effects and estimate risks.
- Require interpretation of radiobiological findings and suggest mitigation strategies.

5. Problem-solving Sessions

- Provide exercises on calculating radiation dose, exposure levels, and assessing deterministic thresholds.
- Analyze genetic and in-utero radiation effects through structured problem sets.

6. Self-directed Learning

- Assign readings from recommended textbooks and journals (e.g., Bushong, IAEA materials).
- Encourage exploration of online radiological databases and e-learning modules for independent study.

7. Formative Assessments and Feedback

- Use quizzes, MCQs, and practical lab reports to assess student understanding regularly.
- Conduct feedback sessions to clarify doubts, reinforce knowledge, and support skill development.

Assessment methods:

 The assessment strategy for the *Biological Radiation Hazards* course is designed to evaluate students' theoretical understanding of ionizing radiation, their ability to assess biological risks, and their development of analytical, laboratory, and communication skills. The assessment methods include:

1. Written Examinations (Midterm and Final Exams)

- **Format:** Multiple-choice questions (MCQs), short-answer questions (SAQs), and analytical essay-style questions.
- **Purpose:** To evaluate students' grasp of core concepts including radiation interactions with biological systems, dose-response relationships, stochastic and deterministic effects, and risk assessment.

2. Practical or Laboratory Assessment

- **Format:** Observation-based evaluation of laboratory experiments involving radiation detection, chromosomal analysis, and dosimetry exercises.
- **Purpose:** To test students' technical proficiency in identifying and analyzing biological effects of radiation in hands-on settings.

3. Case Study Reports

- **Format:** Written reports analyzing clinical or occupational radiation exposure scenarios, focusing on biological impact and protective measures.
- **Purpose:** To assess students' ability to apply theoretical knowledge to real-world problems and evaluate biological consequences of exposure.

4. Assignments and Homework

- **Format:** Problem sets involving radiation risk calculations, biological effect estimations, and scenario-based response plans.
- **Purpose:** To reinforce independent learning, critical analysis, and quantitative application of radiation biology principles.

5. Oral Presentations or Group Projects

- **Format:** Group presentations or individual seminars on key topics such as radiation-induced cancer, fetal radiation effects, or radiobiological safety guidelines.
- **Purpose:** To evaluate students' depth of understanding, communication abilities, and collaboration in synthesizing and presenting complex information.

6. Quizzes and Online Learning Modules

- **Format:** Short, frequent quizzes and interactive online modules covering weekly topics.
- **Purpose:** To encourage regular review, self-assessment, and engagement with course material on a continuous basis.

C. Thinking Skills

By the end of the *Biological Radiation Hazards* course, students will be able to:

1. **Analyze Radiation Interaction Mechanisms**
   - Understand and explain the complex physical and biological interactions of ionizing radiation at the atomic, molecular, cellular, and systemic levels.
2. **Interpret Dose-Response Relationships**
   - Evaluate different types of dose-response curves (linear, non-linear, threshold) and relate them to radiation-induced biological effects.
3. **Assess Risk and Biological Impact**
   - Estimate biological risks from occupational and clinical radiation exposures, including somatic, genetic, and fetal outcomes.
4. **Distinguish Between Stochastic and Deterministic Effects**
   - Identify and compare the characteristics, mechanisms, and clinical significance of stochastic effects (e.g., cancer induction) and deterministic effects (e.g., tissue damage).
5. **Solve Radiation Biology Problems**
   - Apply quantitative reasoning to calculate dose thresholds, radiation weighting factors, and risk probabilities in practical scenarios.
6. **Evaluate Radiobiological Factors**
   - Critically assess how physical and biological modifiers such as LET, RBE, oxygen effect, and age influence radiosensitivity and biological response.
7. **Apply Knowledge in Clinical and Safety Contexts**
   - Integrate theoretical radiobiology knowledge into real-world medical imaging or radiation safety practices, aiming to minimize radiation risk and optimize protection strategies.

COURSE SPECIFICATION

This course provides in-depth knowledge and hands-on training in ultrasound imaging. Students will explore the physics of ultrasound, advanced scanning techniques, and clinical applications in various body systems. Emphasis is placed on image optimization, diagnostic criteria, patient care, and interprofessional communication. Clinical placement and simulation labs will allow practical skill development.

By the end of this course, students will be able to:

1. Explain the physical principles of ultrasound and their application in diagnostic imaging.
2. Demonstrate proficiency in operating ultrasound machines and using appropriate scanning protocols.
3. Identify normal and pathological ultrasound appearances of major organ systems.
4. Evaluate image quality and apply corrective measures.
5. Practice safe, ethical, and effective patient care during ultrasound procedures.
6. Communicate findings effectively within a clinical team.

1. Teaching Institution	Al-Kitab University
2. University Department/Centre	Radiology and ultrasonography technique
3. Course title/code	Ultrasound Imaging
4. Programme(s) to which it contributes	Bachelor's Degree in Radiology and ultrasonography
5. Modes of Attendance offered	Hall lecture and practical lecture on ultrasound machine
6. Semester/Year	First and second term
7. Number of hours tuition (total)	2 hours theory and 4 hours practical
8. Date of production/revision of this specification	26/4/2025

9. Aims of the Course

1. **Develop Advanced Theoretical Knowledge**
   Equip students with an in-depth understanding of the physical principles, instrumentation, and safety standards of ultrasound imaging in diagnostic radiology.
2. **Enhance Practical Proficiency**
   Train students to competently operate ultrasound machines, optimize image quality, and perform standard scanning techniques across different body systems.
3. **Strengthen Clinical Interpretation Skills**
   Enable students to identify normal and pathological ultrasound appearances and correlate them with patient history and clinical findings.

4. **Foster Patient-Centered Care**
   Promote professionalism in patient communication, positioning, and care during ultrasound procedures, with emphasis on ethics, empathy, and safety.
5. **Promote Lifelong Learning and Research Awareness**
   Instill the importance of continuous learning, staying updated with new ultrasound technologies, and understanding the role of evidence-based practice in diagnostic imaging.

10· Learning Outcomes, Teaching ,Learning and Assessment Method

C- Knowledge and Understanding

Learning Outcomes

By the end of this course, students will be able to:

1. Explain the physical principles of ultrasound and the function of key components of ultrasound machines.
2. Describe the interaction of ultrasound with different body tissues and its clinical implications.
3. Identify the normal anatomy and common pathologies in ultrasound imaging of major systems (abdominal, OB/GYN, vascular, MSK, small parts).
4. Understand Doppler techniques and their applications in vascular and cardiac studies.
5. Explain the ethical, legal, and safety aspects of performing ultrasound examinations.

Teaching and Learning Methods

- Lectures and multimedia presentations
- Case-based learning
- Guided reading assignments
- Interactive discussions and quizzes
- Clinical observation

Assessment Methods

- Midterm and final written exams (MCQs, short/long answers)
- Case-based assessment questions
- In-class quizzes and group presentations

B. Subject-specific skills

Learning Outcomes

By the end of this course, students will be able to:

1. Operate various ultrasound machines and adjust settings for optimal imaging.

2. Perform standardized scanning techniques across different anatomical regions (e.g., abdominal, pelvic, vascular).
3. Acquire diagnostic-quality ultrasound images and recognize image artifacts.
4. Apply proper patient positioning and scanning protocols for different clinical scenarios.
5. Document findings and communicate effectively with supervising radiologists and medical staff.
6. Adhere to hygiene, infection control, and patient safety standards during ultrasound procedures.

Teaching and Learning Methods

- Hands-on lab sessions with simulators and real models
- Supervised scanning in clinical settings
- Demonstrations by instructors and guest clinicians
- Role-playing and simulation of patient interaction
- Peer and instructor feedback on practical performance

Assessment Methods

- Objective Structured Clinical Examinations (OSCEs)
- Practical skill checklists and logbooks
- Image acquisition and interpretation assessments
- Clinical performance evaluations
- Reflective practice reports

Teaching and Learning Methods

The course employs a combination of theoretical instruction, practical training, and clinical exposure to ensure that students develop both conceptual understanding and hands-on competence in ultrasound imaging.

1. Lectures:

- Delivered in lecture halls using PowerPoint, videos, and ultrasound image demonstrations.
- Focused on theoretical concepts such as ultrasound physics, anatomy, pathology, and instrumentation.
- Promotes foundational knowledge and diagnostic reasoning.

2. Laboratory Sessions (Hands-On Practical Training)

- Conducted in simulation labs equipped with ultrasound machines and phantoms.
- Enables students to practice scanning techniques, patient positioning, and image acquisition.
- Includes supervised sessions with standardized patients or models.

3. Demonstrations and Tutorials

- Instructors or guest sonographers demonstrate live scanning techniques.
- Small-group tutorials reinforce complex concepts and allow for personalized feedback.

4. Simulation and Role-Playing

- Simulated patient encounters and scanning scenarios.

- Role-play includes practicing patient communication, informed consent, and ethical decision-making.

8. Group Projects and Presentations

- Collaborative work on ultrasound case studies.
- Develops teamwork, presentation skills, and understanding of clinical workflows.

Assessment methods

Assessment is designed to evaluate both **theoretical knowledge** and **practical competence** in ultrasound imaging. A combination of formative and summative assessments ensures comprehensive evaluation across cognitive and professional domains.

1. Written Examinations (30%)

- **Midterm Exam:** Includes multiple-choice questions (MCQs), short answer questions (SAQs), and image-based interpretation.
- **Final Exam** Includes multiple-choice questions (MCQs), short answer questions (SAQs), and image-based interpretation.

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2. Practical Examinations Image Interpretation Test :

  - Students evaluate ultrasound images for anatomy, pathology, and quality.
  - Case-based questions assessing diagnostic accuracy.

3. Quizzes and In-Class Activities :

- Periodic quizzes during lectures or online.
- Encourages continuous engagement and checks understanding of core concepts.

4. Participation and Attendance :

- Active participation in labs, group discussions, and clinical rotations.
- Assesses professional behavior, teamwork, and communication.

C. Thinking Skills

By the end of the course, students will be able to:

1. **Apply theoretical knowledge** of ultrasound physics and anatomy to solve real-world imaging problems.
2. **Analyze ultrasound images** to differentiate between normal and pathological findings.
3. **Interpret clinical information** in conjunction with ultrasound results to support diagnostic decisions.
4. **Evaluate image quality** and apply corrective actions when artifacts or technical limitations are present.

5. **Make informed decisions** about scanning techniques, transducer selection, and patient positioning based on individual clinical scenarios.
6. **Reflect critically** on their own practice to identify areas for improvement and professional growth.

Assessment Methods for Thinking Skills

- **Image Interpretation Exams** requiring analysis and diagnostic reasoning.
- **Case Study Presentations** that assess critical evaluation and communication of findings.
- **OSCE stations** that test real-time problem-solving during simulated patient scans.
- **Written exams** with clinical scenarios requiring application of theoretical knowledge.
- **Reflective reports** that demonstrate awareness and evaluation of one's own clinical decisions and outcomes.

Teaching and Learning Methods

Teaching and Learning Methods

1. Lectures and Interactive Seminars

- Structured presentations delivered in lecture halls, covering ultrasound physics, instrumentation, anatomy, pathology, and clinical protocols.
- Use of multimedia tools, real ultrasound images, and case studies to enhance understanding.
- Question-and-answer sessions and open discussions to encourage engagement and critical thinking.

2. Practical Laboratory Sessions

- Hands-on scanning practice using phantoms, simulation devices, and live models.
- Emphasis on mastering transducer handling, patient positioning, image acquisition, and optimization techniques.

3. Clinical Placement and Hospital-Based Training

- Clinical rotations in accredited ultrasound departments.
- Real-time observation and participation in patient examinations under professional supervision.

4. E-Learning and Multimedia Resources

- Online platforms offering recorded lectures, ultrasound video tutorials, image libraries, and self-assessment quizzes.
- Supports flexible, self-paced learning and revision.

5. Tutorials and Small Group Discussions

- Focused sessions on complex topics or skills needing reinforcement.
- Encourages peer-to-peer interaction, clarification of doubts, and collaborative learning.

Assessment methods

1. Written Examinations :

- **Midterm Exam :**
- Assesses foundational knowledge in ultrasound physics, anatomy, pathology, and instrumentation through:
    - Multiple choice questions (MCQs)
    - Image-based questions
- **Final Theoretical Exam :**
- A comprehensive assessment covering all course topics, focusing on application and clinical reasoning.

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2. Practical/Clinical Examination :

- **Ultrasound Image Evaluation Test :**
  Students interpret normal and pathological images and identify technical artifacts and corrective measures.

3. Case Study Presentation :

- Students present a real or simulated ultrasound case.
- Assessment criteria include:
    - Clinical reasoning and interpretation
    - Understanding of pathology
    - Communication and presentation skills

4. Continuous Assessment :

- **Quizzes and Assignments (5%): Regular short tests to encourage consistent learning.**
- **Attendance and Participation (5%): Engagement** in lectures, labs, and discussions.

D. General and Transferable Skills (other skills relevant to employability and personal development) :

1. Communication Skills

- Communicate effectively with patients, colleagues, and healthcare professionals using appropriate verbal and non-verbal techniques.
- Deliver clear oral and written case reports, and present findings in professional settings.

Learning Activities:

- Case presentations
- Role-play patient interactions
- Report writing exercises

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2. Teamwork and Collaboration

- Work efficiently within a multidisciplinary healthcare team.
- Demonstrate respect, cooperation, and shared responsibility during clinical procedures and group activities.

Learning Activities:

- Group projects
- Clinical rotations with real-time collaboration
- Peer-assisted learning in practical labs

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3. Problem-Solving and Decision-Making

- Analyze clinical information and imaging findings to make informed decisions.
- Identify and resolve technical or procedural challenges independently or as part of a team.

Learning Activities:

- Case-based learning
- OSCE scenarios
- Clinical troubleshooting exercises

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4. Time Management and Organization

- Manage clinical duties, academic responsibilities, and personal study time efficiently.
- Prioritize tasks and meet deadlines in both academic and clinical environments.

Learning Activities:

- Maintaining clinical logbooks
- Structured lab sessions with time constraints
- Assignment and project deadlines

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5. Digital and Technological Literacy

- Operate ultrasound machines and digital imaging systems proficiently.

- Use hospital PACS, RIS, and other healthcare IT systems for documentation and review.

Learning Activities:

- Ultrasound machine operation labs
- Digital image evaluation
- Online case submission and feedback

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6. Ethical and Professional Behavior

- Demonstrate integrity, confidentiality, empathy, and respect for diversity.
- Adhere to legal, ethical, and safety standards in patient care.

Learning Activities:

- Clinical placement evaluations
- Ethics workshops
- Reflective practice reports

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7. Self-Learning and Lifelong Learning

- Identify personal learning needs and pursue continuous professional development.
- Stay updated with emerging ultrasound technologies and research.

Learning Activities:

- Reflective journals
- Literature review assignments
- Access to online learning resources and ultrasound journals

Week	Unit/Module or Topic Title	Teaching Method	Assessment Method	Intended Learning Outcomes (ILOs)	Hours
1	Principle of ultrasound and its terms	Lecture, Demonstration	Quiz, Practical Exam	Understand ultrasound physics, terminology, and basic equipment handling.	2
2	Normal liver	Lecture, Case Studies,	Case Presentation,	Identify and describe	2

		Hands-on Practice	Practical Exam	normal liver anatomy and echogenicity.	
3	Abnormal liver: Enlarged liver/hepatomegaly: homogeneous pattern	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Recognize and differentiate homogeneous hepatomegaly patterns.	2
4	Enlarged liver: non-homogeneous pattern, Small liver/shrunken liver	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify non-homogeneous liver enlargement and atrophic liver changes.	2
5	Cystic lesions in normal or large liver	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Detect and characterize cystic lesions in hepatic tissue.	2
6	Differential diagnosis of liver masses, Trauma of the liver	Lecture, Case Studies, Hands-on Practice	Case Presentation, Practical Exam	Differentiate between benign and malignant liver masses, assess traumatic liver injuries.	2
7	Normal gallbladder and biliary tract	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify normal gallbladder and biliary tract anatomy and function.	2
8	Abnormal gallbladder and biliary tract: distended gallbladder, Acute cholecystitis	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Recognize signs of gallbladder distention and acute cholecystitis.	2
9	Echoes within the gallbladder	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify and interpret different echogenic patterns within the gallbladder.	2
10	Thick gallbladder walls, Small gallbladder, Gallbladder in jaundice	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Assess gallbladder wall thickness, size variations, and changes in jaundice.	2
11	Normal and abnormal pancreas	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Differentiate between normal and pathological	2

				pancreatic findings.	
12	Normal and abnormal spleen	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify normal splenic anatomy and recognize abnormalities.	2
13	Normal kidney and ureters, absent kidney, abnormal kidney: large kidney	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Assess renal size, position, and detect abnormalities such as agenesis or enlargement.	2
14	Renal cysts, Renal masses	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify and differentiate renal cysts from solid masses.	2
15	Small kidney, Renal calculi, Trauma, Perirenal fluid	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Detect signs of renal atrophy, calculi, trauma, and perirenal fluid collections.	2
16	Normal and abnormal Urinary bladder	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Evaluate bladder wall thickness, volume, and detect abnormalities.	2
17	Normal and abnormal thyroid gland	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Assess thyroid size, echogenicity, and identify nodules or other abnormalities.	2
18	Gynaecology (non-pregnant female pelvis): normal uterus	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify normal uterine size, shape, and echotexture.	2
19	Intrauterine contraceptive device, Fluid in the posterior cul-de-sac	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Detect presence and position of intrauterine devices, assess for free fluid in the posterior cul-de-sac.	2

20	The endometrium, Position of the uterus, Ovaries, normal ovary	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Evaluate endometrial thickness, uterine position, and ovarian morphology.	2
21	Ovaries: normal ovary, Ovarian follicles	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify normal ovarian size, follicles, and detect abnormalities.	2
22	Abnormal uterus: Myomas, Malignant disease	Lecture, Case Studies, Hands-on Practice	Case Presentation, Practical Exam	Differentiate between benign and malignant uterine pathologies.	2
23	Uterine endometriosis	Lecture, Case Studies, Hands-on Practice	Case Presentation, Practical Exam	Recognize sonographic signs of endometriosis.	2
24	Abnormal ovary: Ovarian cysts, Pelvic hydatid cysts, Solid ovarian masses	Lecture, Case Studies, Hands-on Practice	Case Presentation, Practical Exam	Identify and differentiate ovarian cysts, hydatid cysts, and solid masses.	2
25	Pelvic inflammatory disease, Pelvic abscess, Pelvic varices, Fallopian tubes	Lecture, Case Studies, Hands-on Practice	Case Presentation, Practical Exam	Assess for signs of pelvic inflammatory disease, abscesses, varices, and evaluate fallopian tubes.	2
26	Obstetrics: Introduction to Obstetrics	Lecture, Demonstration	Quiz, Practical Exam	Understand basic obstetric ultrasound principles and indications.	2
27	Early pregnancy, Ectopic pregnancy	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify early intrauterine pregnancies and signs of ectopic pregnancies.	2
28	Estimation of fetal size and age (fetal biometry)	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	How to assess fetal well binge and fetal biometry	2

29	Normal testis, Abnormal scrotum: Unilateral swelling, Small or absent testis	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify abnormal scrotal swelling, small or absent testis	2
30	The epididymis, Trauma, Torsion of the testis, Hernia, Varicocele	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify testicular torsion ultrasound sign and varicocele, hernia.	2

12. Infrastructure;

1. Educational Facilities

- **Lecture Halls**: Equipped with multimedia projectors, sound systems, and seating arrangements conducive to interactive learning.
- **Demonstration Rooms**: Spaces where instructors can showcase ultrasound techniques using models or simulators.

2. Ultrasound Training Laboratories

- **Clinical Ultrasound Rooms**: Each room should be approximately 25–36 m² to accommodate the examination couch, ultrasound machine, and additional equipment.
- **Equipment**:
  - **Ultrasound Machines**: High-resolution systems with various probes (e.g., linear, convex) for diverse applications.

3. Clinical Training Areas

- **Affiliated Hospitals or Clinics**: Partnerships with medical facilities for hands-on training.
- **Observation Rooms**: For students to observe real-time procedures.
- **Patient Interaction Areas**: Designed to ensure patient comfort and privacy during training sessions.

4. Personnel and Training

- **Qualified Instructors**: Experienced professionals in ultrasound imaging and education.
- **Technical Support Staff**: For equipment maintenance and troubleshooting.
- **Administrative Personnel**: To manage scheduling, documentation, and student records.

Implementation Considerations

- **Budget Planning**: Allocate funds for initial setup, maintenance, and upgrades.
- **Regulatory Compliance**: Ensure adherence to local health and safety standards.
- **Continuous Improvement**: Regularly assess and update the curriculum and facilities to keep pace with technological advancements.

Required reading:	**1. Manual of Diagnostic Ultrasound** P.E.S Palmer **2. Textbook of Diagnostic Sonography** • **Author**: Sandra L. Hagen-Ansert • **Overview**: An authoritative guide detailing sonographic techniques, anatomy, and pathology, with a focus on clinical applications. • **3. Ultrasound Physics and Instrumentation** • **Authors**: William R. Hykes, Donald L. Hedrick, and David E. Starchman • **Overview**: A detailed exploration of the principles of ultrasound technology, including wave propagation, imaging systems, and Doppler principles. **Supplementary Resources** **1. Clark's Essential Guide to Clinical Ultrasound** • **Overview**: A practical guide offering step-by-step instructions for performing ultrasound examinations, with anatomical illustrations and clinical tips. **2. Learning Radiology: Recognizing the Basics (5th Edition)** • **Author**: William Herring
Special requirements (include for example workshops, periodicals, IT software, websites)	**1. Workshops & Hands-On Training** Engaging in practical workshops is crucial for mastering ultrasound techniques. Recommended options include: • **Keith Maudlin & Associates**: Offers hands-on ultrasound training sessions focusing on various specialties. kmaultrasound.com • **Ultrasound – Basic Training Workshop**: Provides foundational training for critical care providers. The Resuscitation Group • **Center for Medical Education**: Conducts advanced ultrasound boot camps covering emergency imaging. courses.ccme.org **2. Periodicals & Journals** Staying updated with the latest research and advancements is vital. Recommended journals include:

	• **Ultrasonography**: A peer-reviewed journal focusing on clinical applications and technological advancements in ultrasound. Wikipedia+2Wikipedia+2Wikipedia+2 • **Journal of Diagnostic Medical Sonography (JDMS)**: Publishes research on ultrasound techniques, instrumentation, and education. Wikipedia • **Ultrasound Quarterly**: Offers insights into medical ultrasound research and clinical practices. **3. IT Software & Simulation Tools** Incorporating advanced software and simulation tools enhances learning: • **SonoSim**: Provides virtual ultrasound training with real patient cases. • **AmCAD-US**: Offers AI-assisted ultrasound imaging solutions for enhanced diagnostics. ASUS Pressroom • **Siemens Healthineers Ultrasound Education**: Delivers personalized education and training modules. **4. Websites & Online Resources** Utilizing reputable online platforms supports continuous learning: • **Radiopaedia**: A collaborative wiki-based educational reference for radiology and ultrasound imaging. https://en.wikipedia.org/wiki/Radiopaedia?utm_source=chatgpt.com

13. Admissions	
Pre-requisites	
Minimum number of students	144
Maximum number of students	280

ANATOMY: COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

ANATOMY: COURSE SPECIFICATION

(محاضرات المقرر النظري للعام الدراسي (2025-2026

1. Teaching Institution	Al-Kitab University
2. University Department/Centre	Radiology and ultrasonography technique
3. Course title/code	Lectures for year (2025-2026)
4. Programme(s) to which it contributes	Bachelor's Degree in Radiology and ultrasonography
5. Modes of Attendance offered	Theory attendance lectures & practical lab study
6. Semester/Year	Semester/
7. Number of hours tuition (total)	30
8. Date of production/revision of this specification	2025-5-28

9. Aims of the Course

Course Description: Anatomy II (Second Year

This course builds upon the foundational knowledge gained in Anatomy I, delving deeper into the intricacies of human anatomy. Students will explore the structure and organization of the human body at a more advanced level, focusing on specific systems and their interrelationships. The course will cover the following key areas

Systemic Anatomy

10· Learning Outcomes, Teaching ,Learning and Assessment Method :

Teaching Methods

.1Lectures

.2Discussions

.3Case studies

.4Group projects

.5Hands-on activities

.6Simulations

.7Guest lectures

.8Online modules

Learning Methods

.1Active learning

.2Collaborative learning

.3Self-directed learning

.4Experiential learning

.5Problem-based learning

.6Flipped classroom

.7Gamification

A- Knowledge and Understanding

: 1. Visual learning: Using diagrams, illustrations, and 3D models to visualize anatomical structures.

.2Hands-on experience: Dissection, prosection, or palpation to explore anatomical structures firsthand.

.3Repetition and review: Regular review of anatomical concepts and structures to reinforce learning.

4. Multimodal learning

ANATOMY: COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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.3Repetition and review: Regular review of anatomical concepts and structures to reinforce learning.

4. Multimodal learning

B. Subject-specific skills:

.1Technical skills (identification, dissection, terminology)

.2Analytical skills (structural analysis, comparative analysis, clinical correlation(

.3Communication skills (anatomical description, visual communication, collaboration(

4. Critical thinking skills (problem-solving, critical analysis, integration with other disciplines)

Teaching and Learning Methods:

.1Traditional methods (lectures, dissections, lab sessions(

.2Interactive methods (3D modeling, virtual dissection, group discussions(

.3Technology-enhanced methods (VR, 3D printing, online platforms(

.4Student-centered methods (active learning, peer teaching, self-directed learning)

Assessment methods:

Written Assessments

.1Multiple-choice questions (MCQs(

.2Short-answer questions

.3Essay questions

.4Labeling diagrams

Practical Assessments

.1Cadaveric dissection or prosection exams

.2Identification of anatomical structures on models or specimens

.3Practical spot tests

C. Thinking Skills:

.1Analyzing anatomical structures and relationships

.2Evaluating the relevance of anatomical knowledge to clinical scenarios

Problem-Solving

.1Applying anatomical knowledge to solve complex problems

2. Identifying and addressing anatomical variations or anomalies

Teaching and Learning Methods:

.1Lectures

.2Dissections if possible. .3Prosections 3 .4D modeling and visualization .5Virtual reality (VR) and augmented reality (AR(.6Online modules and tutorials .7Group discussions and case studies .8Problem-based learning .9Flipped classroom approaches .10Hands-on activities and lab sessions
Assessment methods

D. General and Transferable Skills (other skills relevant to employability and personal development): 1. Effective communication of complex anatomical concepts 2. Presentation and public speaking skills

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	result of completing a course	Skeletal system	Theory	Vedios & pictues& plastic models
2	2	result of completing a course	Skeletal system	Theory	Vedios & pictues& plastic models
3	2	result of completing a course	Skeletal system	Theory	Vedios & pictues& plastic models
4	2	result of completing a course	Skeletal system	Theory	Vedios & pictues& plastic models
5	2	result of completing a course	Skeletal system	Theory	Vedios & pictues& plastic models
6	2	result of completing a course	Skeletal system	Theory	Vedios & pictues& plastic models
7	2	result of completing a course	Respiratory sys.	Theory	Vedios & pictues& plastic models
8	2	result of completing a course	Respiratory sys.	Theory	Vedios & pictues& plastic models
9	2	result of completing a course	Respiratory sys.	Theory	Vedios & pictues& plastic models
10	2	result of completing a course	Respiratory sys.	Theory	Vedios & pictues& plastic models
11	2	result of completing a course	Respiratory sys.	Theory	Vedios & pictues& plastic models
12	2	result of completing a course	Reproductive sys.	Theory	Vedios & pictues& plastic models
13	2	result of completing a course	Reproductive sys.	Theory	Vedios & pictues& plastic models
14	2	result of completing a course	Reproductive sys.	Theory	Vedios & pictues& plastic models

15	2	result of completing a course	Urinary sys.	Theory	Vedios & pictues& plastic models
16	2	result of completing a course	Urinary sys.	Theory	Vedios & pictues& plastic models
17	2	result of completing a course	Urinary sys.	Theory	Vedios & pictues& plastic models
18	2	result of completing a course	Urinary sys.	Theory	Vedios & pictues& plastic models
19	2	result of completing a course	Urinary sys.	Theory	Vedios & pictues& plastic models
20	2	result of completing a course	GIT	Theory	Vedios & pictues& plastic models
21	2	result of completing a course	GIT	Theory	Vedios & pictues& plastic models
22	2	result of completing a course	GIT	Theory	Vedios & pictues& plastic models
23	2	result of completing a course	GIT	Theory	Vedios & pictues& plastic models
24	2	result of completing a course	GIT	Theory	Vedios & pictues& plastic models
25	2	result of completing a course	GIT	Theory	Vedios & pictues& plastic models
26	2	result of completing a course	Cardio-vascular sys.	Theory	Vedios & pictues& plastic models
27	2	result of completing a course	Cardio-vascular sys.	Theory	Vedios & pictues& plastic models
-28 -29 30	2	result of completing a course	Cardio-vascular sys	Theory	Vedios & pictues& plastic models

12. Infrastructure	
Required reading:	
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (Include for example, guest Lectures, internship, field studies)	

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	

TEMPLATE FOR COURSE SPECIFICATION

Lecturer; Dr. Jamal Taqi Qasim

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This course provides advanced knowledge and practical skills in CT imaging techniques. It focuses on the physical principles, image acquisition, post-processing, patient care, radiation safety, and clinical applications of CT in various body systems.

Course Objectives:

By the end of this course, students will be able to:

1. Understand the physics and principles of CT imaging.
2. Identify the components and operation of CT scanners.
3. Perform standard and specialized CT protocols.
4. Apply patient positioning and preparation techniques.
5. Evaluate CT images for quality and diagnostic value.
6. Understand radiation safety and dose optimization.
7. Interpret normal and pathological findings in CT images under supervision.

1. Teaching Institution	Al-Kitab University
2. University Department/Centre	Radiology and ultrasonography technique
3. Course title/code	**Computed tomography Equipment Techniques**
4. Programme(s) to which it contributes	Bachelor's Degree in Radiology and ultrasonography
5. Modes of Attendance offered	**Modular or Block Mode** • Courses are delivered in intensive blocks (e.g., one subject at a time). • **Ideal for**: Learners who prefer focused, immersive study sessions.
6. Semester/Year	1st & 2nd Semesters / 4th Stage

7. Number of hours tuition (total)	2 hours theory+ 2 hours Practical = 4 hours
8. Date of production/revision of this specification	28/5/2025

9. Aims of the Course

1. **To provide foundational knowledge** in the CT-scan technology, enabling students to understand key concepts, theories, and practices.
2. **To develop critical thinking and analytical skills**, allowing students to assess and apply information effectively in academic or professional settings.
3. **To enhance practical skills** relevant to the discipline through hands-on learning, case studies, simulations, or real-world applications.
4. **To prepare students for further education or employment**, equipping them with the competencies needed for progression in their chosen field.
5. **To promote independent learning and personal development**, encouraging lifelong learning, responsibility, and adaptability.

10· Learning Outcomes, Teaching ,Learning and Assessment Method:

Learning Outcomes

By the end of this course, students should be able to:

1. **Understand the principles** of CT imaging, including image formation, physics, and instrumentation.
2. **Explain the anatomy** commonly visualized in CT scans and identify normal and pathological findings.
3. **Demonstrate knowledge** of radiation safety principles and dose optimization in CT.
4. **Operate CT equipment safely and effectively**, following standard protocols and procedures.
5. **Critically analyze CT images** for diagnostic quality and patient positioning.
6. **Apply ethical and legal considerations** in patient care and data handling in CT imaging.
7. **Integrate clinical indications** to determine appropriate CT protocols and procedures.

Teaching and Learning Methods

1. **Lectures & Presentations**
   - Deliver theoretical knowledge of CT based anatomy, and clinical indications.
2. **Practical Laboratory Sessions**
   - Hands-on training with CT equipment or simulators.
   - Practice of patient positioning, scanning techniques, and image reconstruction.
3. **Case-Based Learning**
   - Clinical case studies to integrate theory with practical image interpretation.
4. **E-Learning Modules**
   - Interactive online content covering CT principles, dose reduction, and virtual anatomy.
5. **Group Discussions & Seminars**

- Student-led discussions to develop communication and critical thinking.

6. **Clinical Placements**
   - Supervised practice in a real clinical setting.

Assessment Methods

1. **Written Exams**
   - Multiple-choice and short-answer questions on CT physics, anatomy, and safety.
2. **Image Interpretation Tests**
   - Evaluation of students' ability to read and critique CT images.
3. **Practical Assessment (weekly/ summer practices in hospitals)**
   - Hands-on demonstration of CT scanning techniques and protocols.
4. **Case Study Reports**
   - Written analysis of clinical CT cases, including protocol justification and findings.
5. **Portfolio or Logbook**
   - Record of practical experience, reflective learning, and clinical exposure.
6. **Oral Presentation**
   - Presentation on a chosen CT case or topic, assessing communication and understanding.

B- Knowledge and Understanding

- A solid understanding of **CT** image acquisition, and reconstruction principles.
- Knowledge of **CT equipment and components**, such as the gantry, detectors, and contrast injector systems.
- Understanding of **image quality factors** (e.g., resolution, noise, artifacts) and how they affect diagnostic outcomes.

Anatomical and Pathological Understanding

- Comprehensive knowledge of **cross-sectional anatomy** as seen on CT scans (e.g., brain, chest, abdomen, spine).
- Ability to distinguish **normal anatomy from common pathologies** on CT images.
- Understanding the **clinical indications** for CT examinations and how pathology guides protocol selection.

B. Subject-specific skills

1. Operation of CT Equipment
2. Patient Care and Positioning
3. Image Acquisition and Quality Control
4. Radiation Safety and Dose Management
5. Image Interpretation Support
6. Documentation and Reporting

Teaching and Learning Methods

1. Lectures and Classroom Teaching

- **Purpose:** Deliver core theoretical knowledge on CT physics, image formation, radiation safety, and anatomy.

- **Format:** In-person or online; may include multimedia presentations and expert talks.

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2. E-Learning and Digital Modules

- **Purpose:** Provide flexible, self-paced learning on technical and clinical aspects of CT.
- **Tools:** Interactive software, virtual simulations, anatomy atlases, and dose calculation modules.

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3. Practical Sessions

- **Purpose:** Allow hands-on practice with CT scanners or simulators in a controlled environment.
- **Activities:** Equipment operation, scan planning, patient positioning, and basic troubleshooting.

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5. Case-Based Learning (CBL)

- **Purpose:** Integrate theoretical learning with clinical reasoning.
- **Method:** Analyze real or simulated CT cases to determine protocols, interpret findings, and discuss outcomes.

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6. Group Discussions and Peer Learning

- **Purpose:** Encourage collaboration, critical thinking, and reflection.
- **Examples:** Image critique sessions, ethical scenarios, protocol comparisons.

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7. Seminars and Workshops

- **Purpose:** Deep dive into specialized topics like cardiac CT, dual-energy CT, or advanced post-processing.
- **Format:** Small groups, often with guest speakers or expert facilitators.

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8. Reflective Practice and Learning Logs

- **Purpose:** Encourage students to reflect on experiences, skills developed, and areas for improvement.
- **Tools:** Learning journals, logbooks, and e-portfolios.

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9. Student Presentations

- **Purpose:** Develop communication skills and reinforce learning through teaching.
- **Topics:** Could include case studies, technical innovations, or CT protocol justifications.

Assessment methods

1. Written Examinations

- **Purpose**: Assess understanding of CT physics, anatomy, protocols, and radiation safety.
- **Formats**:
    - Multiple-choice questions (MCQs)
    - Short answer questions (SAQs)
    - Extended response or essay questions

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2. Image Interpretation Assessments

- **Purpose**: Test ability to recognize normal anatomy and identify common pathologies on CT images.

- **Tasks May Include**:
  - Labeling anatomical structures
  - Identifying abnormalities
  - Suggesting appropriate protocols

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3. Objective Structured Clinical Examination (OSCE) / Practical Skills Tests

- **Purpose**: Evaluate hands-on competency in using CT equipment and interacting with patients.
- **Includes**:
  - Patient positioning and preparation
  - Scan protocol selection and justification
  - Equipment setup and basic troubleshooting

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4. Quizzes and online learning methods

Formula: group discussion and individual presentation.
Purpose; to assess communication skills and depth of understanding.

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5. Case Study Reports

- **Purpose**: Assess ability to apply knowledge to real or simulated clinical cases.
- **Includes**:
  - Case background and indication
  - Protocol justification
  - Findings and image evaluation
  - Discussion and reflection

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6. Oral Presentations or Viva Voce

- **Purpose**: Test depth of knowledge, critical thinking, and communication skills.
- **Topics**:
  - Technical advancements
  - Challenging cases
  - Ethical or professional issues in CT

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8. Peer Assessment (optional)

- **Purpose**: Foster collaborative learning and critical feedback skills.
- **Used In**:
  - Group projects
  - Image critique sessions

C. Thinking Skills

By the end of the course, students should demonstrate a range of **higher-order thinking skills** that go beyond rote memorization. These skills are essential for safe, effective, and professional CT practice.

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1. Critical Thinking

- **Evaluate** the suitability of CT scans for various clinical indications.
- **Assess** image quality and determine if re-scanning is necessary.
- **Balance** diagnostic benefit against radiation risks.

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2. Analytical Skills

- **Interpret CT images** to identify normal vs. abnormal findings.
- **Analyze protocols** and adjust parameters to optimize diagnostic outcomes.
- **Identify patterns** in pathology and correlate with clinical presentations.

3. Problem-Solving

- **Troubleshoot technical issues** (e.g., image artifacts, scanner errors).
- **Modify scan plans** in response to unexpected clinical or technical challenges (e.g., trauma, patient discomfort).
- **Adapt procedures** for different patient conditions (e.g., pediatric, obese, anxious).

4. Decision-Making

- **Choose appropriate protocols** based on referral information and patient needs.
- **Make real-time decisions** during scanning to ensure patient safety and diagnostic quality.
- **Prioritize workflow** and manage multiple cases efficiently.

5. Reflective Thinking

- **Evaluate personal performance** and identify areas for improvement.
- **Reflect on clinical experiences** to enhance future practice.
- **Learn from errors or feedback** to grow professionally.

6. Ethical and Professional Reasoning

- **Make judgments** based on ethical considerations (e.g., informed consent, patient dignity).
- **Weigh professional responsibilities** against organizational policies or constraints.
- **Respect patient confidentiality** and legal frameworks governing CT imaging.

D. General and Transferable Skills (other skills relevant to employability and personal development)

In addition to technical and subject-specific knowledge, students completing a CT scan course are expected to develop **broad, transferable skills** that are essential for effective employment and professional growth in healthcare and beyond.

1. Communication Skills

- Effectively **communicate with patients**, including explaining procedures and addressing concerns.
- **Collaborate and coordinate** with radiologists, nurses, and other healthcare professionals.
- Produce **clear documentation** and contribute to clinical reporting when appropriate.

2. Teamwork and Interpersonal Skills

- Work confidently and respectfully within **multidisciplinary teams**.
- Show **empathy, cultural sensitivity**, and professionalism in patient care.

- Support colleagues in high-pressure or emergency situations.

3. Time Management and Organizational Skills

- Prioritize tasks in **busy clinical environments**.
- Manage multiple patient cases efficiently while maintaining quality.
- Plan and prepare for both routine and complex CT procedures.

4. Adaptability and Flexibility

- Adjust scanning techniques for **different patient types** and clinical conditions.
- Respond appropriately to **changing clinical demands**, technical challenges, or emergencies.
- Embrace **new technologies or protocols** as CT systems evolve.

5. IT and Digital Literacy

- Operate **CT scanners and image processing software** confidently.
- Navigate **Radiology Information Systems (RIS)** and **Picture Archiving and Communication Systems (PACS)**.
- Understand digital storage, privacy, and data protection protocols.

6. Problem-Solving and Initiative

- Identify and solve problems related to equipment function, image quality, or patient care.
- Make informed decisions under pressure and take **initiative when unexpected issues** arise.

7. Self-Reflection and Continuous Learning

- Reflect on clinical practice and **evaluate personal performance**.
- Seek and apply feedback for **ongoing personal and professional development**.
- Engage in **lifelong learning** through CPD (Continuing Professional Development) and further education.

8. Ethical Awareness and Professionalism

- Demonstrate **integrity, accountability, and confidentiality** in all professional actions.
- Respect **ethical standards** in patient interaction, consent, and medical decision-making

11. Course Structure:

Weeks	Hours	Teaching Method	Unit/Module or Topic Title	Intended Learning Outcomes (ILOs)	Assessment Method
1	2	Lecture	Introduction to CT Imaging	Understand CT principles, history, and clinical significance	Written Exam
2–3	4	Lecture / E-learning	CT Physics and Image Formation	Explain CT image acquisition,	Quiz

				reconstruction, and artifacts	
4–6	6	Lecture / Case Study	CT Anatomy – Head, Chest, Abdomen	Identify key anatomical structures in cross-sectional images	Assignment
7–8	4	Lab / Simulator	CT of the Head & Neck	Demonstrate safe and effective use of CT equipment	Practical Assessment
			CT spine		
9–10	3	Clinical Placement	CT of the Chest: Cardiac CT High Resoultion CT	Apply ALARA principles and justify dose settings	Portfolio
11–12	4	Group Work	CTAngiography, Indications - Patient Positioning and Preparation - Technical Considerations Scanning Protocols	Recognize common pathologies and relate them to clinical cases	Case Study Report
13	2	Seminar	CT of the esophagus and stomach: CT in Esophageal CT of the stomach	Choose appropriate scan protocols based on clinical info	Presentation
14	2	Independent Study	CT of the small intestine CT of the large bowel	Reflect on patient care, consent, and professional behavior	Reflective Journal
15–16	4	Lab	Computed Tomography of the liver : intravenous and native studies early phase	Operate contrast-enhanced and angiographic CT protocols	Practical Assessment
17	2	Clinical Simulation	Computed Tomography of the pancreas:	Apply critical thinking to real-time CT imaging scenarios	Oral Viva
18–24	20	Clinical Placement	CT scam of the urinary system: native scan ct urography	Record and reflect on real CT procedures and performance	Logbook Assessment
			Male exams and preparation Female exams and preparation		
			CT scan of Trauma Clinical consideration		
			Role of CT in interventional Applications Abscess Drainage Biopsy		
			CT scan of Musculoskeletal System		
			CT artifacts: Detection Remedies		
			Cone Beam CT Technique and position Role of CT Compared with Other Imaging Modalities		
			Male exams and preparation Female exams and preparation		

25	2	Exam	Course Review & Final Assessment	Integrate knowledge across all CT topics	Final Written Exam
26	2	Seminar	Course Evaluation and Career Planning	Plan further development and career steps in radiography	Feedback & Reflection
27	—	—	Revision Weeks / Remediation	—	—
		—	Final Assessments & Submissions		—

12. Infrastructure; To effectively deliver a CT scan course, both **theoretical and practical components** must be supported by appropriate infrastructure. Here's a detailed overview:

1. Lecture and Classroom Facilities

Component	Description
Lecture Hall/Classroom	Spacious, ventilated, with capacity for all enrolled students
Audio-Visual Equipment	Projector, microphone, speakers, smart board, and multimedia system
Computers & Internet	High-speed internet access; computers for students and instructors
E-Learning Platform	LMS (e.g., Moodle, Blackboard) for digital resources, quizzes, and assignments
Reference Library Access	Digital and physical textbooks, journals, and anatomical atlases

2. Simulation and Image Viewing Labs

Component	Description
CT Simulation Software	Software to simulate scan planning, acquisition, and reconstruction
DICOM Image Viewer	Software for viewing, manipulating, and interpreting CT images
Anatomy Workstations	Dedicated systems for cross-sectional anatomy training and labeling
PACS/RIS Access	Simulated or live access for learning documentation, archiving, and protocols

3. Clinical Practice and Hands-On Training

Component	Description
CT Scanner (Demo or Live)	At least one operational CT scanner (hospital-based or dedicated lab unit)
Patient Positioning Aids	Sponges, headrests, straps for realistic practice in patient setup
Contrast Injector (Simulator)	Training injector setup for practicing contrast-enhanced scan protocols
Phantom Models	Anatomical and quality assurance phantoms for test scanning and QA training
Radiation Safety Tools	Lead aprons, dosimeters, warning signs, and shielding for safety practice

4. Support Infrastructure

Component	Description
IT Support	Technical assistance for simulation labs, software, and online learning systems
Maintenance Services	Routine servicing and troubleshooting of CT simulation hardware/software
Administrative Support	Scheduling clinical placements, lab access, and student tracking

Optional Enhancements

- **Virtual Reality (VR) Tools**: For immersive anatomy and scan environment simulations
- **AI-Driven Image Analysis Software**: Introduce AI in CT imaging as part of advanced learning
- **Conference/Webinar Facilities**: For expert guest lectures and industry updates

Required reading:

Below is a curated list of **essential textbooks, reference materials, and resources** for students undertaking a CT Scan (Computed Tomography) module as part of their radiological technician training. These cover **physics, clinical applications, safety, anatomy, and image interpretation**.

Core Textbooks

1. **Bushong's Radiologic Science for Technologists**
   Author: William J. Callaway, E. Russell Ritenour
   Edition: 12th or latest
   ✅ Comprehensive on imaging principles, including CT physics and safety.
2. **Computed Tomography: Physical Principles, Clinical Applications, and Quality Control**
   Author: Euclid Seeram
   Edition: 4th or latest
   ✅ A go-to CT-specific textbook covering scanner design, protocols, QA, and contrast use.
3. **Cross-Sectional Anatomy for Imaging Professionals**
   Authors: Lorrie L. Kelley & Connie M. Petersen
   Edition: 5th or latest
   ✅ Detailed cross-sectional anatomy crucial for CT interpretation.
4. **CT and MRI Pathology: A Pocket Atlas**
   Author: Michael L. Grey
   ✅ Ideal for quick reference on common pathologies with side-by-side imaging.

Recommended Clinical and Practice Guides

5. **Essentials of Radiographic Physics and Imaging**
   Author: James Johnston & Terri L. Fauber
   ✅ Helps reinforce key concepts of image quality, contrast, and dose management.
6. **Radiation Protection in Medical Radiography**
   Author: Mary Alice Statkiewicz Sherer
   ✅ Focuses on ALARA principles and patient safety in CT.
7. **Merrill's Atlas of Radiographic Positioning and Procedures (for comparison)**
   Authors: Ballinger et al.
   ✅ Though more general, useful for reviewing positioning and preparation in CT contexts.

Online and Open Resources

8. **Radiopaedia.org**
   ✅ Free, case-based CT image repository for pathology and anatomy review.
9. **ARRT (American Registry of Radiologic Technologists) CT Content Specifications**
   ✅ Useful for exam prep and curriculum alignment.
10. **IAEA Radiation Protection in CT** (available online)
    ✅ Guidelines on radiation safety and dose optimization.

Optional Reading (Advanced or Supplementary)

- **CT Physics Made Easy** – by Stephanie Ryan
  A simplified approach for students who struggle with physics-heavy content.

	• **Clinical Radiology: The Essentials** – by Richard H. Daffner Covers essential reading on imaging pathways and decision-making.
Special requirements (include for example workshops, periodicals, IT software, websites)	**]1. Practical Workshops (Mandatory & Supplementary)** **Workshop Title** — **Objective** **CT Protocol Design & Optimization Workshop** — Teach students how to select and modify scan param t **Contrast Media Handling and Injection Safety** — Train in intravenous contrast use and managing react o **Radiation Dose Monitoring and Safety** — ALARA training, dosimeter use, and patient protectio **Emergency Situations in CT Imaging** — Simulation of trauma and stroke protocols in urgent **Image Reconstruction & Artifact Analysis** — Hands-on work with post-processing tools and recogu z **Patient Positioning and Immobilization in CT** — Practice accurate and safe positioning techniques for a regions **2. Recommended Periodicals / Journals** **Journal** — **Publisher / Link** **Radiologic Technology** — American Society of Radiologic Technologists (A **Journal of Computed Tomography** — Elsevier **Journal of Radiology and Diagnostic Imaging** — Sciedu Press **European Journal of Radiology** — Elsevier **British Journal of Radiology (BJR)** — British Institute of Radiology **Radiography Journal** — Elsevier / Society and College of Radiographers **3. IT Software / Simulation Tools** **Software/Tool** — **Purpose** **CT Simulation Software** — Virtual scan planning and acquisition practice **DICOM Viewer (e.g., RadiAnt, OsiriX)** — Viewing and analyzing CT images **PACS / RIS Training System** — Exposure to clinical workflows and image managemer **Dose Tracking Software** — Monitor and analyze radiation exposure **Cross-sectional Anatomy Apps** — Interactive anatomy learning (Visible Body, AnatomyM **AI Interpretation Tools (Optional)** — Intro to AI-assisted image analysis (e.g., Aidoc) **4. Websites & Online Resources** **Platform** — **Use** Radiopaedia.org — Case studies, image review, pathology tutorials ARRT CT Content Specs — Curriculum alignment and board exam preparation **IAEA Radiation Protection** — CT radiation safety resources RSNA Education Portal — Research articles, webinars, and interactive modules e-Learning for Healthcare (UK) — Free radiology modules (some require registration) **Additional Requirements** **Item** — **Purpose** **Clinical Placement Site Access** — Real-world training on live CT scanners **Dosimeter (TLD or Digital Badge)** — Monitor radiation exposure during clinical practice **Protective Lead Aprons / Shields** — Patient and operator radiation safety **Personal Logbook / Reflective Diary** — Track practical experience, reflections, and case notes
Community-based facilities (Include for example,	To enhance practical learning and prepare students for real-world radiologic practice, **community-based educational components** are essential. These experiences bridge theory with clinical practice and promote professional development.

guest Lectures, internship, field studies)

1. Guest Lectures by Industry Professionals

Type	Details
Radiologists	Interpretation of complex CT cases, clinical decisio
CT Applications Specialists	Insights on advanced protocols, machine settings, a
Medical Physicists	CT dose optimization, quality assurance, and safet
Radiographers from Hospitals	Real-world workflow, patient handling, and emerg scenarios
Legal/Ethics Experts	Medico-legal issues, informed consent, and patien imaging

2. Internship / Clinical Placement

Component	Details
Duration	4–8 weeks (or flexible, depending on curriculum)
Sites	Teaching hospitals, private radiology centers, or diagnostic imag units
Activities	Hands-on scanning, patient prep, contrast administration, QA r
Supervision	Clinical tutors or licensed radiographers
Documentation	Clinical logbook, daily reflections, performance evaluations

3. Field Visits and Educational Tours

Facility Type	Purpose
CT Equipment Manufacturer	Observe CT scanner manufacturing, calibration, testing
Radiation Safety Department	Understand regulations, safety signage, and inci
National Radiology Conferences	Exposure to emerging technologies and professi networking
Medical Imaging Workshops	Participate in practical training modules or vend on demos

4. Community Health Outreach Projects (Optional)

Initiative	Objective
Public Imaging Awareness	Educate the public about the safe use of CT and radia awareness
Mobile Imaging Units	If available, observe or assist in mobile CT services fo areas
Health Camps	Volunteer or observe CT screening camps for early di detection

Learning Outcomes from Community-Based Activities

- Apply CT knowledge in real clinical settings
- Communicate effectively with multidisciplinary teams
- Demonstrate patient care, ethical practice, and safety awareness
- Reflect on experiences to improve future practice

13. Admissions	
Pre-requisites	
Minimum number of students	145
Maximum number of students	233

TEMPLATE FOR COURSE SPECIFICATION

Lecturer; Dr. Hameeda Mohammed Majeed

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This course provides in-depth knowledge and hands-on training in ultrasound imaging. Students will explore the physics of ultrasound, advanced scanning techniques, and clinical applications in various body systems. Emphasis is placed on image optimization, diagnostic criteria, patient care, and interprofessional communication. Clinical placement and simulation labs will allow practical skill development.

By the end of this course, students will be able to:

7. Explain the physical principles of ultrasound and their application in diagnostic imaging.
8. Demonstrate proficiency in operating ultrasound machines and using appropriate scanning protocols.
9. Identify normal and pathological ultrasound appearances of major organ systems.
10. Evaluate image quality and apply corrective measures.
11. Practice safe, ethical, and effective patient care during ultrasound procedures.
12. Communicate findings effectively within a clinical team.

1. Teaching Institution	Al-Kitab University
2. University Department/Centre	Radiology and ultrasonography technique
3. Course title/code	Ultrasound Imaging

4. Programme(s) to which it contributes	Bachelor's Degree in Radiology and ultrasonography
5. Modes of Attendance offered	Hall lecture and practical lecture on ultrasound machine
6. Semester/Year	First and second term
7. Number of hours tuition (total)	2 hours theory and 4 hours practical
8. Date of production/revision of this specification	26/4/2025

9. Aims of the Course

6. **Develop Advanced Theoretical Knowledge**
   Equip students with an in-depth understanding of the physical principles, instrumentation, and safety standards of ultrasound imaging in diagnostic radiology.
7. **Enhance Practical Proficiency**
   Train students to competently operate ultrasound machines, optimize image quality, and perform standard scanning techniques across different body systems.
8. **Strengthen Clinical Interpretation Skills**
   Enable students to identify normal and pathological ultrasound appearances and correlate them with patient history and clinical findings.
9. **Foster Patient-Centered Care**
   Promote professionalism in patient communication, positioning, and care during ultrasound procedures, with emphasis on ethics, empathy, and safety.
10. **Promote Lifelong Learning and Research Awareness**
    Instill the importance of continuous learning, staying updated with new ultrasound technologies, and understanding the role of evidence-based practice in diagnostic imaging.

10· Learning Outcomes, Teaching ,Learning and Assessment Method

C- Knowledge and Understanding

Learning Outcomes

By the end of this course, students will be able to:

6. Explain the physical principles of ultrasound and the function of key components of ultrasound machines.
7. Describe the interaction of ultrasound with different body tissues and its clinical implications.
8. Identify the normal anatomy and common pathologies in ultrasound imaging of major systems (abdominal, OB/GYN, vascular, MSK, small parts).
9. Understand Doppler techniques and their applications in vascular and cardiac studies.
10. Explain the ethical, legal, and safety aspects of performing ultrasound examinations.

Teaching and Learning Methods

- Lectures and multimedia presentations

- Case-based learning
- Guided reading assignments
- Interactive discussions and quizzes
- Clinical observation

Assessment Methods

- Midterm and final written exams (MCQs, short/long answers)
- Case-based assessment questions
- In-class quizzes and group presentations

B. Subject-specific skills

Learning Outcomes

By the end of this course, students will be able to:

7. Operate various ultrasound machines and adjust settings for optimal imaging.
8. Perform standardized scanning techniques across different anatomical regions (e.g., abdominal, pelvic, vascular).
9. Acquire diagnostic-quality ultrasound images and recognize image artifacts.
10. Apply proper patient positioning and scanning protocols for different clinical scenarios.
11. Document findings and communicate effectively with supervising radiologists and medical staff.
12. Adhere to hygiene, infection control, and patient safety standards during ultrasound procedures.

Teaching and Learning Methods

- Hands-on lab sessions with simulators and real models
- Supervised scanning in clinical settings
- Demonstrations by instructors and guest clinicians
- Role-playing and simulation of patient interaction
- Peer and instructor feedback on practical performance

Assessment Methods

- Objective Structured Clinical Examinations (OSCEs)
- Practical skill checklists and logbooks
- Image acquisition and interpretation assessments
- Clinical performance evaluations
- Reflective practice reports

Teaching and Learning Methods

The course employs a combination of theoretical instruction, practical training, and clinical exposure to ensure that students develop both conceptual understanding and hands-on competence in ultrasound imaging.

1. Lectures:

- Delivered in lecture halls using PowerPoint, videos, and ultrasound image demonstrations.
- Focused on theoretical concepts such as ultrasound physics, anatomy, pathology, and instrumentation.
- Promotes foundational knowledge and diagnostic reasoning.

2. Laboratory Sessions (Hands-On Practical Training)

- Conducted in simulation labs equipped with ultrasound machines and phantoms.
- Enables students to practice scanning techniques, patient positioning, and image acquisition.
- Includes supervised sessions with standardized patients or models.

3. Demonstrations and Tutorials

- Instructors or guest sonographers demonstrate live scanning techniques.
- Small-group tutorials reinforce complex concepts and allow for personalized feedback.

4. Simulation and Role-Playing

- Simulated patient encounters and scanning scenarios.
- Role-play includes practicing patient communication, informed consent, and ethical decision-making.

8. Group Projects and Presentations

- Collaborative work on ultrasound case studies.
- Develops teamwork, presentation skills, and understanding of clinical workflows.

Assessment methods

Assessment is designed to evaluate both **theoretical knowledge** and **practical competence** in ultrasound imaging. A combination of formative and summative assessments ensures comprehensive evaluation across cognitive and professional domains.

1. Written Examinations (30%)

- **Midterm Exam:** Includes multiple-choice questions (MCQs), short answer questions (SAQs), and image-based interpretation.
- **Final Exam** Includes multiple-choice questions (MCQs), short answer questions (SAQs), and image-based interpretation.

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2. Practical Examinations Image Interpretation Test :

  - Students evaluate ultrasound images for anatomy, pathology, and quality.
  - Case-based questions assessing diagnostic accuracy.

3. Quizzes and In-Class Activities :

- Periodic quizzes during lectures or online.

- Encourages continuous engagement and checks understanding of core concepts.

4. Participation and Attendance :

- Active participation in labs, group discussions, and clinical rotations.
- Assesses professional behavior, teamwork, and communication.

C. Thinking Skills

By the end of the course, students will be able to:

7. **Apply theoretical knowledge** of ultrasound physics and anatomy to solve real-world imaging problems.
8. **Analyze ultrasound images** to differentiate between normal and pathological findings.
9. **Interpret clinical information** in conjunction with ultrasound results to support diagnostic decisions.
10. **Evaluate image quality** and apply corrective actions when artifacts or technical limitations are present.
11. **Make informed decisions** about scanning techniques, transducer selection, and patient positioning based on individual clinical scenarios.
12. **Reflect critically** on their own practice to identify areas for improvement and professional growth.

Assessment Methods for Thinking Skills

- **Image Interpretation Exams** requiring analysis and diagnostic reasoning.
- **Case Study Presentations** that assess critical evaluation and communication of findings.
- **OSCE stations** that test real-time problem-solving during simulated patient scans.
- **Written exams** with clinical scenarios requiring application of theoretical knowledge.
- **Reflective reports** that demonstrate awareness and evaluation of one's own clinical decisions and outcomes.

Teaching and Learning Methods

Teaching and Learning Methods

1. Lectures and Interactive Seminars

- Structured presentations delivered in lecture halls, covering ultrasound physics, instrumentation, anatomy, pathology, and clinical protocols.
- Use of multimedia tools, real ultrasound images, and case studies to enhance understanding.
- Question-and-answer sessions and open discussions to encourage engagement and critical thinking.

2. Practical Laboratory Sessions

- Hands-on scanning practice using phantoms, simulation devices, and live models.

- Emphasis on mastering transducer handling, patient positioning, image acquisition, and optimization techniques.

3. Clinical Placement and Hospital-Based Training

- Clinical rotations in accredited ultrasound departments.
- Real-time observation and participation in patient examinations under professional supervision.

4. E-Learning and Multimedia Resources

- Online platforms offering recorded lectures, ultrasound video tutorials, image libraries, and self-assessment quizzes.
- Supports flexible, self-paced learning and revision.

5. Tutorials and Small Group Discussions

- Focused sessions on complex topics or skills needing reinforcement.
- Encourages peer-to-peer interaction, clarification of doubts, and collaborative learning.

Assessment methods

1. Written Examinations :

- **Midterm Exam :**
- Assesses foundational knowledge in ultrasound physics, anatomy, pathology, and instrumentation through:
    - Multiple choice questions (MCQs)
    - Image-based questions
- **Final Theoretical Exam :**
- A comprehensive assessment covering all course topics, focusing on application and clinical reasoning.

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2. Practical/Clinical Examination :

- **Ultrasound Image Evaluation Test :**
  Students interpret normal and pathological images and identify technical artifacts and corrective measures.

3. Case Study Presentation :

- Students present a real or simulated ultrasound case.
- Assessment criteria include:
    - Clinical reasoning and interpretation
    - Understanding of pathology
    - Communication and presentation skills

4. Continuous Assessment :

- **Quizzes and Assignments (5%): Regular short tests to encourage consistent learning.**

- **Attendance and Participation (5%): Engagement** in lectures, labs, and discussions.

D. General and Transferable Skills (other skills relevant to employability and personal development) :

1. Communication Skills

- Communicate effectively with patients, colleagues, and healthcare professionals using appropriate verbal and non-verbal techniques.
- Deliver clear oral and written case reports, and present findings in professional settings.

Learning Activities:

- Case presentations
- Role-play patient interactions
- Report writing exercises

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2. Teamwork and Collaboration

- Work efficiently within a multidisciplinary healthcare team.
- Demonstrate respect, cooperation, and shared responsibility during clinical procedures and group activities.

Learning Activities:

- Group projects
- Clinical rotations with real-time collaboration
- Peer-assisted learning in practical labs

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3. Problem-Solving and Decision-Making

- Analyze clinical information and imaging findings to make informed decisions.
- Identify and resolve technical or procedural challenges independently or as part of a team.

Learning Activities:

- Case-based learning
- OSCE scenarios
- Clinical troubleshooting exercises

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4. Time Management and Organization

- Manage clinical duties, academic responsibilities, and personal study time efficiently.
- Prioritize tasks and meet deadlines in both academic and clinical environments.

Learning Activities:

- Maintaining clinical logbooks
- Structured lab sessions with time constraints
- Assignment and project deadlines

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5. Digital and Technological Literacy

- Operate ultrasound machines and digital imaging systems proficiently.
- Use hospital PACS, RIS, and other healthcare IT systems for documentation and review.

Learning Activities:

- Ultrasound machine operation labs
- Digital image evaluation
- Online case submission and feedback

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6. Ethical and Professional Behavior

- Demonstrate integrity, confidentiality, empathy, and respect for diversity.
- Adhere to legal, ethical, and safety standards in patient care.

Learning Activities:

- Clinical placement evaluations
- Ethics workshops
- Reflective practice reports

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7. Self-Learning and Lifelong Learning

- Identify personal learning needs and pursue continuous professional development.
- Stay updated with emerging ultrasound technologies and research.

Learning Activities:

- Reflective journals
- Literature review assignments
- Access to online learning resources and ultrasound journals

Week	Unit/Module or Topic Title	Teaching Method	Assessment Method	Intended Learning Outcomes (ILOs)	Hours
1	Principle of ultrasound and its terms	Lecture, Demonstration	Quiz, Practical Exam	Understand ultrasound physics, terminology, and basic equipment handling.	2
2	Normal liver	Lecture, Case Studies, Hands-on Practice	Case Presentation, Practical Exam	Identify and describe normal liver anatomy and echogenicity.	2
3	Abnormal liver: Enlarged liver/hepatomegaly: homogeneous pattern	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Recognize and differentiate homogeneous hepatomegaly patterns.	2
4	Enlarged liver: non-homogeneous pattern, Small liver/shrunken liver	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify non-homogeneous liver enlargement and atrophic liver changes.	2
5	Cystic lesions in normal or large liver	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Detect and characterize cystic lesions in hepatic tissue.	2
6	Differential diagnosis of liver masses, Trauma of the liver	Lecture, Case Studies, Hands-on Practice	Case Presentation, Practical Exam	Differentiate between benign and malignant liver masses, assess traumatic liver injuries.	2

7	Normal gallbladder and biliary tract	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify normal gallbladder and biliary tract anatomy and function.	2
8	Abnormal gallbladder and biliary tract: distended gallbladder, Acute cholecystitis	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Recognize signs of gallbladder distention and acute cholecystitis.	2
9	Echoes within the gallbladder	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify and interpret different echogenic patterns within the gallbladder.	2
10	Thick gallbladder walls, Small gallbladder, Gallbladder in jaundice	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Assess gallbladder wall thickness, size variations, and changes in jaundice.	2
11	Normal and abnormal pancreas	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Differentiate between normal and pathological pancreatic findings.	2
12	Normal and abnormal spleen	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify normal splenic anatomy and recognize abnormalities.	2
13	Normal kidney and ureters, absent kidney, abnormal kidney: large kidney	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Assess renal size, position, and detect abnormalities such as agenesis or enlargement.	2
14	Renal cysts, Renal masses	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify and differentiate renal cysts from solid masses.	2
15	Small kidney, Renal calculi, Trauma, Perirenal fluid	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Detect signs of renal atrophy, calculi, trauma, and perirenal fluid collections.	2

16	Normal and abnormal Urinary bladder	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Evaluate bladder wall thickness, volume, and detect abnormalities.	2
17	Normal and abnormal thyroid gland	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Assess thyroid size, echogenicity, and identify nodules or other abnormalities.	2
18	Gynaecology (non-pregnant female pelvis): normal uterus	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify normal uterine size, shape, and echotexture.	2
19	Intrauterine contraceptive device, Fluid in the posterior cul-de-sac	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Detect presence and position of intrauterine devices, assess for free fluid in the posterior cul-de-sac.	2
20	The endometrium, Position of the uterus, Ovaries, normal ovary	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Evaluate endometrial thickness, uterine position, and ovarian morphology.	2
21	Ovaries: normal ovary, Ovarian follicles	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify normal ovarian size, follicles, and detect abnormalities.	2
22	Abnormal uterus: Myomas, Malignant disease	Lecture, Case Studies, Hands-on Practice	Case Presentation, Practical Exam	Differentiate between benign and malignant uterine pathologies.	2
23	Uterine endometriosis	Lecture, Case Studies, Hands-on Practice	Case Presentation, Practical Exam	Recognize sonographic signs of endometriosis.	2
24	Abnormal ovary: Ovarian cysts, Pelvic hydatid cysts, Solid ovarian masses	Lecture, Case Studies, Hands-on Practice	Case Presentation, Practical Exam	Identify and differentiate ovarian cysts, hydatid cysts, and solid masses.	2

25	Pelvic inflammatory disease, Pelvic abscess, Pelvic varices, Fallopian tubes	Lecture, Case Studies, Hands-on Practice	Case Presentation, Practical Exam	Assess for signs of pelvic inflammatory disease, abscesses, varices, and evaluate fallopian tubes.	2
26	Obstetrics: Introduction to Obstetrics	Lecture, Demonstration	Quiz, Practical Exam	Understand basic obstetric ultrasound principles and indications.	2
27	Early pregnancy, Ectopic pregnancy	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify early intrauterine pregnancies and signs of ectopic pregnancies.	2
28	Estimation of fetal size and age (fetal biometry)	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	How to assess fetal well binge and fetal biometry	2
29	Normal testis, Abnormal scrotum: Unilateral swelling, Small or absent testis	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify abnormal scrotal swelling, small or absent testis	2
30	The epididymis, Trauma, Torsion of the testis, Hernia, Varicocele	Lecture, Ultrasound Demonstration	Practical Exam, Image Interpretation	Identify testicular torsion ultrasound sign and varicocele, hernia.	2

12. Infrastructure;

1. Educational Facilities

- **Lecture Halls**: Equipped with multimedia projectors, sound systems, and seating arrangements conducive to interactive learning.
- **Demonstration Rooms**: Spaces where instructors can showcase ultrasound techniques using models or simulators.

2. Ultrasound Training Laboratories

- **Clinical Ultrasound Rooms**: Each room should be approximately 25–36 m^2 to accommodate the examination couch, ultrasound machine, and additional equipment.
- **Equipment**:

- **Ultrasound Machines**: High-resolution systems with various probes (e.g., linear, convex) for diverse applications.

3. Clinical Training Areas

- **Affiliated Hospitals or Clinics**: Partnerships with medical facilities for hands-on training.
- **Observation Rooms**: For students to observe real-time procedures.
- **Patient Interaction Areas**: Designed to ensure patient comfort and privacy during training sessions.

4. Personnel and Training

- **Qualified Instructors**: Experienced professionals in ultrasound imaging and education.
- **Technical Support Staff**: For equipment maintenance and troubleshooting.
- **Administrative Personnel**: To manage scheduling, documentation, and student records.

Implementation Considerations

- **Budget Planning**: Allocate funds for initial setup, maintenance, and upgrades.
- **Regulatory Compliance**: Ensure adherence to local health and safety standards.
- **Continuous Improvement**: Regularly assess and update the curriculum and facilities to keep pace with technological advancements.

Required reading:	**1. Manual of Diagnostic Ultrasound** P.E.S Palmer **2. Textbook of Diagnostic Sonography** • **Author**: Sandra L. Hagen-Ansert • **Overview**: An authoritative guide detailing sonographic techniques, anatomy, and pathology, with a focus on clinical applications. • **3. Ultrasound Physics and Instrumentation** • **Authors**: William R. Hykes, Donald L. Hedrick, and David E. Starchman • **Overview**: A detailed exploration of the principles of ultrasound technology, including wave propagation, imaging systems, and Doppler principles. **Supplementary Resources** **1. Clark's Essential Guide to Clinical Ultrasound** • **Overview**: A practical guide offering step-by-step instructions for performing ultrasound examinations, with anatomical illustrations and clinical tips. **2. Learning Radiology: Recognizing the Basics (5th Edition)** • **Author**: William Herring
Special requirements (include for example workshops, periodicals, IT software, websites)	**1. Workshops & Hands-On Training** Engaging in practical workshops is crucial for mastering ultrasound techniques. Recommended options include: • **Keith Maudlin & Associates**: Offers hands-on ultrasound training sessions focusing on various specialties. kmaultrasound.com • **Ultrasound – Basic Training Workshop**: Provides foundational training for critical care providers. The Resuscitation Group • **Center for Medical Education**: Conducts advanced ultrasound boot camps covering emergency imaging. courses.ccme.org **2. Periodicals & Journals** Staying updated with the latest research and advancements is vital. Recommended journals include:

	• **Ultrasonography**: A peer-reviewed journal focusing on clinical applications and technological advancements in ultrasound. Wikipedia+2Wikipedia+2Wikipedia+2 • **Journal of Diagnostic Medical Sonography (JDMS)**: Publishes research on ultrasound techniques, instrumentation, and education. Wikipedia • **Ultrasound Quarterly**: Offers insights into medical ultrasound research and clinical practices. **3. IT Software & Simulation Tools** Incorporating advanced software and simulation tools enhances learning: • **SonoSim**: Provides virtual ultrasound training with real patient cases. • **AmCAD-US**: Offers AI-assisted ultrasound imaging solutions for enhanced diagnostics. ASUS Pressroom • **Siemens Healthineers Ultrasound Education**: Delivers personalized education and training modules. **4. Websites & Online Resources** Utilizing reputable online platforms supports continuous learning: • **Radiopaedia**: A collaborative wiki-based educational reference for radiology and ultrasound imaging. https://en.wikipedia.org/wiki/Radiopaedia?utm_source=chatgpt.com

13. Admissions	
Pre-requisites	
Minimum number of students	144
Maximum number of students	280