



# Course Specification

— (Bachelor)

Course Title: **Patient Care and Ethics in Radiology**

Course Code: **374216-2**

Program: **Program of Bachelor in Radiological Sciences -374000-Level 6**

Department: **Department of Radiological Sciences**

College: **College of Applied Medical Sciences**

Institution: **Taif University**

Version: **3**

Last Revision Date: **4<sup>th</sup> September 2023**



## Table of Contents

<b>A. General information about the course:</b> .....	3
<b>B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods</b> .....	4
<b>C. Course Content</b> .....	5
<b>D. Students Assessment Activities</b> .....	6
<b>E. Learning Resources and Facilities</b> .....	6
<b>F. Assessment of Course Quality</b> .....	7
<b>G. Specification Approval</b> .....	7



## A. General information about the course:

### 1. Course Identification

1. Credit hours: (2)

2. Course type

A.  University  College  Department  Track  Others

B.  Required  Elective

3. Level/year at which this course is offered: (3rd Level / 2nd Year)

4. Course general Description:

This course is designed to provide the students with the knowledge and skills needed to assess the physical and mental health status of different types of patients with different age groups and basic concept of routine and emergency patient care procedures. Skills lab (practical sessions) allows the student to practice and refine basic nursing skills.

5. Pre-requirements for this course (if any):

None.

6. Co-requirements for this course (if any):

None.

7. Course Main Objective(s):

- Define the role and responsibilities of health care members at the medical imaging department and practice effective communication skills between the technologist and different types of patients.
- Demonstrate accepted infection control and general safety practices and how to respond appropriately to emergency situations.



## 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	16	33.3%
2	E-learning	-	-
3	Hybrid <ul style="list-style-type: none"> <li>Practical sessions on campus</li> <li>Distance learning</li> </ul>	32	66.7%
4	Distance learning	-	-

## 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	16
2.	Laboratory/Studio	32
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
<b>Total</b>		<b>48</b>

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with course	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	Describe patient's care principles, ethical and legal health care issues with different kinds of patients and job ethics.	K3	Lectures	Direct method: Quizzes, Mid-term exam and Final exam.
1.2	Describe how to communicate with different types of patients and suitable transferring methods for each patient.	K3	Lectures	Direct method: Quizzes, Mid-term exam and Final exam.





Code	Course Learning Outcomes	Code of PLOs aligned with course	Teaching Strategies	Assessment Methods
<b>2.0</b>	<b>Skills</b>			
2.1	Analyze different vital signs, emergency situations and how to deal with all types of patients during and after the procedures.	S1	Lectures and Problem solving	Direct method: Assignments and practical exams.
2.2	Develop effective verbal/nonverbal communication skills with patients and healthcare staff.	S4	Lectures and Problem solving	Direct method: Assignments and practical exams.
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
3.1	Adhere to the different aspects of profession's code of ethics and comply with the profession's scope of practice.	V1	Self-learning	Direct method: Presentations.
3.2	Work collaboratively with other healthcare providers to conduct accepted infection control and safety principles.	V2	Self-learning	Direct method: Presentations.
...				

### C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to patient care and medical ethics.	3
2.	Communication skills.	3
3.	Interactions inside radiology department.	3
4.	Patient Safety.	3
5.	Patient transfer. (a)	3
6.	Patient transfer. (b)	3
7.	Vital signs	3
8.	Evaluation of patient physical needs.	3
9.	Infection control.	3
10.	Emergency procedures. (Part1)	3





11.	Emergency procedures. (Part2)	3
12.	Patient interventions.	3
13.	Tube oxygen	3
14.	Ethics and ethical behavior.	3
15.	Presentation assignment	3
16.	Review	3
<b>Total</b>		<b>48</b>

## D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid-term examination.	7 <sup>th</sup>	30%
2.	Assignment (presentation).	12 <sup>th</sup>	10%
3.	Final practical examination.	17 <sup>th</sup>	20%
4.	Final theoretical examination.	19 <sup>th</sup>	40%

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

<b>Essential References</b>	Introduction to Radiologic Sciences and Patient Care Arlene A., Richard R. Carlton Fourth edition, 2007 ISBN 13: 9780323566711
<b>Supportive References</b>	Introduction to Radiography and Patient Care Adler A, Carlton R 2nd edition, 1999 WB Saunders ISBN-13: 978-0721676623
<b>Electronic Materials</b>	shorturl.at/hpDR0  <a href="https://journalofethics.ama-assn.org/article/radiologists-ethical-and-professional-obligations/2007-11">https://journalofethics.ama-assn.org/article/radiologists-ethical-and-professional-obligations/2007-11</a>
<b>Other Learning Materials</b>	Blackboard E-learning and patient care websites.

### 2. Required Facilities and equipment



Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<ul style="list-style-type: none"> <li>Classrooms.</li> <li>Lab for patient care equipment with nursing simulators (catheters, nasal tubes and vital signs check accessories)</li> </ul>
<b>Technology equipment</b> (projector, smart board, software)	Data show.
<b>Other equipment</b> (depending on the nature of the specialty)	Videos.

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Program Leaders	Direct
Effectiveness of Students assessment	Program Leaders	Direct
Quality of learning resources	Student, Faculty	indirect
The extent to which CLOs have been achieved	Faculty	Direct, indirect
Other		

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

<b>COUNCIL /COMMITTEE</b>	<b>DEPARTMENT COUNCIL</b>
<b>REFERENCE NO.</b>	<b>11<sup>TH</sup></b>
<b>DATE</b>	<b>24<sup>TH</sup> SEPTEMBER 2023</b>





# Course Specification

— (Bachelor)

Course Title: **Digital Image Acquisition and Display**

Course Code: **374217-2**

Program: **Program of Bachelor in Radiological Sciences -374000-Level 6**

Department: **Department of Radiological Sciences**

College: **College of Applied Medical Sciences**

Institution: **Taif University**

Version: **3**

Last Revision Date: **4<sup>th</sup> September 2023**





## Table of Contents

A. General information about the course: .....	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods .....	5
C. Course Content.....	5
D. Students Assessment Activities.....	7
E. Learning Resources and Facilities .....	7
F. Assessment of Course Quality .....	8
G. Specification Approval .....	9





## A. General information about the course:

### 1. Course Identification

1. Credit hours: ( 2 )

### 2. Course type

A.	University	College	<input checked="" type="checkbox"/> Department	Track	Others
B.	<input checked="" type="checkbox"/> Required		Elective		

3. Level/year at which this course is offered: (3<sup>rd</sup> Level / 2<sup>nd</sup> year)

### 4. Course general Description:

This course is designed to enable the students to:-

Outline, describe and discuss digital radiography, imaging acquisition.

Identify errors and soft image processing as well as different display modalities.

### 5. Pre-requirements for this course (if any):

None

### 6. Co -requirements for this course (if any):

None

### 7. Course Main Objective(s):

The course is designed to enable the student to outline, describe and discuss digital radiography, imaging acquisition as well as digital display.



## 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	32	100%
2	E-learning	-	-
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>	-	-
4	Distance learning	-	-

## 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
	Lectures	32
	Laboratory/Studio	-
	Field	-
	Tutorial	-
	Others (specify)	-
<b>Total</b>		<b>32</b>





## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with course	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	Define the digital image and the preprocessing as well as post processing methods.	K1	Lecture	Direct method: Mid and final exam
1.2	Explain errors during computer processing and their digital image appearances.	K2	Lecture	Direct method Mid and final exam
<b>2.0</b>	<b>Skills</b>			
2.1	Reconstruct computer parts and network used in radiology.	S5	Small group discussion	Direct method, mid and final exam
2.2	Make use of picture archiving and communication system (PACS).	S5	Lecture	Direct and indirect method (Survey)
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
-	-	-	-	-

## C. Course Content

No	List of Topics	Contact Hours
----	----------------	---------------





1	<b>Introduction to Basic Principles of Digital Radiography.</b> Chapter III imaging science topic one page 11	2
2	<b>Digital Radiography and limitation of conventional radiography.</b> P.p (12-14)	2
3	<b>Characteristics of the digital imaging.</b> Chapter III imaging science 2nd Topic.	2
4	<b>Computed radiography overview.</b> Chapter III imaging science topic three	2
5	<b>Details of Computed radiography (characteristics and comparison).</b> chapter III	2
6	<b>Common CR image Acquisition errors.</b> Chapter III imaging science, Chapter V! Pp 23	2
7	<b>CR image Acquisition artifacts remedies</b> Chapter III imaging science, Chapter V	2
8	<b>Flat Panel digital Radiography.</b> Chapter III imaging science Pp 15	2
9	<b>Cassette less Equipment and image Acquisition.</b> Chapter III imaging science Pp 15-16	2
10	<b>Technical Factor and Equipment Selection (Cassette less Equipment )</b> Chapter III imaging science	2
11	<b>Picture Archiving and communication system PACs.</b> Chapter IV Pp 18	2
12	<b>Digital imaging and communication in medicine (DICOM)</b> Chapter IV	2
13	<b>Image processing and manipulation</b> Chapter IV Pp21 and 23	2
14	<b>Image quality in DR</b> Chapter V Pp19 and 21	2
15	<b>Noise and techniques to reduce noise</b> Chapter V	2
16	<b>Imaging Terminology (Digital imaging, image processing and analysis terminology)</b>	2
<b>Total</b>		<b>32</b>





## D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
	Activities (Presentation)	15 <sup>th</sup>	10%
	Activities (Quiz)	11 <sup>th</sup> , 13 <sup>th</sup>	10%
	Midterm written exam	7 <sup>th</sup>	30%
	Final written Exam	18 <sup>th</sup> /19 <sup>th</sup>	50%

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

<b>Essential References</b>	Radiologic Science for Technologists, Physics, Biology, and Protection Stewart Bushong 12 <sup>th</sup> Edition December 2020 ISBN: 9780323749558
<b>Supportive References</b>	Digital Imaging and Communications in Medicine (DICOM): A Practical Introduction and Survival Guide Oleg S. Pianykh 2 <sup>nd</sup> Edition 978364210849 2012
<b>Electronic Materials</b>	None
<b>Other Learning Materials</b>	None





## 2. Required Facilities and equipment

Items	Resources
<b>Facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom.
<b>Technology equipment</b> (projector, smart board, software)	Data show. Access to the Internet. Board
<b>Other equipment</b> (depending on the nature of the specialty)	None

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Program Leaders	Direct
Extent of achievement of course learning outcomes	Faculty	Direct
Quality of learning resources	Student, Faculty	Indirect
Course management and planning	Students	Indirect
Teaching and interaction with students	Students	Indirect
Effectiveness of Evaluation and exams	Students, peer review	Direct, Indirect

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)





## G. Specification Approval

COUNCIL /COMMITTEE	DEPARTMENT COUNCIL
REFERENCE NO.	11 <sup>th</sup>
DATE	24 <sup>th</sup> MAY 2022







# Course Specification

— (Bachelor)

Course Title: **Human Anatomy**

Course Code: **374210-4**

Program: **Program of Bachelor in Radiological Sciences -374000-Level 6**

Department: **Department of Radiological Sciences**

College: **College of Applied Medical Sciences**

Institution: **Taif University**

Version: **3**

Last Revision Date: **4<sup>th</sup> September 2023**



## Table of Contents

<b>A. General information about the course:</b> .....	3
<b>B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods</b> .....	4
<b>C. Course Content</b> .....	5
<b>D. Students Assessment Activities</b> .....	5
<b>E. Learning Resources and Facilities</b> .....	6
<b>F. Assessment of Course Quality</b> .....	7
<b>G. Specification Approval</b> .....	7



## A. General information about the course:

### 1. Course Identification

1. Credit hours: (4)

#### 2. Course type

A.  University  College  Department  Track  Others  
B.  Required  Elective

3. Level/year at which this course is offered: (3<sup>rd</sup> level /2<sup>nd</sup> year)

#### 4. Course general Description:

The course defines various terminology used in anatomy and its sub-division and explains the organization of bones in different parts of the body. The course enables the students to identify the features of each bone in the body and know the organization of human body and organs forming systems. In addition, the students will be able to identify the normal structure of organs and systems and their relationship.

#### 5. Pre-requirements for this course (if any):

Medical Biology (2) 370211-4.

#### 6. Co-requirements for this course (if any):

None

#### 7. Course Main Objective(s):

The students will be able define various terminology used in anatomy and its sub-division, to correlate anatomical structures of the human body with medical images and correctly locate human body parts, structures by surface marking to enable him to carry out correctly positioning for radiographic procedures.

### 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	80	100%
2	E-learning	-	-
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>	-	-
4	Distance learning	-	-



### 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	48
2.	Laboratory/Studio	32
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
<b>Total</b>		<b>80</b>

### B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with course	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	Recall the anatomical structures of the human body systems.	K1	Lecturing	<b>Direct Assessment:</b> - Written exam <b>Indirect Assessment:</b> - Survey
1.2	Define the anatomy of human skeleton.	K1	Lecturing	
1.3	Outline the surface anatomical landmarks to facilitate accurate positioning for radiographic procedures.	K1	Lecturing	
<b>2.0</b>	<b>Skills</b>			
2.1	Relate the anatomy of the human body to X-ray images.	S1	Discussion	<b>Direct Assessment:</b> - Written exam - Practical exams - Assignment <b>Indirect Assessment:</b> - Survey
2.2	Interpret the clinical importance of the anatomy of the body systems.	S1	Lecturing Problem-solving	
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
3.1	-	-	-	-



### C. Course Content

No	List of Topics	Contact Hours
1.	Bones and joints of the upper limb with practical demonstration. (Chapter, 2 PP.101-112, 45-46, 49-52, 64-66, 75-76, 95)	10
2.	Bones and joints of the lower limb with practical demonstration. (Chapter, 3 PP.169-183, 132-134, 139-144, 148, 160-165)	10
3.	Skull and mandible with practical demonstration. (Chapter, 8 PP.525-533)	5
4.	Vertebra and vertebral column, Bony Pelvis and Thoracic cage with practical demonstration. (Chapter, 6 PP.438-444, 449-454) (Chapter, 4 PP.225-228) (Chapter, 5 PP.298-299)	10
5.	Respiratory system with practical demonstration. (Chapter, 6 PP.384-391, 397-402, 406-409), (Chapter, 4 PP.200-202, 219-224)	10
6.	Cardio-vascular system with practical demonstration. (Chapter, 4 PP.203- 212)	10
7.	Digestive system with practical demonstration. (Chapter, 6 PP.370-372, 392-402), (Chapter, 5 PP.256-278)	10
8.	Nervous system with practical demonstration. (Chapter, 7 PP.473-511)	5
9.	Urinary system with practical demonstration. (Chapter, 5 PP.293-297, 306-	10
<b>Total</b>		<b>80</b>

### D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid-term written exam.	6 <sup>th</sup>	20 %
2.	Mid-term practical exam (case study).	8 <sup>th</sup>	10 %
3.	Assignment.	10 <sup>th</sup>	10 %
4.	Final practical exam.	17 <sup>th</sup>	20 %
5.	Final written exam.	18 <sup>th</sup> -19 <sup>th</sup>	40 %

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).



## E. Learning Resources and Facilities

### 1. References and Learning Resources

<b>Essential References</b>	Last's Anatomy Regional and Applied. Chummy Sinnatamby, 11th Edition. Imprint: Churchill Livingstone. 2009 ISBN: 9780443100321.
<b>Supportive References</b>	Gray`s anatomy for students. Richard L., Drake Wayne. Vogl , Adam W. M. Mitchell , Henry Gray. Imprint: Churchill Livingstone/Elsevier (2nd Edition, 2010). ISBN: 9780443069529
<b>Electronic Materials</b>	- Link for the course at Blackboard Learn Portal on Taif university webpage ( <a href="https://lms.tu.edu.sa/webapps/login/">https://lms.tu.edu.sa/webapps/login/</a> ) - Saudi Digital Library (SDL) on Taif University website (through the Electronic Services portal - academic systems services).
<b>Other Learning Materials</b>	-

### 2. Required Facilities and equipment

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	- Classroom - Laboratory
<b>Technology equipment</b> (projector, smart board, software)	- Data show - Internet access
<b>Other equipment</b> (depending on the nature of the specialty)	- Anatomy lab



## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Program Leaders	Direct
Effectiveness of Students assessment	Faculty	Direct
Quality of learning resources	Student, Faculty	Indirect
The extent to which CLOs have been achieved	Faculty, peer review	Direct, Indirect
Other		

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

<b>COUNCIL /COMMITTEE</b>	<b>DEPARTMENT COUNCIL</b>
<b>REFERENCE NO.</b>	<b>11<sup>TH</sup></b>
<b>DATE</b>	<b>24<sup>TH</sup> MAY 2022</b>





# Course Specification

— (Bachelor)

Course Title: **Physiology**

Course Code: **374224-4**

Program: **Program of Bachelor in Radiological Sciences -374000-Level 6**

Department: **Department of Radiological Sciences**

College: **College of Applied Medical Sciences**

Institution: **Taif University**

Version: **3**

Last Revision Date: **4<sup>th</sup> September 2023**





## Table of Contents

<b>A. General information about the course .....</b>	<b>3</b>
<b>B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods .....</b>	<b>4</b>
<b>C. Course Content .....</b>	<b>5</b>
<b>D. Students Assessment Activities .....</b>	<b>6</b>
<b>E. Learning Resources and Facilities.....</b>	<b>7</b>
<b>F. Assessment of Course Quality.....</b>	<b>7</b>
<b>G. Specification Approval .....</b>	<b>7</b>





## A. General information about the course:

### 1. Course Identification

1. Credit hours: (4)

#### 2. Course type

- A.  University  College  Department  Track  Others
- B.  Required  Elective

3. Level/year at which this course is offered: ( 3<sup>rd</sup> level/2<sup>nd</sup> Year)

#### 4. Course general Description:

Physiology deals with basic theoretical knowledge about functions of body systems. The focus of the course will be on the cardiovascular, respiratory, endocrine, reproductive, urinary, digestive and central nervous system and concepts of homeostasis and control mechanisms - with emphasis on clinical relevance.

5. Pre-requirements for this course (if any):

Medical Biology (2) (370211-4)

6. Co-requirements for this course (if any):

None

#### 7. Course Main Objective(s):

After studying the course, the student will be able to:

- Recognize the normal physiological functions and controls of various human body systems.
- Identify the concepts of homeostasis and basic mechanisms underlying various diseases.
- Applying principles and generalizations learned via course work to novel problems solving and situations in clinical and/or research environments.

### 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	64	100%
2	E-learning	-	-
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>	-	-
4	Distance learning	-	-





### 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	64
2.	Laboratory/Studio	-
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
<b>Total</b>		<b>64</b>

### B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with course	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	Recognize various functions of respiratory and renal system	K1	Lectures	Direct method Examinations (Quizzes, Midterm exam and Final exam)
1.2	Describe various function of endocrine, reproductive and cardiovascular system.	K1	Lectures	Direct method Examinations (Quizzes, Midterm exam and Final exam)
1.3	List various functions of digestive and nervous system	K1	Lectures	Direct method Examinations (Quizzes, Midterm exam and Final exam)
<b>2.0</b>	<b>Skills</b>			
2.1	Explain the physiological principles underlying diseases states.	S1	Lectures- Problem based learning.	Direct method Examinations (Quizzes, Midterm exam and Final exam)





Code	Course Learning Outcomes	Code of PLOs aligned with course	Teaching Strategies	Assessment Methods
2.2	Show self-learning abilities for group assignment preparation in due time.	S2	Group discussion Lectures	Direct method Examinations (Quizzes, Midterm exam and Final exam) Assignment <b>Indirect method</b>
2.3	Research in the internet for resources to develop and give oral presentation.	S2	Problem based learning Research project	Direct method Examinations (Quizzes, Midterm exam and Final exam) <b>Indirect method</b> (survey)
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
-	-	-	-	-

### C. Course Content

No	List of Topics	Contact Hours
1.	Respiratory System: - Pulmonary ventilation. - Mechanics of respiration. - Alveolar gas exchange. - Tissue gas exchange.	4
2.	Respiratory System: - Transport of oxygen and carbon dioxide in blood. - Oxygen hemoglobin dissociation curve. - Control and regulation of respiration.	4
3.	Urinary System: - Kidney Functions. - Mechanism of urine formation. - Electrolytes Balance. - Renal Acid-Base Regulation. - Micturition reflex.	4
4.	Endocrine glands: - Pituitary gland hormones (Functions, control). - Thyroid hormones (Functions, control). - Parathyroid hormones (Functions, control).	4
5.	Endocrine glands: - Thyroid hormones (Functions, control). - Parathyroid hormones (Functions, control).	4





6.	Endocrine glands: - Adrenal gland hormones (Functions, control). - Pancreatic hormones (Functions, control).	4
7.	Reproduction: - Male reproductive system. - Female reproductive system.	4
8.	Cardiovascular System: Blood Compositions and functions of the blood.	4
9.	Cardiovascular System: Heart - Functional characteristics of the heart. - Sinus node and atrio-ventricular node physiology. - Pacemaker activity (automatism) of the heart - The cardiac cycle and Electrocardiogram (ECG)	4
10.	Cardiovascular System: Heart - Regulation of cardiac rate. - Cardiac output and its regulation. - Venous return and factors affecting it	4
11.	Cardiovascular System: - Regulation of blood volume. - Regulation of blood pressure and blood flow.	4
12.	Digestive System: - Motor functions (Motility) of digestive system. - Secretory Functions (Secretions) of digestive system.	4
13.	- Accessory digestive organs: liver, gall bladder, pancreas. - How is the digestive process controlled?	4
14.	Nervous System: - Neural tissue functions - Central nervous system – functions	4
15.	Autonomic Nervous System: - Functions of sympathetic, and parasympathetic nerves	4
16.	Revision.	4
<b>Total</b>		<b>64</b>

#### D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid-term Examination	6 <sup>th</sup> – 7 <sup>th</sup>	30
2.	Online Quiz	10 <sup>th</sup>	10
3.	Activity	15 <sup>th</sup> – 16 <sup>th</sup>	10
4.	Final Examination	18 <sup>th</sup> -19 <sup>th</sup>	50

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).





## E. Learning Resources and Facilities

### 1. References and Learning Resources

<b>Essential References</b>	<ul style="list-style-type: none"> <li>Ross &amp; Wilson Anatomy and Physiology in Health and Illness Authors: Anne Waugh, Allison Grant 13th Edition Published: June 6, 2018 Imprint: Elsevier Paperback ISBN: 9780702072765 eBook ISBN: 9780702072840</li> </ul>
<b>Supportive References</b>	<ul style="list-style-type: none"> <li>Guyton and Hall Textbook of Medical Physiology John E. Hall &amp; Michael E. Hall 14th Edition 2020 Elsevier ISBN: 9780323597128</li> </ul>
<b>Electronic Materials</b>	Websites, Search engines (Saudi Digital Library, PubMed, Google Scholar)
<b>Other Learning Materials</b>	N/A

### 2. Required Facilities and equipment

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
<b>Technology equipment</b> (projector, smart board, software)	Data show, Blackboard and AV
<b>Other equipment</b> (depending on the nature of the specialty)	None

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Program Leaders	Direct
Effectiveness of Students assessment	Students, peer review	Direct
Quality of learning resources	Student, Faculty	Indirect
The extent to which CLOs have been achieved	Faculty	Direct
Course management and planning	Students	Indirect
Teaching and interaction with students	Students	Indirect

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

<b>COUNCIL /COMMITTEE</b>	DEPARTMENT COUNCIL
<b>REFERENCE NO.</b>	11 <sup>TH</sup>
<b>DATE</b>	24 <sup>TH</sup> MAY 2022





# Course Specification

— (Bachelor)

Course Title: **Radiation Physics**

Course Code: **374211-2**

Program: **Program of Bachelor in Radiological Sciences -374000-Level 6**

Department: **Department of Radiological Sciences**

College: **College of Applied Medical Sciences**

Institution: **Taif University**

Version: **3**

Last Revision Date: **4<sup>th</sup> September 2023**



## Table of Contents

<b>A. General information about the course:</b> .....	3
<b>B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods</b> .....	4
<b>C. Course Content</b> .....	5
<b>D. Students Assessment Activities</b> .....	7
<b>E. Learning Resources and Facilities</b> .....	7
<b>F. Assessment of Course Quality</b> .....	7
<b>G. Specification Approval</b> .....	8





## A. General information about the course:

### 1. Course Identification

1. Credit hours: (2)

2. Course type

A.  University  College  Department  Track  Others  
 B.  Required  Elective

3. Level/year at which this course is offered: (3<sup>rd</sup> level/2<sup>nd</sup> Year)

4. Course general Description:

This course integrates with basic understanding of physics in connection with different radio phenomenal applications, which helps improve radiological fundamental concept. Emphasizing on different interaction processes of diagnostic radiation

5. Pre-requirements for this course (if any):

Medical physics (370213-3)

6. Co-requirements for this course (if any):

None

7. Course Main Objective(s):

The course is designed to enable the student to describe the components of the X-ray tube and their functions, the characteristics of the X-ray beam, the attenuation of X-rays and how it affects the radiographic image; in addition to focusing on understanding the basic concepts of radiation physics and the difference between particulate and electromagnetic radiation.

### 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	48	100%
2	E-learning	-	-
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>	-	-
4	Distance learning	-	-



### 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	16
2.	Laboratory/Studio	32
3.	Field	-
4.	Tutorial	
5.	Others (specify)	
<b>Total</b>		<b>48</b>

### B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with course	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	Describe the nature of radiation, atomic structure and theory.	<b>K1</b>	lecture	Mid and final exam
1.2	List the X-ray tube contents and their types.	<b>K2</b>	lecture	Mid and final exam Quiz
1-3	Summarize radioactivity, interaction of X and Gamma with matter and radionuclides used for medical application.	<b>K3</b>	Lecture	Mid and final exam Quiz
<b>2.0</b>	<b>Skills</b>			
2.1	Analyses the nature of electromagnetic radiations	<b>S2</b>	Lab session/ lecture	Mid and final exam Quiz Practical report
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
3.1	-	-	-	-



## C. Course Content

No	List of Topics	Contact Hours
1.	<p>Introduction</p> <ol style="list-style-type: none"> <li>1. Matter                             <ol style="list-style-type: none"> <li>a. Nature of Matter</li> </ol> </li> <li>2. Composition of Nucleus                             <ol style="list-style-type: none"> <li>a. Proton and electron balance.</li> <li>c. Binding energy.</li> <li>d. Valence shell.</li> </ol> </li> </ol> <p style="text-align: center;">Chapter 1, p.1-19</p>	3
2.	<p>Ionization. Excitation. Atomic Number Z. Mass number A. *Practical demonstration (Lab).</p> <p style="text-align: center;">Chapter 1, p.1-19</p>	3
3.	<p>Nature of Radiation:</p> <ol style="list-style-type: none"> <li>a. Electromagnetic.</li> <li>b. Spectrum.</li> <li>c. Wave-particle duality and Properties.</li> </ol> <p>Particulate Types and Characteristics. Non-ionizing (excitation) vs. Ionization Energy Probability.</p> <p style="text-align: center;">Chapter 6, p. 101- 123</p>	3
4.	<p>Radioactivity. Radioactive Decay:</p> <ol style="list-style-type: none"> <li>a. Alpha.</li> <li>b. Beta.</li> <li>c. Gamma emission.</li> <li>d. Half-life (<math>T_{1/2}</math>).</li> </ol> <p style="text-align: center;">Chapter 6, p. 101- 123</p>	3
5.	<p>Radionuclide used within medical applications:</p> <ol style="list-style-type: none"> <li>a. Diagnostic.</li> <li>b. Therapy.</li> </ol> <p>Practical demonstration (Lab).</p> <p style="text-align: center;">Chapter 6, p. 101- 123</p>	3
6.	<ol style="list-style-type: none"> <li>7. X-Ray Production.</li> <li>8. The interaction processes in the X-ray tube.</li> <li>9. Types of Bremsstrahlung and Characteristic</li> <li>10. Practical demonstration (Lab).</li> </ol> <p style="text-align: center;">Chapter 9, p.203-230</p>	3
7.	<p>X-Ray Production cont</p> <ol style="list-style-type: none"> <li>1. Percentage relationship with energy.</li> <li>2. Common terms related to X-ray beam.</li> <li>3. Primary beam.</li> <li>4. Exit/remnant beam</li> <li>5. Leakage radiation</li> <li>6. Off-focus radiation.</li> </ol> <p style="text-align: center;">Chapter 10, p.231-263</p>	3
8.	<p>Conditions necessary for production:</p> <ol style="list-style-type: none"> <li>a. Source of electrons.</li> <li>b. Acceleration of electrons.</li> <li>c. Focusing the electron stream.</li> </ol>	3





	d. Deceleration of electrons. Chapter 10, p.231-263	
9.	X-ray emission spectra a. Continuous spectrum b. Discrete spectrum c. Minimum wavelength Practical demonstration (Lab). Chapter 10, p. 231-263	3
10.	1. Factors that affect emission spectra and effect of each factor in details kVp mA: 2. Practical demonstration (Lab). Chapter 2, p.20-37	3
11.	Interaction of X-ray and gamma ray with matter (10): Practical demonstration (Lab). Chapter 7, p.124-159	3
12.	Interaction of Photons with Matter(:2) a. Photoelectric effect. b. Description of interaction. c. Relation to atomic number. d. Energy of incident photon and resulting product. e. Probability of occurrence atomic number. f. Photon energy. g. Part density. h. Application. Practical demonstration (Lab). Chapter 8, p.160-202	3
13.	Interaction (3) Modified scattering (Compton): a. Description of interaction. b. Relation to electron density. c. Energy. d. Probability of occurrence. e. Importance of each interaction. f. Relation to imaging. Practical demonstration (Lab). Chapter 12 ,p.292-345	3
14.	Controlling the diagnostic and radiotherapy beam Chapter 12 ,p.292-345	3
15.	Less important interaction process in diagnostic and image formation: a. Pair production. b. Photodisintegration. Chapter 13,p.246-394	3
16.	Link of radiation physics to radiation protection and imaging. Practical demonstration (Lab). Chapter 13,p.246-394	3
<b>Total</b>		<b>48</b>





## D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid term	7	30
2.	Quiz	All through	10
3.	Practical report	All through	10
4	Final exam	18	50

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

<b>Essential References</b>	Frank Herbert Attix. Introduction to Radiological Physics and Radiation Dosimetry. published:19 November 1986 ISBN:9783527617135   DOI:10.1002/9783527617135
<b>Supportive References</b>	Fundamentals of Diagnostic Radiology Daniels C, Cupido 1999 Halifax, Nova Scotia: Dalhousie University.
<b>Electronic Materials</b>	1. <a href="http://www.arrt.org">http://www.arrt.org</a> 2. <a href="https://www.asrt.org/asrt.htm">https://www.asrt.org/asrt.htm</a> 3. <a href="http://www.auntminnie.com">http://www.auntminnie.com</a> <a href="http://www.air.asn.au">http://www.air.asn.au</a>
<b>Other Learning Materials</b>	<b>None</b>

### 2. Required Facilities and equipment

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms with multimedia projector. Lab for radiation physics with X-ray simulator. Lab with X-ray machine.
<b>Technology equipment</b> (projector, smart board, software)	Multimedia projector (data show) Software installed in the X-ray simulator.
<b>Other equipment</b> (depending on the nature of the specialty)	X-ray simulator.

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Program Leaders	Direct





Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Students assessment	Students, peer review	Direct, Indirect
Quality of learning resources	Student, Faculty	Indirect
The extent to which CLOs have been achieved	Faculty	Direct
Other		

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

### G. Specification Approval

<b>COUNCIL /COMMITTEE</b>	<b>DEPARTMENT COUNCIL</b>
<b>REFERENCE NO.</b>	<b>11<sup>TH</sup></b>
<b>DATE</b>	<b>24<sup>TH</sup> MAY 2022</b>





# Course Specification

— (Bachelor)

Course Title: **Radiation Protection and Dosimetry**

Course Code: **374212-2**

Program: **Program of Bachelor in Radiological Sciences -374000-Level 6**

Department: **Department of Radiological Sciences**

College: **College of Applied Medical Sciences**

Institution: **Taif University**

Version: **3**

Last Revision Date: **4<sup>th</sup> September 2023**



## Table of Contents

<b>A. General information about the course:</b> .....	3
<b>B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods</b> .....	4
<b>C. Course Content</b> .....	5
<b>D. Students Assessment Activities</b> .....	6
<b>E. Learning Resources and Facilities</b> .....	6
<b>F. Assessment of Course Quality</b> .....	7
<b>G. Specification Approval</b> .....	7





## A. General information about the course:

### 1. Course Identification

1. Credit hours: ( 2 )

#### 2. Course type

- A.  University  College  Department  Track  Others
- B.  Required  Elective

3. Level/year at which this course is offered: ( 3<sup>rd</sup> level/2<sup>nd</sup> Year)

#### 4. Course general Description:

This course is designed to enable students to work on radiation environment area by knowing the benefits and the risk of ionizing radiation to both patients and staff, also enable them to achieve the basic knowledge of radiation protection to allow them to take position in research center that deal with radiation protection and dosimeters concepts.

5. Pre-requirements for this course (if any):

Medical Physics 370213-3

6. Co-requirements for this course (if any):

None

#### 7. Course Main Objective(s):

1. Define the importance of radiation protection and its related topics.
2. Memorize the safe usage of ionizing radiation during diagnostic procedures and radiation protection tools and devices within the diagnostic department.
3. Summarize the principles of pregnant staff and patients.

### 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	32	100%
2	E-learning	-	-
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>	-	-
4	Distance learning	-	-



### 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	32
2.	Laboratory/Studio	-
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
<b>Total</b>		<b>32</b>

### B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with course	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	Explain radiation protection principles.	K1	Lectures	Direct method Examinations (Quizzes, Midterm exam and Final exam) Indirect method (survey)
1.2	Define the importance of radiation protection and the safe usage of ionizing radiation tools during diagnostic procedure for patients, staff and public.	K3	Lectures	Direct method Examinations (Quizzes, Midterm exam and Final exam) <b>Indirect method</b> (survey)
<b>2.0</b>	<b>Skills</b>			
2.1	Apply the protection measures in diagnostic procedures for pregnant patient and staff.	S2	Group Discussion	<b>Direct method</b> Assignment <b>Indirect</b> Survey
2.2	Utilize communication skill to explain the protection rules in diagnostic imaging for the children.	S4	Group Discussion	Direct Method Assignment <b>Indirect</b> Survey
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			



## C. Course Content

No	List of Topics	Contact Hours
1.	1.1 Overview of the curriculum. 1.2 Introduction to radiation protection. (Textbook1- Ch1-Pages:1-6) 1.3 Regulatory/Advisory, Agencies and Regulations. (Textbook2-Ch7-Pages:110-116)	2
2.	Dose concepts - Quantities and units. (Textbook1- Ch3-Pages:43-51)	2
3.	Radiation: Types, sources, and doses received. (Textbook2- Ch9-Pages:143-157)	2
4.	4. Principles and methods of radiation protection in diagnostic departments. (Textbook2- Ch8-Pages:119-120) 4.2 Materials used for primary barrier and secondary barrier. (Textbook2- Ch8-Pages:120-122) 4.3 Barrier Half Value Layer and tenth-value layer -Anti -scatter grid. (Textbook2- Ch8-Pages:123-126)	2
5.	Application for protection from scatter, leakage radiation and Secondary radiation. (Textbook1- Ch7-Pages:161-171)	2
6.	Radiation protection in practice X-ray and ancillary equipment. (Textbook1- Ch7-Pages:153-156)	2
7.	7.1 Beam limiting devices- Exposure control devices. 7.2 Patient protection and image quality. (Textbook1- Ch7-Pages:156-160)	2
8.	Optimization of image quality and patient dose. (Textbook1- Ch7-Pages:161-165)	2
9.	9.1 Relation between radiation dose and image quality. 9.2 Exposure rate constant- gamma constant. (Textbook1- Ch7-Pages:165-171)	2
10.	Special issues in radiation protection I: (Textbook1- Ch8-Pages:201-210) Pregnant patient and staff – Pediatric safety.	2
11.	Radiation safety during fluoroscopy and interventional radiology. (Textbook1- Ch8-Pages:211-215)	2
12.	12. Molecular and cellular radiation biology I (Textbook1-Ch6-Pages: 105-112) 12.1 Early tissue reactions and their effects on organ systems.	2
13.	13. Molecular and cellular radiation biology II (Textbook1-Ch6-Pages:112-127) 13.1 Stochastic effects and late tissue reactions of radiation in organ systems. 13.2 Dose limits for exposure to ionizing radiation.	2
14.	14. Radiation Dosimetry I: (Textbook2- Ch5-Pages:57-71) 14.1 Equipment design for Radiation Protection 14.2 Characteristic- advantages and disadvantages of each measurement instrument	2
15.	15 Radiation Dosimetry II (Textbook1- Ch9-Pages:225-237) 15.1 Personnel Monitoring.	2
16.	16. Radiation Dosimetry II-cont. (Textbook1- Ch9-Pages:225-237) 16.1 Management of imaging personnel radiation dose during diagnostic X-ray procedures for staff.	2



16.2 Radioisotopes and radiation protection	
<b>Total</b>	<b>32</b>

## D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid-term Examination	7 <sup>th</sup> – 8 <sup>th</sup>	30
2.	Activity (Quiz )	5 <sup>th</sup>	10
3.	Activity (Assignment)	12 <sup>th</sup>	10
4.	Final Examination	17 <sup>th</sup> -18 <sup>th</sup>	50

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

<b>Essential References</b>	Sherer, M.S. Visconti,P.J., et al. “Radiation Protection in Medical radiography”, 8th edition. Mosby, 2018 ISBN:978-0-323-44666-2 - ICRP 2017 Radiation protection and dosimetry Journal RPD Report of IAEA for patient protection each year
<b>Supportive References</b>	Radiation Protection in Medical Radiography Authors: Mary Alice Statkiewicz Sherer, Paula Visconti, E. Russell Ritenour, Kelli Welch Haynes 8th Edition March 28, 2017 ISBN: 9780323566780  Introduction to Radiation Protection Claus Grupen. 2 <sup>nd</sup> Edition 2015 Springer ISBN: 978-3-642-02585-3
<b>Electronic Materials</b>	Link for the course at Blackboard Learn Portal on Taif university webpage ( <a href="https://lms.tu.edu.sa/webapps/login/">https://lms.tu.edu.sa/webapps/login/</a> )
<b>Other Learning Materials</b>	<b>None</b>



## 2. Required Facilities and equipment

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
<b>Technology equipment</b> (projector, smart board, software)	Data show- Smart Board
<b>Other equipment</b> (depending on the nature of the specialty)	None

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Program Leaders	Direct
Effectiveness of Students assessment	Students, peer review	Direct
Quality of learning resources	Student, Faculty	Indirect
The extent to which CLOs have been achieved	Faculty	Direct
Course management and planning	Students	Indirect
Teaching and interaction with students	Students	Indirect

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

<b>COUNCIL /COMMITTEE</b>	<b>DEPARTMENT COUNCIL</b>
<b>REFERENCE NO.</b>	<b>11<sup>TH</sup></b>
<b>DATE</b>	<b>24<sup>TH</sup> MAY 2022</b>

