



Course Specifications

Course Title:	Magnetic Resonance Imaging Physics and Instrumentation
Course Code:	374413-3
Program:	Bachelor in Radiological Sciences
Department:	Department of Radiological Sciences
College:	College of Applied Medical Sciences
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3
2. Course type a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/> b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 9 th Level / 3 rd year
4. Pre-requisites for this course (if any): Diagnostic Radiography Instrumentation (374226-3).
5. Co-requisites for this course (if any): None.

1. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

2. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	30
3	Tutorial	---
4	Others (specify)	---
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description This course is designed to introduce the magnetic resonance imaging (MRI) basics. The student will develop and understand MRI components, physics, image information and the environment safety. At the end of this course, students will be qualified and ready to deal with MRI scanners.
2. Course Main Objective To build up the necessary knowledge and skills to perform MRI.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and understanding	
1.1	Describe the basic theory and origin of nuclear magnetic resonance.	K1

CLOs		Aligned PLOs
1.2	Describe the process of image formation and acquisition.	K1
1.3	Describe all different parts of MRI machines.	K2
1.4	Describe the different pulse sequences used in MRI.	K3
2	Skills:	
2.1	Differentiate between different parameters and trade-offs.	S4
2.2	Identify the image contrast based on the pulse sequence.	S2
2.3	Demonstrate the ability to act as a decision maker and prepare patients safely for MRI examinations.	S3
3	Values:	
3.1	Commit professional standards during medical radiology practice.	V1

C. Course Content

No	List of Topics	Contact Hours
1	<p>1. Basic principles (1):</p> <ol style="list-style-type: none"> Atomic structure. Motion of the atom. MR Active nuclei. Alignment. Precession. The Larmor equation. <p>2. Practical demonstration. MRI in practice, Chapter 1, Pages 2-17.</p>	6
2	<p>1. Basic principles (2):</p> <ol style="list-style-type: none"> Resonance. The MR signals. The free induction decay (FID). Relaxation. T1 recovery. T2 decay. Pulse Timing parameters. <p>2. Practical demonstration. MRI in practice, Chapter 1, Pages 13-23. MRI in practice, Chapter 2, Pages 25-30.</p>	6
3	<p>1. Imaging weighting and contrast:</p> <ol style="list-style-type: none"> Image weighting. Image contrast: <ul style="list-style-type: none"> T1 contrast. T2 contrast. Proton density contrast. Contrast mechanisms. Relaxation times in different tissues. <ul style="list-style-type: none"> T1 relaxation time. T2 relaxation time. T2* relaxation time. Pulse sequences. <p>2. Practical demonstration. MRI in practice, Chapter 2, Pages 25, 31-57.</p>	6

4	<p>1. Spatial encoding and image formation:</p> <ol style="list-style-type: none"> Introduction. Gradients. Slice selection. Frequency encoding. Phase encoding. Sampling. K-space description. K-space filling. Fast Fourier transform. K-space traversal. Types of acquisition. <p>2. Practical demonstration. MRI in practice, Chapter 5, Pages 128-157. MRI in practice, Chapter 6, Pages 158-208.</p>	6
5	<p>1. Parameters and trade-offs:</p> <ol style="list-style-type: none"> Signal to noise ratio (SNR). Contrast to noise ratio (CNR). Spatial resolution. Scan time. Trade-offs. Decision making. <p>2. Practical demonstration. MRI in practice, Chapter 7, Pages 209-241.</p>	6
6	<p>1. Introduction to Pulse Sequences:</p> <ol style="list-style-type: none"> Spin Echo. Gradient Echo. <p>MRI in practice, Chapter 3, Pages 58-67. MRI in practice, Chapter 4, Pages 89-93.</p>	6
7	<p>1. MR Instrumentation:</p> <ol style="list-style-type: none"> Magnetism. Permanent magnets. Electromagnets. Superconducting magnets. Fringe fields Shim coils. Gradient coils. Radiofrequency coils. The pulse control unit. Patient transportation system. Operator interface. <p>2. Practical demonstration. MRI in practice, Chapter 9, Pages 311-345.</p>	6
8	<p>1. MR safety:</p> <ol style="list-style-type: none"> Introduction. The main magnetic field. Projectiles. Medical emergencies. Implants and prosthesis. Pacemakers. Gradient magnetic fields. 	6

	<ul style="list-style-type: none"> h. Radiofrequency fields. i. Claustrophobia. j. Quenching. k. Safety education. l. Patient monitoring. m. Monitors and devices in MRI. n. Site planning. <p>2. Practical demonstration. MRI in practice, Chapter 10, Pages 346-368.</p>	
9	<p>Pulse Sequences (Advanced 1) Spin Echo:</p> <ul style="list-style-type: none"> 1. Fast spin echo. 2. Inversion recovery. 3. STIR. 4. FLAIR. <p>MRI in practice, Chapter 3, Pages 68-88.</p>	6
10	<p>Pulse Sequences (Advanced 2)</p> <ul style="list-style-type: none"> 1. Gradient Echo: <ul style="list-style-type: none"> a. Conventional GRE. b. The steady state. c. Coherent GRE. d. Incoherent GRE. e. SSFP. f. Balanced GRE. g. Fast GRE. 2. EPI. 3. Parallel Imaging. 4. Practical demonstration. <p>MRI in practice, Chapter 4, Pages 94-127.</p>	6
Total		60

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding		
1.1	Describe the basic theory and origin of nuclear magnetic resonance.	Lectures and small groups discussions.	Theoretical Written Exams (quiz, midterm exam, and final exam) and Presentation
1.2	Describe the process of image formation and acquisition.	Lectures and small groups discussions.	
1.3	Describe all different parts of MRI machines.	Lectures and small groups discussions.	
1.4	Describe the different pulse sequences used in MRI.	Lectures and small groups discussions.	
2	Skills:		
2.1	Differentiate between different parameters and trade-offs.	Lectures and problem-solving.	Theoretical Written Exams (quiz, midterm exam, final exam, and exit
2.2	Identify the image contrast based on the pulse sequence.	Lectures.	

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.3	Demonstrate the ability to act as a decision maker and prepare patients safely for MRI examinations.	Lectures, problem-based learning, and small groups discussions.	exam), assignment and discussion.
3	Values:		
3.1	Commit professional standards during medical radiology practice.	Lectures, small groups discussions, and collaborative learning.	Presentation and discussion.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid-Term Exam	4 th	30%
2	Quiz	3 rd and 7 th	10%
3	Assignment	9 th	10 %
4	Final Exam	11 th - 12 th	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

Faculty members are available for individual consultation. They usually dedicate 12 hours weekly for office hours and students are encouraged to visit them for help. Appointments can also be made in person with the faculty through email or phone. Faculty provide a range of academic and course management advice. Each student has an academic adviser who offers personal, academic, psychological, and professional counseling, as well as group counseling to support the academic, behavioral, emotional, psychological, and social growth of students.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	MRI in practice Catherine Westbrook, John Talbot 5th edition Wiley Blackwell eBook ISBN: 978-1-119-39200-2
Essential References Materials	MRI from Picture to Proton Donald W. McRobbie, Elizabeth A. Moore, Martin J. Graves and Martin R. Prince. 3rd edition Cambridge University Press eBook ISBN: 9781107706958
Electronic Materials	https://radiopaedia.org

Other Learning Materials	None.
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2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, Blackboard and A/V.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	MRI Simulator.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation 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

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	DEPARTMENT COUNCIL
Reference No.	11TH
Date	24TH MAY 2022





Course Specifications

Course Title:	Special Radiographic Techniques
Course Code:	374316-3
Program:	Bachelor in Radiological Sciences
Department:	Department of Radiological Sciences
College:	College of Applied Medical Sciences
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3
2. Course type a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/> b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 9 th Level/ 3 rd Year
4. Pre-requisites for this course (if any): Diagnostic Radiography Instrumentation (374226-3).
5. Co-requisites for this course (if any): None.

1. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4	100%
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

2. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	40
2	Laboratory/Studio	-
3	Tutorial	-
4	Others (specify)	-
	Total	40

B. Course Objectives and Learning Outcomes

<p>1. Course Description This course is designed to enable the students to practice contrast media examination, as well as focusing on pharmacology principles, physiology of the vascular system, types and makeup of various types of contrast media, routes of contrast media administration, administration of contrast guidelines, reactions to contrast media and emergency treatments of contrast media reactions.</p>
<p>2. Course Main Objective The course is designed to provide the students with the knowledge necessary to perform contrast media imaging procedures for all body systems. Consideration is given to the evaluation of optimal diagnostic images.</p>

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	Knowledge and understanding	

CLOs		Aligned PLOs
1.1	Outline different types of contrast media used in radiology department and state special considerations for contrast media reactions.	K1
1.2	Summarize the clinical indications, standard terminology, and abbreviations of positioning of all examinations with contrast media.	K2
1.3	Demonstrate the contrast media radiographic procedures and know the normal and abnormal radiographic appearance of performed examination.	K3
2	Skills:	
2.1	Utilize all basic and modified radiographic examinations with contrast media and interpret radiographic positioning according to the patient medical condition.	S1
2.2	Identity the correct instructions for patient positioning to help for radiation protection and improve image quality during examinations with contrast media.	S2
3	Values:	
-	-	-

C. Course Content

No	List of Topics	Contact Hours
1	1. Introduction to Special Radiographic Techniques: a. Fluoroscopic equipment. b. Patient preparation and patient care. c. Radiation protection. Section 1 (pages 11-29) Textbook 2	4
2	Drugs and contrast agents in Radiography Chapter 2 (pages 30-46) Textbook 2	4
3	1. Genitourinary system (1): a. IVU: <ul style="list-style-type: none"> • Anatomy. • Procedures. Chapter 14 (pages 526-561) Textbook 1	4
4	1. Genitourinary system (2): a. -HSG: <ul style="list-style-type: none"> • Anatomy. • Procedures. Chapter 19 (pages 718 -722) Textbook 1	4
5	1. The digestive system (1): a. UGIT: <ul style="list-style-type: none"> • Barium swallow. • Barium meal. Chapter 12 (pages 478-487) Textbook 1	4

6	1. The digestive system (2): a. LGIT: <ul style="list-style-type: none"> • Barium follow-through. • Barium enema. Chapter 13 (pages 489 -524) Textbook 1	4
7	1. The biliary system: a. Anatomy. b. Procedures. Chapter 12 (pages 446-449) Textbook 1	4
8	1. Procedure of joints. 2. Procedure of spinal canal. 3. Procedure of salivary glands. Chapter 19 (pages 711 -727) Textbook 1	4
9	Angiographic procedures. Chapter 17 (pages 650-682) Textbook 1	4
10	DEXA scan. Chapter 20 (pages 766 -771) Textbook 1	4
Total		40

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding		
1.1	Outline different types of contrast media used in radiology department and state special considerations for contrast media reactions.	Lectures	Direct method: written exam (Quiz, mid and final exams) and assignment
1.2	Summarize the clinical indications, standard terminology, and abbreviations of positioning of all examinations with contrast media.	Lectures	Direct method: written exam (Quiz, mid and final exams). Indirect method: Survey.
1.3	Demonstrate the contrast media radiographic procedures and know the normal and abnormal radiographic appearance of performed examination.	Lectures	Direct method: written exam (Quiz, mid and final exams) and assignment
2.0	Skills:		
2.1	Utilize all basic and modified radiographic examinations with contrast media and interpret radiographic positioning according to the patient medical condition.	Small group discussion	Discussion

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.2	Identify the correct instructions for patient positioning to help for radiation protection and improve image quality during examinations with contrast media.	Problem based learning	Assignment
3.0	Values:		
-	-	-	-

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm exam	5 th – 6 th	30%
2	Assignment	10 th	10%
3	Final exam	11 th -12 th	60%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

Faculty members are available for individual consultation. They usually dedicate 12 hours weekly for office hours and students are encouraged to visit them for help. Appointments can also be made in person with the faculty through email or phone. Faculty provide a range of academic and course management advice. Each student has an academic adviser who offers personal, academic, psychological, and professional counseling, as well as group counseling to support the academic, behavioral, emotional, psychological, and social growth of students.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Bontrager`s, Textbook for Radiographic Positioning & Related Anatomy John P. Lampignano, Leslie E. Kendrick, 9th Edition Elsevier 2018 ISBN: 978-0-323-39966-1
Essential References Materials	None.
Electronic Materials	<ol style="list-style-type: none"> http://www.radiologyinfo.org/glossary/ http://www.radsciresearch.org http://www.radiography.com/ http://www.jrcert.org http://www.emory.edu/X-RAYS/Sprawls/
Other Learning Materials	None.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Samples of different contrast media types.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation 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

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	DEPARTMENT COUNCIL
Reference No.	11 TH
Date	24 TH MAY 2022





Course Specifications

Course Title:	Ultrasound Imaging Techniques
Course Code:	374323-3
Program:	Bachelor in Radiological Sciences
Department:	Department of Radiological Sciences
College:	College of Applied Medical Sciences
Institution:	Taif University

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1. Mode of Instruction (mark all that apply)	3
2. Contact Hours (based on academic semester).....	3
B. Course Objectives and Learning Outcomes	3
1. Course Description:.....	3
2. Course Main Objectives:.....	3
Upon completion of this course students will be able to:	3
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C. Course Content	4
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E. Student Academic Counseling and Support	6
F. Learning Resources and Facilities	6
1. Learning Resources	6
2. Facilities Required.....	7
G. Course Quality Evaluation	7
H. Specification Approval Data	8

A. Course Identification

1. Credit hours:	3
2. Course type	a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/> b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered:	9 th Level/ 3 rd year
4. Pre-requisites for this course (if any):	<ul style="list-style-type: none"> • Ultrasound Physics and Instrumentation (374312-3). • Pathology (375314-4).
5. Co-requisites for this course (if any):	None.

1. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

2. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	30
3	Tutorial	-
4	Others (specify)	-
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description:

The course is designed to enable the students to enumerate, outline, and discuss the ultrasound procedures performed in a medical ultrasound department, as well as the indications, patient preparation for various types of sonographic examinations according to international ultrasound technique protocols, and apply these techniques to reduce common artifacts and improve ultrasound image quality.

2. Course Main Objectives:

Upon completion of this course students will be able to:

1. Recognize the sonographic landmarks and anatomical correlations that relate to the abdomen, pelvic and small parts.
2. Use live patient models to acquire and evaluate sonographic images of the aorta, IVC, abdomen, and pelvic organs.
3. Become familiar with the diagnostic criteria for gynecology and obstetrics sonography.
4. Understand basic concepts of FNA, FAST scan and Elastography.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and understanding	
1.1	Explain the basic scanning technique principles, instrumentations, general sonographic terms (Anechoic, acoustic enhancement, and acoustic shadowing) and biopsy sampling methods with aid of ultrasound machine as a guidance.	K1
1.2	Illustrate anatomical structures, different pathological conditions demonstrated on ultrasound images and biological effects of ultrasound.	K3
2	Skills:	
2.1	Utilize sonographic examinations of different body parts for routine and emergency cases (FAST sonography).	S1
3	Values:	
3.1	Commit to the professional standards to perform required patient preparation and gathering adequate data necessary for diagnosis to be performed.	V1

C. Course Content

No	List of Topics	Contact Hours
1	Introduction: a. Principles of ultrasound scanning techniques. b. Scanning protocols. Chapters ; 1-3 Pages 1-25 (Textbook-1)	6
2	Blood vessels U/S: a. Aorta. b. IVC. Chapters ; 6-7. Pages 53-65 (Textbook-1)	6
3	Abdominal U/S: a. Liver. b. Gallbladder. Chapters ; 8-9. Pages 71-91. (Textbook-1)	6
4	Abdominal U/S: a. Spleen. b. Pancreas. Chapters ; 10-11. Pages 111-125. (Textbook-1)	6
5	Abdominal U/S: a. Renal sonography. Chapters ; 13-14. Pages 151-175. (Textbook-1)	6
6	Small parts U/S: a. Thyroid. b. Breast. c. Testicular U/S. Chapters ; 15 & 19.	6

	Pages 187-193 & 297-307. (Textbook- 1) Chapter; 3. Pages 193-225. (Textbook-2)	
7	Gynecology U/S. Chapter; 3. Pages; 133-174. (Textbook- 2)	6
8	Obstetrics and newborn U/S. Chapter; 2. Pages; 9-129. (Textbook-2)	6
9	1. Biopsy sampling techniques and cross infection. 2. Focused assessment with sonography in trauma (FAST). Chapter; 22. Pages 317-320. (Textbook-1)	6
10	Elastography. Chapters; 1-3 Pages 1-25 (Textbook-4)	6
Total مجموع		60

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding		
1.1	Demonstrate the basic scanning technique principles, instrumentations, general sonographic terms (Anechoic, acoustic enhancement, and acoustic shadowing) and biopsy sampling methods with aid of ultrasound machine as a guidance.	Lectures	Midterm exam Final exam
1.2	Illustrate anatomical structures, different pathological conditions demonstrated on ultrasound images and biological effects of ultrasound.	Lectures	Midterm exam Final exam
2.0	Skills:		
2.1	Utilize sonographic examinations of different body parts for routine and emergency cases (FAST sonography).	Problem Solving Problem-based learning	Practical exam
3.0	Values:		
3.1	Commit to the professional standards to perform required patient preparation and gathering adequate data necessary for diagnosis to be performed.	Collaborative Learning	Presentation

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Presentation.	4 th	10%
2	Midterm written exam.	6 th	30%
3	Final practical exam.	10 th	10%
4	Final written Exam.	12 th	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

Faculty members are available for individual consultation. They usually dedicate 12 hours weekly for office hours and students are encouraged to visit them for help. Appointments can also be made in person with the faculty through email or phone. Faculty provide a range of academic and course management advice. Each student has an academic adviser who offers personal, academic, psychological, and professional counseling, as well as group counseling to support the academic, behavioral, emotional, psychological, and social growth of students.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<p>Manual diagnostic ultrasound. P.E.S. Palmer. 2014 Illustrated edition. 1995. Chapters; 1-11,13-19 & 22. Pages; 1-350. WHO ISBN-13: 978-9241544610.</p> <p>Manual of diagnostic ultrasound. Elisabetta Buscarini, Harald Lutz and Paoletta Mirk. 2014 2nd Edition, Vol 2. Chapters; 2-4. Pages; 1-196. WHO. ISBN: 9789241548540.</p> <p>Clinical sonography: A practical guide. Roger C. Sanders. 2015 5th edition. Chapters; 1-4. Pages;1-720. Lippincott Williams and Wilkins. ISBN13: 9781451192520</p>
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	Elastography : A practical Approach Richard G. Bart 2017 1 st edition. Chapter; Page Thieme Medical Publishers. Inc. 333 Seventh Avenue. New York .10001. eISBN: 978-1-62623-272-3.
Essential References Materials	Textbook of Diagnostic Ultrasonography; Clinical Sonography: A Practical Guide. Sandra L., Hagen-Ansert Roger C. Sanders 1997 3 rd Edition. Chapters; 1-2. Pages;1-60. Lippincott Williams and Wilkins. ISBN-13: 978-1451192520.
Electronic Materials	<ol style="list-style-type: none"> 1. http://123sonography.com 2. http://www.radiologyinfo.org/glossary/ 3. http://www.radsciresearch.org 4. https://www.meded.virginia.edu/courses/rad/edus/technique1.html
Other Learning Materials	None.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom. Ultrasound lab contains ultrasound scanners equipped with color Doppler, printers, phantoms and acoustic gel for practical sessions.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show. Phantoms for teaching purposes. LCD screen for practical sessions demonstration.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Program Leaders	Direct
Extent of achievement of course learning outcomes	Faculty	Direct
Quality of learning resources	Student, Faculty	Indirect

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course management and planning	Students	Indirect
Teaching and interaction with students	Students	Indirect
Effectiveness of Evaluation and exams	Students, peer review	Direct, Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	DEPARTMENT COUNCIL
Reference No.	11 TH
Date	24 TH MAY 2022





Field Experience Specifications

Course Title:	Clinical Practice in Radiography (2)
Course Code:	374328-3
Program:	Bachelor in Radiological Sciences
Department:	Radiological Sciences
College:	Applied Medical Sciences
Institution:	Taif University

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b. Assessment Responsibilities	4
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a. Field Experience Locations Requirements	5
b. Decision-making procedures for identifying appropriate locations for field experience....	5
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a. Supervision and Follow-up Mechanism	7
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A. Field Experience Identification

1. Credit hours: 3
2. Level/year at which this course is offered: 9th Level / 3rd Year
3. Dates and times allocation of field experience activities. <ul style="list-style-type: none"> • Number of weeks: (10) week. • Number of days: (10) day. • Number of hours/semesters: (90) hour.
4. Pre-requisites to join field experience (if any): General Radiographic Techniques and Radiographic Anatomy (2) (374313-4).

B. Learning Outcomes, and Training and Assessment Methods

1. Field Experience Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and understanding	
1.1	-	-
2	Skills:	
2.1	Apply the radiographic procedure (for chest, abdomen, skull, dental, mammogram and fluoroscopy) in a skilled and safe way.	S4
2.2	Choose appropriate technique with proper care according to the patient's condition.	S1
2.3	Inspect images accurately to create high quality images for chest, abdomen, skull, dental and mammogram.	S2
2.4	Analyze informed decisions about clinical practice within the accepted departmental protocols.	S3
2.5	Take part in operating X-ray machine properly.	S5
3	Values:	
3.1	Adapt the ethical profession as honesty, respect, patient care and infection control.	V1
3.2	Demonstrate the basic radiation protection and safety measures for patients, radiographers, and other health staff.	V2

2. Alignment of Learning Outcomes with Training Activities and Assessment Methods

Code	Learning Outcomes	Training Methods/Activities	Assessment Methods
1.0	Knowledge and understanding		
1.1	-	-	-
2.0	Skills		
2.1	Apply the radiographic procedure (for chest, abdomen, skull, dental, mammogram and fluoroscopy) in a skilled and safe way.	Problem solving Problem-based learning Practical Training	Case study Practical Exam OSPE
2.2	Choose appropriate technique with proper care according to the patient's condition.	Problem solving Problem-based learning Practical Training	Case study Practical Exam OSPE

Code	Learning Outcomes	Training Methods/Activities	Assessment Methods
2.3	Apply the radiographic procedure (for chest, abdomen, skull, dental, mammogram and fluoroscopy) in a skilled and safe way.	Problem solving Problem-based learning Practical Training	Case study Practical Exam OSPE
2.4	Analyze informed decisions about clinical practice within the accepted departmental protocols.	Problem solving Problem-based learning Practical Training	Case study Practical Exam OSPE
2.5	Take part in operating X-ray machine properly.	Problem solving Problem-based learning Practical Training	Case study Practical Exam OSPE
3.0	Values:		
3.1	Adapt the ethical profession as honesty, respect, patient care and infection control.	Collaborative learning Self-learning	Presentation
3.2	Demonstrate the basic radiation protection and safety measures for patients, radiographers, and other health staff.	Collaborative learning Self-learning	Presentation

3. Field Experience Learning Outcomes Assessment

a. Students Assessment Timetable

No.	Assessment task*	Assessment timing (Week)	Percentage of Total Assessment Score
1	Case study.	5 th	20 %
2	Presentation.	7 th	20 %
3	Practical Exam OSPE.	9 th	50 %
4	Hospital Evaluation.	10 th	10 %

*Assessment task (i.e., Practical test, oral test, presentation, group project, essay, etc.)

b. Assessment Responsibilities

No.	Category	Assessment Responsibility
1	Teaching Staff	The faculty teaching staff will evaluate the performance of the students based on direct observation, reports, logbook, activity of the student and direct feedback from the hospital staff.
2	Field Supervisor	The Field Supervisor evaluates the student's Logbook, ability to identify issues/problems, provide solutions, perseverance, dedication, ethics, time management, independence, and work relationships.
3	Others (specify)	None.

C. Field Experience Administration

1. Field Experience Locations

a. Field Experience Locations Requirements

Suggested Field Experience Locations	General Requirements*	Special Requirements**
King Abdul-Aziz Specialist Hospital.	Training letter. Student ID. Medical Uniform. Proper appearance.	None.
King Faisal Specialist Hospital.		None.
Children's Hospital at Taif.		Infection control certificate.
Al-Hada Military Hospital.		Training application Security check.
Prince Mansoor Military Hospital.		Training application Security check.
Prince Sultan Military Hospital.		Training application Security check.

*Ex: provides information technology ,equipment ,laboratories ,halls ,housing ,learning sources ,clinics etc.

**Ex: Criteria of the training institution or related to the specialization, such as: safety standards, dealing with patients in medical specialties, etc.

b. Decision-making procedures for identifying appropriate locations for field experience

- Start with a meeting with the faculty teaching staff, discussing the main objectives of the trainee rounds and putting some suggestions.
- Hospitals are chosen for capacity, availability of radiological modalities, and located within Taif city.
- Students are distributed according to the hospitals' capacity.

2. Supervisory Staff

a. Selection of Supervisory Staff

Selection Items	Field Supervisor	Teaching Staff
Qualifications	Registered radiographer, radiology technologist, or radiologist.	Master's degree or higher in a relevant specialty.
Selection Criteria	The hospital staff is elected by the radiology department within the hospital-based on <ul style="list-style-type: none"> - Experience and qualification. - Availability. 	The faculty teaching staff are elected by the department training committee based on: <ul style="list-style-type: none"> - Qualification. - Availability.

b. Qualification and Training of Supervisory Staff

(Including the procedures and activities used to qualify and train the supervisory staff on supervising operations, implementing training activities, the follow-up and evaluation of students, etc.)

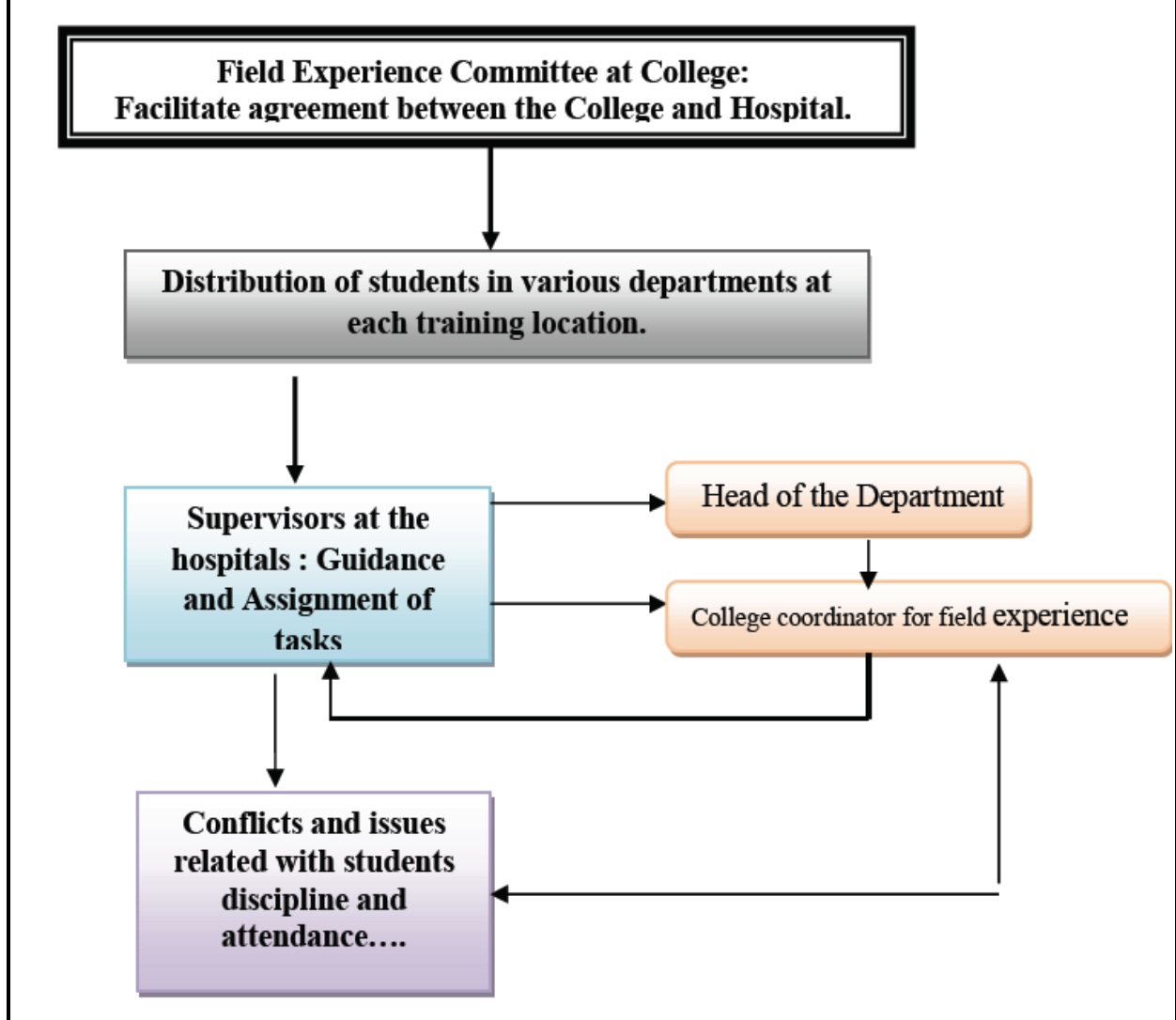
Registered radiographer, radiology technologist, or radiologist.

3. Responsibilities

a. Field Experience Flowchart for Responsibility

including units, departments, and committees responsible for field experience, as evidenced by the relations between them.

- Confidential instructor evaluation questionnaire on completion of the course.
- Student interview.
- Student feedback report to be analyzed by the course instructor and submit the results to the department head.
- External evaluators.



b. Distribution of Responsibilities for Field Experience Activities

Activity	Department or College	Teaching Staff	Student	Training Organization	Field Supervisor
Selection of a field experience site.	√			√	√
Selection of supervisory staff.				√	
Provision of the required equipment.	√	√		√	√
Provision of learning resources.	√	√			√

Activity	Department or College	Teaching Staff	Student	Training Organization	Field Supervisor
Ensuring the safety of the site.	√	√		√	√
Commuting to and from the field experience site.			√		
Provision of support and guidance.		√		√	√
Implementation of training activities (duties, reports, projects, ...etc).		√			√
Follow up on student training activities.		√		√	√
Adjusting attendance and leave.		√		√	√
Assessment of learning outcomes.		√			√
Evaluating the quality of field experience.	√	√	√	√	√
Others (specify): None.	-	-	-	-	-

4. Field Experience Implementation

a. Supervision and Follow-up Mechanism

The students will undergo training to develop their radiographic technique skills in upper and lower extremities, vertebral spine and bony thorax examinations with appropriate patient care, quality service, and safety precautions.

Supervision will be made by both the Field supervisor and Teaching Staff.

b. Student Support and Guidance Activities

Faculty members are available for individual consultation. They usually dedicate 12 hours weekly for office hours and students are encouraged to visit them for help. Appointments can also be made in person with the faculty through email or phone. Faculty provide a range of academic and course management advice. Each student has an academic adviser who offers personal, academic, psychological, and professional counseling, as well as group counseling to support the academic, behavioral, emotional, psychological, and social growth of students. Also, the Complete Training Guide booklet will be provided to the student that contains all the required info regarding the training process and assessments.

5. Safety and Risk Management

Potential Risks	Safety Actions	Risk Management Procedures
Isolation of highly infected patients.	<ul style="list-style-type: none"> - Avoid direct contact with the patient. - Avoid direct contact with contaminated areas (e.g. pressure ulcer). - Wear face mask, gloves, overhead and overshoes cover. 	<ul style="list-style-type: none"> - Enforce student's knowledge in infection control.
Radiation exposure.	<ul style="list-style-type: none"> - Always keep in shielded environment or wear shielding garment. - Keep a safe distance from the radiation source. - Minimize the exposure time as low as possible. - Apply ALARA (as low as reasonably achievable) principle. - Monitor your radiation dose regularly. 	<ul style="list-style-type: none"> - Enforce students' knowledge in radiation protection training. - Personal dosimeters.

G. Training Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Training Committee	Direct
The 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
Safety	Teaching Staff, Field Supervisors	Direct
Training facilities/site	Students, Faculty	Direct, Indirect

Evaluation areas (e.g., Effectiveness of Training and assessment, Extent of achievement of course learning outcomes, quality of learning resources, etc.)

Evaluators (Students, Supervisory Staff, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

E. Specification Approval Data

Council / Committee	DEPARTMENT COUNCIL
Reference No.	11 TH
Date	24 TH MAY 2022

